

3.3.5 Number of books and chapters in edited volumes / books published, and papers in national/international conference-proceedings per teacher during the last five years (6)

S.No	Academic Year	Count
1	2018-19	40
2	2017-18	85
3	2016-17	67
4	2015-16	59
5	2014-15	33
Total		284




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3.3.5 Number of books and chapters in edited volumes / books published, and papers in national/international conference-proceedings per teacher during the last five years (6)

Sl. No	Name of the Author	Name of the books and chapters in edited volumes / books published, and papers in national/international conference	Page No.
1	Muruges. V	Durability Study Of Wha On The Replacement Of Cement In Concrete	19
2	Dr.G.Rajiv Sureshkumar	Mobile Application Development On Detection And Diagnose Of Learning Disability For Children	20
3	Dr.G.Rajiv Sureshkumar	An Instant Guidance On Cancer Prediction And Care Using Web Application	21
4	Mrs.K.Malarvizhi	Brain Tumour Detection And Classification Using Iot	22
5	Mrs.K.Malarvizhi	An Instant Guidance On Cancer Prediction And Care Using Web Application	23
6	Mrs.K.Malarvizhi	Mobile Application Development On Detection And Diagnose Of Learning Disability For Children	24
7	Mr.Biju Balakrishnan	Application For Distinguishing Grounds And Study Troubles Utilized Machine Learning	25
8	Mr.Biju Balakrishnan	Heart Attack Detection	26
9	Mr.K.Jason	Web Application For Disaster Management	27
10	Mr.G.Deeban Chakkarawarthy	Classification Of Url Into Malicious And Benign Using Machine Learning Approach	28
11	Mr.G.Deeban Chakkarawarthy	Mobile Application Development On Detection And Diagnose Of Learning Disability For Children	29
12	Mr.Ravikumar	Web Site For Bullet-In Board	30
13	Mrs.S.Shanmugapriya	Smart Traffic Control System With Path Clearance Ability And Theft Vehicle Detection	31
14	Mrs. Parameswari, Dr. V.J. Arul Karthick	Novel Approach Based An Image Segmentation Using K-Mean Clustering	32



(Signature)
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15	V.Jethose	Modelling And Simulation Of Bidirectional Ac-Dc Power Converter	33
16	C.Sakthivel	Modelling And Simulation Of Bidirectional Ac-Dc Power Converter	34
17	C.Sakthivel	Dynamic Voltage Control Of Dynamic Voltage Restorer For Power Quality Improvement	35
18	G.Ravivarman	A Single Stage Zvs Power Factor Correction Converter	36
19	Dr.G.Ramesh	Recovery Of Propylene Rom Lpg	37
20	Venkateshbabu.S	Application Of Conditioning ,Curve Synthesizing And Quality Control Of Well Log Datas	38
21	N Aravindh	Application Of Conditioning ,Curve Synthesizing And Quality Control Of Well Log Datas	39
22	Mahendran G	Application Of Conditioning ,Curve Synthesizing And Quality Control Of Well Log Datas	38
23	Purushothaman V	Removal Of Nickel(Ii)And Zinc(Ii)Present In The Electroplating Industry Wastewater By Bioaccumulation Method	41
24	Dr.V. Arun	Crystal Structure Of Bis[(((4-Fluorophenyl)Amino)Methyl)Triphenylphosphonium] Tetrachloridocobaltate(Ii), C50H44Cl4Cof2N2P3	42
25	Dr. A.Thirumurugan	Waste Development Of Hybrid Fibre Reinforced Green Concrete Using Industrial Materials	43
26	S.Manikandan	Innovation in Electrical, Electronics Instrumentation and Computer Engineering	44
27	Dr.R.Perumal,Dr.S.Kavitha, B.Janani	Optimization of Endogiucanase Production using response surface methodology	45
28	Dr.Kavitha,J.Praveenkumar, Dr.V.Vijayagopal	Extraction Of Phenol From Waste Vegetables And Optimization Using Solvent Extraction	48
29	J.Praveen Kumar	Removal of oil from waste water using Nusifora	49
30	Dr.S.Kavitha.J.Praveen Kumar,Dr.G.Surendran	Removal of oil from waste water using Nusifora	50
31	K.Balasubramani	Recent Advancements In Eviction Of Pollutants Using Graphite As An Adsobents	53
32	Dr.S.Kavitha,	Optimization Of Endoglucanase Production Using Mixed Substrate By Trichoderma Viride	54
33	K.Balasubramani	Adsorption Of Pollutants Using Synthesized Adsorbent	55

34	S.Venkatesh Babu	Biochemical and Environmental Bioprocessing	56
35	Dr.S Venkateshbabu	Bioleaching -A Novel Approach For Metal Extraction And Detoxification	57
36	Ardra Vijayan K	Green Synthesis Of Nano Particle For The Removal Of Methylene Blue	59
37	Dr.V.Arun	Preparation And Characterization Of Unsymmetrical Azines Using To Analyzed Electrochemical Super Capacitor	60
38	Mrs.R.Banumathi	Quantum Chemical Calculations Of Neurotransmitter Drug Noradreniline	61
39	Mrs.V.Deepa	Quantum Chemical Calculations Of Antidepressant Drug Sertraline	62
40	Mrs.S.Kanchanadevi	Synthesis, Structural Characterization, Dft Studies And Biological Activity Of Co(II),Cu(II) And Ni(II) Complexes Of Hydrazone	63
41	Thirumurugan.A	Development Of Self Healing Concrete To Improve Durability Of Structures	71
42	Thirumurugan.A	Experimental Study On Self Healing Concrete	72
43	Venugopalan.V	Comparative Study On Bio Gas Production From Cow Dung,Food Waste And Organic Waste	73
44	Kumar.A	Experimental Study On Partial Replacement Of Cement With Ceramic Tile Powder In Concrete	74
45	Muruges. V	Experimental Study On Transparent Concrete	75
46	Muruges. V	Experimental Investigation On Strength And Durability Of Concrete By Replacing Cement By Water Hyacinth Ash	76
47	Thangadurai.A	Experimental Studies Of Silica Fume And Sisal Fibre On Performance Of Concrete	78
48	Aruna.C	Experimental Investigation On Strengthening Of Beams Using Retrofitting With Partial Replacement Of Cement By Sugarcane Bagasse Ash In Concrete	79
49	Sellakannu.N	Experimental Investigation On Concrete Compression Member With Ggbs	83
50	Lavanya.L	Experimental Investigation On Rcc Column By Partial Replacement Of Cement With Paper Pulp	84
51	Lavanya.L	Experimental Study On Beam By Partial Replacement Of Cement By Marble Powder And Quarry Dust	85

52	Lavanya.L	Experimental Investigation On Strength Characteristics Of High Performance Concrete Of Grade M35 Using Paper Pulp Powder	86
53	Lavanya.L	Strength Study On Activated Flyash Concrete With Glass Fiber	87
54	Aruna.C	Experimental Investigation On Strengthening Of Beams Using Retrofitting With Partial Replacement Of Cement By Sugarcane Bagasse Ash In Concrete	88
55	Niranjani.S	Strength Study On Activated Flyash Concrete With Glass Fiber Using Beam	89
56	Dr.G.Rajiv Suresh Kumar	Native Hadoop Based Enhanced Cloud Architecture In Biomedical Industry	90
57	K.Malarvizhi	Delay Analysis Using Dynamic Scheduling And Congestion Control For Multi-Hop Wireless Networks	91
58	K .Sivakumar	Native Hadoop Based Enhanced Cloud Architecture In Biomedical Industry	92
59	K .Sivakumar	Enhancing The Security Of Caesar Cipher Substitution Method Using A Transposition Technique For More Secure Communication	93
60	K .Sivakumar	Efficient Cloud Computing With Secure Data Storage Using Aes And Pgp Algorithm	94
61	K .Sivakumar	Review On-Exploring The Limitations And Challenges Of Large Scale Cloud Computing	95
62	K .Sivakumar	Distributed System Framework For Mobile Cloud Computing	96
63	K.Jason	An Assessment Of Quality Of Service And Network Security In Ip Based Communication Networks	97
64	M.J.Delsey	Distributed System Framework For Mobile Cloud Computing	98
65	M.J.Delsey	Efficient Cloud Computing With Secure Data Storage Using Aes And Pgp Algorithm	99
66	R.Tharani	Enhancing The Security Of Caesar Cipher Substitution Method Using A Transposition Technique For More Secure Communication	100
67	R.Tharani	Algorithm Is Based On Ant Colony Optimization Using Grid Simulator	103
68	R.Tharani	Secured Picode : Using Visual Cryptography	104

69	M.Rupa	Review On-Exploring The Limitations And Challenges Of Large Scale Cloud Computing	105
70	Mr.A.Kalimuthu	Noc Based Router Architecture Design Through Decoupled Resource Sharing Using Cabhr Algorithm	106
71	V.Jethose	Performance Improvement Of Ceiling Fan Motor Using Variable Frequency Drive With Sepic Converter	107
72	V.Jethose	Position Control Of Solar Panel	108
73	V.Jethose	Fuzzy Logic In Electrical Power System Control	109
74	V.Jethose	A New Topology Power Generation System In Mppt	110
75	V.Jethose	A Review Of Alternate Fuels	111
76	V.Jethose	Effective Performance Improvement Of Spm Using Adjustable Capacitor And Multilevel Inverter	112
77	V.Jethose	Modified Sepic Convertor Based Induction Motor Drive	113
78	Dr.M.Jayaprakash	Fuzzy Logic In Electrical Power System Control	114
79	Dr.M.Jayaprakash	Hybrid Electric Vehicle Design Systems	115
80	S.Manikandan	Novel Transformer Less Adaptable Voltage Quadrupler Dc Converter With Closed Loop Control	117
81	S.Manikandan	Vehicle Security System Using Embedded System And Gsm Technology	118
82	S.Manikandan	Automatic Breaking System In Train Using Fuzzy Logic Systems	120
83	S.Manikandan	Design Of Optimized Network On-Chip For Reliable Communication	121
84	S.Anbuchandran	Hybrid Electric Vehicle Design Systems	122
85	S.Anbuchandran	Fuzzy Logic In Electrical Power System Control	123
86	J.Madheswari	Seven Level Multilevel Inverter For Power Quality Improvement In Single Phase Induction Motor	124

87	J.Madheswari	Hybrid Electric Vehicle Design Systems	125
88	G.Ravivarman	Vehicle Security System Using Embedded System And Gsm Technology	126
89	G.Ravivarman	Automatic Breaking System In Train Using Fuzzy Logic Systems	127
90	S.Umar Mukthar	A Fuzzy Based Direct Torque Control System To Improve The Induction Motor Performance	128
91	S.Umar Mukthar	Vehicle Security System Susing Embedded Syatem And Gsm Technology	129
92	C.Prakash	Battery Energy Storage System With Hybrid Technology	130
93	C.Prakash	Design Of Optimized Network On-Chip For Reliable Communication	131
94	C.Sakthivel	Automatic Wheelchair Using Dtmp Technology	132
95	C.Sakthivel	A Seven- Level Inverter With Facts Capability For Distributed Systems	133
96	C.Sakthivel	Position Control Of Solar Panel	134
97	C.Sakthivel	A Wind Power Generating Electricity By Fast Moving Vehicles	135
98	C.Sakthivel	Battery Energy Storage System With Hybrid Technology	136
99	C.Sakthivel	Advanced Electricity Usage Via Power Line Communications	137
100	C.Sakthivel	Seven Level Multilevel Inverter For Power Quality Improvement In Single Phase Induction Motor	138
101	C.Sakthivel	Automatic Breaking System In Train Using Fuzzy Logic Systems	139
102	C.Sakthivel	Vehicle Security System Susing Embedded Syatem And Gsm Technology	140
103	C.Sakthivel	A Review Of Ocean Thermal Energy Sources	141
104	C.Sakthivel	Fuzzy Logic In Electrical Power System Control	142
105	C.Sakthivel	Hybrid Electric Vehicle Design Systems	143

106	C.Sakthivel	A New Topology Power Generation System In Mppt	144
107	C.Sakthivel	A Review Of Alternate Fuels	145
108	C.Sakthivel	Industrial Application For Water Waste Plant In Plc Control Systems	146
109	S.Pradeep Kumar	Fuzzy Logic In Electrical Power System Control	147
110	S.Pradeep Kumar	A Review Of Alternate Fuels	148
111	S.Pradeep Kumar	Design Of Optimized Network On-Chip For Reliable Communication	149
112	S.Pradeep Kumar	Industrial Application For Water Waste Plant In Plc Control Systems	150
113	V.Kumaresan	Seven Level Multilevel Inverter For Power Quality Improvement In Single Phase Induction Motor	151
114	V.Kumaresan	Position Control Of Solar Panel	152
115	V.Kumaresan	Vehicle Security System Using Embedded System And Gsm Technology	153
116	P.Sam Jasper	Design Of Optimized Network On-Chip For Reliable Communication	156
117	Dr.R.Perumal	Production Of Fuel From Mixed Waste Stream Of Used Cooking Oil Bio Oil And Waste Lubricating Oil Using Reactive Distillation	157
118	K.Balasubramani	Statistical Optimization Studies On Adsorption Of Ibuprofen Onto Albizialebeck Seed Pods Activated Carbon Prepared Using Microwave Irradiation	158
119	K.Balasubramani	Fixed Bed Adsorption Of Atrazine On To Microwave Irradiated Aegle Marmelos Correa Fruit Shell ,Stastical Optimization ,Process Design And Break Through Modeling	159
120	Venkateshbabu.S	<u>Design Consideration Of Mounded Storage Vessel</u>	160
121	Venkateshbabu.S	Recovery Of Propylene From Lpg	162
122	Venkateshbabu.S	Bioleaching A Novel Approach For Metal Extraction And Detoxification	163
123	Venkateshbabu.S	Inverse Fluidized Bed Bioreactor For Tannery Wastewater Treatment	164

124	Mrs.N.Bhuvaneswari	Growth And Charecterization –Organic Metal Crystal Of Tmaci	165
125	Dr.C.Sivakumar	Biodegradable Polymers For Sustainable Packaging Applications	166
126	Lavanya.L	Site Selection, Analysis And Design Of Incineration Plant For Solid Waste Disposal For Coimbatore Corporation Using Gis	168
127	Muruges.V	Research And Innovations In Civil Engineering	169
128	Dr.G.Rajiv Suresh Kumar	Automated Monitoring Of The Electrical Motors And Alert Using Iot	170
129	Dr.G.Rajiv Suresh Kumar	Native Hadoop Based Enhanced Cloud Architecture In Biomedical Industry	171
130	K.Sivakumar	Native Hadoop Based Enhanced Cloud Architecture In Biomedical Industry	172
131	K.Sivakumar	Distributed System Framework For Mobile Cloud Computing .	173
132	K.Sivakumar	Big Data Processing Using The Native Hadoop	174
133	K.Sivakumar	Review On-Exploring The Limitations And Challenges Of Large Scale Cloud Computing	175
134	Deebanchakkrawarthi.G	Rcs Agriculture Security And Smart Monitoring	176
135	R.Tharani	Computer Vision And Image Processing Technique For Mobile Application	177
136	R.Tharani	Efficient Technique For Color Image Noise Reduction	178
137	M.Ravikumar	Ravenous With Intermediate Awake Data Forwarding Using Node Steadiness Identification Algorithm In Manet	179
138	M.Ravikumar	Assessment Of Greenhouse Gases And Parameters Using Wireless Sensor Network	180
139	M.Ravikumar	A Comparative Study Of Variable Bitrate Based Routing Protocols For Wireless Ad-Hoc Networks	181
140	M.Ravikumar	Heuristic Based Ant Colony And Optimal Algorithm For Load Balancing Grid Scheduling Environment	182
141	M.Rupa	A Classification Approach For Predicting Plant Leaf Diseases	183
142	V.Jethose	Position Control Of Solar Panel	184

143	V.Jethose	Modeling And Simulation Of Bidirectional Ac-Dc Power Converter	185
144	C.Sakthivel	Tuning Of Fractional Order Pid Controller For Speed Control Of Dc Motor Using Optimization Techniques	186
145	C.Sakthivel	Position Control Of Solar Panel	187
146	V.Jethose	Performance Improvement Of Ceiling Fan Motor Using Variable Frequency Drive With Sepic Converter	188
147	Dr.G.Ramesh	Total quality Management	190
148	Dr. S.Venkatesh Babu	Effectt Of Temperature On Removal Of Copper From Electroplating Industrial Sludge Via Biosolubilization:Kinetics And Thermodynamics Studies.	193
149	Dr.V.Arun	Preparation, Characterisation And Applications Of Tio ₂ , Zns Loaded Tio ₂ Modified Glassy Carbon And Platinum Electrodes	194
150	Ms. S. Kanchanadevi	Synthesis, Characterzing, Crystal Structure And Dna Binding Studies.	195
151	Ms. S. Kanchanadevi	Design, Structural Elucidation, Dna Binding, Protein Binding And Catalytic Activity Of M (Ii) (M= Co, Ni And Cu) Schiff Base Complexes	196
152	Dr.C. Sivakumar	Cyclodextrin Based Hyperbranched Polyester; Synthesis, Characterization And Antimicrobial Activity	197
153	Kumar.A	Strengthening Of Reinforced Concrete Beam Using Glass Fibre Reinforced Polymer Composites.	198
154	Satishbabu.N	An Experimental Study On Effect Of Square Slab Using Rice Husk Ash And Glass Fibre On Properties Of Cement With Partial Replacement Of Fine Aggregate By Quarry Dust.	199
155	Satishbabu.N	An Experimental Study On Effect Of Rice Husk Ash And Glass Fibre On Properties Of Cement With Partial Replacement Of Fine Aggregate By Quarry Dust.	200
156	Navaneetha.B	Experimental Behaviour Of Short Column Using Coconut Shell Ash, Iron Powder And Steel Fibres To Enhance The Properties Of Concrete	201
157	Murugesh. V	Experimental Behaviour Of Water Hyacinth Ash As The Partial Replacement Of Cement In Concrete.	202

158	Aruna.C	An Experimental Study On The Strength Behaviour Of Square Slab Steel Fibre, Glass Fibre With Fly Ash And Rise Husk Ash.	203
159	Sellakkannu.N	Strength Studies Of Concrete By Partial Replacement Of Natural Sand With Manufactured Sand.	205
160	Sellakkannu.N	Carbon Fiber Reinforced Polymer Strengthening Of Rc Beam With Partial Replacement Of M Sand	206
161	K.Jason	Assessment Of Greenhouse Gases And Parameters Using Wireless Sensor Network	207
162	K.Jason	Enhanced Hybrid Clustering Scheme For Dense Wireless Sensor Networks	208
163	G.Deebanchakkarawarthy	Evaluation Of Scalable And Effectual Clustering Architecture For Dense Wireless Sensor Networks	209
164	M.Ravikumar	Evaluation Of Scalable And Effectual Clustering Architecture For Dense Wireless Sensor Networks	210
165	Mr.A.Kalimuthu	Efficient Design Of Error Recovery And Improve The Performance Using Mesh Of Ring Topology Based Noc	211
166	Mrs.A.Parameswari	Novel Approach Based Smart Grid Involved In Energy Consumption Using Signal Transmission	212
167	Mrs.A.Parameswari, Mrs.V.Kavithamani, Mrs.D.Vedha Vinodha	Energy Saving From Sunlight With Microcontroller Using Proteus Software Design	213
168	Mr.A.Kalimuthu	Advances In Natural And Applied Sciences Analysis And Testing Of Power And Area Efficient Five Port Router For Noc	214
169	V.Jethose	Genetic Algorithm Based Sensor Less Speed Control Of Induction Motor Drives At Zero And Low Frequency With Resistance Estimation.	215
170	G.Ravivarman	Single-Phase H-Bridge Cascaded 15-Level Inverter With D-Statcom Capability For Harmonic Reduction	216
171	G.Ravivarman	High-Voltage Gain Boost Converter In Single Conversion Stage	217
172	J.Madheswari	Single-Phase H-Bridge Cascaded 15-Level Inverter With D-Statcom Capability For Harmonic Reduction	218
173	C.Sakthivel	Direct Torque Control Of Induction Motor Using Fuzzy Logic	219

174	C.Sakthivel	Modified Sepic Converter With High Static Gain For Renewable Energy Applications	220
175	C.Sakthivel	Design And Implementation Of A Converter Model For Hybrid Electric Vehicle Energy Storage System	221
176	C.Sakthivel	Hysteresis Voltage Control Of Dynamic Voltage Restorer For Power Quality Improvement	222
177	S.Pradeep Kumar	Hysteresis Voltage Control Of Dynamic Voltage Restorer For Power Quality Improvement	223
178	S.Pavithra	Hysteresis Voltage Control Of Dynamic Voltage Restorer For Power Quality Improvement	224
179	Mrs. K. Swathi	Herbal Antioxidants-A Review	225
180	Dr.G.Ramesh	Optimizing The Supercharger Effect On The Performance And Emission Of Biogas Diesel Engine Using Anfis	226
181	Dr.G.Ramesh	Optimising Biogas From Food Waste Using Neural Network Model	227
182	Dr.P.Pitchandi	A Temperature Gradient Based Harvesting Of Solar Energy Using A Teg Device	228
183	K.Balasubramani	Effect Of Process Parameter On The Phenol Removal Rate From Petrochemical Effluent Using Electrochemical Method	229
184	Er .S.Venkatesaprabu	Effect Of Temperature On Removal Of Cr(VI) From Tannery Sludge Through Bio Leaching: Studies And Kinetics	230
185	Er R Gengadevi	Rheological Behaviour Of Eco--Accomodating Drilling Fluids From Bio Polymer	231
186	Er K Reetabai	Effect Of Temperature On Removal Of Cr(VI) From Tannery Sludge Through Bio Leaching: Studies And Kinetics	232
187	Er P Bharathiraja	Bioleaching Kinetics Of Chalcopyrite Concentration Using Lepto Sprillum Ferriphilum:Effects Of Silver Ion	233
188	Er Kanimozhi	Effect Of Temperature On Removal Of Cr(VI) From Tannery Sludge Through Bio Leaching: Studies And Kinetics	234
189	Venkateshbabu.S	Optimization Of Anaerobic Conditions For The Treatment Of Textile Dye Wastewater Using Mixed Culture	235
190	Venkateshbabu.S	Anaerobic Treatment Of Textile Dye Wastewater Using Mixed Culture In Batch Reactor	236

191	Venkateshbabu.S	Activities Of Root-Derived Phytochemicals Of Withania Somnifera On Cancer Kinase: Computational Approach	237
192	Dr.M.S.Balamurugan	Single Crystal Epr And Optical Studies Of (Vo) Ion Doped In Triglycine Acetate.	238
193	Dr.G.Rajiv Suresh Kumar	Tail Latent & Energy Efficient Query Processing In Web Search Engines	239
194	Dr.G.Rajiv Suresh Kumar	An Approach For Detection And Elimination Of Resource Depletion Attack In Wsn	240
195	Deebanchakkrawarthi.G	Students Safety Security Innovations	241
196	Deebanchakkrawarthi.G	Survey Paper On Engine Optimization	242
197	Mrs.A.Parameswari, Mrs.V.Kavithamani, Mrs.D.Vedha Vinodha	Energy Saving From Sunlight With Microcontroller Using Proteus Software Design	243
198	C.Sakthivel	Dynamic Voltage Control Of Dynamic Performance For Power Quality Measurement	244
199	C.Sakthivel	Direct Torque Control Of Induction Motor Using Fuzzy Logic	245
200	S.Pradeep Kumar	A Seven Level Inverter With Facts Capability For Distribution System	246
201	J.Madheswari	Contemporary Induction Water Heater With Low Power Consumption For Domestic Applications.	247
202	J.Madheswari	Single-Phase H-Bridge Cascaded 15-Level Inverter With D-Statcom Capability For Harmonic Reduction	248
203	J.Madheswari	High-Voltage Gain Boost Converter In Single Conversion Stage	249
204	S.Manikandan	Closed Loop Control Of Three Phase Induction Motor Using Model Predictive Control	250
205	Dr.R.Paramasivam,K.Balasubramani,G.Arumugam	Recent Advancements In Alternative,Renewable Energy Technology And Management	251
206	M.Suresh,S>Sankar Prasad	Petroleum Refining And Petrochemicals And Fuel Quality Improvement Technologies	253
207	Dr.R.Paramasivam	Recent Advancements In Chemical Environmental And Energy Engineering	255
208	K.Balasubramani	International Conference On Adaptive Technologies For Sustainable Growth	256
209	Thirumurugan.T	Strength And Fracture Properties Of Hybrid Fibre Reinforce Concrete	257

210	Kumar.A	Laboratory Studies On Conversion Of Biomass Into Energy Source Using Effective Micro Organisms	258
211	Kumar.A	Synthesis Of Biogas As A Renewable Energy From Organic Waste Mixture By Anaerobic Fermentation	259
212	Kumar.A	An Experimental Study On Effect Of Size Of Coarse Aggregate In Polypropylene Fibre Reinforced Self-Compaction Concrete	260
213	Kumar.A	An Experimental Study On Glass Fibre Reinforced Self-Compacting Concrete Using Copper Slag And A Partial Replacement Of Fine Aggregate	261
214	Kumar.A	A Pilot Scale Study On In-Vessel Composting Of Organic Waste Using Forced Aeration	262
215	Navaneetha.B	Experimental Study On Glass Fibre Reinforced Steel Slag Concrete With Fly Ash	263
216	Navaneetha.B	Experimental Study On Hybrid Fibre Reinforced Concrete Using Silica Fume And Steel Slag	264
217	Muruges. V	Experimental Study On Sisal Fibre Reinforced Concrete With Partial Replacement Of Cement By Ggbs	266
218	Satishbabu.N	Experimental Study On Strength Properties Of Triple Blended Scc.	267
219	Aruna.C	Experimental Study On Effect Of Metakaolin And Fly Ash On Steel Fibre Reinforced Concrete	270
220	Aruna.C	Experimental Study On Fibre Reinforced Concrete By Partial Replacement Of Cement Using Metakaolin And Fine Aggregate Using Quarry Dust.	271
221	R. Ranjithkumar	Experimental Investigation On Hybrid Fibre Reinforced Concrete With The Addition Of Silica Fume And Partial Replacement Of Iron Slag To Fine Aggregate	272
222	Dharani.K	Experimental Study On Utilization Of Red Mud And Iron Slag On Fibre Reinforced Concrete	274
223	Jebitta.P	Experimental Study On The Influence Of Fly Ash, Lime Powder And Hybrid Fibre On The Properties Of Concrete	276
224	Jebitta.P	An Experimental Investigation On The Effect Of Concrete By Replacing Cement With Ggbs And Rice Husk Ash With The Addition Of Steel Fibre	277
225	Dr.G.Rajiv Suresh Kumar	Cluster Initialization In Dense Distributed Wireless Sensor Networks Using Jumping Ants	278

226	K.Sivakumar	Trusted Cloud Computing Methods Using To Protected File Encryption Performance	279
227	K.Sivakumar	Lbmpso Algorithm For Balancing The Load In Grid Environment	280
228	K.Sivakumar	A Hierarchical Fuzzy Relational Clustering Algorithm For Sentence Level Text Clustering	281
229	K.Jason	Cluster Initialization In Dense Distributed Wireless Sensor Networks Using Jumping Ants	282
230	G.Deebanchakkarawarthy	Real-World Application Scenarios And Their Corresponding Issues Towards Cluster Formation In Hybrid Wsns	283
231	V.Jethose	Performance Enhancement In Single Phase Induction Motor – A Novel Approach Using Lab View	284
232	V.Jethose	New Advancement In The Performance Improvement Of Synchronous Reluctance Motor	286
233	S.Manikandan	Power Quality Improvement Using Bridgeless Buck-Boost Converter Fed Bldc Motor Drive	287
234	S.Manikandan	Analysis The Performance Of Multi Core Processor Using Timed Lap Concept In Labview	288
235	C.Prakash	Design And Simulation Of Phase Locked Loop Controller Based Unified Power Quality Conditioner Using Nonlinear Loads	289
236	C.Sakthivel	Optimal Generation Scheduling Of Thermal Units With Considering Startup And Shutdown Ramp Limits	290
237	C.Sakthivel	Implementation Of An 11-Level Inverter With Facts Capability For Distributed Energy System	291
238	C.Sakthivel	Wind Turbine Based Generation In Hybrid Remote Area Power Supply System	292
239	C.Sakthivel	Short Term Generation Scheduling Of Thermal Units With Emission Limitation In Deregulation Environment	293
240	S.Pradeep Kumar	Short Term Generation Scheduling Of Thermal Units With Emission Limitation In Deregulation Environment	294
241	S.Pavithra	Short Term Generation Scheduling Of Thermal Units With Emission Limitation In Deregulation Environment	295
242	S.Pavithra	Wind Turbine Based Generation In Hybrid Remote Area Power Supply System	296
243	N.Abner Leo	Design And Simulation Of Phase Locked Loop Controller Based Unified Power Quality	297

		Conditioner Using Nonlinear Loads	
244	M.S.Vidhya	Wind Turbine Based Generation In Hybrid Remote Area Power Supply System	298
245	Dr.G.Ramesh	Cfd Analysis For Homogenous Effect Of Biogas And Air In The Intake Manifold Of Dual Fuel Ci Engine.	299
246	D.Joslin Vijaya	Acoustical Failure Diagnosis Of Bush In A Domestic Mixer	300
247	P.Satish Kumar	Investigation Of Electrochemical Micromachining Of Al6061 – 6% Wt Gr Based On Taguchi Design Of Experiments	301
248	P.Satish Kumar	Machinability Study On Electrochemical Machining – A Review	302
249	A.S.Arunprasad	Kinetics Studies On Cleome Viscosa Using Nanomgo Catalyst For Biodiesel Production	305
250	Gangadevi R	Hydrodynamics Studies On Semi- Fluidized Bed Using Internals	307
251	Gangadevi R	Studies On Hydrodynamics,Mixing Time Distribution And Residence Time Distribution Behaviour Of External Loop Airlift Reactor	308
252	Kumar.A	Biodigestion Of Wetland Weeds For Energy Production	309
253	R.Tharani	Defending Ddos With Soa & Forensic Analysis	310
254	M.Ravikumar	Defending Ddos With Soa & Forensic Analysis	311
255	M.Ravikumar	Baco Algorithm For Scheduling Job In Grid Environment	312
256	R.Tharani	Boco Algorithm For Job Scheduling In Grid Simulator	313
257	M.Ravikumar	A Memory Aware Dynamic Job Scheduling Model In Cloud Computing	314
258	K.Sivakumar	Heuristic Based Ant Colony And Optimal Algorithm For Load Balancing Grid Scheduling Environment	315
259	K.Sivakumar	Defending Ddos With Soa & Forensic Analysis	315
260	K.Sivakumar	Baco Algorithm For Scheduling Job In Grid Environment	317
261	K.Sivakumar	Lbmpso Algorithm For Balancing The Load In Grid Environment	318

262	Deebanchakkrawarthy.G	Energy Efficient Target Tracking In Sensor Networks Using Opss	319
263	Deebanchakkrawarthy.G	Energy Efficient Target Tracking In Sensor Networks Using Opss	320
264	R.Tharani	Balanced And Colony Optimization Algorithm For Job Scheduling In Grid Computing.	321
265	J.Madheswari	Thermal Electric Energy Based On Solar Power	322
266	J.Madheswari	Multi Input Multi Output Converter Based Battery Application	323
267	S.Manikandan	Power Quality Improvement Using Bridgeless Buck-Boost Converter Fed Bldc Motor Drive	324
268	A.S.Arun Prasad	Sustaniable Technologies For Waste To Energy	325
269	Mr.P.Sureshkumar	Optimizing The Process Parameters On Tool Wear Of Tungsten Carbide Insert When Machining Of Aisi 304 Stainless Steel Material	326
270	Mr.P.Sureshkumar	Structural Analyzing In Gear Box Cover Using Nx-Nastran	327
271	Mr.J.Prabahar	Augmentation Of Yield On Double Slope Single Basin Solar Still By Wick Materials	328
272	Mr.J.Prabahar	Investigation On Double Slope Solar Still Under Various Water Depths	329
273	C.Sakthivel	Grid Connected Hybrid System With Battery Energy Storage For Critical Load	330
274	Dr.G.Ramesh	Comparitive Investigation On Performane Of Various Aspiraiton Methods Applied In A Single Cylinder Diesel Engine	331
275	N.S.Vijayakumar	Optimizing The Process Parameters On Tool Wear Of Tungsten Carbide Insert When Machining Of Aisi 304 Stainless Steel Material	332
276	Arunkumar, C,Perumal,Lakshminarayana n,Arunkumar	Use Of Corn Cob As Low Cost Adsorbent For The Removal Of Nickel (Ii) From Aqueous Solution	333
277	Arunkumar, C,Perumal,Lakshminarayana n,Arunkumar	A Batch Study On The Removal Of Nickel (Ii) Using Low Cost Adsorbent Flyash	334
278	S.Venkatesaprabu	Detoxification Of Electroplating Sludge By Bioleaching :Process And Kinetic Aspects	335
279	S.Venkatesaprabu	Optimization Studies On The Biodegradation Of Textile Dye Congo Red Using Fungal Strains	336

280	S.Venkatesaprabu	Kinetics Of Heavy Metals Biosolubilization From Electroplating Sludge:Effects Of Sulfur Concentration	337
281	A Sakthisaravanan	Optimization Of Various Parameters On Botryococcus Braunii For Biodiesel Production Using Nano Cao Catalyst	338
282	A Sakthisaravanan	Kinetics Studies On Cleome Viscosa Using Nano Mgo Catalyst For Biodiesel Production	339
283	S.Venkatesaprabu	Kinetics Of Biosolubilization Of Copper From Electro Plating Sludge:Effect Of Agitation Speed	340
284	Dr.G.Ramesh	Comparitive Investigation On Performane Of Various Aspiraiton Methods Applied In A Single Cylinder Diesel Engine	341



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Experimental Studies on Durability Studies of Concrete with Partial Replacement of Cement by Water Hyacinth Ash

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Abstract

Cement is the main constituent ingredient in concrete. Now days many investigations undergone for substitute of cement due to green houses effect and global warming .Many new products like rice husk ash, egg shell powder, baggage ash, etc are used as an effluent replacement material for cement. The new and Practical material for substitute of cement is water hyacinth ash .Water hyacinth ash (WHA), is used as an effectual replacement of partial cement, and it has been proved in several characteristics of concrete. The main important parameters in concrete are strength, durability and workability. In this paper, 10 % of cement replaced by water hyacinth ash to investigate the effects of WHA on durability and Strength in concretes. On this basis, specimens were engrossed in water and acid to study the absorption property, acid attack and compared to conventional concrete. The test results show that replacement of cement by WHA in concrete has improved the parameters of concrete.

Keywords : Water Hyacinth Ash, Compression Strength, Acid Resistance, Water Absorption

1. Introduction

Concrete is the main constituents materials considered in the construction industry all over the world. The main important criteria for design of reinforced concrete structures are Durability and strength. At present environment, concrete structures are affected by different pollutants which contains chloride, sulphate, carbonation of concrete. In the world, 40 % of investment are spent for maintenance of building. A good deal of research undergoes for a innovative material for the replacement of cement which should not affect the environment. Water hyacinth ash is new alternative material for cement. It can be easily visible on lakes and ponds . Then it is dried, powdered and heated upto 600°C for 6 hours at oven. Water hyacinth ash are replaced in cement and tested earlier for some mechanical characteristics of concrete. The results show 10 percent of water hyacinth ash is the optimum replacement for cement in concrete. Durability is the property of resistance of concrete against chemical attack, and environmental pollutants. Cement is replaced by 10 % of WHA to found the water absorption property, loss of mass in chlorine resistance attack and also strength aspects. The results are compared with conventional concrete M30.

2. Objectives

- To evaluate the strength property of WHA replacement concrete and conventional concrete.
- To study the durability property of WHA replacement concrete and conventional concrete.

- To analyze the water absorption property of WHA replacement concrete and conventional concrete.

3. Materials

The materials used in the experiment are:

- Cement
- Water Hyacinth Ash (WHA)
- Fine aggregate
- Coarse aggregate
- Water

4. Experimental Work

4.1. Saturated water absorption test

The main important parameters for durability of concrete are water absorption which tends to corrode the reinforcement bars in the concrete structures. Cubes are cast and de -mould after 28 days .then the cubes were dried at oven for 24 hours at 105°C. The cubes are kept at open atmosphere and noted the dry weight of specimens .A dried sample is immersed in water for 24 hours. Then the specimens are taken out and noted the wet weight of specimens.

$$\text{Water absorption} = [(W1 - W2)/W2] \times 100\%.$$

Where W1- Wet Weight ; W2- Dry Weight

Mobile Application Development on Detection and Diagnose of Learning Disability for Children

G.Rajivsureshkumar, K.Malarvizhi, G.Deebanchakkarawartha

Abstract: Learning disability alludes to a huge impairment of general intellectual and adaptive functioning that begins in childhood. Children register their name and attend the test for identifying their learning disability. In the existing system was developed as a mobile application dyscalculia for children in Malaysia during the year 2017. The existing application was developed in native language of Malaysia so it cannot use globally. Though the researches are done, there are no implemented solutions for this problem. In the proposed system presents the detection and diagnose of learning disability. The role of this mobile application will improve the hard life of persons with learning disability. The mobile application system is supporting the individual with learning disability to practice arithmetic and language skills. This application also focuses on the development and brain stimulation of a community with learning disability as a social development service. The Mobile application is developed for registration, information gathering, and disability test through questionnaire using clinical methods. To improve the learning disability to conduct tests for basic arithmetic and language skills. It combines neuron science and computer science in order to find the solution for a community. It develops computational models of attention and memory. The vital goal of this application is to improve brain efficiency of individuals with learning disability.

Keywords: Learning disability, Detection, disability test and improve brain efficiency.

I. INTRODUCTION

Learning disability is not related with physical disability. There are three kinds of learning disability. Those are writing disability, reading disability and mathematical disability and it is shown in fig.1. Learning disabilities are neurologically-based treating problems. These processing problems can restrict with learning basic skills such as reading, writing and/or math. They can also impede with higher level skills such as organization, time planning, mental reasoning, long or short term memory and attention. It is main to realize that learning disabilities can affect an individual's life beyond academics and can impact relationships with family, friends and in the workplace.

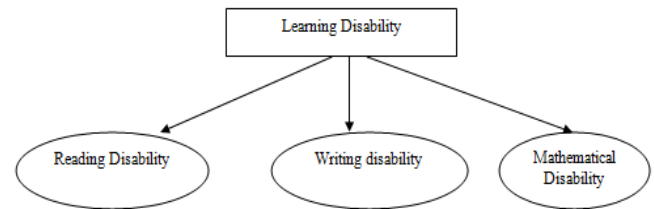


Fig. 1 Learning Disability classification

Since problems with reading, writing and/or math are detectable problems during the school years, the signs and signs of learning disabilities are most often diagnosed during that time. However, some individuals do not accept an evaluation until they are in post-secondary education or adults in the employees. Other individuals with learning disabilities may never obtain an evaluation and go through life, never knowing why they have complications with academics and why they may be consuming problems in their jobs or in interactions with family and friends.

Learning Disability has affected one third of the children in the whole world, it takes long time to detect the Disability in children. As Learning Disability is not a physical disability, the children are affected with neurological issues that can be improved through the systematical treatment. The application can be used for detecting and diagnosing the Learning Disability in the children, the digitalized systems are needed in our decade. The users are afraid to consult doctors thinking the future issues in society, so that the community of children with learning disabilities is not getting enough treatment. The system gives enough treatment via the new technologies for a community of children who are not getting enough concern the need of this system is to detect the Learning Disability and to improve the abilities of children.

There are several Mobile application are developed for children. One of the application was dyscalculia who are not capable enough normal children normal IQ in mathematics only in Malaysia. The application is developed in the Malay language which is the national language of Malaysia. So the application can be used within the Malaysia only. It influences the capacity to do mathematical problems by step by step lessons and it improves the mathematical efficiency.

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An Instant Guidance on Cancer Prediction and Care Using Web Application

K.Malarvizhi, G.Rajivsureshkumar

Abstract: *The medical field comprises heterogeneous data such as text, facts and images that can be properly separated to provide useful medical information. The medical data has been useful to the doctor in order to identify the pattern of disease. The predicted endurance of the patient after the illness is complex to sternness of the disease. The main goal of this paper is to design the web application for cancer prediction. There are various techniques used earlier for predicting the cancer disease. Cancer is one of the primary causes of demise in global. In the existing system have ensued several times require doctors assist immediately, but they are not accessible owing to a few reasons. The proposed system is an instant guidance on cancer prediction and care is developed for end users to sustain online session project. A web application is designed for users to acquire through control on their cancer disease using an online intelligent system. This application provides variety of cancer related information. The system facilitates users to determine their cancer related issues. It also directs the user precise details to ensure for the range of illnesses that could be linked with it. Data mining techniques are used to deduce the perfect level of disease that could be connected with patient's details. We have verified the outcome for classification routinely shows the specific doctor's place and status. A reservation system is ruined where users can honestly reserve their doctors for promote cure. A response system is as long as useful where users can allocate and view comment and status of doctors and hospitals.*

Keywords: *Decision tree, k-means, Cancer Prediction, Prognosis, Risk levels, reservation and Response system.*

I. INTRODUCTION

Cancer is primarily a common disease in the earth so that effect is mass of demise. Cancer is a source for unrestrained extension of cubicles in each constituent of the stiff. Tumor can ensue into a few portion of the corpse and might perhaps expand near a quantity of additional components. In premature revealing of cancer [7] at the early period and evading from diffusion to additional elements in spiteful phase can keep a human beings existence. There are several causes that might distress anyone's inclination for cancer. Data mining provides a range of origin of obscured projecting information for giant databases.

Data mining tools [15] visualize imminent developments and behaviors, consent to dealing to compose hands-on, awareness determined resolutions. Data mining [8] techniques utilize the exploit of intricate data investigation utensils to determine formerly unknown, suitable models

and associations in huge data position. These tackles be able to comprise numerical sculpts, arithmetical procedure and machine knowledge [9] techniques in hasty innovation of growth. During organization information specifies the knowledge system is accessible among a lay down of confidential instances opening which it is predictable toward come across out the structure of arrangement hidden cases.

The organization erudition [10] affords a connection between facial manifestations and also distresses a group assessment. In clustering [11] set of sculpts that robust in mutually are essential. The numeric prophecy system expresses the termination to continue predictable is not a detach class but a numeric value.

Many experiments are carried out for prediction of breast cancer using data mining techniques such as digital mammography classification using association rule mining [12], Naïve-Bayes classifier, Support vector machines and Logistic Regression [1]. Data mining algorithms such as decision trees, Naïve-Bayes and ID3 are used for prediction flung, breast and skin cancer [2]. Various methods are used for prediction of lungs, breast, oral, cervix, and stomach and blood cancers. These methods include k means clustering classification based on genetic and non-genetic factors and significant pattern generation. Risk level is calculated using scores assigned to each symptoms [3]. Performance is increased by using decision trees and classification for prediction of lung, breast, oral, cervix, and stomach, blood cancers [4]. Experiments are carried out using AprioriTid, correlation, decision trees and association rules are used for predicting lung cancer [5]. Collected data set, Data set preprocessing, association rule mining, classification method and deep learning are used for prediction [6] of blood tumor.

In the existing system used architecture [13] of data mining systems supported on cancer prophecy system merging the prediction scheme with mining tools. The categorization [14] algorithms used in the existing system is called decision tree.

The user enters into the cancer prophecy scheme, and then required to retort the queries, connected to genetic and non-genetic skin textures. In that case the prediction structure allots the hazard rate to both query bases on the client retorts. One time the exposure significance is estimated, the series of the coercion preserve is resolute by the forecast structure.

II. SYSTEM MODEL

The classification [14] algorithms are used in the existing system is known as decision tree.

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Brain Tumour Detection and Classification using Fusion Technology on IOT

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Abstract: Automatic defects detection in MR images is very important in many diagnostic and therapeutic applications. Because of high quantity data in MR images and blurred boundaries, tumour segmentation and classification is very hard. This work has introduced one automatic brain tumour detection method to increase the accuracy and yield and decrease the diagnosis time. The goal is classifying the tissues to three classes of normal, begin and malignant. In MR images, the amount of data is too much for manual interpretation and analysis. During past few years, brain tumour segmentation in Magnetic Resonance Imaging (MRI) has become an emergent research area in the field of medical imaging system. In the proposed system accurate detection of size and location of brain tumour plays a vital role in the diagnosis of tumour. The diagnosis method consists of four stages, pre-processing of MR images, feature extraction, and classification. The features selection is based on Discrete Wavelet Transformation (DWT).and feature extraction based GLCM. In the last stage, Probabilistic Neural network is employed to classify the Normal and abnormal brain. After that normal image store on cloud and move towards on android application.

Keywords: Brain Tumour detection, MRI Scan, DVM, GLCM, PNN, Deep learning, cloud access, feature selection, feature selection

I. INTRODUCTION

The brain is the management centre of the central nervous system and is responsible for the execution of activities all throughout the human body. Brain tumours can threaten human life directly. If the tumour is detected at an early stage, the patient's survival chance increases. Magnetic resonance (MR) imaging is widely used by physicians in order to determine the existence of tumours or the specification of the tumours [1]. The qualification of the brain cancer treatment depends on the physician's experience and knowledge [2]. For this reason, using an automated and flawless working tumour detection system is extremely important to aid physicians to detect brain tumours.

Detection of tumours in the brain via MR images has become an important task and numerous studies have been conducted in recent years. The flaws in MRI scan images could result in wrong scan results and this can't happen as it's a matter of life. So in here, we are considering filtering the results of an MRI scan using three discrete methods namely, Discrete Wavelength Transformation (DWT), Grey Level Co-Occurrence Matrix (GLCM), and Probabilistic Neural Network (PNN). After matching the search results with those of the MRI images stored in the database for reference, an accurate result will be returned. This result is further allowed to be accessed by the patient/a doctor by cloud access and from there to a discrete android mobile application.

The existing system for Brain Tumor Detection mostly consists of methods such as threshold techniques and edge detection. Image processing is any form, of information processing, in which the input is an image. The existing method is based on the threshold and also region growing. At the threshold based segmentation the image is considered as having only two values either black or white. But the bitmap image contains 0 to 255 gray scale values. So it ignores the tumor cells also. In [1] case of the region growing based segmentation it needs more user interaction for the selection of the seed. Seed is nothing but the center of the tumor cells; it may cause intensity in homogeneity problems. And also it will not provide the acceptable result for all the images.

The regional growing method ignored the spatial characteristics. Normally spatial characteristics are important for malignant tumor detection. In [4] threshold based segmentation the image is considered as having only two values either black or white. This is the main problem of the current system, due to that proposed technique for brain tumor segmentation. Hence, due to the lack of filtering accuracy, the scan results may go faulty, resulting in a wrong result. These methods are not applicable for multiple images for tumor detection in a short time. And also, Medical Resonance images contain a noise caused by operator performance which can lead to serious in accuracies classification.

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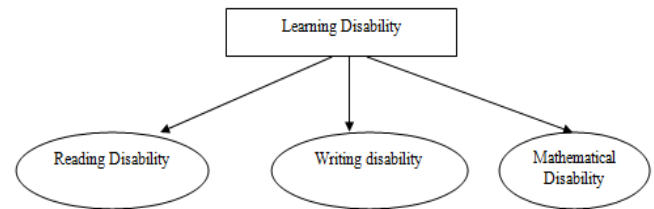


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Application for Distinguishing Grounds Understudy Troubles Utilize Machine Learning

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Abstract: The understudy's execution expectation is an imperative research theme since it can enable teachers to keep understudies from dropping out before final tests and distinguish understudies that need extra help. So Accurately foreseeing understudies' future execution dependent on their progressing scholarly records is vital for successfully completing important instructive intercessions to guarantee understudies' on-time and palatable graduation. With the help of machine learning technology, using decision tree algorithm the academic performance and extra-curricular activities of a student will be monitored and learnt to provide alert to the respective tutor. Based on this alert sent by the automated system, the performance of a student could be improved effectively.

Keyword: Machine Learning, Decision tree

I. INTRODUCTION

Despite the fact that there is a rich writing on foreseeing understudy execution when taking care of issues or considering for courses utilizing information driven methodologies, anticipating understudy execution in completing the course is significantly less examined and faces new difficulties: (1) Students contrast immensely regarding foundations and chose courses; (2) Courses are not similarly useful for making precise expectations; (3) Students' advancing advancement should be fused into the forecast. In this paper, we build up a AI and Machine Learning technique for anticipating understudy execution in degree programs that can address these key difficulties. Also, a variety of characteristic language planning strategies were utilized to decide the ideal pre-processing arrangement to create significant outcomes. We found that identifying potential understudy dissatisfaction or disarray was best utilizing a Sequential Minimal Optimization calculation (SMO), and a custom word reference to help decide pertinence likelihood.

II. EXISTING SYSTEM

The existing system only detecting potential student frustration or confusion and a custom dictionary to help determine relevance probability. The accuracy of the system is very low and also more complicated. Right now, most of the colleges give utilizing e- learning frameworks regulated learning and, eventually to the precision showed in between rather unwavering quality testing. Going ahead, we hope to proceed with our work on two principle fronts. Initially, to refine the credit recognizable proof to more readily decide course material or points where all understudies normally experience issues, in light of the fact that the probabilities around importance would in general decide in favour of incorporation. Also, second, to test the classifiers created with our present information crosswise over various space and subject materials. At long last, will work grow the utilization of Tutor Alert through the production of modules or coordination into prevalent web-based learning conditions.

III. PROPOSED SYSTEM

In proposed framework like those utilized in feeling examination, yet connected to the information created by understudies in a grounds domain so as to recognize confounded or disappointed understudy. To refine the credit distinguishing proof to all the more likely decide course material or points where all understudies commonly experience issues, on the grounds that the probabilities around pertinence would in general decide in favour of incorporation. Also, second, to test the classifiers created with our present information crosswise over various area and subject materials. Will work extend the utilization of TutorAlert through the making of modules or coordination into well-known web-based learning situations. The main advantage of the proposed is there no complication and better to use decision tree algorithm level and also easy and accurate.

Heart Attack Detection System

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Abstract: Heart attack is a major death causing disease that can risk in patients lives. If a person is affected by cardiac arrest then the only option is to give medical treatment as soon as possible. What if the patient is a single resident of a house that there is no one there to help him in case of any emergencies. So what if an android Smartwatch is able to detect the heart rate of a person, detect any abnormalities that are happening with his heart. What if the same watch sends notifying messages to the close personalities of the patient whenever he needs them. We are planning to make this alive.

A system that could read the heart's blood pressure rate, respiratory rate, temperature of the body and the pulse rate simultaneously to analyze the condition of the heart. Notify the patient about his condition. Notify the doctor about his patients condition and notify his children. The system uses Internet of Things to connect and systemize the working of the sensors and the detectors. Actually four types of sensors are being used : they are: pulse rate sensors, blood pressure sensor, respiratory sensor and temperature detector. These sensors and detectors simultaneously work together to monitor the hearts condition. Then the detailed results can be checked by using the mobile application

Keywords: Heart attack, Atmega Microcontroller, WiFi module, Internet Of Things (IoT)

I. INTRODUCTION

For the last few years a lot of cardiac patients are dying on their way to the hospital and before reaching the hospital. The main reason for this is that a majority of the cardiac patients are of the age 50 and above . Out these about a 75% of the patients are single residents. The main problem of these patients is that they are all on their own. They got nobody to give them CPR or take them to the nearest hospital. So we have developed a Smartwatch that can analyze the data acquired by the sensors to check the condition of the heart. The IoT technology is being used in almost every aspect of life. From home furnishings to medical field. From automobile technology to agriculture. So nowadays IoT is the working domain of a lot of technically served areas. IoT is simultaneous working of sensors and detectors that automatically generates output according to the dynamically generated inputs. The main significance is the interaction between the device with the data that is been stored and analyzed regularly. The output will be updated to the user through any output device. The main target of this system is to help those who are actually single resident senior citizens .

II. METHODOLOGY

STEP 1:Defining strategy: Examining of current devices ,review of objectives and targets ,identification of technical requirements, evaluation of future needs.

STEP2: Planning: Analyzingof data, analyzing the patient's current condition , planning adaptive changes that occur with dynamic errors.

STEP3: Design: Design for the Smartwatch and the mobile application will be identified and implemented.

STEP 4: Testing: Testing of the Smartwatch, testing of the mobile application.

STEP 5: Maintenance: Technical support is available to give continuous site maintenance.

III.PROPOSED SYSTEM

The proposed system includes the continued monitoring of heart rate of a person and signaling the same patient if he needs any medical assistance. The monitored data of the heart will be uploaded to the mobile application which will directly notify his close personalities and the consulting doctors through a SMS notification message. The device works mainly on sensors and detectors. There are four sensors present in it. They are: Pulse Rate Sensor, Blood Pressure Sensor, Respiratory Sensor And Temperature Detector. We are using four sensors to get efficient and actual results on the heart's condition. In the existing system only two sensors were used and the results it generated were not efficient. They tend to give false results on frequent times .The device was not user friendly and it had more complex design. In our proposed system there are only two modules a hardware device which is the Smartwatch itself and the mobile application. The Smartwatch monitors and analyze the heart's rate at every time intervals and will notified to the mobile application at the very same time. Using the mobile application anyone can simply go through his or her heart's condition without going to the hospital.

Web Application for Disaster Management

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Abstract: The web application for disaster management can provide all the helpline and it is used for public welfare and efficient management of disaster. However the existing system have some such like less accuracy and less prediction. This paper present web application for disaster management for public welfare and efficient management easily. This application include all the detail about help lines and government bodies to be contact in the stage of emergency. Then we have to upload all the news. We have all the government data set and disaster dataset. All the dataset have to analyze then those information are sort it based on user needs. Then it uploaded to this web app. GPS and hazard mapping is used to identify the areas of concern and giving the exact location along with a future prediction. This web application is developed by using HTML, CSS, Bootstrap and Python. This papers main goal is to develop a web app for disaster management. This system is very useful for at the time of disaster.

Keywords: Disaster, Hazard Mapping ,Data Set, Help Lines

I. INTRODUCTION

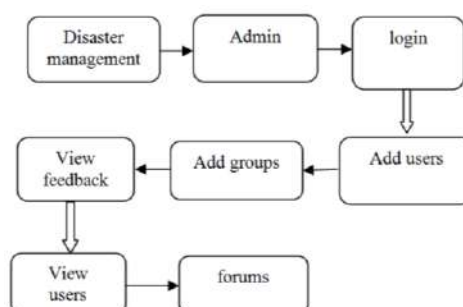
The past disaster management systems are widely existing at many places due to some disadvantages. However our web application for disaster management have a)quick prediction b)accuracy c)increased searching speed d)predict the exact location of concern areas e)user can search for the helpline at any point of time. This paper present the web app that is used for disaster management for public welfare and efficient management of disaster. Recent natural disaster have highlighted the need for disaster preparedness . planning and management. In this paper we focus on developing an ontology structure of element for web based disaster management system. This ontology structure is further coded into a web based system that allowing easy online access. People can access this app at any time at anywhere . This system have interface that provide easier communication. Whatever happened during the disaster ,people can updated the information news happening around the world through the internet. Once the user logged the web app ,the user can get all the information and the system also provide feedback form for sharing users review.

II. PROPOSED SYSTEM

The proposed system includes various details about disasters, concern areas, helpline, government bodies, shelter homes. This web application used for accessing any information and basic needs for users at the stage of emergency. In this system we use the GPS and hazard mapping technique so we can identify the areas of concern and giving the exact location along with the future predictions .It include all the details of the helpline of the government bodies to be contacted in the stage of emergency. The software should have an add on version for shelter or rescue homes .path finding and random forest algorithm are used.HTML ,CSS,PYTHON are the core language used for developing this software. The user can upload any information related to this . they can also access any information at any time by using this web application.

III. MODULES

Administration System:



Classification of URL into Malicious or Benign using Machine Learning Approach

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Abstract: Now days everything is digitalized and it's difficult to secure our data. Web security is a major issue because everything is connected through internet. The common way of launching an internet attack is by using malicious URLs. Hackers or Intruders leaks billions of confidential data every year by using malicious websites. The traditional way of detecting these kinds of malicious URLs or websites is by the use of a web database called Blacklists. There are many URL shortening methods and Domain Generation Algorithms are available which make it difficult to detect the newly generated malicious URLs. To increase the efficiency and avoid database dependency we proposed the Machine learning approach to detect the malicious URLs. In machine learning approach there are so many algorithms available for the classification and feature extraction from that we select the best method that is Random forest which will give us more accurate result than the past ones. So our proposed system will increase the efficiency and gave accurate prediction whether the URL entered is malicious or benign by using a well-defined dataset. It is also possible to implement the machine learning application in a proxy server or any network traffic controller system.

Keywords: Malicious URL; Random forest; Machine learning; Blacklist; Detection; prediction; URL; benign

I. INTRODUCTION

Web-based malware attacks become one in every of the foremost serious threats that require to be addressed desperately. Many approaches that have attracted attention as promising ways in which of defence work such as malware embrace using numerous blacklists. However, these standard approaches usually fail to observe new attacks because of the flexibility of malicious websites. Thus, it's tough to take care of up-to-date blacklists with information concerning new malicious web sites. Malicious address detection plays an important role for several cyber-security applications, and clearly machine learning approaches square measure a promising direction. In combination with privacy constraints on knowledge sets of actual user traffic, its troublesome for researchers and merchandise developers to gauge anti-malware solutions against massive scale knowledge sets of realistic net traffic. Machine learning technique [1] area unit employed in order to classify the online traffics into malicious and benign URLs. The appearance of recent communication technologies has had tremendous impact with in the growth and promotion of companies spamming across several applications as well as online-banking, e-commerce, and social networking. In fact, in today's age it's nearly obligatory to possess a web presence to run an eminent venture. As a result, the importance of the world wide net has unendingly been increasing. Sadly the technological advertisements return in addition to new subtle techniques to attack and scam user. Such attacks embrace malicious websites that sell counterfeit merchandise, monetary fraud by tricking users into revealing sensitive information that eventually cause thieving of cash or identity, or perhaps putting in malware within the users system. There square measure a large type of techniques to implement such attacks, like specific hacking tries, Derive-by exploits, Denial of service [2], Distributed denial of service [1] and lots of others. Concentrating the variability of attacks, doubtless new attack varieties, and also the unnumbered contexts within which such attacks will seems, it's arduous to style-strong systems to discover cyber security breaches. The limitations of traditional security management technologies are becoming more and more serious given this exponential growth of new security threats, rapid changes of new IT technologies, and significant shortage of security professionals. Most of these attacking techniques are realized through spreading compromised URLs [1].

II. PROPOSED ALGORITHM

The machine learning approach of detecting malicious URLs contain mainly three phases they are feature extraction, classification and prediction. Machine Learning approaches, use a set of URLs as training data, and based on the

Mobile Application Development on Detection and Diagnose of Learning Disability for Children

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Abstract: Learning disability alludes to a huge impairment of general intellectual and adaptive functioning that begins in childhood. Children register their name and attend the test for identifying their learning disability. In the existing system was developed as a mobile application dyscalculia for children in Malaysia during the year 2017. The existing application was developed in native language of Malaysia so it cannot use globally. Though the researches are done, there are no implemented solutions for this problem. In the proposed system presents the detection and diagnose of learning disability. The role of this mobile application will improve the hard life of persons with learning disability. The mobile application system is supporting the individual with learning disability to practice arithmetic and language skills. This application also focuses on the development and brain stimulation of a community with learning disability as a social development service. The Mobile application is developed for registration, information gathering, and disability test through questionnaire using clinical methods. To improve the learning disability to conduct tests for basic arithmetic and language skills. It combines neuron science and computer science in order to find the solution for a community. It develops computational models of attention and memory. The vital goal of this application is to improve brain efficiency of individuals with learning disability.

Keywords: Learning disability, Detection, disability test and improve brain efficiency.

I. INTRODUCTION

Learning disability is not related with physical disability. There are three kinds of learning disability. Those are writing disability, reading disability and mathematical disability and it is shown in fig.1. Learning disabilities are neurologically-based treating problems. These processing problems can restrict with learning basic skills such as reading, writing and/or math. They can also impede with higher level skills such as organization, time planning, mental reasoning, long or short term memory and attention. It is main to realize that learning disabilities can affect an individual's life beyond academics and can impact relationships with family, friends and in the workplace.

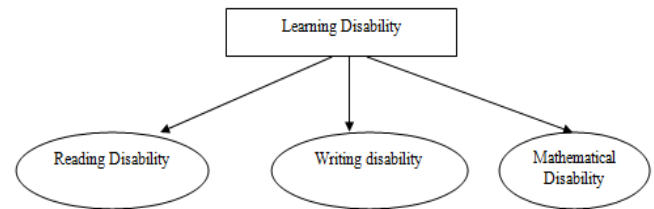


Fig. 1 Learning Disability classification

Since problems with reading, writing and/or math are detectable problems during the school years, the signs and signs of learning disabilities are most often diagnosed during that time. However, some individuals do not accept an evaluation until they are in post-secondary education or adults in the employees. Other individuals with learning disabilities may never obtain an evaluation and go through life, never knowing why they have complications with academics and why they may be consuming problems in their jobs or in interactions with family and friends.

Learning Disability has affected one third of the children in the whole world, it takes long time to detect the Disability in children. As Learning Disability is not a physical disability, the children are affected with neurological issues that can be improved through the systematical treatment. The application can be used for detecting and diagnosing the Learning Disability in the children, the digitalized systems are needed in our decade. The users are afraid to consult doctors thinking the future issues in society, so that the community of children with learning disabilities is not getting enough treatment. The system gives enough treatment via the new technologies for a community of children who are not getting enough concern the need of this system is to detect the Learning Disability and to improve the abilities of children.

There are several Mobile application are developed for children. One of the application was dyscalculia who are not capable enough normal children normal IQ in mathematics only in Malaysia. The application is developed in the Malay language which is the national language of Malaysia. So the application can be used within the Malaysia only. It influences the capacity to do mathematical problems by step by step lessons and it improves the mathematical efficiency.

Another Mobile Application for the children The Easy Lexia and Dyslexia for learning disabilities. The above applications influences the capacity of reading comprehension in children, but the application has an effortful interface that the children with physical disability has to take effort.

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Website for Bulletin Board

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Abstract

A Bulletin board is a place where people can read announcements, posters or leave comments on public messages. However traditional bulletin board system certainly have several disadvantages such like without interaction with users, inefficient reusability, monotonous, space consuming is more. This paper presents website for bulletin board for sharing information to others and interact others easily. At first we keep on finding various news, information, within the area. Then we have to analyse those information and sort it out based on user needs. Then we have to upload it on website. Compare to traditional bulletin boards and intelligent bulletin board system, our website has more flexibility. Continuous monitoring, updating daily news. This web portal is developed by word press platform using HTML, CSS languages. The main goal of this paper is intended to develop a portal for manage news. Our system offers a simple, useful and economical solution for the real time interaction between the user and web applications.

Keywords - Sharing, user needs, style, news, develop, analyze.

I. INTRODUCTION

During past decades, guiding systems and bulletin boards are widely existing at many places, especially prevalent at universities. However, traditional bulletin board systems and bulletin boards certainly have a) inefficient reusability b) space consuming c) without real time interactions with users d) monotonous. In the recent modern age, sharing or exchanging information, messages to others files on a network. These systems can differ rapidly in size and focus depending on the needs of users. Based on the user requirements, we have to develop a new website for bulletin board. Many researchers have paid attention on the user choice for the purpose of making an ease of use environment between the human beings and machines. Our objective is to create website for bulletin board for sharing information to others. A website for bulletin board is a place where people can read announcements, posters or leave public messages. People can access this website at any time at anywhere. This paper presents a bulletin board system with real time human computer interaction using website. People are becoming accustomed to easy access to information. Whether it's through the

internet, people want themselves to be updated with the latest event happening around the world. In today's world people prefer wireless connection because they can interact with people easily and it require less time. Once logged on this website users can do read and write messages in discussion forums upload and download files and play online games, online magazines, local and international news and other factual information related to this specialty of the bulletin board system. It is one of the best communication and entertainment mediums you won't find anywhere else.

II. METHODOLOGY

STEP 1 : Defining strategy: Examining of current site, review of objectives and targets, evaluation of technical requirements, evaluation of future needs, development of creation schedules.

STEP2: Planning: Data engineering, route, and client stream investigation, sitemap and wireframes.

STEP3: Design: Key configuration ideas for assessment, refined outline heading for the picked plan direction

STEP 4: Testing: Testing of development site, deployment of website.

STEP 5: Maintenance: Technical support is available to give continuous site maintenance.

III. PROPOSED SYSTEMS

The proposed system includes that sharing information to user with the help of website. This website is used for accessing any information and basic needs for user's. In this paper we have to monitoring overall cities around Coimbatore and gathering information for user's. It is very easy to gain the information and recognize the problem can be affected in an area. WORDPRESS is the platform used for this website to upload daily news and user interaction.

At any time being anywhere we can add or remove or alter the text according to our requirements using html and CSS. The main advantage of this website is we will know about daily news very shortly and easily, then sports news, weather news, students information, business news etc... are available. There are more number of pages in this websites based upon the user needs. We have to proposed that users can access any information at any time at anywhere by using this website

Smart Traffic Control System with Path Clearance Ability and Theft Vehicle Detection

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Abstract: The principal challenge in traffic control is to accommodate the traffic in safe and efficient way conventional system do not gives much preference to emergency vehicles such as ambulance, fire and safety vehicles... that's why majority of human lives are ended on traffic on the way to hospital. So in consideration to that we proposed this system. Path clearance for emergency vehicle is included here emergency vehicle driver as well as user have an application to give and get the notification respectively also there is a centralized server in between the min addition to this we included theft detection module. It is for the vehicle owner through hardware and a application.

Keywords: Traffic light, WIFI access point, RSSI, ESP32, DJANGO server.

I. INTRODUCTION

The project deals with a novel method for path clearance for emergency vehicles and also for vehicle theft detection. The work aims in designing an intelligent traffic controlling system. There is a great requirement to have well coordination of the traffic signals and also with the other vehicle on the way. so for the effective path clearance for emergency vehicle we are implemented in 3 modules. Emergency vehicle driver alert, traffic light control, user alert. This are done through the android application. And also the project deals with a novel method for vehicle tracking and providing an alert to the owner of the vehicle by communication through android application to get alert. Vehicle tracking and theft detection systems have brought the N component especially for the vehicle versions which are not included hotspot facility in vehicle and also for increment the network range. the signal strength when the user's WIFI is connected with the hotspot is helps to find out whether the vehicle is theft or not.

II. EXISTING SYSTEM

Existing system for traffic control is differ in different countries. Currently there are many intelligent traffic control systems are there using different technologies such as embedded system, RFID, PLC, fuzzy logic, image segmentation, scada, MEGA 328P microcontroller and Arduino software. These are already implemented in various countries and also its own advantages and disadvantages. Concepts using RFID arduino are successfully implemented in countries like UK&US. But in a developing country like India it is very difficult to implement because of the high population and also its high cost similarly in case of theft vehicle detection there are any options available in the vehicle itself like jaguar, audi, benz..most of the uses anti theft locking system, 360° protection car radar GPS laser detector safety which are costly and also any of the factory cars are designed to turn off. so this is not a efficient method which are the main disadvantages of the existing system and we are proposing a system to overcome these cons.

III. PROPOSED SYSTEM

We are proposing a system with a little more features to the current one, by involving the emergency vehicle driver and other vehicle owners through an application to give and get notification regarding the arrival of emergency vehicle with the help of a centralized server. All system is connected to a centralized server. Centralized server will control traffic lights when the ambulance approach the traffic control. User also connected with centralized server. User got a notification to slowdown the vehicle. in case of theft detection we are creating a hardware setup to place it as hidden in the vehicle and we are using the signal strength from the device to vehicle theft detection and find the vehicle. Here we are included 4 modules. Emergency vehicle alert, Traffic light control, User alert and theft detection.

NOVEL APPROACH BASED AN IMAGE SEGMENTATION USING K-MEAN CLUSTERING

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ABSTRACT - Now a day's image processing is an important role in real life application. Image segmentation is the maneuver of partitioning an image into a set of connected sets of pixels. Partitioning covers the whole image. Each row of data represents one pixel. Each column of data represents one image. Have k-means decide which cluster each pixel belongs to. Here, we convert the pixel into images for all class index. It is supposed to be monochrome, get the dimensions of the image. If it is not a gray image then that notifies the colour image. Use subjective computation of all channels to generate a gray scale image. Convert it to gray scale by taking only the green channel, Convert it to gray scale by taking only the green channel, get the data for doing k-means. We will have one column for each colour channel. These papers describe an image segmentation method based on k-mean clustering algorithm to get a segmented image. Finally we get the segmented image.

1. Introduction

Image segmentation is used to separate an image into several "meaningful" parts. It is an old research topic, which started around 1970, but there is still no robust solution toward it. There are two main reasons, the first is that the content variety of images is too large, and the second one is that there is no benchmark standard to judge the performance. For example, we show an original image and two segmented images based on different kinds of image segmentation methods. The one separates the sky into several parts while that misses some detail in the original image. Every technique has its own advantages also disadvantages, so it's hard to tell which one is better. There are tons of previous works about image segmentation, great survey resources could be found. From these surveys, we could simply separate the image segmentation techniques into three different classes (1) feature-space based method, (2) image-domain based method, and (3) edge-based method. The feature-space based method is composed of two steps, feature extraction and clustering. Feature extraction is the process to find some characteristics of each pixel or of the region around each pixel, for example, pixel value, pixel color component, windowed average pixel value, windowed variance, Law's filter feature, Tamura feature, and Gabor wavelet feature, etc.. After we get some symbolic properties around each pixel, clustering process is executed to separate the image into several "meaningful" parts

based on these properties. This is just like what we have tried from DIP homework 4, where we used Law's feature combined with K-means clustering algorithm.

Image-domain based method goes through the image and finds the boundary between segments by some rules. The main consideration to separate two pixels into different segments is the pixel value difference, so this kind of methods couldn't deal with textures very well. Split and merge, region growing, and watershed are the most popular methods in this class. The third class is edge-based image segmentation method, which consists of edge detection and edge linking.

Although there have been many kinds of existed methods, some common problem still can't be solved. For the accurate boundaries between segments are still hard to determine because features take properties around but not exactly on each pixel. Then only uses the pixel value information, which may result in over-segmentation on texture regions. Finally the edge detection process makes always suffer the over-segmentation problem.

2. K-means clustering

We have two goals to achieve: maintain large distance among data points in different clusters and small distance among data points in the same clusters. This is the famous tool for unsupervised classification problems.

2.1 K-Means Algorithm

K-means is one of the simplest unsupervised learning algorithms that solve the well known clustering problem. The procedure follows a simple and easy way to classify a given data set through a certain number of clusters (assume k clusters) fixed a priori. The main idea is to define k centroids, one for each cluster. These centroids should be placed in a cunning way because of different location causes different result. So, the better choice is to place them as much as possible far away from each other. The next step is to take each point belonging to a given data set and associate it to the nearest centroid. When no point is pending, the first step is completed and an early group age is done. At this point we need to recalculate k new centroids as barycentre of the clusters resulting from the previous step. After we have these k new centroids, a new binding has to be done between the same data set points and the nearest new centroid. A loop

Modeling and simulation of bidirectional AC-DC power converter ?

Publisher: IEEE

4 Author(s) C. Sakthivel ; T. Venkatesan ; V. Jet...



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Dynamic Voltage Control of Dynamic Voltage Restorer for Power Quality Improvement

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ABSTRACT

Power quality is one of the most important issues in present systems. Power quality problems like voltage sag, swell and harmonics are major concern of industrial and commercial electrical consumers this is due to large number of sophisticated electrical and, simple operation and variable switching electronics equipment such as computers, adjustable speed drives, programmable logic controllers and so forth. This equipment often requires high power supplies with high quality. Some devices are sensitive to the load voltage disturbances if these take up to several periods the circuit does not work. Various solutions are presented for this problem. One of the most effective methods is the use of Dynamic Voltage Restorer. The efficiency of the DVR is depends upon the control techniques involved in switching the inverter. In this paper hysteresis voltage control of DVR is used to improve the power quality problems. Hysteresis control has very fast transient response frequency. The performance of the proposed method and achievement of desired compensation are confirmed by the results of the simulation using MATLAB/simulink.

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KEY WORDS Power quality, Dynamic Voltage Control, FACTS nd STATCOM

1. Introduction

Power quality is the delivery of sufficiently high grade electrical services to the customer. A power quality problem is an occurrence manifested as a non-standard voltage, current or frequency that results in failure or mis-operation of end user equipment's. Power distribution systems, ideally should provide customer with an uninterrupted flow of energy at smooth sinusoidal voltage at the Contracted magnitude level and frequency, but in practice distribution systems, have nonlinear loads, which affect the purity of waveform of supply. Some events both usual (e.g. Capacitor switching, motor Starting) and unusual (e.g. Faults) could also inflict power quality problems. Faults at distribution level causes voltage sag or swell, which can cause sensitive equipment to fail as well as create a large current unbalance that could blow fuses or trip breakers. Under heavy load conditions, a significant voltage drop may occur in the system. A dip is usually taken as an event lasting less than one minute when voltage decreases to between 0.1 and 0.9 p.u. (dip greater than 0.1 p.u. is usually treated as an interruption) or Voltage sag can occur at any instant of time, with amplitudes ranging from 10-90 % and a duration lasting for half cycle to one minute These effects can be very expensive for the customer, from minor quality variation to production

Downtime and equipment damage. Voltage swell is defined as an increase in rms voltage or current at the power frequency for durations from 0.5 cycles to 1 min. If the supply voltage or load current decreases to less than 0.1 p.u for a period of time not more than one minute is known as interruption. It can be caused either by system faults,

equipment failures or control malfunctions. Voltage support at a load can be achieved by reactive power injection at the load point of common coupling. The method for this is to install mechanically switched shunt capacitors in the primary terminal of the distribution transformer. The mechanical switching will be on a schedule, via the signals from a supervisory control and data acquisition (SCADA) system, with some timing schedule, or without switching at all. The disadvantage in this method is that, high speed transients cannot be compensated. Some sag is not cleared within the limited time frame of mechanical switching devices. Transformer tapings may be used, but tap changing under load is costly.

Initially for the improvement of power quality or reliability of the system FACTS devices like static synchronous compensator (STATCOM), static synchronous series compensator (SSSC), interline Power flow controller (IPFC), and unified power flow controller (UPFC) etc are introduced. These types of FACTS devices are designed for the transmission system. But now a day as more attention is on the distribution system for the improvement of power quality, these FACTS devices are modified and known as custom power devices. The most effective type of CPD devices is considered to be dynamic voltage restorer (DVR). Power quality in the distribution system can be improved by using DVR, as assures pre-specified quality and reliability of supply. This prespecified quality of DVR may contain a combination of specification of following: low harmonic distortion in load voltage, low phase unbalance, no power interruptions, acceptance of fluctuations, and poor power factor loads without having significant effect on the terminal voltage,

A single stage ZVS Power factor correction converter

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Abstract

The aspects with respect to control strategies power factor correction (PFC) converter are examined. Research effort in focus to minimized switching stress for improving better efficiency in power rating is 500W/48V, is achieved by using soft switching. In this suggested converter and switching scheme ZVS voltage stress is shaped. Added to this power loss is minimized. A 500W/48V prototype is proposed to serve the concept proof, which exhibits 92.69% peak efficiency at low input line voltage.

Keywords: Power factor correction, Zero voltage switching, Zero current switching, Total harmonics Distortion, Soft switching, Single Stage converter.

1. Introduction

In accordance with IEC 1000-3-2, required to achieved with power factor high and very low THD at power conversion of ac/dc for the purpose of full usage of the lines transmission and for improved grid nature, Passive electronic components are those that don't have the ability to control current by means of another electrical signal, but Active electronic components are those that can control the flow of current. So we conclude that active component better than passive component. In passive power factor correction method, the inductive and capacitive filter is used between the AC supply and diode rectifier of AC/DC converter is a very finest way to achieved power factor correction but the main drawback of this is very heavy and bulky so it's applicable only for low power rating like less than 25W.

To work at high frequency, the circuit size to be decreased. The high-frequency double –stage functioning PFC converters have been put-forth [3] and [5] . In the first stage ac/dc, the PFC converter is working with switching frequency in the tenth to several hundred KHz to tenths and vice versa, to acquire proper input current which is near to sinusoidal waveform. In the second stage, the galvanic isolation and output voltage regulation are provided by dc/dc converter. Both stage controllers are totally independent of one another.

The Single-Stage ac/dc converter is the cost-effective one for the reduction in the number of switches [5]. In single stage the front-end PFC and dc/dc are working together as a unit. The capacitor or inductor is in between both the stage which acts an energy storage unit and gives up enough hold up time. A lot of PFC ac/dc are put forth, working in a discontinuous mode for effective PF control.

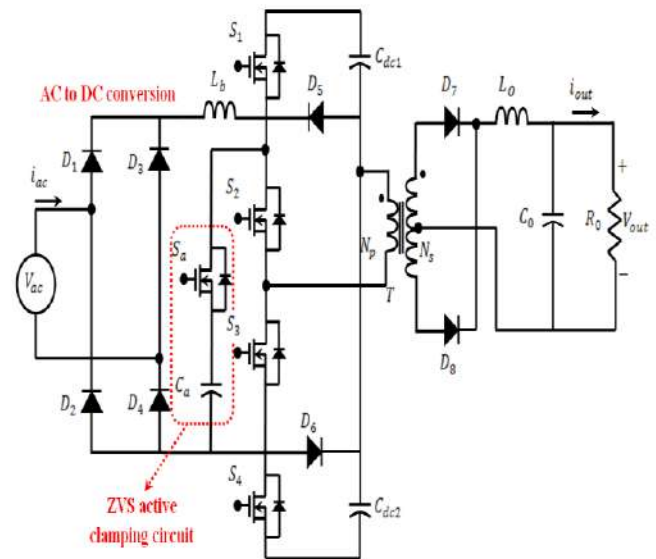


Fig. 1: Proposed ZVS single stage ac-dc converter

This study suggests not an old SSTC stand-alone ac-dc PFC converter which is achieved with completed working togetherness of double stages, where the switch is distributed between input current and output voltage as in Fig.1. The proposed converter gives the least components as three-level dc/dc converter, which will not need auxiliary circuit except a diode bridge and an inductor. This topology is cost efficient application for a high – voltage dc-link.[6]-[11].

The two self –dependent algorithms are mingled together to achieve PFC and output regulation. In light load also the feature allows for lower ripple and less change input current. Added to this center two switches are in ON condition under zero current in discontinuous conduction mode operation and the top and lower switches are turned ON under zero volt, where the efficiency is raised up. Moreover, high rate PF can be accruing at high line voltage as a result of flexible dc-link voltage is organized.

RECOVERY OF PROPYLENE FROM LPG

Dr. S.Venkatesh Babu¹, Dr. G.Ramesh²

Abstract- LPG consists of an propylene, butylenes and many other hydro carbon mixtures. The allowable quantity of propylene in LPG is about 5%. Though Propylene has many adverse effects it is used as feedstock for many reactors and used as light power fuel. LPG is a form of natural gas which has rich portion of propylene in it. on demand necessity of lighter power fuel in the market demands for the more propylene supply. This paper reveals the promising removal technology of propylene from the LPG. Distillation and catalyst hydrogenation technologies are used for the separation of propylene from the hydrocarbons. But the later was costly when compared to the former. In our proposed technology cost effective methods are used for the same purpose. From our method about 95% pure propylene is being obtained.

Keywords: LPG, cumene, C3-C4 splitter, centrifugal pump, propylene.

1. INTRODUCTION

Liquefied petroleum gas commonly known as LPG are being a part of the day to day life since the last two decades. LPG consists of propylene, butylenes and many other hydrocarbons. They are also simply called as propane. Other than being used as cooking equipment they are also used as fuel, aerosol propellant, refrigerant, etc.

There is a maximum allowable limitation of 5% of propylene in the LPG. But due to the adulteration in LPG the propylene level is being raised in order to obtain the high profit in the propane fuel market.

Propylene also known as methyl ethylene is an fossil fuel and also comes as an by product during refining and processing of crude oil and natural gas. Hydrocarbons are cracked to give many other by products including propylene. Since hydrocarbons are much needed source of energy propylene is higher in demand in fuel market. Other than cracking of hydrocarbons propylene are also produced by other chemical methods like fractional distillation and refining. The propene obtained by this method is about 60-70%. Switching to Light steam cracking feedstocks with low propene has over taken the gasoline usage which causes the propylene to emerge as a in-demand product in the market there by increasing its production in a noticeable level.

2. PROPYLENEPRODUCING

2.1 Methods

2.1.1.Olefin Metathesis

Olefin metathesis, is an disproportionation method which involves the bond breakage between ethylene and butenes which are then reversed to produce propylene. Propylene produced by this method is about 90% in molecular weightage. This process is used as an optional when there is shortage of butene feedstock. Here ethylene is inputted to the ethylene-dimerization unit which outputs butene.

2.2. Dehydrogenation

In this method the propane is converted into propene by the removal of hydrogen molecules and the hydrogen is given as an by-product. The propene produced by this method is about 85% in molecular weightage. The by-products obtained from this method are used as fuel for this method itself thereby downsizing the external fuel requirement.

Many dehydrogenation plants are being constructed around the world for the production of propene. There are many techniques to produce the propene by this method. The differences in each method will be the reactor design, catalyst used and the conversion rates. So far five technologies has been identified and licensed.

3. FLUID CATALYTIC CRACKING

Fluid catalytic cracking (FCC) method uses traditional cracking technique under severe compressed conditions such as keeping high steam rate, high ratio of catalyst to oil under high temperature. These conditions are maintained so as to increase the amount of propylene produced. This unit is fed with the paraffin residue inputs to produce propylene weighting about 20-25 mol % also byproducing the gasoline.

In this technology large Olefins molecules (C4-C8) are cracked by the catalytic action so as to produce more propene and ethylene in fewer amount.

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RESEARCH ARTICLE

APPLICATION OF CONDITIONING, CURVE SYNTHESIZING AND QUALITY CONTROL OF WELL LOG DATA'S.

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Abstract

During exploration and development stage Petrophysical evaluation of well log data has always been crucial step for identification and assessment of hydrocarbon bearing zones. In this paper, petrophysical evaluation of well log data from cluster of five wells in the selected study area is carried out in National Petroleum Reserve Alaska (NPRA). Petrophysical evaluation has provided the estimation of reservoir location, the fluid type and its amount. Log conditioning and quality control of log data's play a significant role in the interpretation process. In this work we had done quality control of log data's for the selected wells and conditioned those data's which are poor in quality using MLR (Multi Linear Re-gression) method and the bad data points are identified by cross plotting the curve with respect to others, which is carried out in the petrophysical software, IPv4.2 and TECHLOG²⁰¹⁵.

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Introduction:-

Well logging, as a terminology, is originated from France in 1927. Its primary meaning is electrical cor-ing, which is a continuous record of characteristics of rock formations traversed by a measurement device in the well bore. Well logging is the process of continuous recording various physical, chemical, electrical, or other properties of the rock or fluid mixtures penetrated by drilling a well into the earth's mantle. The most appropriate name of this continuous depth-related record is a wire-line geophysical well log, conveniently shortened to well log or log. It has often been called an "electrical log" because historically the first logs were electrical measurements of electrical properties. However, the measurements are no longer simply electrical, and modern methods of data transmission do not necessarily need a wire-line so the name above is recommended.

To perform a logging operation, the measuring instrument, often called a probe or sonde, is lowered into the borehole on the end of an insulated electrical cable. The cable provides power to the downhole equipment. Additional wires in the cable carry the recorded measurement back to the surface. The cable itself is used as the depth measuring device, so that properties measured by the tools can be related to particular depths in the borehole. A logging tool is made up of a sonde and a cartridge. The sonde is the portion of the tool which gives off energy, receives energy, or both. The cartridge contains the electrical circuitry or computer components needed to control the downhole equipment, and to transmit data to and from the surface. Combination logging tools consist of more than one sonde and cartridge, so that more than one log can be recorded on a single trip into the wellbore. Surface equipment is mounted in a logging truck, van, or skid unit from which all logging operations are controlled. The

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Removal of Nickel (II) and Zinc (II) present in the Electroplating Industry Wastewater by Bioaccumulation Method

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ABSTRACT:

In the present work, the bioaccumulation study of electroplating industrial waste water using *Micrococcus cascolyticus* was carried out. The characteristics of the wastewater (pH, BOD, COD, TDS) were analyzed using standard method and it was found to be above permissible limit. The preliminary analysis for the bioaccumulation process was done by spread plate method and the concentration of the Nickel and Zinc was determined using standard method. After the bioaccumulation treatment, the aforesaid parameters were found to be below the permissible limit as prescribed by pollution control board. The removal percentage of Nickel and zinc present in the treated effluent was found to be 44.68 % and 48.76 % respectively. The maximum biomass for the Nickel and Zinc was found to be 5.8 g/l and 4.8 g/l respectively. For better bioaccumulation process, the parameters such as pH, Temperature, microbial volume, were optimized. The optimized temperature for the removal of Nickel and Zinc was found to be 50°C and 55°C respectively. Thus the *Micrococcus cascolyticus* has an ability to reduce the heavy metals concentration and other parameters (pH, BOD, COD, TDS) present in the waste water at the promising level.

KEYWORDS:

Bioaccumulation, *Micrococcus cascolyticus*, electroplating industrial effluents, Spread plate assay.

Cite:

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S. Kanchanadevi, Frank R. Fronczek, V. Arun and V. Mahalingam*

Crystal structure of bis[(((4-fluorophenyl)amino)methyl)triphenylphosphonium] tetrachloridocobaltate(II), $C_{50}H_{44}Cl_4CoF_2N_2P_2$

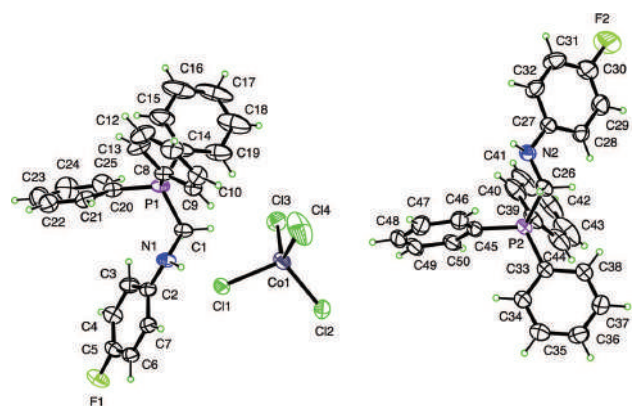


Table 1: Data collection and handling.

Crystal:	Blue fragment
Size:	0.40 × 0.34 × 0.33 mm
Wavelength:	Mo K α radiation (0.71073 Å)
μ :	0.71 mm ⁻¹
Diffractometer, scan mode:	Bruker Kappa APEX-II DUO CCD, φ and ω
$\theta_{\max}$, completeness:	28.9°, >99%
$N(hkl)_{\text{measured}}$, $N(hkl)_{\text{unique}}$, R_{int} :	198347, 12366, 0.043
Criterion for I_{obs} , $N(hkl)_{\text{gt}}$:	$I_{\text{obs}} > 2 \sigma(I_{\text{obs}})$, 10091
$N(\text{param})_{\text{refined}}$:	556
Programs:	Bruker [1, 2], SHELX [3, 4]

<https://doi.org/10.1515/ncrs-2018-0288>

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Abstract

$C_{50}H_{44}Cl_4CoF_2N_2P_2$, orthorhombic, *Pbca* (no. 61), $a = 18.4662(6)$ Å, $b = 15.2888(5)$ Å, $c = 33.2661(10)$ Å, $V = 9391.9(5)$ Å³, $Z = 8$, $R_{\text{gt}}(F) = 0.0403$, $wR_{\text{ref}}(F^2) = 0.1005$, $T = 180.0(5)$ K.

CCDC no.: 1855274

The asymmetric unit of the title crystal structure is shown in the figure. Tables 1 and 2 contain details on crystal structure and measurement conditions and a list of the atoms including atomic coordinates and displacement parameters.

Source of material

An ethanol solution of $[CoCl_2(PPh_3)_2]$ (0.2 mmol) in ethanol (25 mL) and the Schiff base 2-[(4-fluorophenylimino)-methyl]-phenol (0.2 mmol) in 1:1 molar ratio was added and heated under reflux in a round bottom flask fitted with a double surface condenser for 6 h. The solution was then concentrated on the water bath to 3 mL and cooled. The product {bis[(((4-fluorophenyl)amino)methyl)triphenylphosphonium] tetrachloridocobaltate(II)} was precipitated by the addition of small quantity of petroleum ether (60–80 °C) and recrystallized from CH_2Cl_2 /petroleum ether and dried in vacuum (Yield-70–16%). Anal. calcd. for $C_{50}H_{44}CoN_2P_2F_2Cl_4$ (%): C, 61.68; H, 4.55; N, 2.87. Found (%): C, 61.63; H, 4.25; N, 2.75.

Experimental details

Hydrogen atoms were treated by a mixture of independent and constrained refinement. Coordinates for NH hydrogen atoms were refined, while those on C were placed in idealized positions. U_{iso} values for H were assigned as 1.2 time the U_{eq} values for the atoms to which they are bonded.

Comment

Schiff base ligands play a vital role in preparation of synthetic drugs and biological processes. These bioactive compounds have attracted their attention in the field of anti-cancer [5, 6] anti malarial [7, 8] and various clinical and pharmacological areas [9–13]. They gained attraction in the field of super capacitors, organic solar cells, electro chromic

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This Certificate is presented to



Dr. Thirumurugan A

Professor

Department of Civil Engineering

JCT College of Engineering and Technology

Coimbatore

for presenting the research paper entitled “Waste Development of Hybrid Fibre Reinforced Green Concrete using Industrial Materials” in the **International Conference on Civil, Mechanical, Chemical Engineering & Technologies - 2018 (ICCMCT - 2018)** organized by **SVS College of Engineering, Coimbatore, Tamil Nadu, India**, during **23 - 24, February 2018**.

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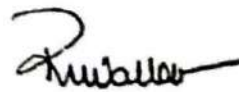
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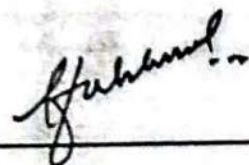
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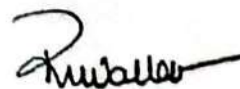
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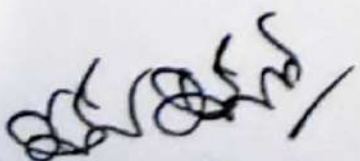
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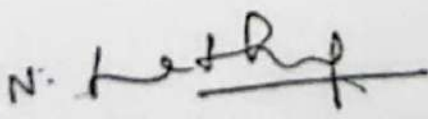

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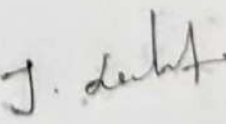

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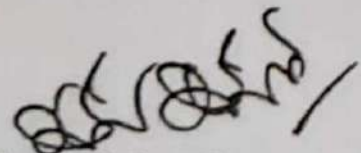


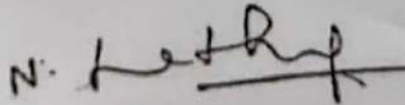
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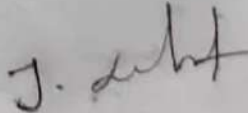
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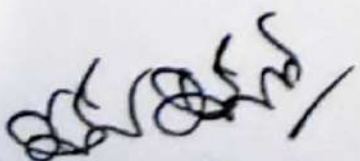
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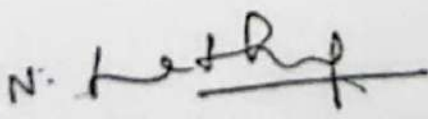
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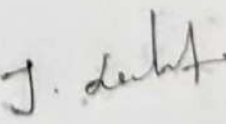
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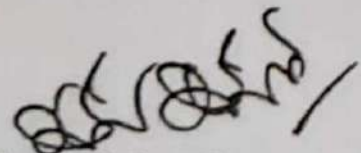


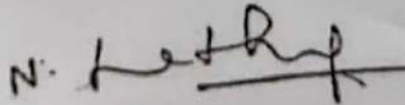
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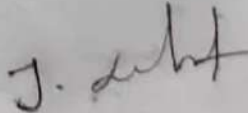
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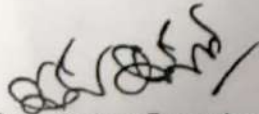
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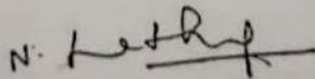
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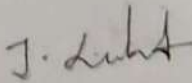
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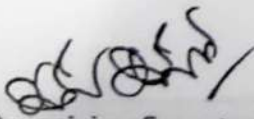
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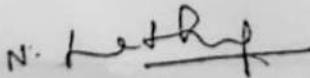
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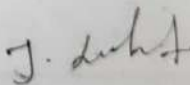
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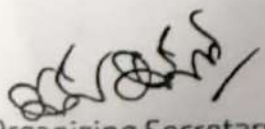


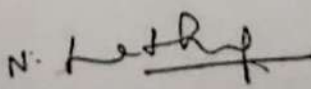
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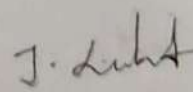
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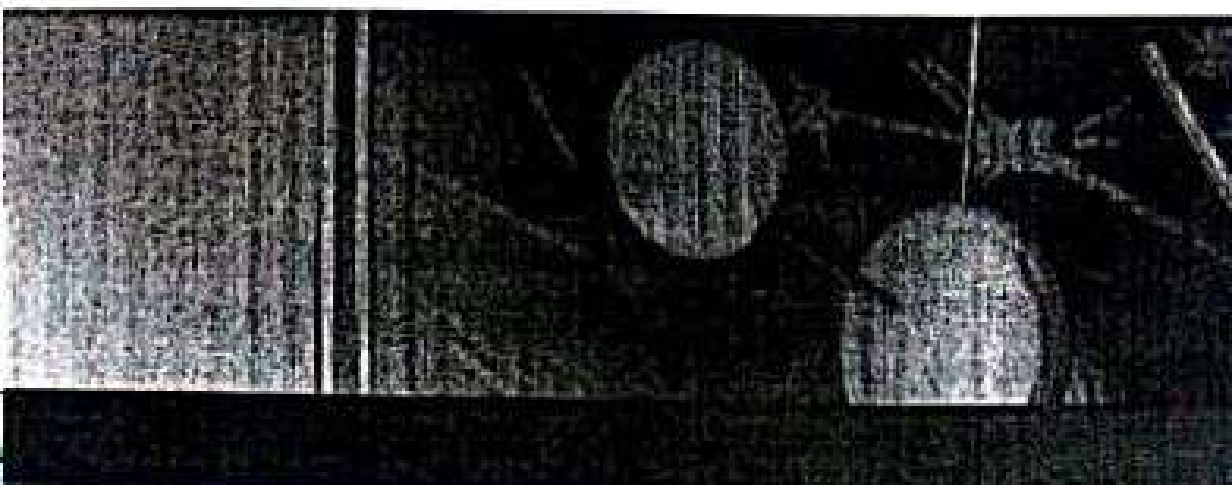
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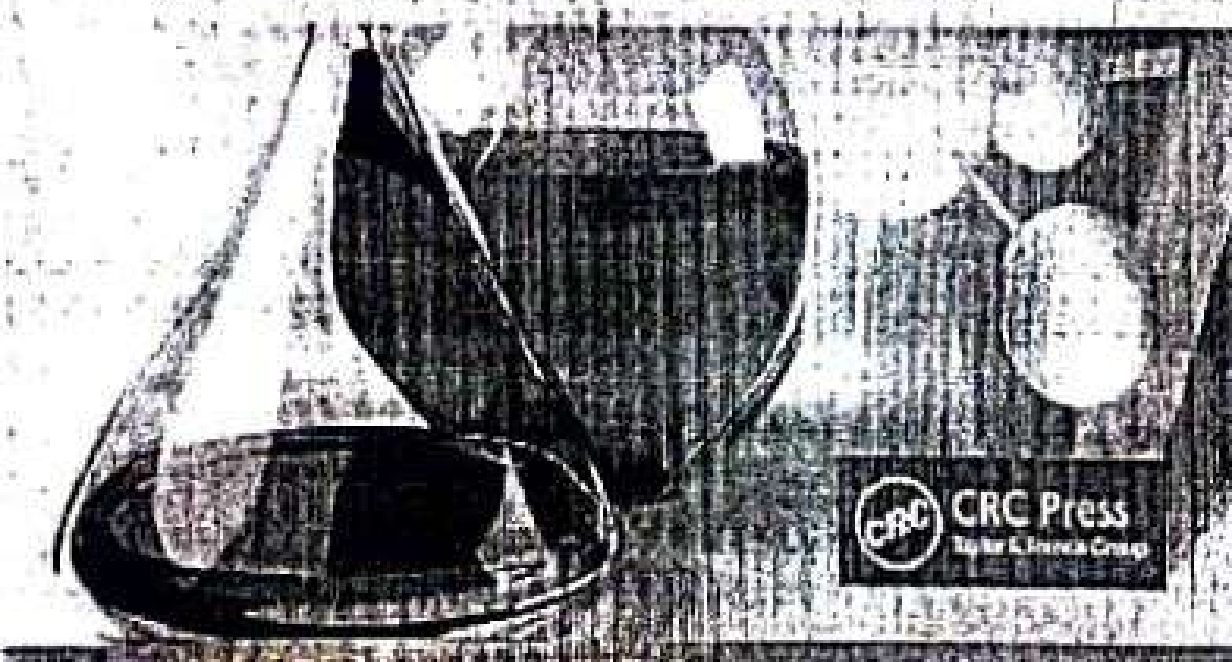
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BIOCHEMICAL AND ENVIRONMENTAL BIOPROCESSING

CHALLENGES AND DEVELOPMENTS

Edited by
M. Jerold and V. Sivasubramanian



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Biochemical and Environmental Bioprocessing

Challenges and Developments

Edited by M. Jerold and V. Sivasubramanian

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Contents

Foreword	vii	Editors
Preface	ix	Contributors
.....	xi	
.....	xiii	
Chapter 1 Biosorption – An Elective Strategy for Wastewater Treatment: An Eco-Friendly Approach	1	
<i>A. Saravanan, P. Senthil Kumar and P. R. Yaashikaa</i>		
Chapter 2 Recent Advancements and Perspectives on Biological Degradation of Azo Dye	17	
<i>Rajmohan K. S., Ramya C. and Murali Mohan Seepana</i>		
Chapter 3 Performance Analysis of Anaerobic Digestion of Textile Dyeing Industry Effluent in a Modified Sequential Batch Reactor	37	
<i>S. Venkatesh Babu and M. Rajasimman</i>		
Chapter 4 Waste Sea Shells for Biodiesel Production – Current Status and Future Perspective	53	
<i>Subramaniapillai Niju and M. Balajii</i>		
Chapter 5 An Intensified and Integrated Biorefinery Approach for Biofuel Production	87	
<i>Devadasu Sushmitha and Srinath Suranani</i>		
Chapter 6 Hydrothermal Carbonization for Valorization of Rice Husk	105	
<i>B. Sai Rohith, Naga Prapurna, Kuldeep B. Kamble, Rajmohan K. S. and S. Srinath</i>		
Chapter 7 Production of Biofuels from Algal Biomass	123	
<i>Murali Mohan Seepana, M. Jerold and Rajmohan K. S.</i>		
v		
vi Contents		
Chapter 8 Diffusion Limitations in Biocatalytic Reactions: Challenges and Solutions	139	



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GREEN SYNTHESIS OF MAGNETIC IRON NANOPHOTOCATALYST FOR THE REMOVAL OF METHYLENE BLUE DYE

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Dr. Mary Lubi C, Professor, Government Engineering College, Kozhikode

Paper prepared for presentation

at the 'NANOMATERIALS AND SMART MATERIALS' Session

of the 2019 Conference of the

Kerala state Technological Congress 2019 organised at

Government Engineering College Thrissur

ABSTRACT

Magnetic iron nanoparticles were green synthesized using the extract of green tea leaves and immobilized in calcium alginate beads. Characterization of nanoparticles was done by SEM and FTIR. The synthesized nanoparticle is spherical and have size 30-60nm range. These synthesized nanoparticles were used for the photocatalytic degradation of methylene blue. Effect of concentration of methylene blue dye, contact time, pH, catalyst dosage and hydrogen peroxide dosage were found out. COD can be lowered from 778mg/L to 122mg/L using this synthesized nanoparticle. Methylene blue degradation was 100% in 120 minutes using 4g/L of synthesized nanoparticle. Kinetic study of degradation reveals that it follows first order kinetics with reaction rate constant 0.05 min^{-1} .

Keywords: Green synthesis; Green tea; Iron oxide nanoparticle; Methylene blue dye removal; photocatalyst.

1. INTRODUCTION

Iron oxide nanoparticles can be used as Fenton-like catalyst for the degradation of organic solutes. Due to its nano scale size, high surface area and surface reactivity can be obtained [1-19]. Synthesis of metal nanoparticles through green route is an ecological friendly, cost effective method without the use of toxic chemicals [20-29]. In green synthesis of iron nanoparticles, the extract of plant parts is used as reducing agents. Presence of biomolecules including polyphenol, terpenoids, flavonoids etc, in plant extracts are responsible for the reduction of iron precursor and leads to nanoparticle production. Considering, green tea contains the majority of polyphenols, it is used for synthesizing nanoparticles.

Sunlight is abundantly available natural source of energy which can be conveniently exploited for the photodegradation of pollutants and can make the process economically more viable [30-35]. Dyes can be degraded in the presence of photocatalyst upon irradiation with visible light because of their absorption in the visible region.

The objective of this work is the green synthesis of magnetic iron oxide nanoparticle using ferric chloride as iron precursor and green tea aqueous extract as reducing agent and stabilizer. Nanoparticles were characterized by Fourier Transform Infrared (FT-IR), Scanning Electron Microscope (SEM) and Thermogravimetric Analysis (TGA). The effectiveness of this nanoparticles for the removal of methylene blue dye from aqueous solution were



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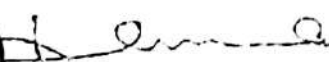


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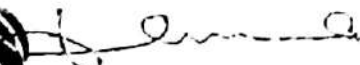


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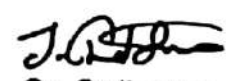
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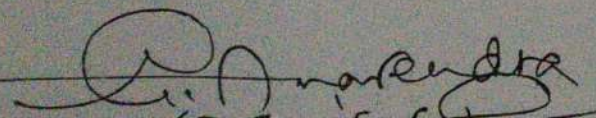


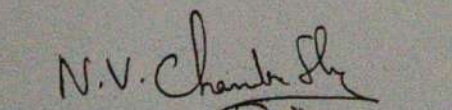
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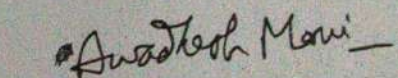


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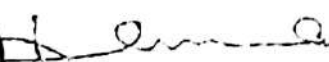


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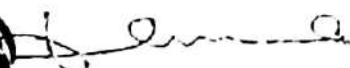


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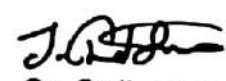
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Development of Self Healing Concrete to Improve Durability of Structures

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Abstract: - Concrete is most commonly used construction material which is strong in compression and weak in tension. The major drawback of concrete is formation of cracks, which affects the serviceability of concrete. When the applied load exceeds the limit, cracks develop on the structure through which water, salts and other foreign matters enter into the concrete and lead to the failure of the structure. Bacterially induced CaCO_3 precipitation has been proposed as an environmental friendly technique which can remediate cracks in concrete. Metabolic activities of bacteria in concrete can improve overall performance of concrete. In this paper an attempt to study bacterial concrete, types and classification of bacteria, mechanism, merits, demerits and applications of bacterial concrete.

Key words: - Concrete, bacteria, concrete strength, durability, applications.

I. INTRODUCTION

Concrete is strong, durable, locally available building material widely used for construction. Concrete is a composite building material composed primarily of cement, aggregate and water. Plain concrete possesses two major drawbacks as a structural material. They behave in brittle fashion and possess a very low tensile strength. It possesses a low modulus, limited ductility and little resistance to cracking. Micro cracks develop during its manufacture due to inherent volumetric and micro structural changes. Hence it is necessary to impart tensile resistance properties to concrete structural members to use it as a load bearing material. If the load applied on the concrete is more than their limit of resisting load, it causes the strength reduction of concrete by producing the cracks in concrete and the treatment of cracks is very expensive. The entry of moisture and harmful chemicals into the concrete through cracks can result in decrement of strength and life. These defects can be rectified by utilizing self healing technology which has high potential to repair cracks in concrete and enhance the durability of concrete structures with a reduction of demand for repair and maintenance. A new and advanced way of improving properties of concrete is through mineralization of bacterial isolates. Bacterial organisms have the ability to produce Calcium Carbonates through metabolic activity. Bacteria incorporated concrete

have enhanced durability as cracks in concrete can be rectified through mineral precipitation (CaCO_3). *Bacillus* species are aerobic spore forming gram positive bacteria with specialized thick walled dormant cells, viable for more than 200 years under dry condition. Incorporation of calcite precipitating bacteria to concrete in certain concentrations so that the bacteria will precipitate calcium carbonate when it comes in contact with water and this precipitate will heal the cracks. Bacterial concrete is also known as self - healing concrete or Bio concrete. Micro biologically induced calcite precipitation can heal cracks and improve the performance of the concrete.

II. LITERATURE REVIEW

Chithra P Bai et al.,(2016) "*An experimental investigation on the strength properties of fly ash based bacterial concrete*",^[1] This paper deals with the influence of *Bacillus Subtilis* bacteria on strength properties of fly ash concrete. In fly ash concrete, cement was partially replaced with 10%, 20% and 30% with fly ash by weight and optimizes the percentage of fly ash for making bacterial concrete. The bacteria *Bacillus Subtilis* of different cell concentrations 10^3 , 10^5 and 10^7 cells/ml were used for making bacterial concrete. The experimental investigations were carried out for 28 and 56 days. Tests conducted include Compressive strength, Split tensile strength, Flexural strength and Ultrasonic Pulse Velocity. In fly ash concrete, maximum strength properties observed for 10% replacement of cement with fly ash and the percentage of fly ash is fixed as 10% for making bacterial concrete. In bacterial concrete, maximum strength properties obtained for the bacteria cell concentration of 10^5 cells/ml.

K. Nagajyothi et al.,(2017) "*Experimental study on bacterial rice husk ash concrete by incorporating quarry dust as partial replacement of fine aggregate*",^[2] In this study, *Bacillus subtilis* was used as a microbial material for the preparation of bacterial concrete. Control concrete was prepared for comparison with bacterial concrete. Rice husk ash (RHA) and Quarry dust (QD) are used as a partial replacement of cement and fine aggregate in both control concrete and bacterial concrete. Cement was partially replaced with 5%, 10%, 15% RHA and fine aggregate was replaced

Experimental Study on Self Healing Concrete

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Abstract: - Concrete is strong, durable, locally available building material widely used for construction. If the load applied on the concrete is more than their limit of resisting load, it causes strength reduction of concrete by producing the cracks. The entry of moisture and harmful chemicals into the concrete through cracks can result in decrement of strength and life. The strength and durability of the concrete can be improved by a technique involving bacterial induced calcite precipitation. Micro biologically induced calcite precipitation can heal cracks and improve the performance of the concrete. In this paper an attempt to study bacterial concrete, types and classification of bacteria, mechanism, merits, demerits and applications of bacterial concrete.

Key words: - Concrete, bacteria, concrete strength, durability, applications.

I. INTRODUCTION

Concrete is the major component in the construction industry as it is cheap, easily available and convenient to cast. Concrete is a composite building material composed primarily of cement, aggregate and water. Concrete is strong in compression but weak in tension. Its drawbacks are low modulus, limited ductility and little resistance to cracking. Since it is weak in tension it cracks under sustained loading and due to aggressive environmental agents which ultimately reduce the life of the structure. Micro cracks are the main cause to structural failure. Micro cracks developed in concrete allow liquids and gases through them which eventually lead to damage not only concrete but also the reinforcement gets corroded. There are many techniques available for the treatment of cracks. Besides, by these techniques there are disadvantageous like different thermal expansion coefficient, environment hazard and health hazard. The need for an environment friendly and effective alternate crack remediation technique leads to the development of using the bio mineralization method in concrete known as bacterial concrete, self healing concrete or bio concrete. Bacterially produced Calcite precipitation (CaCO_3) is a biological technique called bio- mineralization is used for self healing of cracks. This technique is also used to increase the stiffness of the cracked concrete specimen. Bacillus species are aerobic spore forming gram positive bacteria with specialized thick

walled dormant cells, viable for more than 200 years under dry condition. Mixing of calcite precipitating bacteria to concrete so that when it comes in contact with water the bacteria will precipitate calcium carbonate and will heal the cracks. Metabolic activities of bacteria in concrete can improve overall performance of concrete.

II. CLASSIFICATION OF BACTERIA

Bacteria are relatively simple, single celled organisms. Various types of bacteria used in concrete are

- Bacillus pasteurii
- Bacillnesphaericus
- Escherichia coli
- Bacillus Subtilis
- Bacillus cohnii
- Bacillus pseudofirrius
- Bacillus balodurais

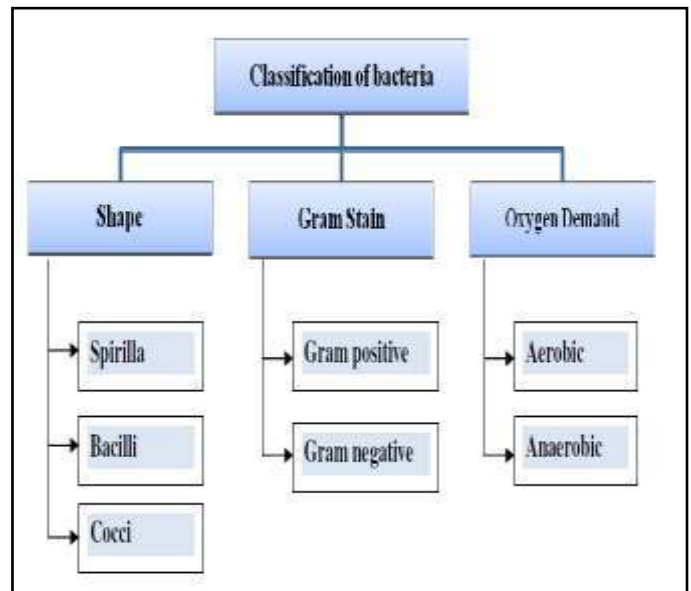


Fig.1. Classification of Bacteria



COMPARATIVE STUDY ON BIOGAS PRODUCTION FROM COW DUNG, FOOD WASTE AND ORGANIC WASTES

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ABSTRACT

Anaerobic digestion is one of the ecofriendly methods to treat and dispose the biodegradable wastes and has more advantages when compared to any other waste treatment methods. Biogas production and composting of slurry from the biogas plant is one of the methods to reduce volume of waste (zero waste discharge) and maximum energy recovery from the organic wastes is possible.

In this study the production potential of biogas from bio degradable organic wastes such as food waste, cow dung and fresh organic wastes under the same operating condition of room temperature between 28°C to 32°C are compared. A pilot plant of 0.3 cubic meter gas holding capacity is used as digester.

Key words: anaerobic digestion, biogas, composting, cow dung, food waste

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1. INTRODUCTION

At present environment is getting affected by numerous pollutants that pollute land, water, atmosphere and environment. For controlling the pollution, various measures are taken now a days. More research is being carried out to identify the method to reduce the rate of pollution and controlling the pollutants. Solid waste management is one of the major challenges faced by many countries around the world. The Integrated Solid Waste Management system is a comprehensive waste prevention, recycling, composting and disposal program. It is based on the concept of reduce, reuse and recycling of wastes.

EXPERIMENTAL STUDY ON PARTIAL REPLACEMENT OF CEMENT WITH CERAMIC TILE POWDER IN CONCRETE

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Abstract: Concrete is the widely used material in construction around the world and cement, a major constituent of concrete is being costly and only moderately available, researches or experiments are conducted to study the variations in the strength characteristics of concrete by replacement of cement partially or fully by cheaper or locally available materials. Ceramic waste powder is settled by alleviation and then dumped away which results in environmental pollution, in addition to forming dust in summer and menacing both agriculture and public health. Therefore, utilization of the ceramic waste powder in various industrial sectors especially the construction, agriculture, glass and paper industries would help to protect the environment. In this research study the cement has been replaced by ceramic waste powder accordingly in the range of 10% 15%, 20% by weight of M30 grade. Concrete mixtures were produced, tested and compared in terms of compressive strength, split tensile strength and flexural strength to the conventional concrete. These tests were carried out to evaluate the mechanical properties for 7, 14 and 28 days. This research work is concerned with the experimental investigation on strength of concrete and optimum percentage of the partial replacement by replacing cement via 10%, 15%, 20%, of ceramic waste. Keeping all this view, the aim of the analysis is to study the performance of concrete while replacing the ceramic waste with different proportions in concrete.

Keywords : Ceramic waste powder, Compressive strength, Mechanical properties, Conventional concrete.

I. INTRODUCTION

The advancement of concrete technology can reduce the consumption of natural resources, which can be reused and find other alternatives. In India numbers of waste materials are produced by different manufacturing companies, thermal power plant, municipal solid wastes and other wastes. Solid as well as liquid waste management is one of the biggest problems of the whole world. Disposal of waste in to the land causes serious impact on environment. Now a day's large amount of tile powder is generated in tile industries with an impact on environment and humans. By using the replacement materials offers cost reduction, energy savings and few hazards in the environment. Concrete is nothing but a combination of aggregates both fine and coarse, Cement and water. Comparing to all other ingredients in concrete, cement is considered to be the expensive material. This is because cement is manufactured using energy-intensive process. Cement is one of the major producers of carbon dioxide, which is the main cause of global warming. During the manufacturing process of cement the formation of clinker can be achieved only by heating the cement

at very high temperature. This leads to the release of enormous amounts of carbon in the atmosphere. This was one among the major problems identified for climatic changes.

Various research works has been carried out for the cost reduction in construction with some of the locally available materials as the partial or full replacement material for cement. Over the last few decades supplementary materials like fly ash, rice husk, silica fume, egg shell, groundnut shell, etc. are used as a replacing material. These supplementary materials have proven to be successful in meeting the needs of the concrete in construction.

In India ceramic production is 100 million ton per year. The tile industry has about 15% to 30% waste material generated from the total production. The tile waste which is dumped in land filling and pit or vacant spaces causes the environmental pollution which is dangerous for human health. This waste is not recycled in any form at present. However, the tile waste is durable, hard and highly resistant to biological, chemical, physical degradation forces. The tile waste which is dumped in land filling and pit or vacant spaces causes the environmental and dust pollution which is dangerous for human

Experimental Study on Transparent Concrete

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Abstract: With the world looking towards more beautiful, better, strong energy saving, building material for the good future. Engineers are all over the world are experimenting with different construction materials. In this project represents transparent concrete as the smart building material with increased strength good aesthetic appearance and also having the light transmitting property. Saving of energy and safety evaluation are the two important key issues for the buildings or infrastructure. in this case, the concrete specimen is produced by embedding the optical plastic fibres with different percentages and comparing it into the conventional concrete. Difference tests were carried out in the specimens like compressive strength, split tensile strength and intensity of the light passing through it. The results of the experiments shows that an optical plastic fibre can be easily blended with the concrete and it can also provide a steady light transmitting ability. The compressive strength test obtained for the specimen having high optical plastic fibre was found to be the higher strength as compared to the conventional concrete. which clearly indicates that the light transmitting concrete allows the light through it without affecting the strength of the concrete.

Keywords: Optical Plastic Fibres, Transparent Concrete, Compressive Strength, Split Strength Test

I. INTRODUCTION

Conservation of energy has become an important issue in today's world. One research estimated that by 2050, the carbon is released by institutional, commercial and residential buildings that will amount to 3800 tonnes and this carbon will consume 38% of the global energy. In order to reduce the energy consumption by structures and also the upcoming building construction in future. Many researchers and scientists were attracted towards the development of new construction material which will consume very less amount of energy. Transparent concrete is the concrete is one such new developed material. Concrete is the basic thing or material required for all types of construction. This type of transparent concrete is an innovative concrete it has the ability to letting light pass through it. This innovative concrete is made transparent by reinforcing the optical plastic fibres in it. This is because of optical plastic fibres can transmit sunlight without any light, heat or any other photochemical reaction. In this optical plastic fiber can transmit the light from one end of the fibre to another. Hungarian architect Aron Losonzi was the first person who forward the concept of transparent concrete in 2001. The first transparent concrete block was named as LiTraCon in 2003. The main purpose is to use sunlight as a light source in order to reduce the power consumption. In this study, the results of including optical plastic fibres on compressive strength and split tensile strength of the concrete has been studied. The optical plastic fibres were added in to the concrete layer by layer distributed uniformly throughout the body of the concrete block. The compressive strength of the transparent concrete is also compared with that of the conventional concrete block. It gives the result that the compressive strength of the transparent concrete is more than that of the conventional concrete.

II. MATERIALS

- A. **Cement:** Ordinary Portland cement, 53 grade confirming to Is1269-1987.
- B. **Fine aggregate :** Locally available river sand confirming to grading zone II of nominal size 1.18 mm as per IS:383-1970.
- C. **Coarse aggregate :** Locally available crushed blue granite stones confirming to graded aggregate of nominal size 10 mm as per IS :383 -1970.
- D. **Water :** Portable water
- E. **Optical fibre :** Plastic optical fibre
Optical fibre is a flexible transparent fibre made by drawing glass or plastic to a diameter slightly thicker than that of human hair. Optical fibre are used most often as a means to transmit light between the two ends of fibre and light find wide usage in fibre optic communication. The diameter of optical plastic fibre was 1mm.

Experimental Behaviour of Water Hyacinth Ash as the Partial Replacement of Cement In Concrete

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ABSTRACT

Concrete is probably the most extensively used construction material in the world. The main ingredient in the conventional concrete is Portland cement. The amount of cement production emits approximately equal amount of carbon dioxide into the atmosphere. Cement production is consuming significant amount of natural resources. That has brought pressure to reduce cement consumption by the use of supplementary materials. Water hyacinth (*Eichhornia crassipes*), an entirely free source of biomass is found unutilized as supplementary cementitious material until now. It grows vigorously and richly to produce a large biomass and doubles the population in two weeks. In this work, studies have been carried out to evaluate this bio-waste for the first time as cementitious material and this will be beneficial for future application of Water hyacinth ash in cement concrete. The study focuses on the workability, compression strength and split tensile strength performance of the blended concrete containing different percentage of water hyacinth ash as a partial replacement of cement. The cement in concrete is replaced accordingly with the percentage of 10% and 20% by weight. Concrete cubes are testing at the age of 7 days of curing. Finally, the workability and strength performance of ash blended concrete is compared with conventional concrete. From the experimental investigation, it has been observed that, the optimum replacement of Water hyacinth ash to cement is 10% for M30 grade concrete.

Keywords : Water Hyacinth, Cement, Concrete, Setting time and Compressive Strength.

I. INTRODUCTION

Concrete is a commonly used construction material made by combining mainly cement, water and aggregates. In this cement is costly. The production of concrete has always lead to massive exploitation of natural resources. Manufacturing 1 tonne of Portland cement requires quarrying 1.5 tonnes of limestone and clay (civil and marine, 2007). Moreover, continuous extraction of natural aggregate; sand and gravel; from river beds, lake and other water bodies over the years have led to erosion which eventually leads to flooding and landslides. Further, there is less filtration of rain water due to reduced amount of natural sand, causing contamination of water needed for human consumption. 1.4 tonnes of Ordinary Portland cement being produced yearly around the globe contributes to 5 percentage of greenhouse gas, carbon dioxide, emission worldwide (civil and marine, 2007). Not only burning fuel to heat the kiln emits carbon dioxide, but also decomposition of limestone emits

even more gas. These identified problems clearly, contribute significantly to climate change. The ideal target to partly solve the above phenomenon is to develop a sustainable system loop which can turn resources which are landfilled as waste material into useful products in the construction industry, thus preserving the natural resources. Concrete is a tension-week building material, which is often crack ridden connected to plastic and hardened states, drying shrinkage and the like. The cracks generally develop with time and stress to penetrate the concrete, thereby impairing the water proofing properties and exposing the interior of the concrete to the destructive substances containing moisture, bromine, acid sulphate, etc.

So partial or full replacement of cement in concrete with another suitable material will provide a means of reducing the cost of construction materials. Over the last few decades, replacement is done by locally available raw materials such as industrial, agricultural

Experimenta Study on Strength of Water Hyacinth Ash as Partial Replacement of Cement in Concrete

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Abstract: Concrete is an artificial material which composed of cement, fine aggregates, coarse aggregates and water. The main constituent of traditional and ordinary concrete is cement. Cement production emits a huge amount of carbon dioxide in the atmosphere. To reduce carbon dioxide, cement is replaced as a supplementary cementitious material in concrete. Water hyacinth grows vigorously in ponds and doubles the quantity within two weeks. The studies have been done to evaluate water hyacinth ash in the replacement of cement. The Present study reveals about the different proportion of water hyacinth ash replacing cement which will affect the properties of workability, compression, and split tensile strength of concrete. Concrete is cast in cubes and cylinders with different percentage (0, 10%, 20% by weight of cement), The casted specimens are removed from the mould, cured and tested for 7, 14 and 28 days. The tested result were compared with conventional concrete and the different ratio of WHA replaces cement concrete in comparing the concrete and WHA replacement concrete, the ultimate strength achieved at 10% for M30 grade.

Keywords: Water Hyacinth Ash, Cement, Concrete, workability, setting time and Strength.

I. INTRODUCTION

Concrete is considerably the world's largely adaptable and well-liked material produced each year in the construction. Concrete is nothing but a combination of aggregates both fine and coarse, Cement and water. Comparing to all other ingredients in concrete, cement is considered to be the expensive material. This is because cement is manufactured using energy -intensive process. Cement is one of the major producers of carbon dioxide, which is the main cause of global warming. During the manufacturing process of cement the formation of clinker can be achieved only by heating the cement at very high temperature. This leads to the release of enormous amounts of carbon in the atmosphere. This was one among the major problems identified for climatic changes.

Various research works has been carried out for the cost reduction in construction with some of the locally available materials as the partial or full replacement material for cement. Over the last few decades supplementary materials like fly ash, rice husk, silica fume, egg shell, groundnut shell, etc. are used as a replacing material. These supplementary materials have proven to be successful in meeting the needs of the concrete in construction. Water hyacinth is a free floating aquatic plant that grows in still or slow moving fresh water bodies.

Water Hyacinth produces a large biomass by rapidly growing and doubles its population within two weeks. Many problems are caused by the water hyacinth. Some of them are loss of bio diversity, affects water quality, water loss, agricultural implications, damage to infrastructure and it affects health and safety of humans as well as some aquatic species. Hence, the bio – admixture extracted from the water hyacinth can be used as the replacement material for cement and it is cost effective. In this research work, bio waste is utilized as a substitute of cement in concrete.



Fig.1 Water Hyacinth Plant in Palakkad Region

Experimental Studies of Silica Fume and Sisalfibre on Performance of Concrete

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Abstract: *The main objective of this project is to investigate effect of silica fume & fiber orientation of sisal fiber on performance of concrete, which ultimately solve the problems of waste disposal & reduces global warming and increase the strength of concrete. India is a developing country, therefore Infrastructure development is necessary for our country and concrete plays a vital role in it. Concrete is the world's largest consuming material in the construction field. The emission of carbon-dioxide (CO₂) in the atmosphere from the operation and maintenance of structures as well as production of building materials can be reduced by using renewable resources and construction materials. Conventional concrete is relatively strong in compression but weak in tension, in order to overcome the weakness the use of a sufficient volume of certain fibers such as sisal fiber is used in this experiment, which is easily available, renewable and economical and enhance many of the mechanical characteristics of the basic materials such as fracture toughness, flexural strength and resistance to fatigue, impact, thermal shock and spalling. The study focuses on the compressive strength, split tensile strength, in 7, 14, and 28 days of curing containing different percentage of sisal fiber and silica as a partial replacement of OPC. The cement in concrete is replaced accordingly with the percentage of 0%, 10 %, and 20% by volume and 0%, 1% , 1.5% and 2% of sisal fiber is added by weight of cement. Finally, the strength performance of silica blended fiber reinforced concrete is compared with the performance of conventional concrete.*

Keywords: *Sisal Fiber, Silica fume, Sustainable, Renewable, Global Warming, Economic, compressive strength, split tensile strength.*

I. INTRODUCTION

Concrete is the most versatile building material. Concrete has a relatively low tensile strength (compared to other building materials) and low ductility. And also it is susceptible to cracking. The production of concrete leads to lot of environmental issues associated with the significant release of CO₂ and other greenhouse gases. Therefore, it is necessary to look for sustainable solutions for future concrete construction. The fusion of concrete with micro silica & natural fibres is a conventional technique. Natural fibers have the potential to be used as reinforcement to overcome the inherent deficiencies in concrete material composites. These fibers have always been considered promising as reinforcement of cement based matrices because of their availability and low consumption of energy. Fiber reinforcement in concrete, mortar and cement paste can enhance many of the engineering properties of the basic materials, such as fracture toughness, flexural strength and resistance to fatigue, impact, thermal shock and spalling. Micro silica also known as silica fume is one of the waste materials that is being produced from alloy industries in tones of industrial waste per year in our country. It is a byproduct of producing silicon metal or ferrosilicon alloys. It consists of spherical particles with mean size of about 100 nm which is about 100 times finer than Portland cement. One of the most beneficial uses of micro silica is in concrete. Concrete containing micro silica has very high strength and is very durable. Natural fibers such as sisal fibers are preferred due to their greater advantages, which include low cost, high strength-to-weight ratio, better durability, environmental compatibility, biodegradability and recyclability. By adding this sisal fiber it has been found that there is an increase in properties of both fresh and hardened concrete.

II. MATERIALS USED AND PROPERTIES

A. Silica Fume

Silica fume, also referred to as microsilica or condensed silica fume, is a byproduct material that is used as a pozzolan. This byproduct is a result of the reduction of high-purity quartz with coal in an electric arc furnace in the manufacture of silicon or ferrosilicon alloy. Silica fume rises as an oxidized vapor from the 2000°C (3630°F) furnaces. The escaping gaseous SiO oxidizes and condenses in the form of extremely fine spherical form of amorphous silica (SiO₂); hence, it called as silica fume.

EXPERIMENTAL INVESTIGATION ON STRENGTHENING OF BEAMS USING RETROFITTING WITH PARTIAL REPLACEMENT OF CEMENT BY SUGARCANE BAGASSE ASH IN CONCRETE

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Abstract: Concrete is a composite material composed of cement material embedded in a hard matrix of material (the aggregate or binder) that fills the space among the aggregate particles and glues them together. Cement is an important component of concrete. We know the rate of cement is increasing day by day. The aim of the present study is replacing cement in concrete by sugarcane bagasse ash. Sugarcane bagasse ash has been partly used to replace cement in concrete as it contributes beneficial properties to concrete. It improves the strength and durability of concrete. This project is to study the physical and mechanical properties of concrete using sugar cane bagasse at various cement replacements of 0%, 5%, 10%, 15%, 20%, 25% with water cement ratio 0.40. In the present work all the beams that are strengthened using externally bonded are expected to withstand higher load compared to the control beam.

Keywords : Sugarcane bagasse ash, Compressive strength, Mechanical properties, Conventional concrete

I. INTRODUCTION

Cement concrete is the most widely used construction material in any infrastructure development projects. Cost of cement and fine aggregate plays a main role in concrete industry. Many researches were done to replace fine aggregate by using different materials. In this study, we aim to replace cement by using Sugarcane bagasse.

Sugar cane bagasse, the fibrous residue after crushing and juice extraction of Sugar cane, is a major industrial waste product from the sugar industry in India. Now a day, it is commonplace to reutilize sugar cane bagasse as a biomass fuel in boilers for vapour and power generation in sugar factories. Depending on the incinerating conditions, the resulting sugar National Metal and Materials Technology Centre (MTEC), National Science and Technology Development.

Pozzolanic activity of industrial Sugar Cane Bagasse Ash (SCBA) may contain high levels of SiO_2 and Al_2O_3 , enabling its use as a supplementary cementitious material (SCM) in blended cement systems. The use of SCBA as an SCM to partially replace ordinary

Portland cement not only helps reduce methane emissions from disposal of the organic waste and reduce the production of cement, which is infamous for its high energy consumption and CO_2 emission, but also can improve the compressive strength of cement-based materials.



Fig.1. Sugarcane bagasse ash

II. MATERIALS AND METHODS

Experimental study on strength behaviour of Square Slab using Steel fiber, Glass fiber, Fly ash and Rice Husk Ash

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Abstract: *Hybrid Fiber-reinforced concrete is a composite material consisting of mixtures of cement, fine aggregate, coarse aggregate, steel fiber and glass fiber. The hybrid fiber reinforced concrete exhibits better fatigue strength and increased static and dynamic tensile strength. In this project, the strength of fiber reinforced concrete was investigated with partial replacement of cement with rice husk ash and fly ash. Steel fiber and Glass fiber was added in the order of 0.25%, 0.5% and 0.75% by volume of concrete and 0.25%, 0.5% by weight of cement. Rice husk ash was used to replace Ordinary Portland Cement by 20% and fly ash 20% by weight of cement proportions.*

Keywords: *Compression strength, Tensile strength, Rice Husk Ash, Quarry dust and Glass fibre.*

1.INTRODUCTION

Hybrid fiber-reinforced concrete is a type of fiber reinforced concrete characterized by its composition. Specifically, it contains at least two or more types of fibers of different sizes, shapes or origins. It is well known that cracking in fresh concrete can be effectively inhibited by glass fibers and that different sizes contribute to different mechanical properties. Considering that fibers of different types have different effects on the properties on fresh and hardened concrete, the use of hybrid fibers allows optimization of the properties of fiber reinforced concrete at all levels. Specific fibers retain their individual effects on the properties of fiber reinforced concrete. Fibre reinforced concrete (FRC) is Portland cement concrete reinforced with more or less randomly distribute fibres. (FRC) is concrete containing fibrous material which increases its structural integrity. So we can define fibre reinforced concrete as a composite material of cement concrete or mortar and discontinuous discrete and uniformly dispersed fibre. The addition of these fibers into concrete mass can dramatically increase the compressive strength, tensile

strength, flexural strength and impact strength of concrete. Steel fibre is one of the most commonly used fibre. Generally round fibres are used. The diameter may vary from 0.25 to 1 mm. Glass fibres have very high tensile strength. In this project, investigating the behavior and flexural strength of hybrid fiber reinforced concrete with partial replacement of cement with Fly ash and Rice husk ash. Two types of fibers such as steel and glass are used. Steel Fibers are added in the order 0.25%, 0.5%, and 0.75% by volume of concrete. Glass fibers are added 0.25% by weight of cement The Fly ash and Rice husk ash substitutes are to be used to replace Ordinary Portland Cement by each 20% by weight of cement proportions. The total replacement level is 40%. Superior properties of concrete can be developed with the help of hybridization concept mainly to increase in flexural strength of concrete. The hybrid fiber reinforced concrete composites specimens are to be tested for mechanical properties and durability related properties. The results are to be compared to the control specimen that contains no fibers and with Cement replacement materials. With the appropriate interpretation of the obtained results, it can be possible to determine the optimum fiber percentage.

2 OBJECTIVES

The hybrid fiber reinforced concrete composites specimens are to be tested for mechanical properties. The results are to be compared to the control specimen that contains with Cement replacement materials and without fibers. Results obtained from this study are expected to contribute to the efforts made to characterize the mechanical properties of hybrid fiber reinforced concrete with the utilization of fly ash and rice husk ash. With the appropriate interpretation of the obtained results, it can be possible to determine the optimum fiber percentage in hybrid fiber reinforced concrete with partial replacement of cement with Fly ash and Rice Husk Ash.

Experimental Study on the Effect of Metakaolin and Fly ash on Steel Fibre Reinforced Concrete

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ABSTRACT

Cement production is the reason for increase to CO₂ emissions generated by the calcinations of CaCO₃ and by the fossil, being responsible for about some percentage of the CO₂ emissions in the world. This can be substantially reduced if cement replacement materials such as fly ash and Metakaolin are used. The vast improvements achieved by the addition of fibers to concrete, there are different applications where Fibers Reinforced Concrete (FRC) can be intelligently and beneficially use. The present report deals with the effects of admixtures, by partial replacement of cement in steel fibre reinforced concrete, in terms of improved performance on compressive, split tensile and flexural strengths. The main aim of this experimental project was to study the effect of Fly-ash and Metakaolin on Steel Fibre Reinforced Concrete. The compressive strength of concrete was measured by the cubes of 150 x 150 x 150 mm for 28 days. Cement was replaced by Fly-ash with 15 % and Metakaolin by 5%,10%,15%,20% .A constant amount of Super plasticiser was used was by weight of cement. The water-cement ratio adopted in this work was 0.45 in all mixtures of Cement + Fly-ash + Metakaolin. The value of water cement ratio in the presence of Fly-ash and Metakaolin affected the results. The steel fibres were added 1% by volume of concrete. The results will compare with the specimens of Conventional Cement Concrete and steel fibre reinforced Concrete with Metakaolin, Fly ash.

Key words: Normal Concrete (NC), Steel Fibre, Metakaolin, Fly Ash ,Super plasticiser, Ductility, Strength tests, workability tests.

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INTRODUCTION

The brittleness property was increased by using short discreet and discontinuous, reinforcement from the ancient days what is called “fibre”. Addition of fibre in the concrete has shown wide improvements in engineering properties in the recent decade. The improvement in properties depends on various parameters such as type of fibre, aspect ratio, elastic properties, size and shape of fibre , method of preparation etc. By varying these parameters respective investigation have been conducted already.

Experimental Study On Fibre Reinforced Concrete By Partial Replacement Of Cement Using Metakaolin And Fine Aggregate Using Quarry Dust

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ABSTRACT

The scarcity of river sand is one of the major problems in the construction industry. Generally, studies were conducted to find out feasibility of using quarry dust to partially replace sand in concrete. These studies revealed that due to increased fineness, the combination requires an increased water cement ratio which results in strength reduction. The use of pozzolanic supplementary cementing materials such as silica fume, metakaolin etc in concrete and mortar improves the strength. Metakaolin is a supplementary cementitious material, calcined kaolinite is available at moderate cost. In this paper the study presents the results to use metakaolin in concrete as a partial replacement of cement where, quarry dust was used as a partial replacement of fine aggregate with constant super plasticizer dosage. In some cases there occurs a gradual decrease in the strength in quarry rock dust based concrete. Hence to overcome this disadvantage polypropylene fibres are added to the varying mixes. The study focuses on the compressive strength, split tensile strength, flexural strength performance. The cement in concrete is replaced accordingly with the percentage of 5%, 10%, 15%, 20% by weight of metakaolin and quarry dust is replaced at 25% by weight of fine aggregate. Finally the strength performance of metakaolin blended fibre concrete is compared with the performance of nominal concrete. From the experimental studies it has been observed that, the optimum replacement of metakaolin to cement is 15% for M30 grade mix.

Key words: OPC 53 grade, Metakaolin, Quarry Rock Dust, Polypropylene Fibres, Super Plasticizers, Strength, Results.

Corresponding Author: Linu V.Abraham

INTRODUCTION

Concrete is the dominant construction material used around the world and its properties have been undergoing changes through the recent years of advancement. Various type of concrete has been developed to enhance the different properties of concrete. This development can be divided into four stages. The earliest is the conventional concrete which is composed of

Experimental Investigation on Concrete Compression Member with GGBS

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Abstract: *The increasing search for an alternative sustainable and eco-friendly construction material has led to research on various replacement materials in concrete that have properties similar to that of cement. The concept of partial replacement of cement which is capable for sustainable development is characterized by application of industrial wastes to reduce consumption of natural resources and energy and pollution of the environment. GGBS a by-product in pig iron manufacture has been found to be an ideal material to replace ordinary Portland cement used in concrete and it improves the durability of concrete. GGBS slag is obtained by quenching molten iron slag from a blast furnace in water or steam, to produce a glassy, granular product that is then dried and ground into a fine powder. Ground Granulated Blast Furnace Slag (GGBS) was partially replaced as 0%, 10%, 20%, 30%, and 40% in place of cement in concrete. Concrete are made for M -30 mix and the cubes, cylinders and prisms are casted for 7, 14 & 28 days of ages and based on the testes conducted on these specimens the 30% replacement is found to be the optimum percentage of replacement of GGBS in concrete. In this study the comparison of conventional RCC column and 30% GGBS RCC column are analysed. The columns are casted for 28 days of curing and tested. It is found that normal M30 grade concrete fails to sustain the compressive strength as compared to the M30 grade concrete prepared by partial replacement of cement by GGBS.*

Keywords: *GGBS, Sustainable and Eco-Friendly, Super plasticizer, Concrete compression member, Compressive strength.*

I. INTRODUCTION

Concrete is primarily comprised of Portland cement, aggregates, and water. Cement plays a great role in the production of concrete and is the most expensive of all other concrete making materials. In addition, there is environmental concern in the production of cement. The ground granulated blast furnace slag is a waste product from the iron manufacturing industry, can protect the steel reinforcement more efficiently, so that it can resist corrosion, and thus the structure as a whole. GGBS concrete is a type of concrete in which a part of the cement is replaced by ground granulated blast furnace slag, which is an industrial waste. Thus the implementation of GGBS concrete can minimize corrosion in an effective way. Moreover it can lead to much durable structure without considerable increase in cost. Ground granulated blast furnace slag from modern thermal power plants generally does not require processing prior to being incorporated into concrete and is therefore considered to be an environmentally free input material. When used in concrete, ground granulated blast furnace slag is a cementitious material that can act as a partial substitution for Portland cement without significantly compromising the compressive strength. Columns are the basic parts of many engineering structures. The columns majorly take the axial loads and try to resist the bending caused due to the applied axial loads.

A. Applications

GGBS is used to make durable concrete structures in combination with ordinary Portland cement and/or other Pozzolanic materials. Two major uses of GGBS are in the production of quality-improved slag cement, namely Portland Blast furnace cement (PBFC) and high-slag blast-furnace cement (HSBFC), with GGBS content ranging typically from 30 to 70%; and in the production of ready-mixed or site batched durable concrete. Concrete made with GGBS cement sets more slowly than concrete made with ordinary Portland cement, depending on the amount of GGBS in the cementitious material, but also continues to gain strength over a longer period in production conditions. This results in lower heat of hydration and lower temperature rises, and makes avoiding cold joints easier, but may also affect construction schedules where quick setting is required.

II. MATERIALS INVESTIGATION

A. Cement

The Ordinary Portland cement of 53-grade was used in this study conforming to IS: 12269-1987. The specific gravity of cement is 3.15. The initial setting time is found as 35 minutes and the Standard consistency of cement was 31%.

EXPERIMENTAL INVESTIGATION ON STRENGTH CHARACTERISTICS OF HIGH PERFORMANCE CONCRETE OF GRADE M35 USING PAPER PULP POWDER

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Abstract: Concrete is widely used material in construction around the world and cement, a major constituent of concrete is being costly and only moderately available, researches or experiments are conducted to study the variations in the strength characteristics of concrete by replacement of cement partially or fully by cheaper or locally available materials. High performance concrete was proposed and their strength characteristics were studied during the past decades. As a result varieties of cement are available in the market to suit different construction situations. Portland cement is the most important ingredient of concrete and is a versatile and relatively high cost material. Large scale production of cement is causing environmental problems on one hand and depletion of natural resources on other hand. This work examines the possibility of using waste paper sludge to produce a low cost concrete by blending various ratios of cement with paper sludge and to reduce disposal and pollution problems due to waste paper sludge. The innovative use of waste paper sludge in concrete as a supplementary cementitious material was tested as an alternative to traditional concrete. The present study reveals about the cement has been replaced by waste paper sludge accordingly as the range of 0%, 10%, 20% by weight for M35 mix. By using adequate amount of waste paper pulp and water, concrete mixtures were produced and going to compare in terms of slump and strength with the conventional concrete. The concrete specimen will going to be tested as compression test, split tensile strength and flexural strength..

Keywords : Paper pulp, Cement, Concrete, workability, strength

I. INTRODUCTION

Concrete is considerably the world's largely adaptable and well-liked material produced each year in the construction. Concrete is nothing but a combination of aggregates both fine and coarse, Cement and water. Comparing to all other ingredients in concrete, cement is considered to be the expensive material. Industrial wastes are being produced per annum by chemical and agricultural process in India. These materials possess problems of disposal, health hazards and aesthetic problem. Paper fibers can be recycled only a limited number of times before they become too short or weak to make high quality paper. It means that the broken, low- quality paper fibers are separated out to become waste sludge.

Paper sludge behaves like cement because of silica and magnesium properties which improve the setting of the concrete. The quantity of sludge varies from mill to mill. The amount of sludge generated by a recycled paper mill is greatly dependent on the type of furnish being used and end product being manufactured. Paper mill sludge can be used as an alternative material applied as partial replacement of fine aggregates in manufacturing fresh concrete intended to be used for low cost housing projects. About 300 kg of sludge is produced for each tone of recycled paper. This is a relatively large volume of sludge produced each day that makes making landfill uneconomical as paper mill sludge is bulky. By adjusting the mixture to an equivalent density,

concrete mixtures containing the residuals can be produced that are equal in slump and strength to a reference concrete without residuals.

II. MATERIALS

CEMENT:

In this work the Ordinary Portland Cement 53 grade was used. Cement is affine, grey powder. It is mixed with water and materials such as sand, pozzolanas to make mortar and concrete. The cement and water forms a paste that binds the other materials together.

COARSE AGGREGATE:

Locally available crushed stones confirming to graded aggregate of nominal size of 20mm as per IS 383-1970 are adopted. The physical properties of coarse aggregate like specific gravity, gradation and fineness modulus are tested.

FINE AGGREGATE:

Locally available river sand confirming to grading zone II of nominal size 1.18 mm as per IS 383-1970.

Experimental Study on Beam by Partial Replacement of Cement by Marble Powder & Quarry Dust

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Assistant Professor², ² Department of Civil Engineering JCT College Engineering & Tech, Coimbatore, Tamil Nadu, India

Abstract— The present study is aimed to utilize Waste marble powder and quarry sand as partial replacement of cement and comparing it with conventional concrete. This experimental investigation is carried out by M₃₀ grade of concrete is produced by replacing cement with 0%, 10%, 20% & 30% of Marble Powder & Quarry dust. It is found that the studies of concrete made of waste marble powder and quarry dust increases the workability reduction at 10% and 30% respectively. Therefore the quarry dust and waste marble powder should be used in construction works and then the natural resources would be used efficiently.

Keywords— Marble Powder, Quarry dust, Compressive Strength, Split Tensile Strength

I. INTRODUCTION

Concrete is a composite material composed with fine and coarse aggregate is mixed together with dry Portland cement and water, the mixture forms a fluid slurry that is easily poured and moulded into shape. The cement reacts chemically with the water and other ingredients to form a hard matrix that binds the materials together into a durable stone-like material that has many uses. Cement and concrete production consumes enormous amounts of natural resources and aggregates, thereby causing substantial energy and environmental losses. So we have to rectify this problem by using replacement of various materials to composite materials.

Marble is a metamorphic rock composed of recrystallized carbonate minerals most commonly calcite or dolomite. Marble may be foliated. Geologists use the term marble to refer to metamorphosed limestone. A large amount of waste is generated during sawing, grinding and polishing process. The result is that the marble waste which is 20% of total marble quarried has reached as high millions of tons. Generally the marble wastes are being dumped in any nearby pit or vacant space near the marble processing industries, although notified areas have been marked for dumping the same. This leads to increased environmental risks as dust pollution spreads alongside for a large area. In the dry season, the dust dries up, floats in the air, flies and deposits on crops and vegetation. In addition, the deposition of such generated huge amount of fine wastes certainly creates necrotic ecological conditions for flora and fauna changing landscapes and habitats. Now a day's marble waste is one of the causes of environmental problems around the world. Therefore, max. Utilization of marble waste in various industrial sectors, especially the construction, agriculture, glass and paper industries would help to protect the environment.

Quarry dust as a by-product from crushing process during quarrying activities is one of those Material that have recently gained attention to be used as concreting aggregates, especially as fine aggregate. In concrete production in could be used as a partial or full replacement of nature sand. This kind of waste material that is generated from the stone crushing industry which is abundantly available to the extent of 200 million tons per annum which has landfill disposal problems and health and environmental hazards.

II. MATERIAL PROPERTIES

A) Materials Used

1) Cement

Portland pozzolona cement of ultra tech brand was used and it was conforming to IS 1489-1991. Tests were conducted to find the properties of cement and the results are tabulated in Table A.

SL.N O	Physical Properties of Cement	Value
1	Specific Gravity	3.25
2	Grade of Cement	PPC53
3	Fineness Test	340Kg/M ²
4	Soundness test	1.00mm
5	Initial Setting Time	105min
6	Final Setting time	310min

Table A: Physical Properties of Cement

2) Fine Aggregate

Locally available river sand was used as fine aggregate. Tests are conducted to find the properties of fine aggregate and test results are tabulated in table 3 B.

SL.N O	Tests	Value
1	Specific Gravity	2.76
2	Water absorption	1.5%
3	Sieve Analysis	Zone II

Table B: Physical Properties of Fine Aggregate

3) Coarse Aggregate

Coarse aggregate was crushed stone which was available locally. Maximum size chosen was 10mm down. Tests are conducted to find the properties of coarse aggregate and the results are tabulated in Table C.

SL.N O	Tests	Value
1	Specific Gravity	2.92
2	Size Of aggregate	20MM
3	Fineness Modulus	5.20

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FINE AGGREGATE:

Locally available river sand confirming to grading zone II of nominal size 1.18 mm as per IS 383-1970.

Strength Study on Activated Fly ASH Concrete with Glass Fiber

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Abstract: Concrete has become an indispensable construction material and it is now used in greater quantities than any other material. In the current era, the concept of durability and the sustainable development are the key issues for the development. The replacement of cement with fly ash benefits cost saving, energy saving environmental protection and conservation of resources. The replacement of cement with fly ash decreases the early strength and increases setting time. But chemical activation is simple and economical. The chemical activators destroy the crystalline structure and produces calcium silicate hydrate which enhances the strength and durability of concrete. In this study fly ash is activated using chemicals like calcium oxide (CaO) and sodium silicate (Na_2SiO_3) in the ratio of 1:8 for the effective inclusion of fly ash as replacement to cement. The percentages of replacement of activated fly ash (AFC) are 30%. The hardened concrete properties are studied and compared with control mix with PPC and fly ash concrete without activation. In general the concrete is weak in tension to increase the tension nature in the concrete addition of fiber is taken place. So we are using glass polymer fiber to gain such tensile strength. The proportion of the fiber we are used 0.5% and 1% from the weight of cement.

Keywords: Fly Ash, Activated Fly Ash, Glass fiber, workability, strength

I. INTRODUCTION

Fly ash is being increasingly used in concrete to lower the costs and improve the properties of concrete. However the replacement of Portland cement with fly ash especially in high volume decreases the earlier strength of the concrete.

A. Fly ash contributes the strength of concrete in three ways,

- 1) By reduction of water requirement for a given slump.
- 2) By increasing the volume of paste there by improvement of workability.
- 3) By pozzolanic reaction between fly ash and CaO.

Containing fly ash is attributed to the slow pozzolanic reaction between fly ash and CaO.

Little work has been done on the chemical activation of the reactivity of fly ash. Earlier studies have indicated that the addition of chemical activators can effectively accelerate or improve the pozzolanic reaction of natural pozzolans. In a primary study, it was found that the reactivity of fly ash could be significantly increased by addition of CaO and Na_2SiO_3 . This study examines the effect of chemical activators CaO and Na_2SiO_3 on early microstructure development of lime fly ash pastes and the strength of concrete compared to ordinary Portland cement and inactivated fly ash. The M_{20} grade of concrete was used with mix proportion of 1:1.28:2.78 kg/m^3 at 0.50 water binder ratio. The mechanical properties such as cube compressive strength, split tensile strength & flexural strength were studied at 7 and 14 days.

II. MATERIALS AND METHODS

A. fly ash

Fly ash is one of the residues generated in the combustion of coal. Fly ash is generally captured from the chimneys of power generation facilities, whereas bottom ash is, as the name suggests, removed from the bottom of the furnace. In the past, fly ash was generally released into the atmosphere via the smoke stack, but pollution control equipment mandated in recent decades now require that it be captured prior to release. It is generally stored on site at most US electric power generation facilities. Depending upon the source and makeup of the coal being burned, the components of the fly ash produced vary considerably, but all fly ash includes substantial amounts of silica (silicon dioxide, SiO_2) (both amorphous and crystalline) and lime (calcium oxide, CaO). Fly ash is commonly used to supplement Portland cement in concrete production, where it can bring both technological and economic benefits, and is increasingly finding use in synthesis of geopolymers and zeolites.

EXPERIMENTAL INVESTIGATION ON STRENGTHENING OF BEAMS USING RETROFITTING WITH PARTIAL REPLACEMENT OF CEMENT BY SUGARCANE BAGASSE ASH IN CONCRETE

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Abstract: Concrete is a composite material composed of cement material embedded in a hard matrix of material (the aggregate or binder) that fills the space among the aggregate particles and glues them together. Cement is an important component of concrete. We know the rate of cement is increasing day by day. The aim of the present study is replacing cement in concrete by sugarcane bagasse ash. Sugarcane bagasse ash has been partly used to replace cement in concrete as it contributes beneficial properties to concrete. It improves the strength and durability of concrete. This project is to study the physical and mechanical properties of concrete using sugar cane bagasse at various cement replacements of 0%, 5%, 10%, 15%, 20%, 25% with water cement ratio 0.40. In the present work all the beams that are strengthened using externally bonded are expected to withstand higher load compared to the control beam.

Keywords : Sugarcane bagasse ash, Compressive strength, Mechanical properties, Conventional concrete

I. INTRODUCTION

Cement concrete is the most widely used construction material in any infrastructure development projects. Cost of cement and fine aggregate plays a main role in concrete industry. Many researches were done to replace fine aggregate by using different materials. In this study, we aim to replace cement by using Sugarcane bagasse.

Sugar cane bagasse, the fibrous residue after crushing and juice extraction of Sugar cane, is a major industrial waste product from the sugar industry in India. Now a day, it is commonplace to reutilize sugar cane bagasse as a biomass fuel in boilers for vapour and power generation in sugar factories. Depending on the incinerating conditions, the resulting sugar National Metal and Materials Technology Centre (MTEC), National Science and Technology Development.

Pozzolanic activity of industrial Sugar Cane Bagasse Ash (SCBA) may contain high levels of SiO_2 and Al_2O_3 , enabling its use as a supplementary cementitious material (SCM) in blended cement systems. The use of SCBA as an SCM to partially replace ordinary

Portland cement not only helps reduce methane emissions from disposal of the organic waste and reduce the production of cement, which is infamous for its high energy consumption and CO_2 emission, but also can improve the compressive strength of cement-based materials.



Fig.1. Sugarcane bagasse ash

II. MATERIALS AND METHODS

STRENGTH STUDY ON ACTIVATED FLY ASH CONCRETE WITH GLASS FIBER USING BEAM

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Native Hadoop Based Enhanced Cloud Architecture in biomedical industry

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ABSTRACT

Explosion of biological data due to large scale genomic research and advances in high throughput data generation tools result in massive distributed datasets. Analysis of such large non relational, heterogeneous, and distributed datasets is emerging challenge in data driven biomedical industries. Highly complex biological data require unconventional computational approaches and knowledge-based solutions. Distributed datasets need to be reduced to smaller datasets that can be efficiently queried. Since genomic and biological data is generated in large volume and is stored in geographically diverse locations, distributed computing on multiple clusters, our objective here is to assess the feasibility of using Cloud based platform to analyze genomic big data. In this paper we report on the limitation of cloud based platform in the analysis of genomic data and we implement the edtc3 with native hadoop infrastructure to overcome its limitations.

Keywords: Cluster, Cloud, Distributed Computing, EDTC3, Native Hadoop

I. INTRODUCTION

Bioinformatics applications usually require large complex amounts of data processing and computational capabilities. A large distributed file based processing is adopted in this project to process large data files which can scale up to few terabytes. Native Hadoop based cloud architecture is composed of Hadoop Distributed File System (HDFS) (Fig.2), MapReduce programming model and etcd3 as (Fig.1) coordination service. HDFS cluster is composed of a centralized indexing system called NameNode and its data processing units called DataNodes; together they form a unique distributed file system. NameNode plays an important part in supporting the Hadoop Distributed File System by maintaining a File-Based block index map, this map is responsible to locate all the blocks related to the HDFS. HDFS is the primary storage system; HDFS creates multiple replicas of data blocks and is further responsible to distributes data blocks throughout a cluster to enable reliable, extremely rapid computations [1]. Etcd3 is critical component of the infrastructure, it provide coordination and messaging across applications [2]. The Etcd3capabilities include

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RESEARCH ARTICLE

DYNAMIC JOINT SCHEDULING AND CONGESTION CONTROL IN WIRELESS NETWORKS

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ABSTRACT- *The network nodes that are connected by wireless data connections called as wireless networks. The devices are connected via wireless link to communicate with each other. In wireless networks, it is very difficult to maintain the trade-off between throughput and delay. This paper proposes a new joint scheduling and congestion control algorithm for multihop wireless networks with dynamic route flows. The proposed algorithm achieves a provable throughput guarantee and provable end-to-end delay of every flow. The new joint scheduling and congestion control algorithm improves throughput and delay for dynamic wireless network by changing scheduling scheme with virtual adaptation model. The proposed algorithm combines window-based flow control with a new rate based distributed scheduling algorithm and maximum weight scheduling algorithm. This approach adaptively selects a set of routes according to the traffic load. Furthermore this dynamic adaptation mechanism achieves better performance in terms of throughput, end-to-end delay and drop rate.*

KEYWORDS- *Joint scheduling and congestion, End-to-end delay, virtual adaptation, Throughput, Drop rate*

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ABSTRACT

Explosion of biological data due to large scale genomic research and advances in high throughput data generation tools result in massive distributed datasets. Analysis of such large non relational, heterogeneous, and distributed datasets is emerging challenge in data driven biomedical industries. Highly complex biological data require unconventional computational approaches and knowledge-based solutions. Distributed datasets need to be reduced to smaller datasets that can be efficiently queried. Since genomic and biological data is generated in large volume and is stored in geographically diverse locations, distributed computing on multiple clusters, our objective here is to assess the feasibility of using Cloud based platform to analyze genomic big data. In this paper we report on the limitation of cloud based platform in the analysis of genomic data and we implement the edtc3 with native hadoop infrastructure to overcome its limitations.

Keywords: Cluster, Cloud, Distributed Computing, EDTC3, Native Hadoop

I. INTRODUCTION

Bioinformatics applications usually require large complex amounts of data processing and computational capabilities. A large distributed file based processing is adopted in this project to process large data files which can scale up to few terabytes. Native Hadoop based cloud architecture is composed of Hadoop Distributed File System (HDFS) (Fig.2), MapReduce programming model and etcd3 as (Fig.1) coordination service. HDFS cluster is composed of a centralized indexing system called NameNode and its data processing units called DataNodes; together they form a unique distributed file system. NameNode plays an important part in supporting the Hadoop Distributed File System by maintaining a File-Based block index map, this map is responsible to locate all the blocks related to the HDFS. HDFS is the primary storage system; HDFS creates multiple replicas of data blocks and is further responsible to distributes data blocks throughout a cluster to enable reliable, extremely rapid computations [1]. Etcd3 is critical component of the infrastructure, it provide coordination and messaging across applications [2]. The Etcd3 capabilities include

Enhancing the Security of Caesar Cipher Substitution Method using a transposition technique for more Secure Communication

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ABSTRACT In recent years there is drastic progress in Internet world. Sensitive information can be shared through internet but this information sharing is susceptible to certain attacks. Cryptography was introduced to solve this problem. Cryptography is an art and the science of creating the secret code. Substitution and the transposition are the two technique use for encoding and decoding the text. So when we these two technique individually it is easy to track. This can be overcome by combining these two techniques. So the Caesar cipher from substitution and the keyed transposition and the columnar technique from the transposition can be used. So by combining these two techniques the fundamental weakness can be overcome and the cipher text becomes very hard to track.

Key words: Caesar cipher, Columnar method, Transposition technique, Encryption, Decryption

I. INTRODUCTION

- We are living in the information age. We need to keep track of our information about every aspect of our lives.
- And the computer becomes the most essential part of all human lives. So the computer based transaction had become more popular among all now a days.
- Computer based system have three valuable components. They are
 - i) Hardware
 - ii) Software
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- Securities of these components are evaluated in terms of vulnerability, threats, attacks and control.
- An assault on system security that derives from an intelligent threat; that is an intelligent act that is a deliberated attempt to evade security services and violates the security policy of a system.
- So the security for the sensitive information through internet had become more important.
- So but still we are left with a difficult job of protecting network from variety of attacks.
- And because of lots of efforts network support staff came up with the solution to the problem named "CRYPTOGRAPHY"
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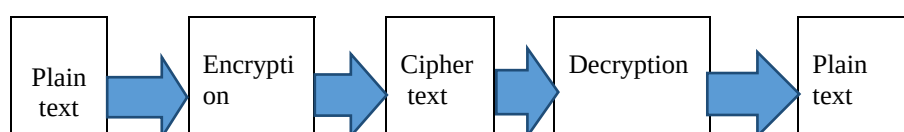


Fig.1 Encryption and Decryption

Efficient Cloud Computing with Secure Data Storage Using AES and PGP Algorithm

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Abstract- Cloud computing is usually associated with a set of applications and tools, used by companies to conduct their businesses. However, the possibilities offered by the cloud, and its versatility, causes that its tools and applications can also be used in education and many other fields. And the cloud computing uses the service models like SaaS, PaaS, and IaaS an organization achieves their business goal with minimum effort as compared to traditional computing environment. So the security among the data service becomes more concern with the entire factor. It requires a very high degree of privacy and authentication. So the cryptography is the one of the method used to provide the security among these data in the cloud server. Cryptography provides various symmetric and asymmetric algorithms to secure the data. This paper presents the symmetric cryptographic algorithm named as AES (Advanced Encryption Standard) for data at rest and PGP (Pretty Good Privacy) provide security for the data at motion. This paper is organized into four section I section is introduction which gives brief information about cloud computing and secret keys and its various algorithms, attacks on cryptography etc. Section II is literature survey which includes related work in corresponding topic. Section III contain proposed algorithm. Section IV conclusion.

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Cloud computing has enabled companies to provide Internet service without the need to purchase additional hardware, also helped to reduce costs, including incurred in connection with the work, they had done at the customer service staff. This causes that cloud computing is being seen as: "cloud computing is rapidly emerging as a technology trend almost every industry that provides or consumes software, hardware and infrastructure can leverage" [1].

The main task of cloud service providers is the ability to data mass management, and the ability to acquire data at the point whenever user demands it. Also Cloud computing presents a model that provides on demand access to

software and hardware resources with minimal management efforts.

And considering Cloud computing as an infrastructure, it refers to the physical components that are required by the system in order to provide the full functionality. These components are the processors, databases, network hardware or operating system. These definitions are the extension of concepts such as SaaS (Software as a System), PaaS (Platform as a system) and IaaS (Infrastructure as a system) [6].

These concepts are also treated as cloud layers, where each of them fulfills a different role or provides services to individual users. In addition to these layers, there is another dSaaS (Data Storage as a Service), which provides a place to store files. As the central data storage is the key facility of the cloud computing it is of prominent importance to provide the security [6].

The art and science of concealing the messages to introduce secrecy in information security is recognized as cryptography. Security goals of data cover three points namely: Availability, Confidentiality, and Integrity. Cryptography, in modern days is considered grouping of three types of algorithms. They are

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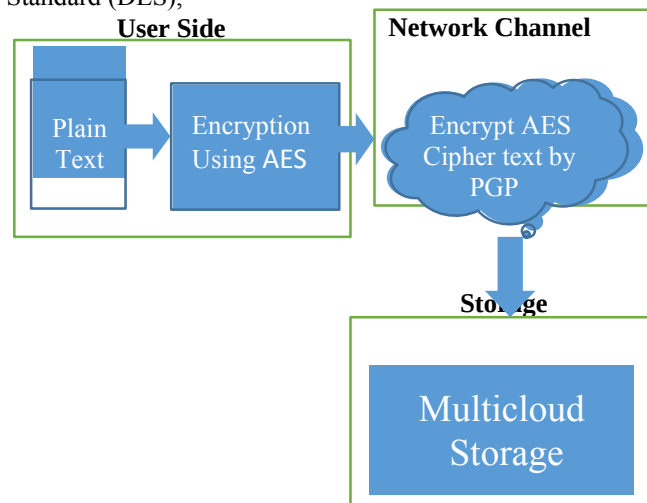


Fig.1 Encryption Process

Review on-Exploring the Limitations and Challenges of Large Scale Cloud Computing

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Abstract: Cloud Computing is a creative platform and popular system in big data. Big Data is accomplished through the principle of virtualization. This paper deals with the time consumption in large-scale data storage. Security, data format and data processing problems occur while sharing large scale of data. To overcome all these issues Map Reduce and Hadoop technology is used. Map Reduce is based on the Modified Hilbert Curve (MHC) Algorithm, which helps to reduce the execution time. Addressing of Big Data is a challenging task and requires large computational infrastructure. Modules like Replication, Fault Tolerance and Data Encryption are used. This paper also discusses about the definition, characteristics, and classification of Big Data storage using large-scale Computing and research challenges.

Keywords: Cloud Computing, Big Data, Hadoop Technology, Modified Hilbert Curve (MHC) Algorithm, Map Reduce, Replication, Fault Tolerance, Data Encryption.

I. INTRODUCTION

Big Data is a new paradigm for next-generation analytics development, enabling large-scale data computing, sharing and exploration of large volumes. Data using Cloud Computing technologies like large-scale data and service-oriented computational infrastructure facility. Large scale Data Computing is another worldview which consolidates large-scale computing with new data-intensive techniques and scientific models to construct data investigation for intrinsic data extraction. Large scale data computing is developed as service-oriented computing model to convey infrastructure platform and applications as administrations from the suppliers to the consumers meeting the quality of services (QOS) parameters, by empowering the reported and processing of huge volumes of rapidly developing data at a faster scale. Big Data demands large data computing and data resources and clouds offer large-scale infrastructure, hence both these technologies could be integrated.

The proposed research work deals with the challenges in integration of both these technologies. Big Data is a powerful metaphor for the administration of large-scale data computing in adaptable computing and store infrastructures. The proposed work examines an

architectural system for Big Data computing in clouds that support large-scale distributed data-intensive applications. Data Aware Scheduling model for effectively scheduling the jobs gets the data from remote distributed storage utilizing transformative genetic approach, composed by Hadoop Distributed File System (HDFS) and Map Reduce. The proposed research work will demonstrate their sufficiency by performing scheduling experiments in both simulation and real-time environments utilizing Hadoop clusters.

1.1 BIG DATA

Big Data refers to the extension of the volume of data that are difficult to store, process, and analyze. The difficulty can be identified with data capture, storage, sharing and visualization [1].

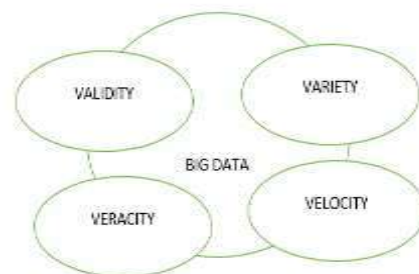


Fig 1 Big Data Characteristics

Big Data is characterized by four dimensions:

- Data Variety
- Data Validity
- Data Veracity
- Data Velocity

Data Variety: Variety refers to the different kinds of data accumulated by sensors and smart phones. Such types of data include video, image, text, and audio [2]. It reaches beyond the organized data and unorganized data [1].

Data Validity: It alludes to data authenticity. Description due to correctness or accuracy of data used to extract result in the form of information [2].

Data Veracity: Different types of data arrived from different sources by means of different platforms [2].

Distributed System Framework for Mobile Cloud Computing

K. Arul Jothy, K. Sivakumar and M.J. Delsey

Abstract--- Today's global computing environment involves the vital role of the mobile cloud computing. Mobile Cloud Computing (MCC) is the combination of cloud computing, mobile computing and wireless networks which brings rich computational resources to mobile users, network operators, as well as cloud computing providers. So its main goal is to provide the user rich experience. Now-a-day's smart phones are facing problem like slow online speed, space insufficiency (small memory), and lower stand by time. So this problem can be overcome by placing alternating solution like placing power full battery and speed can be improved by connecting the device through blue tooth or any other wireless devices and in the cloud network the basic problem is the higher response time of nodes while performing data communication operation through co-operative cache [1]. This dominant problem can be overcome by applying the distributed system as a hub in the star topology. The distributed system is used as a central controller of the star topology. Any one of the controller among the distributed system keeps track of the status of all other devices during the communication and that device will share the status among the other entire device within its own system and it use the passive scan over the device for the communication. Another basic issue in the cloud storage is that it is not able to provide security to the data stored and accessed from it and not able to prevent from the hacker so it can be overcome by using KF sensor. [Using distributed system will efficiently maintain the failure of device without data loss].

Keywords--- Mobile Cloud Computing, Co-operative Cache, Star Topology Network, Central Controller, KF sensor.

I. INTRODUCTION

- Mobile cloud computing (MCC) at its simplest, refers to an infrastructure where both the data storage and data processing happen outside of the mobile device[2].
- Mobile cloud applications move the computing power and data storage away from the mobile devices and into powerful and distributed computing platforms

located in clouds, which are then accessed over the wireless connection based on a thin native client [2].

- Mobile devices face many resource challenges (battery life, storage, bandwidth etc.)
- Cloud computing offers advantages to users by allowing them to use infrastructure, platforms and software by cloud providers at low cost and elastically in an on-demand fashion [2].
- Mobile cloud computing provides mobile users with data storage and processing services in clouds, obviating the need to have a powerful device configuration (e.g. CPU speed, memory capacity etc), as all resource-intensive computing can be performed in the cloud [2].

A. MCC Popularity

According to a recent study by ABI Research, more than 240 million businesses will use cloud services through mobile devices by 2015.

That traction will push the revenue of mobile cloud computing to \$5.2 billion.

Mobile cloud computing is a highly promising trend for the future of mobile computing.

Many security issues are there as different technologies including networks, databases, operating systems, virtualization, resource scheduling, transaction management, load balancing, concurrency control and memory management are used in cloud computing. Some of the security issues include data isolation, browser security, malware, flooding attack, privacy, data integrity, and protection of DATA [3].

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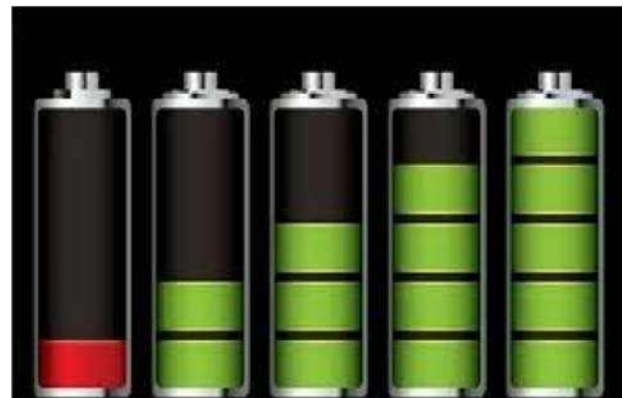


Figure 1: Low Battery Problem

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An Assessment of Quality of Service and Network Security in IP Based Communication Networks

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^{1,2}Assistant Professor, Department of CSE, JCT College of Engineering and Technology, Coimbatore, India.

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ABSTRACT

The current distribution of IPv6 in core networks of operators, its obtainability to end customers of multiple ISPs together with the availability of native access to large services like Google Access, the dispersion of IPv6 has been increased. While its deployment from the inside of the network leading to the edges is fruitful, the transition remains a matter today for numerous enterprises which see it as a monotonous and error-prone task for network administrators. In order to fill this breach and to present the essential algorithms and provide the subsidiary tools to permit this transition to become automatic. Based on the model of an IPv4 network, we design and implement an ipv6 network, thereby it supports auto configuration to the host and security is inbuilt with the protocol. An assessment of quality of service and network security in IP based communication networks has been carried out in this paper.

INTRODUCTION

Enabling the IPv6 protocol which enable the stateless auto configuration and also enables the security features which is inbuilt with IPv6 protocol. IPv4 is an abbreviation of "Internet Protocol Version Four". It is also recognized as RFC 719. IPv4 was the fourth generation of Internet Protocol and was also the first version to be extensively deployed. The Internet Protocol sits on the third layer of the OSI network model. This is also identified as the network layer. The physical layer is the first layer in the OSI which is software based. The network layer (third layer) of the OSI model generally deals with finding, routing and switching for end to end communications that are not unswervingly connected to each other using a physical link. The security features is not in built with IPv4, ISP uses ACL, fire-wall/check point which enables the security in IPv4 network. The Internet Protocol is the most leading protocol on the Internet nowadays and commonly runs on upper layer protocols such as the Transmission Control Protocol (TCP) and the User Datagram Protocol (UDP). IP networking is a pattern of connectionless networking service (CLNS). IPv4 address consists of 32 bits, 4 bytes that are a combination between zeros and ones. The address contains two parts, the network and host address part.

Yehia et al. have planned various routing protocols and assessed them based on some performance metrics [1]. This evaluation is performed hypothetically and by using simulation. Sunjian and fang have introduced the OSPF protocol for IPv6 which is also mentioned as OSPFv3 and they primarily familiarized the knowledge of IPv6, and then implemented the OSPF over IPv6 [2]. Horenoor has introduced the implementation decision to be made when the choice is available between protocols that involve distance vector or link state or the combination of both [3]. In this paper, it is shown that OSPF definitely achieves better when compared to RIP in terms of network convergence, latency and throughput. Bahk and Zarki described about various dynamic multipath routing algorithm for networks [4]. Joseph Davies has specified detailed information for understanding IPv6 and its routing protocols [5]. The authors have made the case studies in real time about use of the dynamic routing protocols [6]. A tutorial has been entailed for simulating the wide area network using GNS-3.

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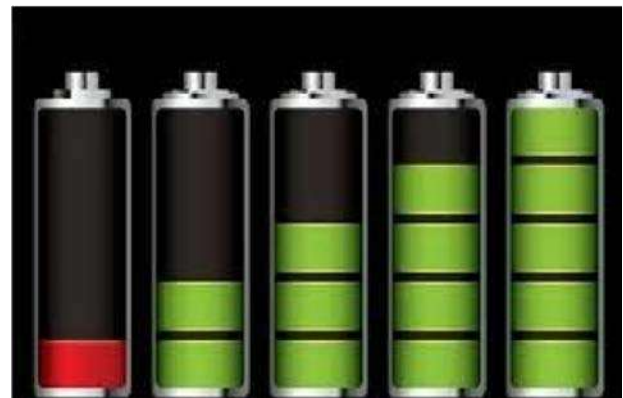


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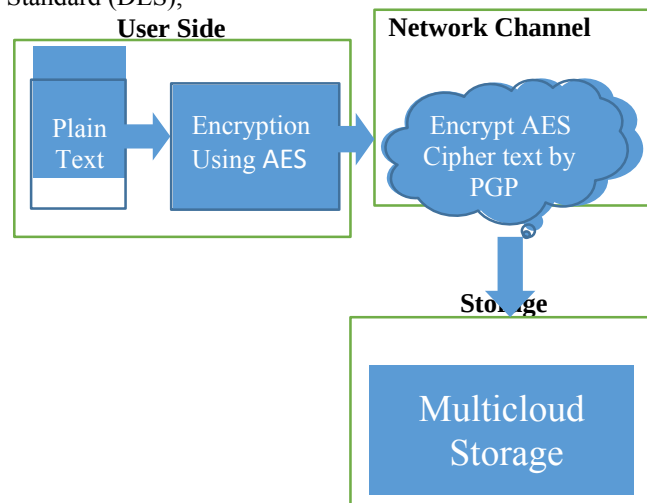


Fig.1 Encryption Process

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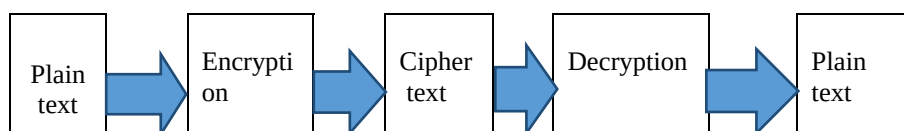


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ABSTRACT In recent years there is drastic progress in Internet world. Sensitive information can be shared through internet but this information sharing is susceptible to certain attacks. Cryptography was introduced to solve this problem. Cryptography is an art and the science of creating the secret code. Substitution and the transposition are the two technique use for encoding and decoding the text. So when we these two technique individually it is easy to track. This can be overcome by combining these two techniques. So the Caesar cipher from substitution and the keyed transposition and the columnar technique from the transposition can be used. So by combining these two techniques the fundamental weakness can be overcome and the cipher text becomes very hard to track.

Key words: Caesar cipher, Columnar method, Transposition technique, Encryption, Decryption

I. INTRODUCTION

- We are living in the information age. We need to keep track of our information about every aspect of our lives.
- And the computer becomes the most essential part of all human lives. So the computer based transaction had become more popular among all now a days.
- Computer based system have three valuable components. They are
 - i) Hardware
 - ii) Software
 - iii) Data
- Securities of these components are evaluated in terms of vulnerability, threats, attacks and control.
- An assault on system security that derives from an intelligent threat; that is an intelligent act that is a deliberated attempt to evade security services and violates the security policy of a system.
- So the security for the sensitive information through internet had become more important.
- So but still we are left with a difficult job of protecting network from variety of attacks.
- And because of lots of efforts network support staff came up with the solution to the problem named "CRYPTOGRAPHY"
- Cryptography is the process of encrypting and decrypting the information from sender to receiver through the network.
- The information is encrypted and decrypted with the help of secret key.

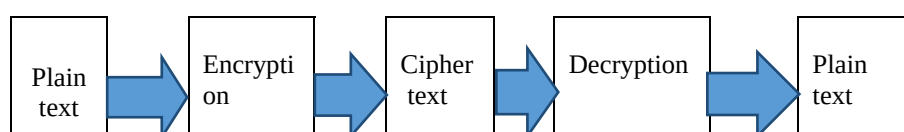


Fig.1 Encryption and Decryption

Algorithm is Based on Ant Colony Optimization using Grid Simulaor

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Abstract

In today's competitive environment the objectives and goals of the producers (also called resource owners) and consumers (also called end users) are different. Computational grid has been considered as the best paradigm for handling large scale distributed system having geographically allocated resources. Load balancing algorithms are important in the research of network applications. In this paper we present an algorithm which reduces the average execution time and cost of the tasks. This method considers both cost and time constraints. The proposed algorithm is implemented with Gridsim toolkit which can simulate a decentralized module. The GridSim toolkit abstracts the features and behaviour of complex fundamental grid elements such as grid tasks, grid resources and grid users. This algorithm provides services like resource discovery. For evaluation purpose a comparison of execution times and cost of proposed algorithm and the other similar algorithm is also provided in this paper. Results support the proposed approach.

Keyword- Grid Computing, Load Balancing, Resource management, Execution time, Execution Cost, Ant Colony Algorithm, Random Algorithm

I. INTRODUCTION

Grid Computing enables sharing, selection, aggregation of geographically distributed resources dynamically at run time depending on their accessibility, ability and users Quality of Service requirements [1]. The main objective of the grid technology is to maximize the utilization of the organization's computing resources by making them as shareable entities, and provide computing on demand to the users. Balancing the load of all available resources is another important issue in the grid [2]. Unlike scheduling problems in conventional distributed systems, scheduling problem in grid system is much more complex as new features of grid systems such as its dynamic nature and the high degree of heterogeneity of jobs and resources must be undertaken [3]. Scheduling is mainly classified into two types, static and dynamic scheduling. Static scheduling allocates the task to suitable resource before starting the execution. In case of static scheduler all the details of tasks should be known well before starting the process. Dynamic scheduling allocates the resource during the execution time i.e. the scheduler can take decision during job execution [4]. Online mode and batch modes are available in dynamic scheduling.

In online mode the scheduler will be always in ready state, so when a job arrives, it allocates the resource immediately. In batch mode the jobs are grouped as set of tasks, known as Meta task and the mapping is done in a prescheduled time. Scheduling can aim to provide- two objectives namely high performance computing and high throughput computing. High performance computing decreases the execution time whereas high throughput computing increases the Processing capacity of the system.

Scheduler has the following three main phases [5]. In phase one all the available resource will be collected. This is known as resource discovery. Second phase collects the information about the resources and choose the best suitable resource to the task. Third phase executes the job in the selected machine.

By harmonizing and distributing the grid resources efficiently, an advanced resource allocation strategy can reduce total run time and total expenses greatly and bring an optimal performance [6] [7].

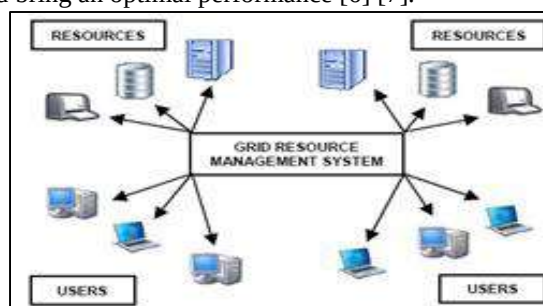


Fig. 1: Grid Computing Environment

Secured Picode: Using Visual Cryptography

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Abstract

In this paper, we propose a new technology which combines the visual cryptography with a picture embedding pictode for the security of information. Hence the paper combines both the advantages of the modified visual cryptography and improved picture embedded 2D barcode. Actually, there are two methods used to introduce confidentiality and security when visual data are transmitted through unsecured channels: data hiding and visual cryptography. Data hiding usually tries to embed data in digital media and transmit it in an imperceptible way so that the confidential messages is send securely and with visual cryptography the original input is shared between a set of participants by a secret image holder. Visual cryptography is a method of protecting the image-based secrets that has a computation free decoding process. The scheme provides an efficient way to hide the natural image among different shares. The two-dimensional barcodes have been widely used as an interface to connect potential customers and advertisement contents. However, the appearance of a conventional 2D barcode pattern is often too obtrusive for integrating into an aesthetically designed advertisement.

Keyword- QR Code, 2Dbarcode, Picode, Datamatrixcode, Visual Cryptography, Security, Distortion, Perceptual Quality, Fixed Pattern, Secret

I. INTRODUCTION

In the past few decades, many discussions were carried out on barcodes and its generations as a means to connect satisfy the potential customer and to make a link between the offline and online business. In such a application, a 2D barcode encoding a product promotion web link is often attached to an advertisement to engage customers and the mobile phone with ever increasing computational power and imaging capability is employed as a 2D barcode capturing and decoding device. Potential customers can conveniently retrieve further information about an advertisement by scanning the barcode with their mobile phones. This process simply involves initiating a suitable barcode scanning mobile software and pointing the phone camera towards the barcode. More human oriented applications of 2D barcodes can be found in. However, the traditional 2D barcodes, such as QR code and Data Matrix code shown in Fig. 1 (a)-(d), are not originally designed for mobile barcode applications. Firstly, they are of binary appearance which is not perceptually. Review paper discusses about the last few years, conventional Two-Dimensional (2D) barcodes and some existing beautified QR codes. Quick Response (QR) code is widely used in many applications such as marketing, for industrial applications, retail applications, health care applications, manufacturing, and product tracking etc.

Secret sharing scheme is a method of sharing secret information among a group of participants. In a secret sharing scheme, each participant gets a piece of secret information, called a share. When the allowed coalitions of the participants pool their shares, they can recover the shared secret; on the other hand, any other subsets, namely non-allowed coalitions, cannot recover the secret image by pooling their shares. In the last decade, various secret sharing schemes were proposed, but most of them need a lot of computations to decode the shared secret information.

The simplest access structure is the 2 out of 2 schemes where the secret image is encrypted into 2 shares and both needed for a successful decryption. To begin with, every pixel is extended to 2×2 blocks, where each block is composed of two black pixels and two white pixels. By referring to a predefined coding table, a block can be produced. The pixel coding as follows: Firstly, the system randomly picks one block from the six, shown in Fig.1, to represent share 1 block. Secondly, according to the pixel in the secret image, a matching block for share 2 is selected from the Table I.



Fig. 1: Block Group

Review on-Exploring the Limitations and Challenges of Large Scale Cloud Computing

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Abstract: Cloud Computing is a creative platform and popular system in big data. Big Data is accomplished through the principle of virtualization. This paper deals with the time consumption in large-scale data storage. Security, data format and data processing problems occur while sharing large scale of data. To overcome all these issues Map Reduce and Hadoop technology is used. Map Reduce is based on the Modified Hilbert Curve (MHC) Algorithm, which helps to reduce the execution time. Addressing of Big Data is a challenging task and requires large computational infrastructure. Modules like Replication, Fault Tolerance and Data Encryption are used. This paper also discusses about the definition, characteristics, and classification of Big Data storage using large-scale Computing and research challenges.

Keywords: Cloud Computing, Big Data, Hadoop Technology, Modified Hilbert Curve (MHC) Algorithm, Map Reduce, Replication, Fault Tolerance, Data Encryption.

I. INTRODUCTION

Big Data is a new paradigm for next-generation analytics development, enabling large-scale data computing, sharing and exploration of large volumes. Data using Cloud Computing technologies like large-scale data and service-oriented computational infrastructure facility. Large scale Data Computing is another worldview which consolidates large-scale computing with new data-intensive techniques and scientific models to construct data investigation for intrinsic data extraction. Large scale data computing is developed as service-oriented computing model to convey infrastructure platform and applications as administrations from the suppliers to the consumers meeting the quality of services (QOS) parameters, by empowering the reported and processing of huge volumes of rapidly developing data at a faster scale. Big Data demands large data computing and data resources and clouds offer large-scale infrastructure, hence both these technologies could be integrated.

The proposed research work deals with the challenges in integration of both these technologies. Big Data is a powerful metaphor for the administration of large-scale data computing in adaptable computing and store infrastructures. The proposed work examines an

architectural system for Big Data computing in clouds that support large-scale distributed data-intensive applications. Data Aware Scheduling model for effectively scheduling the jobs gets the data from remote distributed storage utilizing transformative genetic approach, composed by Hadoop Distributed File System (HDFS) and Map Reduce. The proposed research work will demonstrate their sufficiency by performing scheduling experiments in both simulation and real-time environments utilizing Hadoop clusters.

1.1 BIG DATA

Big Data refers to the extension of the volume of data that are difficult to store, process, and analyze. The difficulty can be identified with data capture, storage, sharing and visualization [1].

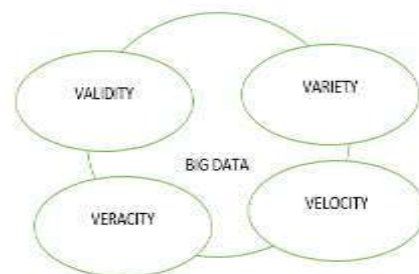


Fig 1 Big Data Characteristics

Big Data is characterized by four dimensions:

- Data Variety
- Data Validity
- Data Veracity
- Data Velocity

Data Variety: Variety refers to the different kinds of data accumulated by sensors and smart phones. Such types of data include video, image, text, and audio [2]. It reaches beyond the organized data and unorganized data [1].

Data Validity: It alludes to data authenticity. Description due to correctness or accuracy of data used to extract result in the form of information [2].

Data Veracity: Different types of data arrived from different sources by means of different platforms [2].

NOC Based Router Architecture Design Through Decoupled Resource Sharing Using CABHR Algorithm

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ABSTRACT

A Network-on-Chips (NoCs) is rapid promising for an on-chip alternative designed in support of many-core System-on-Chips (SoCs). In spite of this, developing an increased overall performance low latency Network on chip using low area overhead has always been a new challenge. Network on Chips (NoCs) by using mesh and torus interconnection topologies have become widely used because of the easy construction. A torus structure is nearly the same as the mesh structure, however, has very slighter diameter. In this regard, we propose effective router design for Decoupled Resource sharing in a torus topology based on clustering algorithms Based Hierarchical Routing (CABHR) to get better the efficiency of NoC. We show that our approach is provides improved latency and energy consumption, overall performance developments compared to the most distinguished existing routing technique.

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1. INTRODUCTION

The SoCs is established to provide good performance resolution for fulfill the expanding communication requirements of challenging Very large scale integration circuits. System on chip provides high efficiency from reusing predefined Intellectual Property (IPs). System on chip employed to be linked IPs through using busses; however; common channel buses can problems the throughput. Because the complexity for SoC raises, limits on power dissipation, chip scalability and operating frequency are receiving most important problems. Major SoC will cause considerable rise in interconnection needs leading to more energy consumption as well as delay. The Network on Chip (NoC) is an alternative technology of SoC that is proposed like resolution for the interconnection issue of large scale SoCs. Network on Chip consists of processing elements (PEs) interconnected through network Interface (NI), communication channels and switches. NoCs accomplish higher scalability and also better performance of the on-chip interconnection wires. In Network on Chip, a normal interconnections similar to point-to-point wires as well as busses starting source to destination IPs. The NoC became an efficient approach to the conventional bus based design for inter core communication.

In [1], Network on Chip (NoC) is realized through the use of Torus structure. They recommended a routing algorithm, router design as well as given solution to the challenge offered from the long wire connection within torus structure through pipe-lining both the long and short wire connection by increase the input buffers connected to the long wires. Because of the fact, gate delays will be scale down along with technology. Large-scale wire delays usually rise tremendously, linearly by including repeaters [3]. The delay may possibly meet or exceed restriction of a clock cycle or repeatedly, a number of clock cycles, in spite of repeater insertion. For ultra deep submicron methods, 75% or a lot of delay with crucial paths may be due to

PERFORMANCE IMPROVEMENT OF CEILING FAN MOTOR USING VARIABLE FREQUENCY DRIVE WITH SEPIC CONVERTER

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Abstract: Single phase induction motors(SPIM) are the commonly used motor in household appliances because of its rugged construction and low cost. The major problem associated with SPIM is the low power factor and the high harmonic distortion. The power factor was found very poor and a huge amount of power is being wasted up and this affects the quality of power. The main objective of this paper is to improve power factor and to reduce ripples in the input current and also to provide an efficient speed control method. The proposed system is used for the single phase induction motor in ceiling fan or refrigerator. Conventional speed control techniques using TRIAC consumes huge amount of energy for the speed control of induction machine. The above mentioned problem is overcome by means of a Power Factor Correction Circuit with single-ended primary-inductor converter (SEPIC) converter which is operating in Discontinuous Conduction Mode (DCM) with Pulse Width Modulation(PWM) control technique for the smooth speed control. As a result a smooth speed control is achieved with improved power factor and reduced Total Harmonic Distortion (THD). To validate the above, the simulink model of SEPIC PFC converter fed induction motor drive in MATLAB/Simulink platform is developed and the results achieved were compared with and without the PFC converter.

Keywords: SEPIC, Pulse with modulation, DCM, motor speed, PWM inverter

1. Introduction

Development in the field of power electronics is quick and appreciable. These developments have increased the non-linearity of the electrical system. With increasing Quantities of non-linear loads being added to the electrical systems, it has become necessary to maintain the power quality. The problems related power quality becomes an issue of concern. If electrical equipment operates correctly and reliably without being damaged or stressed[1], then the electrical power is of good quality. Power quality determines how efficiently the power is utilized by the consumer devices. Poor power quality can be described as any event related to the electrical network that ultimately results in a financial loss and reduce the life of the appliance connected to the supply of poor quality[3].

The induction motors are the commonly used motor in household appliances because of its rugged construction and low cost. The major problem associated with the induction motors are the low power factor and the high harmonic distortion. The power factor was found to be 0.6 to 0.7 and a huge amount of power is being wasted up and this affects the quality of power[4]. The main objective of the work is to improve power factor and to reduce ripples in the input current and also to provide an efficient speed control method [9]. The proposed system is used for the single phase induction motor in ceiling fan or refrigerator. Normally the speed control of the single phase induction motor is done using triac[3]. This is not an energy efficient technique as huge amount of energy is wasted in the speed control of induction machine. The above mentioned problem is overcome by means of a PFC SEPIC converter which Operating in DCM and a PWM control technique is used for the smooth speed control of the induction machine. As a result the problem related to power factor and harmonic distortions were solved [2].

1.1. Induction motor

POSITION CONTROL OF SOLAR PANNEL

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ABSTRACT

Photovoltaic systems normally use a maximum power point tracking (MPPT) technique to continuously deliver the highest possible power to the load irrespective of the temperature and irradiation conditions and of the load electrical characteristics. The main difference between the method used in the proposed MPPT system and other techniques used in the past is that the PV array output voltage is used to directly control the position of solar panel, thus reducing the complexity of the system. A simple method of tracking the maximum power points (MPP's) and forcing the system to operate close to these points is presented. This paper details the proposed work to design the solar tracking system based around the microcontroller programmable IC. The solar panel is in the form of array of photovoltaic cells. The operation of the solar panel is actuated by means of the final control element (FCE). The FCE used is stepper motor. For the optimum utilization of solar energy the position of solar panel in the form of photovoltaic array is controlled in accordance with the position of optical electronic sensors located at particular angle of elevation of light rays with respect to ground.

The physical model consists of solar panel in the form of photovoltaic cells; to which the stepper motor with its extended shaft is fabricated. The minimum necessary hardware interfacing circuit associated with microcontroller and the stepper motor is designed and fabricated. The control functions are implemented using 8051 Microcontroller based hardware and software. The proposed model resembles the features of solar tracking system, which can be used in usual practice. The experimental results show that the use of the proposed MPPT control increases the PV output power by as much as 10-15% and hence the resulting system has improved high-efficiency, lower cost and can be easily modified to handle more energy sources.

Key Words- Maximum power point tracking, microcontrollers, photovoltaic systems, solar array, battery charging.

I. INTRODUCTION

As Conventional sources of energy are rapidly depleting and the cost of energy is rising, photovoltaic array becomes a promising alternative source. The major advantages associated with PV array are that it is 1) abundant; 2) pollution free; 3) recyclable; 4) installation cost is considerably high and energy conversion is relatively low. To overcome these problems, the following two essential ways are used: 1) increase the efficiency of conversion for solar array and 2) maximize the output power from the array. With the development of technology, the cost of solar array is expected to decrease continuously in making them attractive for

Fuzzy Logic in Electrical Systems

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Abstract

With the advent of modern computer technology, the field of Artificial Intelligence is showing a definite utility in all spectrum of life. In the field of control, there is always a need for optimality with improved controller performance. In this paper, the feasibility of Fuzzy Logic as an effective control tool for DC motors is dealt with. The Fuzzy Logic Controller (FLC) is showing a better performance than conventional controllers in the form of increased robustness. In this paper, the role of Fuzzy Logic as a controller and its implementation is studied.

Keyword- Fuzzy Logic Controller (FLC), Fuzzification, DC Motors

I. INTRODUCTION

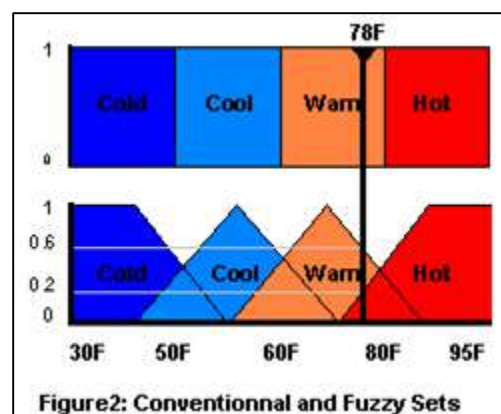
- Fuzzy logic is a powerful problem solving methodology introduced by Lotfi Zadeh in 1960's.
- It provides tools for dealing with imprecision due to uncertainty and vagueness, which is intrinsic to many engineering problems.
- It is a superset of Boolean or Crisp logic.
- It emerged into mainstream of information technology in late 1980's and early 1990

II. FUZZY LOGIC

- Fuzzy logic resembles human decision making with its ability to work from approximate data and find precise solutions.
- Classical logic or Boolean logic has two values or states. Eg. (true or false). It requires a deep understanding of a system, exact equations, and precise numeric values.
- Fuzzy logic is a continuous form of logic. eg (bad, very bad, poor, average). It allows modeling complex systems using a higher level of abstraction originating from our knowledge and experience.

III. WORKING OF FUZZY LOGIC

- The working of fuzzy logic can be understood by considering a simplified example of a thermostat controlling a heater fan.
- The room temperature detected through a sensor is input to a controller, which outputs a control force to adjust the heater fan speed.
- The first step in designing such a fuzzy controller is to characterize the range of values for the input and output variables of the controller.
- Labels such as cool for the temperature and high for the fan speed are assigned and a set of simple English-like rules to control the systems are written.



A New Topology Power Generation System with MPPT

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Abstract

We have introduced a microcontroller controlled thermoelectric generator(a turbine free system) which transforms geothermal energy, one of the renewable energy sources, to directly electrical energy and then the system was tested and its performance analysis is explained. In the system, energy transformation is provided by the thermoelectric modules. Since changeable DC voltage depending on temperature difference is obtained by the thermoelectric modules which are used to charge a battery or accumulator. The regulator circuit and inverter circuit are used in order to obtain the values 5V DC, 12V DC and 220V AC in the electrical energy. System control signals are arranged by using the PIC16F877 microcontroller in the system. The system is quite useful to meet electrical energy needs easily, cleanly and cheaply from the geothermal sources.

Keyword- MCGTG, MPPT, Microcontroller

I. INTRODUCTION

The need of electrical energy of the countries around the world is increasing every day. Here a microcontroller controlled geothermal thermoelectric generator (MCGTG), which transforms geothermal energy, one of the renewable energy sources, directly to electrical energy after then the system was tested and its performance analysis was examined. Today in our metro world, there are only eight renewable energy sources as follows.

- Biomass
- Geothermal
- Solar power
- Hydro power
- Wind power
- Tydal power
- Wave power

Our paper deals with the geothermal energy for our today concern. The subtopic follows

- Definition
- Principle
- General Construction
- Basic Thermoelectric Module
- Working
- System control using Microcontroller
- Performance analysis
- Outlook
- Applications
- Advantages
- Disadvantages
- Conclusion

A. Definition

Geothermal power (from the Greek roots geo, meaning earth, and thermos, meaning heat) is energy generated from heat stored in the earth, or the collection of absorbed heat derived from underground.

A Review of Alternate Fuels

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Abstract

At the present time, virtually all of the world's transportation needs are supplied by fuels derived from petroleum, also known as crude oil. Gasoline, diesel, jet fuels are examples of transportation fuels that are produced from petroleum. The combustion of petroleum in motor vehicles results in emission of gases associated with global warming, acid rain and urban air pollution. Using hydrogen as fuel can fundamentally change our relationship with the natural environment. Hydrogen boasts many important advantages over other fuels. So, it is the fuel of choice in this paper for energy.

Keyword- Gasoline, Diesel, Jet Fuels

I. INTRODUCTION

Alternative energy sources, is one that can be adopted to save energy for our future generation and to reduce ecological threads like pollutions, scarcity, global warming etc. Some of the commonly used alternative fuels are wind energy, solar energy, tidal energy, geothermal energy and the blooming alternative fuel is hydrogen.

A. Fossil Fuels and Its Effects

Fossil fuel is the "incompletely oxidized and decayed animal and vegetable materials, specifically coal, peat, lignite, petroleum and natural gas". Technically it is defined as "material that can be burned or otherwise consumed to produce heat".

Combustion of these fossil fuels is considered to be the largest contributing factor to the release of greenhouse gases into the atmosphere. Usage of fossil fuel causes air pollution, water pollution, accumulation of solid waste, not to mention the land degradation and human illness.

This fossil fuel affects small plants and animals via smoke exhaust from vehicles and by producing air pollution. Many toxic substances like VANADIUM and MERCURY are released by these fossil fuels.

When fossil fuel like coal is burnt it will produce nitrous oxide and sulphuric oxide which will retain in the atmosphere for a long term and at times of raining it will mix with the moisture and it form harmful nitric acid and sulphuric acid and reaches earth. This is known as Acid rain.

Sometimes the leakage of these fossil fuels during the delivery via pipeline will leads to leakage and produces oil rigs and pollute water and damages the water living organisms.

II. METHODS TO REDUCE FOSSIL FUEL'S DAMAGE

- Use of unleaded gas has helped to reduce the release of lead into the environment. But it has slighter less octane number when compared to the actual leaded petrol. But it affects the environment in minor amount since lead is not released.
- Use of alternative and renewable energy resources will reduce the effect of fossil fuels and environment and helps to meet the energy demand.

III. ALTERNATIVE FUELS OR RENEWABLE ENERGY SOURCES

These energies are produced by absolute natural sources and these energies can be replenished. Some of the alternative fuels are,

- Solar Energy
- Tidal Energy
- Wind Energy
- Geo Thermal Energy
- Bio Mass Fuel
- Hydrogen Energy

Effective Performance Improvement of SPM using Adjustable Capacitor and Multilevel Inverter

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Abstract: A method to achieve good performances of a SPIM in specific speed range is introduced on the basis of using an adjustable capacitor. Effect of capacitor change on the most important performance factors of the motor is investigated. As different capacitances are required in different situations, an adjustable capacitor is introduced that achieves this requirement. But single phase induction motor cannot produce required starting torque. So implementing an auxiliary winding that in contribution with the main winding produces a rotating field in the air gap. In high power and high starting torque applications, a series connected capacitor with auxiliary winding is used to gain better performances. The total harmonic distortion of the input supply of single phase induction motor is reduced by using multilevel inverter. By this proposed method, the performance parameters of single phase induction motor like electromagnetic torque, speed and rotor current can be improved and THD is reduced.

Keywords: Adjustable capacitor, Auxiliary winding, Main winding, Single phase induction motor (SPIM), Total harmonic distortion (THD)

I. INTRODUCTION

The increasing demand for energy has led to demand for efficient and good quality of power in motor and motor systems. Single phase induction motor is the most commonly used driving systems in domestic, commercial, agricultural, industrial and other low power applications. These motors are available in different ratings from fractional horsepower to hundreds of horsepower. Due to the rugged design, low maintenance, reliable operation and cheaper cost, single phase induction motor are most familiar over all other electric motors. Most of the domestic appliance like fans, washing machines, refrigerators etc uses this motor for their functioning which is mostly rated in the fractional horsepower. The single-phase induction motor (SIM) is preferred in the applications that do not require a variable speed drive, regarding the low efficiency, due to its low cost and rugged construction. Due to the large number of existing motors in use, researches were done to improve the motor's performances by keeping low price and minimizing potential equipment failure.

In spite of popularity, this type of motor cannot produce required starting torque. To overcome this problem, known techniques are used as implementing an auxiliary winding that in contribution with the main winding produces a rotating field in the air gap. In high power and high starting torque applications, a series connected capacitor with auxiliary winding is used to gain better performances. The main drawback of this combination is different capacitors that are required for optimum performances in different speeds especially at start and rated speed. Essentially, starting capacitor is larger than running one. Power electronic devices can help to convert a fixed value capacitor to an adjustable one. Moreover, rotating fields theory helps us to evaluate the machine characteristics and determine the required capacitor for optimum performances in different operating conditions.

One way to produce starting torque in the SIM is equipping it with the auxiliary winding physically perpendicular to the main winding. Proper phase shift in currents flow through these windings is required which can be reached by using a capacitor in series with the auxiliary winding. If a fixed capacitor is to be utilized, usually, maximum starting torque determines its value. When the motor reaches 70-80% of its rated speed, the capacitor is bypassed, because a large capacitor in the auxiliary circuit decreases the motor performances. "Fig.1." shows the schematic view of the windings and the capacitor of the SIM.

Modified SEPIC Convertor based Induction Motor Drive

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Abstract: The request for developing power quality of the AC system has drawn excessive interest during the recent years. The increased usage of power electronic devices, such as variable speed drives, uncontrolled rectifiers and other switching devices, affects the power quality of the utility grid significantly. The SEPIC converter is selected because of its numerous advantages over buck, boost and buck-boost converter. The bridgeless SEPIC converter has numerous advantages compared to the ordinary bridge converter. It reduces the complexity of the control circuit, can be easily implemented. The SEPIC converter operating in continuous conduction mode is explained in this paper. This SEPIC converter is capable of giving high power factor and low harmonic distortion. The implementation of this Bridgeless model in the SEPIC converter operating in Discontinuous conduction mode is the main outcome of my project and how it works. Applications: Balanced three phase equipment and single phase equipment, portable power tools, All lighting equipment, single phase (below 600W).

Keywords: Discontinuous conduction mode (DCM), Pulse width modulation (PWM), Voltage source inverter (VSI), Simulation

I. INTRODUCTION

Development in the field of POWER ELECTRONICS is quick and appreciable. These developments have increased the non-linearity of the electrical system. With increasing quantities of non-linear loads being added to the electrical systems, it has become necessary to maintain the power quality. The problems related power quality becomes an issue of concern. If electrical equipment operates correctly and reliably without being damaged or stressed, then the electrical power is of good quality. Power quality determines how efficiently the power is utilized by the consumer devices. Poor power quality can be described as any event related to the electrical network that ultimately results in a financial loss and reduce the life of the appliance connected to the supply of poor quality.

The induction motors are the commonly used motor in household appliances because of its rugged construction and low cost. The major problem associated with the induction motors are the low power factor and the high harmonic distortion. The power factor was found to be 0.667 and a huge amount of power is being wasted up and this affects the quality of power. The main objective of the project is to improve power factor and to reduce ripples in the input current and also to provide an efficient speed control method.

The proposed system is used for the single phase induction motor in ceiling fan or refrigerator. Normally the speed control of the single phase induction motor is done using triac. This is not an energy efficient technique as huge amount of energy is wasted in the speed control of induction machine. The above mentioned problem is overcome by means of a PFC SEPIC converter which operating in DCM and a PWM control technique is used for the smooth speed control of the induction machine. As a result the problem related to power factor and harmonic distortions were solved.

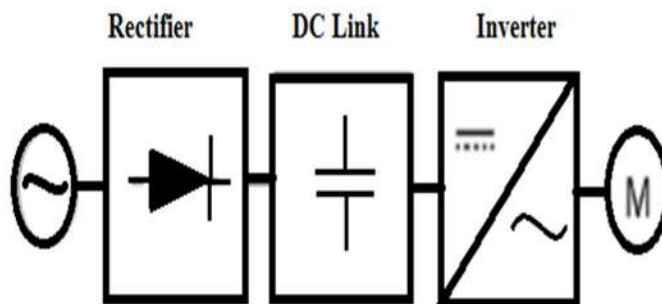


Fig 1 Block diagram of variable frequency drive

Fuzzy Logic in Electrical Systems

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Abstract

With the advent of modern computer technology, the field of Artificial Intelligence is showing a definite utility in all spectrum of life. In the field of control, there is always a need for optimality with improved controller performance. In this paper, the feasibility of Fuzzy Logic as an effective control tool for DC motors is dealt with. The Fuzzy Logic Controller (FLC) is showing a better performance than conventional controllers in the form of increased robustness. In this paper, the role of Fuzzy Logic as a controller and its implementation is studied.

Keyword- Fuzzy Logic Controller (FLC), Fuzzification, DC Motors

I. INTRODUCTION

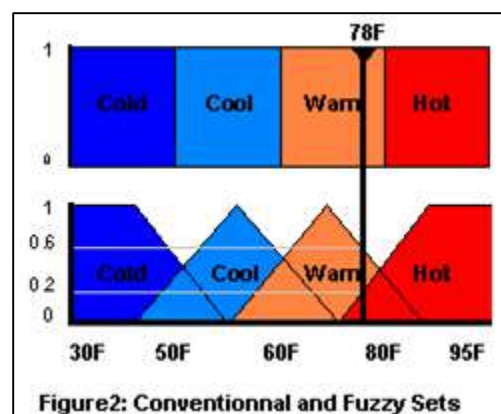
- Fuzzy logic is a powerful problem solving methodology introduced by Lotfi Zadeh in 1960's.
- It provides tools for dealing with imprecision due to uncertainty and vagueness, which is intrinsic to many engineering problems.
- It is a superset of Boolean or Crisp logic.
- It emerged into mainstream of information technology in late 1980's and early 1990

II. FUZZY LOGIC

- Fuzzy logic resembles human decision making with its ability to work from approximate data and find precise solutions.
- Classical logic or Boolean logic has two values or states. Eg. (true or false). It requires a deep understanding of a system, exact equations, and precise numeric values.
- Fuzzy logic is a continuous form of logic. eg (bad, very bad, poor, average). It allows modeling complex systems using a higher level of abstraction originating from our knowledge and experience.

III. WORKING OF FUZZY LOGIC

- The working of fuzzy logic can be understood by considering a simplified example of a thermostat controlling a heater fan.
- The room temperature detected through a sensor is input to a controller, which outputs a control force to adjust the heater fan speed.
- The first step in designing such a fuzzy controller is to characterize the range of values for the input and output variables of the controller.
- Labels such as cool for the temperature and high for the fan speed are assigned and a set of simple English-like rules to control the systems are written.



Hybrid Electric Vehicle Design

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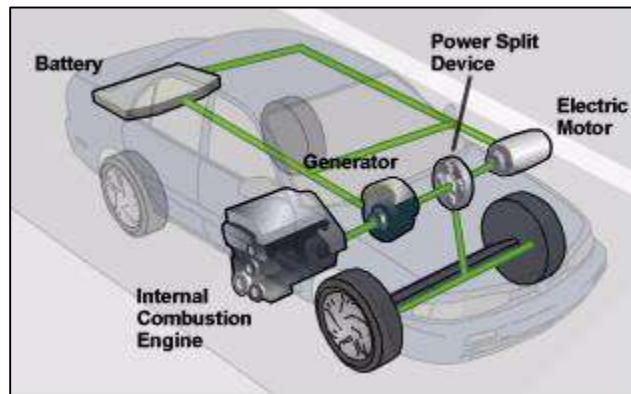
A hybrid electric vehicle (HEV) is a hybrid vehicle which combines a conventional propulsion system with a rechargeable energy storage system (RESS) to achieve better fuel economy than a conventional vehicle. Modern mass-produced HEVs prolong the charge on their batteries by capturing kinetic energy via regenerative braking, and some HEVs can use the internal combustion engine to generate electricity by spinning an electrical generator (often a motor-generator) to either recharge the battery or directly feed power to an electric motor that drives the vehicle.

Keyword- Hybrid Electric Vehicle (HEV), Rechargeable Energy Storage System (RESS), Internal Combustion Engine (ICE)

I. HYBRID ELECTRIC VEHICLE

Regular HEVs most commonly use an internal combustion engine (ICE) in tandem with [[electric motor]]s to power their propulsion system. Modern mass-produced HEVs prolong the charge on their batteries by capturing "kinetic energy" via [[regenerative braking]], and some HEVs can use the combustion engine to generate electricity by spinning an [[electrical generator]] (often a [[motor-generator]]) to the fraction of the cause results to the abdomile reswult the vehicle. An HEV's engine is smaller and may be run at various speeds, providing more efficiency.

Hybrid-electric vehicles (HEVs) combine the benefits of gasoline engines and electric motors and can be configured to obtain different objectives, such as improved fuel economy, increased power, or additional auxiliary power for electronic devices and power tools.



A. Regenerative Braking

The electric motor applies resistance to the drivetrain causing the wheels to slow down. In return, the energy from the wheels turns the motor, which functions as a generator, converting energy normally wasted during coasting and braking into electricity, which is stored in a battery until needed by the electric motor.

B. Electric Motor Drive/Assist

The electric motor provides additional power to assist the engine in accelerating, passing, or hill climbing. This allows a smaller, more efficient engine to be used. In some vehicles, the motor alone provides power for low-speed driving conditions where internal combustion engines are least efficient.

C. Automatic Start/Shutoff

Automatically shuts off the engine when the vehicle comes to a stop and restarts it when the accelerator is pressed. This prevents wasted energy from idling.

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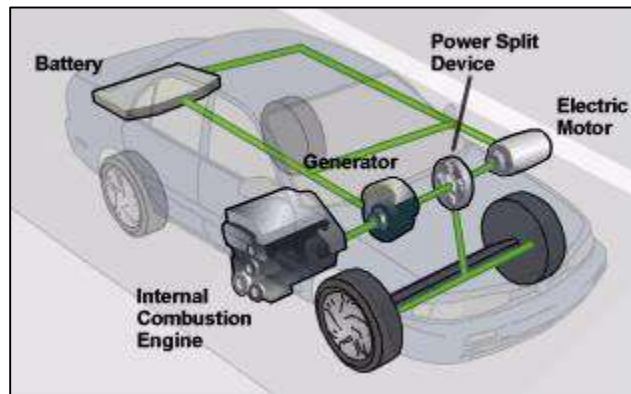
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Novel Transformer Less Adaptable Voltage Quadrupler DC Converter With Closed Loop Control

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Abstract: In this paper, a novel transformer-less adjustable voltage quadrupler dc-dc converter with high voltage transfer gain and reduced semiconductor voltage stress was analyzed. The proposed topology utilizes input-parallel output-series configuration and is derived from a two-phase interleaved boost converter for providing a much higher voltage gain without adopting an extreme large duty cycle. The proposed converter cannot only achieve high step-up voltage gain but also reduce the voltage stress of both active switches and diodes. This will allow one to choose lower voltage rating MOSFETs and diodes to reduce both switching and conduction losses. In addition, due to the charge balance of the blocking capacitor, the converter features automatic uniform current sharing characteristic of the two interleaved phases for voltage boosting mode without adding any extra circuitry or complex control methods.

Keywords; Automatic Uniform Current Sharing, High Step-Up Converter, Low Voltage Stress, Transformer-Less, Voltage Quadrupler.

I. INTRODUCTION

With global energy shortage and strong environmental movements, renewable or clean energy sources such as solar cells and fuel cells are increasingly value worldwide. However, due to the inherent low voltage characteristic of these sources, a high step-up dc converter is essential as a prestage of the corresponding power conditioner. The conventional boost and buck-boost converters, due to the degradation in the overall efficiency as the duty ratio approaches unity, obviously cannot fulfill the application need. Besides, the extreme duty ratio not only induces very large voltage spikes and increases conduction losses but also induces severe diode reverse-recovery problem. Many topologies have been presented to provide a high step-up voltage gain without an extremely high duty ratio.

A dc-dc fly back converter is a very simple isolated structure with a high step-up voltage gain, but the active switch of this converter will suffer a high voltage stress due to the can realize high efficiency and high step-up conversion. However, the start-up operation of these converters must be considered separately. Moreover, the cost is increased because many extra power components and isolated sensors or feedback controllers are required. In order to reduce system cost and to improve system efficiency, a non isolated dc/dc converter is, in fact, a more suitable solution. The switched capacitor-based converters proposed in provide solutions to improve the

conversion efficiency and achieve large voltage conversion ratio. achieve large voltage conversion ratio.

Unfortunately, the conventional switched capacitor technique makes the switch suffer high transient current and large conduction losses. Furthermore, many switched capacitor cells are required to obtain extremely high step-up conversion, which increases the circuit complexity. The coupled inductor-based converters are another solution to implement high step-up gain because the turns ratio of the coupled inductor can be employed as another control freedom to extend the voltage gain. However, the input current ripple is relatively larger by employing single stage single-phase-coupled inductor-based converters, which may shorten the usage life of the input electrolytic capacitor. As such, a family of interleaved high step-up boost converters with winding-cross-coupled inductors is proposed. To achieve higher voltage conversion ratio and further reduce voltage stress on the switch and diode, the high step-up ratio converter and the ultra high step-up converter have been proposed. Unfortunately, the voltage stress of diodes in those converters remains rather high. In this project, a novel transformer-less adjustable voltage quadrupler topology is proposed. It integrates two-phase interleaved boost converter to realize a high voltage gain and maintain the advantage of an automatic current sharing capability simultaneously. Furthermore, the voltage stress of active switches and diodes in the proposed converter can be greatly reduced to enhance overall conversion efficiency.

II. PROPOSED SYSTEM

Here the uncoupled interleaved boost converter voltage gain is twice that of the basic two phase boost converter. Also, the voltage stress of both the active switches and diodes are much lower than the latter. The modified converter possesses automatic uniform current sharing capability without adding extra circuitry or complex control methods. This proposed system will produce an output voltage 16 times that of the input. If a 12v DC input voltage is applied to anquadrupler boost converter. The quadrupler, it receives and produce an output as 16 times of that input voltage, ie 200V. This output voltage is fed to a motor load. An closed loop feedback Is provided to get desired and constant output during varying load. A PI -controller is provided in the feedback.

Vehicle Security System using Embedded and GSM Technology

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Abstract

This paper deals with design and development of the theft control system for an automobile, which is being used to prevent or control the theft. The developed system makes use of an embedded system based on GSM technology. The designed and developed is installed in the vehicle. An interfacing mobile is also connected to the microcontroller which is in turn, connected to the engine. We need to give the password before starting it. Once an unauthorized person tries to run the vehicle by giving a wrong password an alert message is sent to the owner of the vehicle that the vehicle is being stolen. This information is passed on to the central processing system whereby sitting at a remote place, a particular number is dialed by them to the interfacing mobile that is with the hardware kit which is installed in the vehicle. By reading the signals received by the mobile, one can control the ignition of the engine, say to stop the engine immediately. Again it will come to the normal condition only after entering a secured password. The owner of the vehicle and the central processing system will know this secured password. The main concept in this design is introducing the mobile communication into the embedded system. The designed unit is very simple and low cost. The entire designed unit is on a single chip. When the vehicle is stolen, the owner of the vehicle may inform to the central processing system, then they will stop the vehicle, by just giving a ring to the secret number and with the help of SIM tracking knows the location of the vehicle and informs to the local police or stops it from further movement.

Keyword- GSM, Embedded, Security

I. INTRODUCTION

In recent years, vehicle thefts are increasing at an alarming rate around the world. People have started to use the theft control systems installed in their vehicles. The commercially available anti-theft vehicular systems are very expensive. Here, we make a modest attempt to design and develop a simple, low cost vehicle theft control scheme using an inbuilt microcontroller. This scheme involves a microcontroller and a mobile for the communication purposes.

Tracking of the stolen vehicle can be done through the internet interface. Once the position of the stolen vehicle is found out using the GPS, a location request is sent back to the central processing system, which takes care of the event to be performed using remote control systems.

Control functions of the tracking system allow us to perform many functions such as to stop or start the vehicle, automatic position reporting based on time or distance, over speed detection and reporting, etc.

This paper is organized in the following sequence. A small literature survey on the theft control system was given in the previous paragraphs. This is followed by the preview of the GSM mobile communication concepts, Microcontroller along with its peripherals, overview of the design and SIM tracking.

II. PRESENT ANTI-THEFT DEVICES

All vehicle theft prevention equipment's help to deter criminals. Many anti-theft devices are also effective in protecting your vehicle from burglaries & vandalism. Following are some of the anti-theft devices that are used now-a-days.

- Kill switch
- Tire/wheel locks
- Alarms
- Electronic keys
- Electronic tracking devices

The above mentioned anti-theft devices are not 100% save so to overcome this GSM based systems which are more reliable can be used.

A Review of Ocean Thermal Energy Conversion

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Abstract

Oceans cover more than 70% of the Earth's surface. As the world's largest solar collectors, oceans generate thermal energy from the sun. They also produce mechanical energy from the tides and waves. Even though the sun affects all ocean activity, the gravitational pull of the moon primarily drives the tides, and the wind powers the ocean waves. This makes them the world's largest solar energy collector and energy storage system. On an average day, 60 million square kilometers (23 million square miles) of tropical seas absorb an amount of solar radiation equal in heat content to about 250 billion barrels of oil. If less than one-tenth of one percent of this stored solar energy could be converted into electric power, it would supply more than 20 times the total amount of electricity consumed in the United States on any given day. OTEC, or ocean thermal energy conversion, is an energy technology that converts solar radiation to electric power. OTEC systems use the ocean's natural thermal gradient—the fact that the ocean's layers of water have different temperatures—to drive a power-producing cycle. As long as the temperature between the warm surface water and the cold deep water differs by about 20°C (36°F), an OTEC system can produce a significant amount of power. The oceans are thus a vast renewable resource, with the potential to help us produce billions of watts of electric power. This potential is estimated to be about 1013 watts of baseload power generation, according to some experts. The cold, deep seawater used in the OTEC process is also rich in nutrients, and it can be used to culture both marine organisms and plant life near the shore or on land. The economics of energy production today have delayed the financing of a permanent, continuously operating OTEC plant. However, OTEC is very promising as an alternative energy resource for tropical island communities that rely heavily on imported fuel. OTEC plants in these markets could provide islanders with much-needed power, as well as desalinated water and a variety of Mari-culture products.

Keyword- Ocean Thermal Energy Conversion (OTEC), Cycle Types

I. PLANT DESIGN AND LOCATION

Commercial ocean thermal energy conversion (OTEC) plants must be located in an environment that is stable enough for efficient system operation. The temperature of the warm surface seawater must differ about 20°C (36°F) from that of the cold deep water that is no more than about 1000 meters (3280 feet) below the surface. The natural ocean thermal gradient necessary for OTEC operation is generally found between latitudes 20 deg N and 20 deg S. Within this tropical zone are portions of two industrial nations—the United States and Australia—as well as 29 territories and 66 developing nations. Of all these possible sites, tropical islands with growing power requirements and a dependence on expensive imported oil are the most likely areas for OTEC development.

Commercial OTEC facilities can be built on

- Land or near the shore
- Platforms attached to the shelf
- Moorings or free-floating facilities in deep ocean water

A. Land-Based and Near-Shore Facilities

Land-based and near-shore facilities offer three main advantages over those located in deep water. Plants constructed on or near land do not require sophisticated mooring, lengthy power cables, or the more extensive maintenance associated with open-ocean environments. They can be installed in sheltered areas so that they are relatively safe from storms and heavy seas. Electricity, desalinated water, and cold, nutrient-rich seawater could be transmitted from near-shore facilities via trestle bridges or causeways. In addition, land-based or near-shore sites allow OTEC plants to operate with related industries such as Mari culture or those that require desalinated water.

Land-based or near-shore sites can also support Mari culture. Mari culture tanks or lagoons built on shore allow workers to monitor and control miniature marine environments. Mari culture products can be delivered to market with relative ease via railroads or highways.

One disadvantage of land-based facilities arises from the turbulent wave action in the surf zone. Unless the OTEC plant's water supply and discharge pipes are buried in protective trenches, they will be subject to extreme stress during storms and

Automatic Braking System in Train using Fuzzy Logic

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Abstract

This paper focuses a new way of approach to find the solution for the artificial intelligent braking system in train using the fuzzy logic controller. Here we are designing the fuzzy logic controller using fuzzy logic tool box in mat lab software. The main function of the fuzzy logic controller used here is to automatically stop the train in each station without any manual procedure of stopping the train. Generally the Indian railways use two drivers to operate a train. In this paper the usage of fuzzy logic controller reduces the number of drivers to one. The fuzzy logic controller in train gets activated about 500m from the station so that the train stops at the station smoothly and automatically. The fuzzy controller takes the decision with reference to the speed and distance of the train.

Keyword- Fuzzy Logic, Automatic Braking System

I. INTRODUCTION

Day to day new advancements is taking place in railways. The new way of approach is to reduce the man power and to automate the system. We can use the advanced control equipment's in order to automate the system effectively. Generally the design of automatic braking system becomes more complex but it can be made easier and flexible by using fuzzy logic controller. In order to get the dynamic output we should connect the target to the fuzzy controller. The input of the fuzzy controller is chosen as distance and speed. The output of the fuzzy controller is braking power. Based on rules of logic obtained from train drivers we Have framed 4x4 (16 rules) for fuzzy logic controller. In our design we use the triangular and trapezoidal member functions. The results from mat lab simulation clearly show that braking power is smooth and the train stops completely when the distance becomes zero.

II. OVERVIEW OF DESIGN

The design starts with the selection of number of stations where the train should stop. The distance between the stations is calculated. The fuzzy logic controller for braking system in train gets activated about 500m from the station. The controller gets its input as speed and distance instantaneously. The numerical values are converted into fuzzy sets by fuzzification technique.

Example:

For Speed = 70 kmph, distance=200m

The fuzzy set is,

Speed $\rightarrow$ {very fast, 1}

Distance $\rightarrow$ {far, 0.8}

After the fuzzification the corresponding rules are fired. Here, for the above example, the following rule is fired. If distance is (FAR) and speed is (VERY FAST) then braking power is (HEAVY). Then the fuzzy sets are converted into numerical values by the defuzzification technique. This numerical value which is the output of the fuzzy logic controller is used to Control the braking system of the train.

III. DESIGN PROCEDURE

Inputs - Speed and Distance

Output-Braking power (or % of braking).

A. Membership Functions
(Triangular and Trapezoidal)

Design of Optimized Network on-Chip for Reliable Communication

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Abstract

In this paper, a new mesh-typed NoC(Network on Chip) architecture is proposed which aims at enhancing network performance. Networks-on-Chips (NoCs) are a new design paradigm for scalable high throughput communication infrastructures, in Systems-on-Chips (SoCs) with billions of transistors. The idea of NoCs is dividing a chip into several independent clusters connected together by global communication architecture. As the number of cores integrated into System-on-Chip increases, the on-chip communication limits the performance and power consumption in current and next generation SoCs. The resultant NoC uses mesh topology along with virtual channel allocation methodology. The routing algorithm combined with mesh topology improves average latency and saturation traffic load.

Keyword- Systems-on-Chip, Multiprocessor Array, Network-on-Chip (Noc), Mesh Type Noc, Virtual Channel

I. INTRODUCTION

As the trend of device miniaturization continues the number of transistors per chip doubles every couple of years. The increasing density can be used in several ways: the size of the chips can be reduced, individual processing blocks can become more complex thus providing higher processing power, and more functional blocks can be integrated on the same chip. Reducing the size of chips, although beneficial from the cost point of view, cannot be done indefinitely because at a certain point the cost of packaging and terminals would become dominant. The direction that is left and is still promising is the integration functions that are traditionally performed by different devices into a single device.

Integration has several benefits: the cost of several packages is eliminated and the need for connections that would normally go to the outside of the chip is removed. Integration improves performance because communication bandwidth available on chip is significantly higher than off chip. It decreases power consumption as driving external pins uses much more energy than on-chip communication. Another important benefit is the reduced physical size of devices.

Traditionally IP blocks are connected using a single bus or a hierarchy of buses. The parameters of these components could be manually chosen by a skilled engineer and the components themselves could be instantiated from a library to obtain a working system. However, this approach will not scale to designs having tens to hundreds of cores, because companies cannot afford increasing the engineering effort per device. Timing constraints become increasingly difficult to meet and verification becomes difficult to perform.

Analyzing the system from the performance point of view also becomes increasingly difficult. While the computation requirements for individual processors can be generally analyzed and verified for many real life applications, the communication performance requirements are less straightforward since the interactions between different IPs need to be taken into account. If the system fails to meet the performance requirements, redesigning the interconnect (or entire SoC) may be a time-consuming and costly operation. It is therefore desirable to have automated tools to dimension and verify the interconnect. These tools start with a high level system or application requirements and automatically generate an interconnect that the system components are attached to. This interconnect may also be verifiable by construction from the correctness and performance points of view.

The remainder of this paper is organized as follows. Section II describes the background of network on chip architecture design and their different topologies. Section III presents the proposed architecture and its design with a switch-by-switch interconnection scheme that can support a backtracking path-setup and a source-synchronous wave pipeline transmission of the data. Section IV. Finally, the conclusion and discussion for further research are given in Section V.

II. BACKGROUND

A. NOC Architecture

The function of an on-chip network is to deliver messages from source node to destination node and there exist many design alternatives to accomplish this job. Depending on the application requirements, how to choose suitable network architecture

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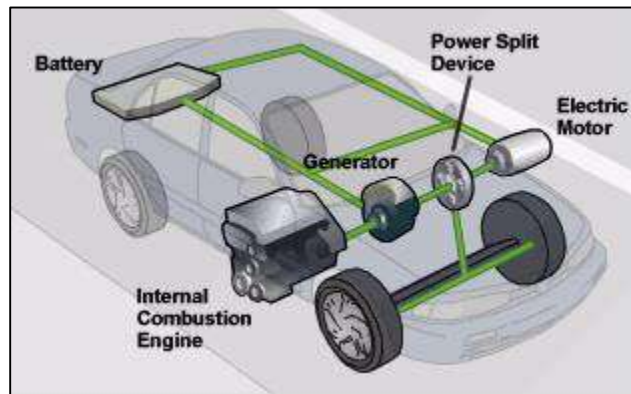
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Fuzzy Logic in Electrical Systems

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Abstract

With the advent of modern computer technology, the field of Artificial Intelligence is showing a definite utility in all spectrum of life. In the field of control, there is always a need for optimality with improved controller performance. In this paper, the feasibility of Fuzzy Logic as an effective control tool for DC motors is dealt with. The Fuzzy Logic Controller (FLC) is showing a better performance than conventional controllers in the form of increased robustness. In this paper, the role of Fuzzy Logic as a controller and its implementation is studied.

Keyword- Fuzzy Logic Controller (FLC), Fuzzification, DC Motors

I. INTRODUCTION

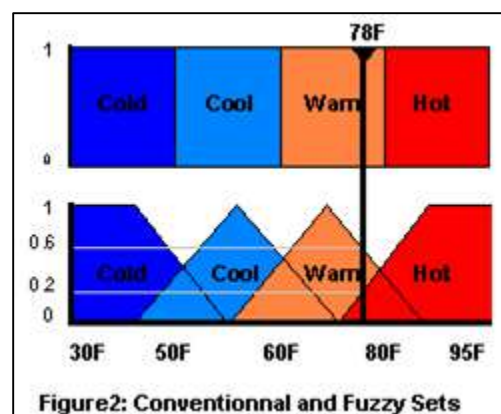
- Fuzzy logic is a powerful problem solving methodology introduced by Lotfi Zadeh in 1960's.
- It provides tools for dealing with imprecision due to uncertainty and vagueness, which is intrinsic to many engineering problems.
- It is a superset of Boolean or Crisp logic.
- It emerged into mainstream of information technology in late 1980's and early 1990

II. FUZZY LOGIC

- Fuzzy logic resembles human decision making with its ability to work from approximate data and find precise solutions.
- Classical logic or Boolean logic has two values or states. Eg. (true or false). It requires a deep understanding of a system, exact equations, and precise numeric values.
- Fuzzy logic is a continuous form of logic. eg (bad, very bad, poor, average). It allows modeling complex systems using a higher level of abstraction originating from our knowledge and experience.

III. WORKING OF FUZZY LOGIC

- The working of fuzzy logic can be understood by considering a simplified example of a thermostat controlling a heater fan.
- The room temperature detected through a sensor is input to a controller, which outputs a control force to adjust the heater fan speed.
- The first step in designing such a fuzzy controller is to characterize the range of values for the input and output variables of the controller.
- Labels such as cool for the temperature and high for the fan speed are assigned and a set of simple English-like rules to control the systems are written.



Seven Level Cascaded Multilevel Inverter for Power Quality Improvement in Induction Motor

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Abstract

Induction motors are the workhorses of any industry. The speed control of induction motor is mainly done through Variable Frequency Drives (VFD). The VFD includes IGBT or MOSFET based voltage source inverter which is fed from a rectifier. The output AC of the inverter contains more harmonic content and has square waveform. However sinusoidal PWM technique is used to get much more sinusoidal output AC. But the frequent switching of the switches will result in increasing the harmonic content which in turn increases the size of the output filter. To overcome this, a cascaded multilevel inverter is proposed to reduce the harmonic content and improve the power quality. The cascaded multilevel inverter produces nearly sinusoidal output compared to sinusoidal PWM switching. The common configuration of cascaded multilevel inverter includes separate DC sources for each H-bridge. The proposed 3 phase cascaded multilevel inverter has only one DC source. By choosing the adequate switching angles and appropriate carrier frequency, harmonics can be eliminated in the output waveform. Appropriate choice of a fundamental frequency switching pattern can produce a nearly sinusoidal output thereby improving the power quality. In this work, the aim to study the performance of an induction motor, which is used as a medium.

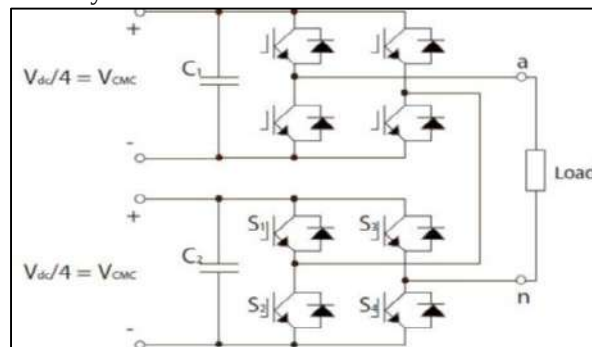
Keyword- Hybrid Cascaded Multilevel Inverter, Total Harmonic Distortion, Sinusoidal Multicarrier Pulse Width Modulation, In-Phase Disposition

I. INTRODUCTION

For the better quality of power the voltage and current waveforms should be sinusoidal, but in actual practice it is somewhat non-sinusoidal and this phenomena is called Harmonic Distortion. Voltage Harmonic Distortion which is generally present in supply of power from utility. The distortion in current waveform is called as current harmonic distortion which is generally injected by the nonlinear loads to the supply of utility and corrupts it.

II. HYBRID CASCADED SEVEN LEVEL INVERTER

One more alternative for a multilevel inverter is the cascaded multilevel inverter or series H-bridge inverter. It uses cascaded full-bridge inverters with separate DC-sources to buildup the stepped waveform. Each full-bridge can be seen as a module and it is only these modules that build up the Cascaded Multilevel Inverter topology. With its modularity and flexibility, the CMI shows superiority in high-power applications, especially shunt and series connected FACTS controllers. It should be noted that, unlike the diode-clamped and flying-capacitor topologies, isolated sources are required for each cell in each phase. In some systems these sources may be available through batteries or photovoltaic cells, but in most drive systems transformer/rectifier sources are used. The figure 4.6 shows the circuit diagram of the five level cascaded multilevel inverter. One full-bridge module is itself a three-level Cascaded Multilevel Inverter, and every module added in cascade to that extends the inverter with two voltage levels.



Hybrid Electric Vehicle Design

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Abstract

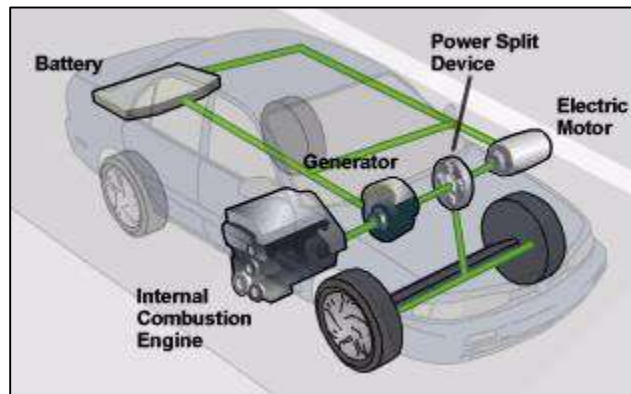
A hybrid electric vehicle (HEV) is a hybrid vehicle which combines a conventional propulsion system with a rechargeable energy storage system (RESS) to achieve better fuel economy than a conventional vehicle. Modern mass-produced HEVs prolong the charge on their batteries by capturing kinetic energy via regenerative braking, and some HEVs can use the internal combustion engine to generate electricity by spinning an electrical generator (often a motor-generator) to either recharge the battery or directly feed power to an electric motor that drives the vehicle.

Keyword- Hybrid Electric Vehicle (HEV), Rechargeable Energy Storage System (RESS), Internal Combustion Engine (ICE)

I. HYBRID ELECTRIC VEHICLE

Regular HEVs most commonly use an internal combustion engine (ICE) in tandem with [[electric motor]]s to power their propulsion system. Modern mass-produced HEVs prolong the charge on their batteries by capturing "kinetic energy" via [[regenerative braking]], and some HEVs can use the combustion engine to generate electricity by spinning an [[electrical generator]] (often a [[motor-generator]]) to the fraction of the cause results to the abdomile reswult the vehicle. An HEV's engine is smaller and may be run at various speeds, providing more efficiency.

Hybrid-electric vehicles (HEVs) combine the benefits of gasoline engines and electric motors and can be configured to obtain different objectives, such as improved fuel economy, increased power, or additional auxiliary power for electronic devices and power tools.



A. Regenerative Braking

The electric motor applies resistance to the drivetrain causing the wheels to slow down. In return, the energy from the wheels turns the motor, which functions as a generator, converting energy normally wasted during coasting and braking into electricity, which is stored in a battery until needed by the electric motor.

B. Electric Motor Drive/Assist

The electric motor provides additional power to assist the engine in accelerating, passing, or hill climbing. This allows a smaller, more efficient engine to be used. In some vehicles, the motor alone provides power for low-speed driving conditions where internal combustion engines are least efficient.

C. Automatic Start/Shutoff

Automatically shuts off the engine when the vehicle comes to a stop and restarts it when the accelerator is pressed. This prevents wasted energy from idling.

Vehicle Security System using Embedded and GSM Technology

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Abstract

This paper deals with design and development of the theft control system for an automobile, which is being used to prevent or control the theft. The developed system makes use of an embedded system based on GSM technology. The designed and developed is installed in the vehicle. An interfacing mobile is also connected to the microcontroller which is in turn, connected to the engine. We need to give the password before starting it. Once an unauthorized person tries to run the vehicle by giving a wrong password an alert message is sent to the owner of the vehicle that the vehicle is being stolen. This information is passed on to the central processing system whereby sitting at a remote place, a particular number is dialed by them to the interfacing mobile that is with the hardware kit which is installed in the vehicle. By reading the signals received by the mobile, one can control the ignition of the engine, say to stop the engine immediately. Again it will come to the normal condition only after entering a secured password. The owner of the vehicle and the central processing system will know this secured password. The main concept in this design is introducing the mobile communication into the embedded system. The designed unit is very simple and low cost. The entire designed unit is on a single chip. When the vehicle is stolen, the owner of the vehicle may inform to the central processing system, then they will stop the vehicle, by just giving a ring to the secret number and with the help of SIM tracking knows the location of the vehicle and informs to the local police or stops it from further movement.

Keyword- GSM, Embedded, Security

I. INTRODUCTION

In recent years, vehicle thefts are increasing at an alarming rate around the world. People have started to use the theft control systems installed in their vehicles. The commercially available anti-theft vehicular systems are very expensive. Here, we make a modest attempt to design and develop a simple, low cost vehicle theft control scheme using an inbuilt microcontroller. This scheme involves a microcontroller and a mobile for the communication purposes.

Tracking of the stolen vehicle can be done through the internet interface. Once the position of the stolen vehicle is found out using the GPS, a location request is sent back to the central processing system, which takes care of the event to be performed using remote control systems.

Control functions of the tracking system allow us to perform many functions such as to stop or start the vehicle, automatic position reporting based on time or distance, over speed detection and reporting, etc.

This paper is organized in the following sequence. A small literature survey on the theft control system was given in the previous paragraphs. This is followed by the preview of the GSM mobile communication concepts, Microcontroller along with its peripherals, overview of the design and SIM tracking.

II. PRESENT ANTI-THEFT DEVICES

All vehicle theft prevention equipment's help to deter criminals. Many anti-theft devices are also effective in protecting your vehicle from burglaries & vandalism. Following are some of the anti-theft devices that are used now-a-days.

- Kill switch
- Tire/wheel locks
- Alarms
- Electronic keys
- Electronic tracking devices

The above mentioned anti-theft devices are not 100% save so to overcome this GSM based systems which are more reliable can be used.

Automatic Braking System in Train using Fuzzy Logic

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Abstract

This paper focuses a new way of approach to find the solution for the artificial intelligent braking system in train using the fuzzy logic controller. Here we are designing the fuzzy logic controller using fuzzy logic tool box in mat lab software. The main function of the fuzzy logic controller used here is to automatically stop the train in each station without any manual procedure of stopping the train. Generally the Indian railways use two drivers to operate a train. In this paper the usage of fuzzy logic controller reduces the number of drivers to one. The fuzzy logic controller in train gets activated about 500m from the station so that the train stops at the station smoothly and automatically. The fuzzy controller takes the decision with reference to the speed and distance of the train.

Keyword- Fuzzy Logic, Automatic Braking System

I. INTRODUCTION

Day to day new advancements is taking place in railways. The new way of approach is to reduce the man power and to automate the system. We can use the advanced control equipment's in order to automate the system effectively. Generally the design of automatic braking system becomes more complex but it can be made easier and flexible by using fuzzy logic controller. In order to get the dynamic output we should connect the target to the fuzzy controller. The input of the fuzzy controller is chosen as distance and speed. The output of the fuzzy controller is braking power. Based on rules of logic obtained from train drivers we Have framed 4x4 (16 rules) for fuzzy logic controller. In our design we use the triangular and trapezoidal member functions. The results from mat lab simulation clearly show that braking power is smooth and the train stops completely when the distance becomes zero.

II. OVERVIEW OF DESIGN

The design starts with the selection of number of stations where the train should stop. The distance between the stations is calculated. The fuzzy logic controller for braking system in train gets activated about 500m from the station. The controller gets its input as speed and distance instantaneously. The numerical values are converted into fuzzy sets by fuzzification technique.

Example:

For Speed = 70 kmph, distance=200m

The fuzzy set is,

Speed $\rightarrow$ {very fast, 1}

Distance $\rightarrow$ {far, 0.8}

After the fuzzification the corresponding rules are fired. Here, for the above example, the following rule is fired. If distance is (FAR) and speed is (VERY FAST) then braking power is (HEAVY). Then the fuzzy sets are converted into numerical values by the defuzzification technique. This numerical value which is the output of the fuzzy logic controller is used to Control the braking system of the train.

III. DESIGN PROCEDURE

Inputs - Speed and Distance

Output-Braking power (or % of braking).

A. Membership Functions
(Triangular and Trapezoidal)

A Fuzzy based Direct Torque Control System to Improve the Induction Motor Performance

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Abstract: *The Induction Motor is most widely used owing to its high reliability, robust in operations, relatively low cost, and modest maintenance requirements. In order to improve the performance of the Induction Motor P, PI, PID controllers were used. But these controllers provide more distortion in the system. Hence to overcome this, a new controller is introduced as Direct Torque Controller (DTC). In this paper DTC is a method which is employed to control flux and torque of an Induction Motor. The Fuzzy Based Direct Torque Controller is proposed to reduce the torque and flux ripples. Therefore the proposed controller is used as a solution for the improvement in the performance of Single Phase Induction Motor apart from using conventional Controllers.*

Keywords: *Direct torque control (DTC), Fuzzy logic controller, Field oriented control (FOC), Induction motor, Proportional integral direct torque control (PIDTC), Simulation*

I. INTRODUCTION

The induction motor is most widely because of its high reliability, robust in operations, relatively low cost and modest maintenance requirements. But they require much more complex methods of control, more expensive and higher rated power converters than DC and permanent magnet machines. Three phase induction motor is widely used in industrial drive because they are reliable and rugged. Single phase induction motors are widely used for heavier loads for example in fans in household appliances. The fix speed service, induction motors are being increased with variable frequency drives. Induction motor achieves a quick torque response, and has been applied in various industrial applications instead of dc motors. It permits independent control of the torque and flux by decoupling the stator current into two orthogonal components FOC (Field Oriented Control). However it is very sensitive to flux, which is mainly affected by parameter variations. It depends on accurate parameter identification to achieve the expected performance. The vector control of IM drive for speed control is mainly classified into two types such as field oriented control (FOC) and direct torque control (DTC). In FOC, the speed of the induction motor is controlled like a separately excited dc-motor with more transformations and complexity involved in the system. In order to control the induction motor speed in simple way without required any transformations the DTC is used. In the middle of 1980 direct torque control was developed by Takahashi and Depenbrock as an alternative to field oriented control to overcome its problems. Direct torque control is derived from the fact that on the basis of the errors between the reference and the estimated values of torque and flux it is possible to directly control the inverter states in order to reduce the torque and flux errors within the prefixed band limits. Direct torque control is a strategy research for induction motor speed adjustment feeding by variable frequency converter. It controls torque on the base of keeping the flux value invariable by choosing voltage space vector.

The conventional DTC is having high torque ripples and slow transient response to the step changes in torque during start-up. Numerous techniques have been proposed to improve the torque performance and speed trajectory. However using fast error limiters can reduce the torque ripples by selecting high optimal switching frequencies or to the change in the inverter topology. For this fuzzy controller could be better solution to develop high performance motor drives applications to get high degree of accuracy and can pursue the command smoothly and quickly.

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Battery Energy Storage System with Hybrid Technology

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Abstract

In this thesis hybrid of Hydro-Solar generation system employing one Permanent Magnet Synchronous Generator (PMSG) driven by a constant-power hydro turbine. Battery storage is designed to supply continuous power to the load, when the combined Hydro and Photovoltaic sources cannot meet the net load demand. It works as an uninterruptible power source that is able to feed a certain minimum amount of power into the load under all conditions. Power transfer was different modes of operation, including normal operation without use of battery, which gives the user-friendly operation. A control strategy regulates power generation of the individual components so as to give the hybrid system to operate in the proposed modes of operation. The concept and principle of the hybrid system and its control were described. The proposed system using PMSGs and a voltage and frequency controller are modeled and simulated in MATLAB using Simulink and Sim Power System set toolboxes, and different aspects of the proposed system are studied for various types of linear and nonlinear loads under varying conditions. The performance of the proposed system is presented to demonstrate its Voltage and Frequency Control (VFC), harmonic elimination, and load balancing.

Keyword- Uninterrupted Power Supply, Elimination of Harmonics, Using of Renewable Energy Source, Balancing of Load Demand

I. INTRODUCTION

The Solar, Hydro, Wind and Biomass are the renewable energy sources. RES is derived from natural processes that are replenished constantly such as sunlight, water, wind, tides, plant growth and geothermal heat. Solar energy can be produced from the radiation that rises from the sunlight. The total solar irradiance is defined as the amount of radiation energy emitted by the sun over all wavelengths, not just visible light, falling each second on a one square meter perpendicular plane outside earth atmosphere at a given distance from the sun. It is roughly constant, fluctuation by only a few parts per thousand from day to day. On the outer surface of the earth's atmosphere the irradiation is known as the solar constant and is equal to about 1367watts per square meter. The amount of solar energy that actually passes through the atmosphere and strikes a given area on the earth over a specific time varies with latitude and with the season as well as weather and is known as the insolation. When sun is directly overhead the insolation, that is the incident energy arriving on a surface on the ground perpendicular to the sun's rays, is typically 1000watts per square meter. This is due to the absorption of the sun's energy by the earth's atmosphere which dissipates about 25% to 30% of the radiation energy.

Hydro-power or water power is power derived from the energy of falling water and running water, which may be harnessed for useful purpose. The power available from falling water can be calculated from the flow rate and density of water, the height of fall and the local acceleration due to gravity. In SI units, the power is

$$P = \eta \rho Q g h$$

Where P is the power in watts, η is the dimensionless efficiency of the turbine, ρ is the density of water in kilograms per cubic meter, Q is the flow in cubic meter per second, g is the acceleration due to gravity, h is the height difference between inlet and outlet. The force of water will rotate the blades of the turbine by which the generator starts to produce electrical supply.

Below Block Diagram shows the hybrid of hydro and solar with battery energy storage system. Hydro system contains Reservoir, Turbine and PMSG Generator and the Solar System consist of photovoltaic panels, Dc-Dc converter, Battery Storage system and Inverter with filter. The combination hydro and solar system will be given to the linear or non-linear loads.

The rest of this paper organized as follows, the principle of operation of the proposed hybrid system is given in II. In Section III, a design procedure is presented for selection of various components of the proposed system. In Section IV, the developed MATLAB-based simulation is discussed for the proposed system. In Section V, the simulation results for the proposed system under linear load, nonlinear load presented and discussed verifying the validity of the proposed system

Design of Optimized Network on-Chip for Reliable Communication

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Abstract

In this paper, a new mesh-typed NoC(Network on Chip) architecture is proposed which aims at enhancing network performance. Networks-on-Chips (NoCs) are a new design paradigm for scalable high throughput communication infrastructures, in Systems-on-Chips (SoCs) with billions of transistors. The idea of NoCs is dividing a chip into several independent clusters connected together by global communication architecture. As the number of cores integrated into System-on-Chip increases, the on-chip communication limits the performance and power consumption in current and next generation SoCs. The resultant NoC uses mesh topology along with virtual channel allocation methodology. The routing algorithm combined with mesh topology improves average latency and saturation traffic load.

Keyword- Systems-on-Chip, Multiprocessor Array, Network-on-Chip (Noc), Mesh Type Noc, Virtual Channel

I. INTRODUCTION

As the trend of device miniaturization continues the number of transistors per chip doubles every couple of years. The increasing density can be used in several ways: the size of the chips can be reduced, individual processing blocks can become more complex thus providing higher processing power, and more functional blocks can be integrated on the same chip. Reducing the size of chips, although beneficial from the cost point of view, cannot be done indefinitely because at a certain point the cost of packaging and terminals would become dominant. The direction that is left and is still promising is the integration functions that are traditionally performed by different devices into a single device.

Integration has several benefits: the cost of several packages is eliminated and the need for connections that would normally go to the outside of the chip is removed. Integration improves performance because communication bandwidth available on chip is significantly higher than off chip. It decreases power consumption as driving external pins uses much more energy than on-chip communication. Another important benefit is the reduced physical size of devices.

Traditionally IP blocks are connected using a single bus or a hierarchy of buses. The parameters of these components could be manually chosen by a skilled engineer and the components themselves could be instantiated from a library to obtain a working system. However, this approach will not scale to designs having tens to hundreds of cores, because companies cannot afford increasing the engineering effort per device. Timing constraints become increasingly difficult to meet and verification becomes difficult to perform.

Analyzing the system from the performance point of view also becomes increasingly difficult. While the computation requirements for individual processors can be generally analyzed and verified for many real life applications, the communication performance requirements are less straightforward since the interactions between different IPs need to be taken into account. If the system fails to meet the performance requirements, redesigning the interconnect (or entire SoC) may be a time-consuming and costly operation. It is therefore desirable to have automated tools to dimension and verify the interconnect. These tools start with a high level system or application requirements and automatically generate an interconnect that the system components are attached to. This interconnect may also be verifiable by construction from the correctness and performance points of view.

The remainder of this paper is organized as follows. Section II describes the background of network on chip architecture design and their different topologies. Section III presents the proposed architecture and its design with a switch-by-switch interconnection scheme that can support a backtracking path-setup and a source-synchronous wave pipeline transmission of the data. Section IV. Finally, the conclusion and discussion for further research are given in Section V.

II. BACKGROUND

A. NOC Architecture

The function of an on-chip network is to deliver messages from source node to destination node and there exist many design alternatives to accomplish this job. Depending on the application requirements, how to choose suitable network architecture

AUTOMATIC WHEELCHAIR USING DTMF TECHNOLOGY

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Abstract

Dual tone modulation frequency technology is used in this Robotic vehicle and it is described in this article. When a button is pressed from our mobile phone, it creates a unique tone different frequencies, one is large frequency and another one is small frequency from our keypad. This small frequency can be decoded into binary sequence. Tone from encoder is given to the DTMF decoder. The decoder contains operational amplifier which pre filters to separate low and high frequencies. Then it is transferred to code detector circuit and it decodes the incoming tone into bits of binary data. This data is directly given to the driver IC to drive the motors. These motors rotate according to the decoded output.

1. INTRODUCTION

A robot is an electro-mechanical machine which is guided by PC, Mobile telephone or controller. DTMF chips away at the premise of Decoder. This is the primary preferred standpoint for utilizing DTMF. Also, utilizing versatile we can create the two level of frequencies like HIGH and LOW level. HIGHER most extreme range is (1477) and LOWER greatest range is (941). These frequencies are changed over into Binary code by DTMF. In DTMF, by changing over the recurrence to twofold we get 4 bit yield. The yield is given to the engine driver input (D0 – input 1, D1-input 2, D2-input 3, D3-input 4). Now, the yield of the engine driver is given to the Motor (Output 1, 2-engine 1; Output 2, 3-programming, and it can do assignments all alone. The Robot Institute of America characterized that "A robot is a reprogrammable multifunctional controller intended to move material parts, instruments or concentrated gadget through factor customized movements for the execution of an assortment of assignments." DTMF (Dual tone Multi-Frequency) which performs to run the mechanical auto without utilizing miniaturized scale engine 2).

A New Multi-level Inverter with FACTS Capabilities for Wind Applications

Publisher: IEEE

2 Author(s) Pedram Sotoodeh ; Ruth Douglas Miller [View All Authors](#)

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 - II. Concept of the MMC topology
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 - IV. Simulation Results
 - V. Experimental Results

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Figures

Abstract:

The modular multilevel converter (MMC) is an attractive topology for HVDC/FACTS systems. In this paper a new single-phase MMC-based D-STATCOM inverter for grid connection is proposed. The proposed inverter is designed for grid-connected wind turbines in the small- to mid-sized (10kW-20kW) range using the most advanced multi-level inverter topology. The proposed MMC D-STATCOM inverter controls the DC link voltage as well as the active and reactive power transferred between the renewable energy source, specifically wind turbine, and the grid in order to regulate the power factor (PF) of the grid regardless of the input active power from wind turbine. The goal of this paper is to present a new inverter with D-STATCOM capability in a single unit without any additional cost. The 5-level D-STATCOM inverter is simulated and the results are presented to verify the operation of the proposed system. The simulation studies are carried out in the MATLAB/Simulink environment. To validate the simulation results, an experimental configuration of a 5-Level DSTATCOM inverter has been built and tested.

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POSITION CONTROL OF SOLAR PANNEL

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ABSTRACT

Photovoltaic systems normally use a maximum power point tracking (MPPT) technique to continuously deliver the highest possible power to the load irrespective of the temperature and irradiation conditions and of the load electrical characteristics. The main difference between the method used in the proposed MPPT system and other techniques used in the past is that the PV array output voltage is used to directly control the position of solar panel, thus reducing the complexity of the system. A simple method of tracking the maximum power points (MPP's) and forcing the system to operate close to these points is presented. This paper details the proposed work to design the solar tracking system based around the microcontroller programmable IC. The solar panel is in the form of array of photovoltaic cells. The operation of the solar panel is actuated by means of the final control element (FCE). The FCE used is stepper motor. For the optimum utilization of solar energy the position of solar panel in the form of photovoltaic array is controlled in accordance with the position of optical electronic sensors located at particular angle of elevation of light rays with respect to ground.

The physical model consists of solar panel in the form of photovoltaic cells; to which the stepper motor with its extended shaft is fabricated. The minimum necessary hardware interfacing circuit associated with microcontroller and the stepper motor is designed and fabricated. The control functions are implemented using 8051Microcontroller based hardware and software. The proposed model resembles the features of solar tracking system, which can be used in usual practice. The experimental results show that the use of the proposed MPPT control increases the PV output power by as much as 10-15% and hence the resulting system has improved high-efficiency, lower cost and can be easily modified to handle more energy sources.

Key Words- Maximum power point tracking, microcontrollers, photovoltaic systems, solar array, battery charging.

I. INTRODUCTION

As Conventional sources of energy are rapidly depleting and the cost of energy is rising, photovoltaic array becomes a promising alternative source. The major advantages associated with PV array are that it is 1) abundant; 2) pollution free; 3) recyclable; 4) installation cost is considerably high and energy conversion is relatively low. To overcome these problems, the following two essential ways are used: 1) increase the efficiency of conversion for solar array and 2) maximize the output power from the array. With the development of technology, the cost of solar array is expected to decrease continuously in making them attractive for

A Wind Power Generating Electricity by Fast Moving Vehicles

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Abstract

A method for generating electricity using high wind pressure generated by fast moving vehicles channeling the induced wind in the direction of the wind turbine; converting the energy of the wind into mechanical energy by using wind turbine; and converting the mechanical energy into electrical energy by using a generating device and can be used for applications.

Keyword- Renewable Energy, Wind, Wind Turbines, etc

I. INTRODUCTION

In this modern age more and more energy is required for daily consumption in all walk of life. Sources and quantum of fossil energy are dwindling day by day and getting exhausted at a very fast rate. Hence conservation, tapping new sources of energy and harnessing of the same from the various non-conventional sources, is an important aspect of energy production/conservation and utilization all over the world.

The sky-rocketing price of crude oil has ruined the economy of many a country, hence there is a crying need for production of energy from non-conventional sources at the earliest. The present concept is one of the answers to this problem, as the said induced wind into useable electric energy which can be utilized straight away or stored in batteries.

II. ENERGY REQUIREMENTS

World primary energy demand grows by 1.6% per year on an average between 2006 and 2030 - an increase of 45%. Demand for oil rises from 85 million barrels per day now to 106 mb/d in 2030 - 10 mb/d less than projected last year.

Modern renewable energies grow most rapidly, overtaking gas to become the second-largest source of electricity soon after 2010. With increasing environmental concern, and approaching limits to fossil fuel consumption, wind power has regained interest as a renewable energy source.

These new generations of wind mills produces electric power and are more generally used for all applications, which require power.

III. FIELD OF INVENTION

A. Back Ground

The fixed wind powered electricity generation systems in use, till now are dependent on wind direction and the force of the wind. But the wind is not available at all place and all time throughout the year. Therefore, there exists an immense need of a system for generating electricity from wind induced by moving vehicles, trains or airplanes, which is available throughout the year at various places and with sufficient force of wind. Therefore this invention provides a solution to the problem for generating electricity in this manner.

B. Method

This invention relates to a method for generating electricity using high wind pressure generated by fast moving vehicles channeling the induced wind in the direction of the wind turbine. A fast moving vehicle compresses the air in the front of it and pushes the air from its sides thereby creating a vacuum at its rear and its sides as it moves forward.

Battery Energy Storage System with Hybrid Technology

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Abstract

In this thesis hybrid of Hydro-Solar generation system employing one Permanent Magnet Synchronous Generator (PMSG) driven by a constant-power hydro turbine. Battery storage is designed to supply continuous power to the load, when the combined Hydro and Photovoltaic sources cannot meet the net load demand. It works as an uninterruptible power source that is able to feed a certain minimum amount of power into the load under all conditions. Power transfer was different modes of operation, including normal operation without use of battery, which gives the user-friendly operation. A control strategy regulates power generation of the individual components so as to give the hybrid system to operate in the proposed modes of operation. The concept and principle of the hybrid system and its control were described. The proposed system using PMSGs and a voltage and frequency controller are modeled and simulated in MATLAB using Simulink and Sim Power System set toolboxes, and different aspects of the proposed system are studied for various types of linear and nonlinear loads under varying conditions. The performance of the proposed system is presented to demonstrate its Voltage and Frequency Control (VFC), harmonic elimination, and load balancing.

Keyword- Uninterrupted Power Supply, Elimination of Harmonics, Using of Renewable Energy Source, Balancing of Load Demand

I. INTRODUCTION

The Solar, Hydro, Wind and Biomass are the renewable energy sources. RES is derived from natural processes that are replenished constantly such as sunlight, water, wind, tides, plant growth and geothermal heat. Solar energy can be produced from the radiation that rises from the sunlight. The total solar irradiance is defined as the amount of radiation energy emitted by the sun over all wavelengths, not just visible light, falling each second on a one square meter perpendicular plane outside earth atmosphere at a given distance from the sun. It is roughly constant, fluctuation by only a few parts per thousand from day to day. On the outer surface of the earth's atmosphere the irradiation is known as the solar constant and is equal to about 1367watts per square meter. The amount of solar energy that actually passes through the atmosphere and strikes a given area on the earth over a specific time varies with latitude and with the season as well as weather and is known as the insolation. When sun is directly overhead the insolation, that is the incident energy arriving on a surface on the ground perpendicular to the sun's rays, is typically 1000watts per square meter. This is due to the absorption of the sun's energy by the earth's atmosphere which dissipates about 25% to 30% of the radiation energy.

Hydro-power or water power is power derived from the energy of falling water and running water, which may be harnessed for useful purpose. The power available from falling water can be calculated from the flow rate and density of water, the height of fall and the local acceleration due to gravity. In SI units, the power is

$$P = \eta \rho Qgh$$

Where P is the power in watts, η is the dimensionless efficiency of the turbine, ρ is the density of water in kilograms per cubic meter, Q is the flow in cubic meter per second, g is the acceleration due to gravity, h is the height difference between inlet and outlet. The force of water will rotate the blades of the turbine by which the generator starts to produce electrical supply.

Below Block Diagram shows the hybrid of hydro and solar with battery energy storage system. Hydro system contains Reservoir, Turbine and PMSG Generator and the Solar System consist of photovoltaic panels, Dc-Dc converter, Battery Storage system and Inverter with filter. The combination hydro and solar system will be given to the linear or non-linear loads.

The rest of this paper organized as follows, the principle of operation of the proposed hybrid system is given in II. In Section III, a design procedure is presented for selection of various components of the proposed system. In Section IV, the developed MATLAB-based simulation is discussed for the proposed system. In Section V, the simulation results for the proposed system under linear load, nonlinear load presented and discussed verifying the validity of the proposed system

Advanced Electricity Usage via Power Line Communications

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Abstract

Power line communication (PLC) presents an interesting and economical solution for Automatic Meter Reading (AMR). If an AMR system via PLC is set in a power delivery system, a detection system for illegal electricity usage may be easily added in the existing PLC network. In the detection system, the second digitally energy meter chip is used and the value of energy is stored. The recorded energy is compared with the value at the main kilo Watt-hour meter. In the case of the difference between two recorded energy data, an error signal is generated and transmitted via PLC network. The detector and control system is proposed. The architecture of the system and their critical components are given. The measurement results are given.

Keyword- Automatic Meter Reading (AMR), Detector, Illegal Electricity Usage, Power Line Communication, Power Line Communications (PLC) Modem

I. INTRODUCTION

India, the largest democracy with an estimated population of about 1.04 billion, is on a road to rapid growth in economy. Energy, particularly electricity, is a key input for accelerating economic growth.

The theft of electricity is a criminal offence and power utilities are losing billions of rupees in this account. If an Automatic Meter Reading system via Power line Communication is set in a power delivery system, a detection system for illegal electricity usage is possible.

Power line communications (PLC) has many new service possibilities on the data transferring via power lines without use of extra cables. Automatic Meter Reading (AMR) is a very important application in these possibilities due to every user connected each other via modems, using power lines. AMR is a technique to facilitate remote readings of energy consumption. The following sections will describe the proposed detection and control system for illegal electricity usage using the power lines

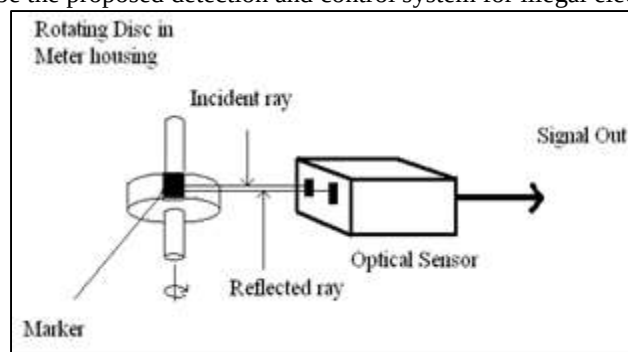


Fig. 1: Electromechanical movement to digital signal conversion

II. DETECTION OF ILLEGAL ELECTRICITY USAGE

In this section the discussion is on how a subscriber can illegally use the electricity and the basic building blocks for the detection using power line communication.

A. Methods of illegal electricity usage

In illegal usage a subscriber illegally use electricity in the following ways,

Seven Level Cascaded Multilevel Inverter for Power Quality Improvement in Induction Motor

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Abstract

Induction motors are the workhorses of any industry. The speed control of induction motor is mainly done through Variable Frequency Drives (VFD). The VFD includes IGBT or MOSFET based voltage source inverter which is fed from a rectifier. The output AC of the inverter contains more harmonic content and has square waveform. However sinusoidal PWM technique is used to get much more sinusoidal output AC. But the frequent switching of the switches will result in increasing the harmonic content which in turn increases the size of the output filter. To overcome this, a cascaded multilevel inverter is proposed to reduce the harmonic content and improve the power quality. The cascaded multilevel inverter produces nearly sinusoidal output compared to sinusoidal PWM switching. The common configuration of cascaded multilevel inverter includes separate DC sources for each H-bridge. The proposed 3 phase cascaded multilevel inverter has only one DC source. By choosing the adequate switching angles and appropriate carrier frequency, harmonics can be eliminated in the output waveform. Appropriate choice of a fundamental frequency switching pattern can produce a nearly sinusoidal output thereby improving the power quality. In this work, the aim to study the performance of an induction motor, which is used as a medium.

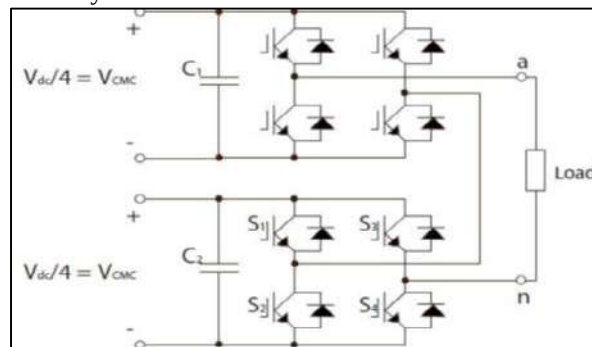
Keyword- Hybrid Cascaded Multilevel Inverter, Total Harmonic Distortion, Sinusoidal Multicarrier Pulse Width Modulation, In-Phase Disposition

I. INTRODUCTION

For the better quality of power the voltage and current waveforms should be sinusoidal, but in actual practice it is somewhat non-sinusoidal and this phenomena is called Harmonic Distortion. Voltage Harmonic Distortion which is generally present in supply of power from utility. The distortion in current waveform is called as current harmonic distortion which is generally injected by the nonlinear loads to the supply of utility and corrupts it.

II. HYBRID CASCADED SEVEN LEVEL INVERTER

One more alternative for a multilevel inverter is the cascaded multilevel inverter or series H-bridge inverter. It uses cascaded full-bridge inverters with separate DC-sources to buildup the stepped waveform. Each full-bridge can be seen as a module and it is only these modules that build up the Cascaded Multilevel Inverter topology. With its modularity and flexibility, the CMI shows superiority in high-power applications, especially shunt and series connected FACTS controllers. It should be noted that, unlike the diode-clamped and flying-capacitor topologies, isolated sources are required for each cell in each phase. In some systems these sources may be available through batteries or photovoltaic cells, but in most drive systems transformer/rectifier sources are used. The figure 4.6 shows the circuit diagram of the five level cascaded multilevel inverter. One full-bridge module is itself a three-level Cascaded Multilevel Inverter, and every module added in cascade to that extends the inverter with two voltage levels.



Automatic Braking System in Train using Fuzzy Logic

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Abstract

This paper focuses a new way of approach to find the solution for the artificial intelligent braking system in train using the fuzzy logic controller. Here we are designing the fuzzy logic controller using fuzzy logic tool box in mat lab software. The main function of the fuzzy logic controller used here is to automatically stop the train in each station without any manual procedure of stopping the train. Generally the Indian railways use two drivers to operate a train. In this paper the usage of fuzzy logic controller reduces the number of drivers to one. The fuzzy logic controller in train gets activated about 500m from the station so that the train stops at the station smoothly and automatically. The fuzzy controller takes the decision with reference to the speed and distance of the train.

Keyword- Fuzzy Logic, Automatic Braking System

I. INTRODUCTION

Day to day new advancements is taking place in railways. The new way of approach is to reduce the man power and to automate the system. We can use the advanced control equipment's in order to automate the system effectively. Generally the design of automatic braking system becomes more complex but it can be made easier and flexible by using fuzzy logic controller. In order to get the dynamic output we should connect the target to the fuzzy controller. The input of the fuzzy controller is chosen as distance and speed. The output of the fuzzy controller is braking power. Based on rules of logic obtained from train drivers we Have framed 4x4 (16 rules) for fuzzy logic controller. In our design we use the triangular and trapezoidal member functions. The results from mat lab simulation clearly show that braking power is smooth and the train stops completely when the distance becomes zero.

II. OVERVIEW OF DESIGN

The design starts with the selection of number of stations where the train should stop. The distance between the stations is calculated. The fuzzy logic controller for braking system in train gets activated about 500m from the station. The controller gets its input as speed and distance instantaneously. The numerical values are converted into fuzzy sets by fuzzification technique.

Example:

For Speed = 70 kmph, distance=200m

The fuzzy set is,

Speed $\rightarrow$ {very fast, 1}

Distance $\rightarrow$ {far, 0.8}

After the fuzzification the corresponding rules are fired. Here, for the above example, the following rule is fired. If distance is (FAR) and speed is (VERY FAST) then braking power is (HEAVY). Then the fuzzy sets are converted into numerical values by the defuzzification technique. This numerical value which is the output of the fuzzy logic controller is used to Control the braking system of the train.

III. DESIGN PROCEDURE

Inputs - Speed and Distance

Output-Braking power (or % of braking).

A. *Membership Functions*
(Triangular and Trapezoidal)

Vehicle Security System using Embedded and GSM Technology

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Abstract

This paper deals with design and development of the theft control system for an automobile, which is being used to prevent or control the theft. The developed system makes use of an embedded system based on GSM technology. The designed and developed is installed in the vehicle. An interfacing mobile is also connected to the microcontroller which is in turn, connected to the engine. We need to give the password before starting it. Once an unauthorized person tries to run the vehicle by giving a wrong password an alert message is sent to the owner of the vehicle that the vehicle is being stolen. This information is passed on to the central processing system whereby sitting at a remote place, a particular number is dialed by them to the interfacing mobile that is with the hardware kit which is installed in the vehicle. By reading the signals received by the mobile, one can control the ignition of the engine, say to stop the engine immediately. Again it will come to the normal condition only after entering a secured password. The owner of the vehicle and the central processing system will know this secured password. The main concept in this design is introducing the mobile communication into the embedded system. The designed unit is very simple and low cost. The entire designed unit is on a single chip. When the vehicle is stolen, the owner of the vehicle may inform to the central processing system, then they will stop the vehicle, by just giving a ring to the secret number and with the help of SIM tracking knows the location of the vehicle and informs to the local police or stops it from further movement.

Keyword- GSM, Embedded, Security

I. INTRODUCTION

In recent years, vehicle thefts are increasing at an alarming rate around the world. People have started to use the theft control systems installed in their vehicles. The commercially available anti-theft vehicular systems are very expensive. Here, we make a modest attempt to design and develop a simple, low cost vehicle theft control scheme using an inbuilt microcontroller. This scheme involves a microcontroller and a mobile for the communication purposes.

Tracking of the stolen vehicle can be done through the internet interface. Once the position of the stolen vehicle is found out using the GPS, a location request is sent back to the central processing system, which takes care of the event to be performed using remote control systems.

Control functions of the tracking system allow us to perform many functions such as to stop or start the vehicle, automatic position reporting based on time or distance, over speed detection and reporting, etc.

This paper is organized in the following sequence. A small literature survey on the theft control system was given in the previous paragraphs. This is followed by the preview of the GSM mobile communication concepts, Microcontroller along with its peripherals, overview of the design and SIM tracking.

II. PRESENT ANTI-THEFT DEVICES

All vehicle theft prevention equipment's help to deter criminals. Many anti-theft devices are also effective in protecting your vehicle from burglaries & vandalism. Following are some of the anti-theft devices that are used now-a-days.

- Kill switch
- Tire/wheel locks
- Alarms
- Electronic keys
- Electronic tracking devices

The above mentioned anti-theft devices are not 100% save so to overcome this GSM based systems which are more reliable can be used.

A Review of Ocean Thermal Energy Conversion

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Abstract

Oceans cover more than 70% of the Earth's surface. As the world's largest solar collectors, oceans generate thermal energy from the sun. They also produce mechanical energy from the tides and waves. Even though the sun affects all ocean activity, the gravitational pull of the moon primarily drives the tides, and the wind powers the ocean waves. This makes them the world's largest solar energy collector and energy storage system. On an average day, 60 million square kilometers (23 million square miles) of tropical seas absorb an amount of solar radiation equal in heat content to about 250 billion barrels of oil. If less than one-tenth of one percent of this stored solar energy could be converted into electric power, it would supply more than 20 times the total amount of electricity consumed in the United States on any given day. OTEC, or ocean thermal energy conversion, is an energy technology that converts solar radiation to electric power. OTEC systems use the ocean's natural thermal gradient—the fact that the ocean's layers of water have different temperatures—to drive a power-producing cycle. As long as the temperature between the warm surface water and the cold deep water differs by about 20°C (36°F), an OTEC system can produce a significant amount of power. The oceans are thus a vast renewable resource, with the potential to help us produce billions of watts of electric power. This potential is estimated to be about 1013 watts of baseload power generation, according to some experts. The cold, deep seawater used in the OTEC process is also rich in nutrients, and it can be used to culture both marine organisms and plant life near the shore or on land. The economics of energy production today have delayed the financing of a permanent, continuously operating OTEC plant. However, OTEC is very promising as an alternative energy resource for tropical island communities that rely heavily on imported fuel. OTEC plants in these markets could provide islanders with much-needed power, as well as desalinated water and a variety of Mari-culture products.

Keyword- Ocean Thermal Energy Conversion (OTEC), Cycle Types

I. PLANT DESIGN AND LOCATION

Commercial ocean thermal energy conversion (OTEC) plants must be located in an environment that is stable enough for efficient system operation. The temperature of the warm surface seawater must differ about 20°C (36°F) from that of the cold deep water that is no more than about 1000 meters (3280 feet) below the surface. The natural ocean thermal gradient necessary for OTEC operation is generally found between latitudes 20 deg N and 20 deg S. Within this tropical zone are portions of two industrial nations—the United States and Australia—as well as 29 territories and 66 developing nations. Of all these possible sites, tropical islands with growing power requirements and a dependence on expensive imported oil are the most likely areas for OTEC development.

Commercial OTEC facilities can be built on

- Land or near the shore
- Platforms attached to the shelf
- Moorings or free-floating facilities in deep ocean water

A. Land-Based and Near-Shore Facilities

Land-based and near-shore facilities offer three main advantages over those located in deep water. Plants constructed on or near land do not require sophisticated mooring, lengthy power cables, or the more extensive maintenance associated with open-ocean environments. They can be installed in sheltered areas so that they are relatively safe from storms and heavy seas. Electricity, desalinated water, and cold, nutrient-rich seawater could be transmitted from near-shore facilities via trestle bridges or causeways. In addition, land-based or near-shore sites allow OTEC plants to operate with related industries such as Mari culture or those that require desalinated water.

Land-based or near-shore sites can also support Mari culture. Mari culture tanks or lagoons built on shore allow workers to monitor and control miniature marine environments. Mari culture products can be delivered to market with relative ease via railroads or highways.

One disadvantage of land-based facilities arises from the turbulent wave action in the surf zone. Unless the OTEC plant's water supply and discharge pipes are buried in protective trenches, they will be subject to extreme stress during storms and

Fuzzy Logic in Electrical Systems

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Abstract

With the advent of modern computer technology, the field of Artificial Intelligence is showing a definite utility in all spectrum of life. In the field of control, there is always a need for optimality with improved controller performance. In this paper, the feasibility of Fuzzy Logic as an effective control tool for DC motors is dealt with. The Fuzzy Logic Controller (FLC) is showing a better performance than conventional controllers in the form of increased robustness. In this paper, the role of Fuzzy Logic as a controller and its implementation is studied.

Keyword- Fuzzy Logic Controller (FLC), Fuzzification, DC Motors

I. INTRODUCTION

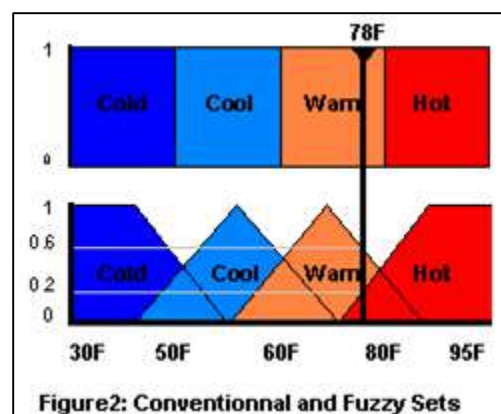
- Fuzzy logic is a powerful problem solving methodology introduced by Lotfi Zadeh in 1960's.
- It provides tools for dealing with imprecision due to uncertainty and vagueness, which is intrinsic to many engineering problems.
- It is a superset of Boolean or Crisp logic.
- It emerged into mainstream of information technology in late 1980's and early 1990

II. FUZZY LOGIC

- Fuzzy logic resembles human decision making with its ability to work from approximate data and find precise solutions.
- Classical logic or Boolean logic has two values or states. Eg. (true or false). It requires a deep understanding of a system, exact equations, and precise numeric values.
- Fuzzy logic is a continuous form of logic. eg (bad, very bad, poor, average). It allows modeling complex systems using a higher level of abstraction originating from our knowledge and experience.

III. WORKING OF FUZZY LOGIC

- The working of fuzzy logic can be understood by considering a simplified example of a thermostat controlling a heater fan.
- The room temperature detected through a sensor is input to a controller, which outputs a control force to adjust the heater fan speed.
- The first step in designing such a fuzzy controller is to characterize the range of values for the input and output variables of the controller.
- Labels such as cool for the temperature and high for the fan speed are assigned and a set of simple English-like rules to control the systems are written.



Hybrid Electric Vehicle Design

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Abstract

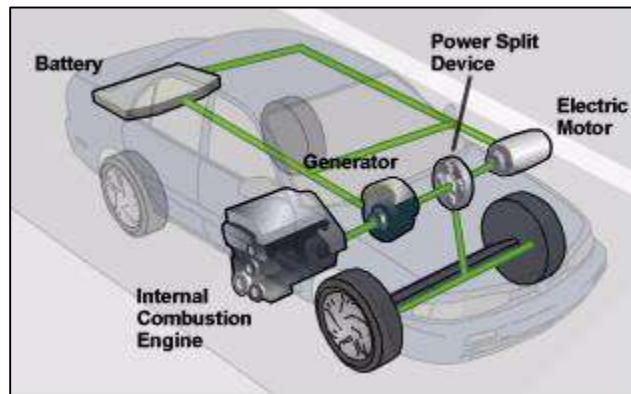
A hybrid electric vehicle (HEV) is a hybrid vehicle which combines a conventional propulsion system with a rechargeable energy storage system (RESS) to achieve better fuel economy than a conventional vehicle. Modern mass-produced HEVs prolong the charge on their batteries by capturing kinetic energy via regenerative braking, and some HEVs can use the internal combustion engine to generate electricity by spinning an electrical generator (often a motor-generator) to either recharge the battery or directly feed power to an electric motor that drives the vehicle.

Keyword- Hybrid Electric Vehicle (HEV), Rechargeable Energy Storage System (RESS), Internal Combustion Engine (ICE)

I. HYBRID ELECTRIC VEHICLE

Regular HEVs most commonly use an internal combustion engine (ICE) in tandem with [[electric motor]]s to power their propulsion system. Modern mass-produced HEVs prolong the charge on their batteries by capturing "kinetic energy" via [[regenerative braking]], and some HEVs can use the combustion engine to generate electricity by spinning an [[electrical generator]] (often a [[motor-generator]]) to the fraction of the cause results to the abdomile reswult the vehicle. An HEV's engine is smaller and may be run at various speeds, providing more efficiency.

Hybrid-electric vehicles (HEVs) combine the benefits of gasoline engines and electric motors and can be configured to obtain different objectives, such as improved fuel economy, increased power, or additional auxiliary power for electronic devices and power tools.



A. Regenerative Braking

The electric motor applies resistance to the drivetrain causing the wheels to slow down. In return, the energy from the wheels turns the motor, which functions as a generator, converting energy normally wasted during coasting and braking into electricity, which is stored in a battery until needed by the electric motor.

B. Electric Motor Drive/Assist

The electric motor provides additional power to assist the engine in accelerating, passing, or hill climbing. This allows a smaller, more efficient engine to be used. In some vehicles, the motor alone provides power for low-speed driving conditions where internal combustion engines are least efficient.

C. Automatic Start/Shutoff

Automatically shuts off the engine when the vehicle comes to a stop and restarts it when the accelerator is pressed. This prevents wasted energy from idling.

A New Topology Power Generation System with MPPT

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Abstract

We have introduced a microcontroller controlled thermoelectric generator (a turbine free system) which transforms geothermal energy, one of the renewable energy sources, to directly electrical energy and then the system was tested and its performance analysis is explained. In the system, energy transformation is provided by the thermoelectric modules. Since changeable DC voltage depending on temperature difference is obtained by the thermoelectric modules which are used to charge a battery or accumulator. The regulator circuit and inverter circuit are used in order to obtain the values 5V DC, 12V DC and 220V AC in the electrical energy. System control signals are arranged by using the PIC16F877 microcontroller in the system. The system is quite useful to meet electrical energy needs easily, cleanly and cheaply from the geothermal sources.

Keyword- MCGTG, MPPT, Microcontroller

I. INTRODUCTION

The need of electrical energy of the countries around the world is increasing every day. Here a microcontroller controlled geothermal thermoelectric generator (MCGTG), which transforms geothermal energy, one of the renewable energy sources, directly to electrical energy after then the system was tested and its performance analysis was examined. Today in our metro world, there are only eight renewable energy sources as follows.

- Biomass
- Geothermal
- Solar power
- Hydro power
- Wind power
- Tidal power
- Wave power

Our paper deals with the geothermal energy for our today concern. The subtopic follows

- Definition
- Principle
- General Construction
- Basic Thermoelectric Module
- Working
- System control using Microcontroller
- Performance analysis
- Outlook
- Applications
- Advantages
- Disadvantages
- Conclusion

A. Definition

Geothermal power (from the Greek roots geo, meaning earth, and thermos, meaning heat) is energy generated from heat stored in the earth, or the collection of absorbed heat derived from underground.

A Review of Alternate Fuels

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^{1,2,4}JCT College of Engineering and Technology, Coimbatore, Tamilnadu, India ³SRM University, Chennai, Tamilnadu, India ⁵Sree Vidyanikethan Engineering College, Tirupati, Andhra Pradesh, India

Abstract

At the present time, virtually all of the world's transportation needs are supplied by fuels derived from petroleum, also known as crude oil. Gasoline, diesel, jet fuels are examples of transportation fuels that are produced from petroleum. The combustion of petroleum in motor vehicles results in emission of gases associated with global warming, acid rain and urban air pollution. Using hydrogen as fuel can fundamentally change our relationship with the natural environment. Hydrogen boasts many important advantages over other fuels. So, it is the fuel of choice in this paper for energy.

Keyword- Gasoline, Diesel, Jet Fuels

I. INTRODUCTION

Alternative energy sources, is one that can be adopted to save energy for our future generation and to reduce ecological threads like pollutions, scarcity, global warming etc. Some of the commonly used alternative fuels are wind energy, solar energy, tidal energy, geothermal energy and the blooming alternative fuel is hydrogen.

A. Fossil Fuels and Its Effects

Fossil fuel is the "incompletely oxidized and decayed animal and vegetable materials, specifically coal, peat, lignite, petroleum and natural gas". Technically it is defined as "material that can be burned or otherwise consumed to produce heat".

Combustion of these fossil fuels is considered to be the largest contributing factor to the release of greenhouse gases into the atmosphere. Usage of fossil fuel causes air pollution, water pollution, accumulation of solid waste, not to mention the land degradation and human illness.

This fossil fuel affects small plants and animals via smoke exhaust from vehicles and by producing air pollution. Many toxic substances like VANADIUM and MERCURY are released by these fossil fuels.

When fossil fuel like coal is burnt it will produce nitrous oxide and sulphuric oxide which will retain in the atmosphere for a long term and at times of raining it will mix with the moisture and it form harmful nitric acid and sulphuric acid and reaches earth. This is known as Acid rain.

Sometimes the leakage of these fossil fuels during the delivery via pipeline will leads to leakage and produces oil rigs and pollute water and damages the water living organisms.

II. METHODS TO REDUCE FOSSIL FUEL'S DAMAGE

- Use of unleaded gas has helped to reduce the release of lead into the environment. But it has slighter less octane number when compared to the actual leaded petrol. But it affects the environment in minor amount since lead is not released.
- Use of alternative and renewable energy resources will reduce the effect of fossil fuels and environment and helps to meet the energy demand.

III. ALTERNATIVE FUELS OR RENEWABLE ENERGY SOURCES

These energies are produced by absolute natural sources and these energies can be replenished. Some of the alternative fuels are,

- Solar Energy
- Tidal Energy
- Wind Energy
- Geo Thermal Energy
- Bio Mass Fuel
- Hydrogen Energy

Industrial Applications using Wastewater Treatment using PLC

¹C. Sakthivel ²R. Guruprasath ³K. Selvakumar ⁴R. Pradeep ⁵R. Rajasekaran

^{1,2,3,4,5}Assistant Professor

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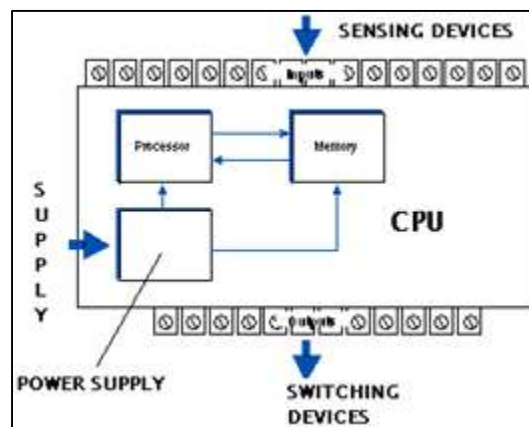
Abstract

Many industries have a need to treat water to obtain very high quality water for demanding purposes. Industrial wastewater treatment covers the mechanisms and processes used to treat waters that have been contaminated in some way by commercial activities prior to its release into the environment or its re-use. This is most commonly done by manually controlled devices. With the development in technology, this process can be automated. In this paper, we have described the automated industrial wastewater treatment process using PLC technology. This process involves treatment in two phases namely, primary and secondary stages. Here the steps are made automatic using sensors and timers of a PLC. The wastewater is first primarily treated where solid wastes settle down and lighter debris and grease rise to the surface to form a crust. In the primary stage, the working is based on the principle that when the water level drops enough so that the Low Level float switch is off (down), the PLC will open the valve to let more water in. Once the water level raises enough so that the High Level switch is on (up), the PLC will shut the inlet to stop the water from overflowing. The secondary stage involves biological treatment using the same principle. This treatment gives a new dimension for the automation of such manual processes.

Keyword- A Programmable Logic Controller (PLC), Suspended Film Systems, Primary Treatment Methods

I. INTRODUCTION

Wastewater is any water that has been adversely affected in quality by anthropogenic influence. It comprises liquid waste discharged by residences, commercial properties, industry, and/or agriculture and can encompass a wide range of potential contaminants and concentrations.



There are numerous processes that can be used to clean up waste waters depending on the type and concentration of the water. Here we use PLC technology for the automated working in the cleaning of the contaminated water.

A. Architecture of the PLC

A programmable logic controller (PLC) or programmable controller is the 'work horse' of industrial automation. Unlike general-purpose computers, the PLC is designed for multiple inputs and output arrangements, extended temperature ranges, immunity to electrical noise, and resistance to vibration and impact. Programmable logic control is important because all production processes go through a fixed repetitive sequence of operations that involve logic steps and decisions. A PLC is used to control, time and

Fuzzy Logic in Electrical Systems

¹C. Sakthivel ²V. Jethose ³Dr. M. Jayaprakash ⁴S. Pradeep Kumar ⁵S. Anbuchandran

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Abstract

With the advent of modern computer technology, the field of Artificial Intelligence is showing a definite utility in all spectrum of life. In the field of control, there is always a need for optimality with improved controller performance. In this paper, the feasibility of Fuzzy Logic as an effective control tool for DC motors is dealt with. The Fuzzy Logic Controller (FLC) is showing a better performance than conventional controllers in the form of increased robustness. In this paper, the role of Fuzzy Logic as a controller and its implementation is studied.

Keyword- Fuzzy Logic Controller (FLC), Fuzzification, DC Motors

I. INTRODUCTION

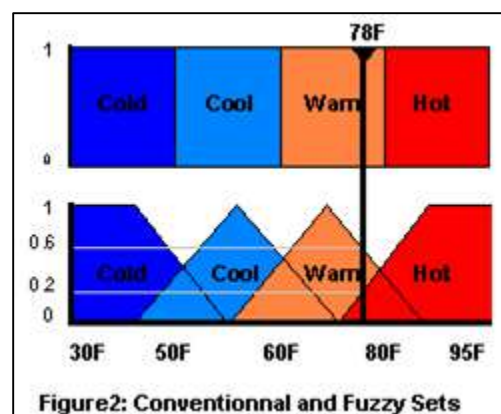
- Fuzzy logic is a powerful problem solving methodology introduced by Lotfi Zadeh in 1960's.
- It provides tools for dealing with imprecision due to uncertainty and vagueness, which is intrinsic to many engineering problems.
- It is a superset of Boolean or Crisp logic.
- It emerged into mainstream of information technology in late 1980's and early 1990

II. FUZZY LOGIC

- Fuzzy logic resembles human decision making with its ability to work from approximate data and find precise solutions.
- Classical logic or Boolean logic has two values or states. Eg. (true or false). It requires a deep understanding of a system, exact equations, and precise numeric values.
- Fuzzy logic is a continuous form of logic. eg (bad, very bad, poor, average). It allows modeling complex systems using a higher level of abstraction originating from our knowledge and experience.

III. WORKING OF FUZZY LOGIC

- The working of fuzzy logic can be understood by considering a simplified example of a thermostat controlling a heater fan.
- The room temperature detected through a sensor is input to a controller, which outputs a control force to adjust the heater fan speed.
- The first step in designing such a fuzzy controller is to characterize the range of values for the input and output variables of the controller.
- Labels such as cool for the temperature and high for the fan speed are assigned and a set of simple English-like rules to control the systems are written.



A Review of Alternate Fuels

¹C. Sakthivel ²V. Jethose ³K. Selvakumar ⁴S. Pradeep Kumar ⁵E. Parimalasundram

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Abstract

At the present time, virtually all of the world's transportation needs are supplied by fuels derived from petroleum, also known as crude oil. Gasoline, diesel, jet fuels are examples of transportation fuels that are produced from petroleum. The combustion of petroleum in motor vehicles results in emission of gases associated with global warming, acid rain and urban air pollution. Using hydrogen as fuel can fundamentally change our relationship with the natural environment. Hydrogen boasts many important advantages over other fuels. So, it is the fuel of choice in this paper for energy.

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Design of Optimized Network on-Chip for Reliable Communication

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Abstract

In this paper, a new mesh-typed NoC(Network on Chip) architecture is proposed which aims at enhancing network performance. Networks-on-Chips (NoCs) are a new design paradigm for scalable high throughput communication infrastructures, in Systems-on-Chips (SoCs) with billions of transistors. The idea of NoCs is dividing a chip into several independent clusters connected together by global communication architecture. As the number of cores integrated into System-on-Chip increases, the on-chip communication limits the performance and power consumption in current and next generation SoCs. The resultant NoC uses mesh topology along with virtual channel allocation methodology. The routing algorithm combined with mesh topology improves average latency and saturation traffic load.

Keyword- Systems-on-Chip, Multiprocessor Array, Network-on-Chip (Noc), Mesh Type Noc, Virtual Channel

I. INTRODUCTION

As the trend of device miniaturization continues the number of transistors per chip doubles every couple of years. The increasing density can be used in several ways: the size of the chips can be reduced, individual processing blocks can become more complex thus providing higher processing power, and more functional blocks can be integrated on the same chip. Reducing the size of chips, although beneficial from the cost point of view, cannot be done indefinitely because at a certain point the cost of packaging and terminals would become dominant. The direction that is left and is still promising is the integration functions that are traditionally performed by different devices into a single device.

Integration has several benefits: the cost of several packages is eliminated and the need for connections that would normally go to the outside of the chip is removed. Integration improves performance because communication bandwidth available on chip is significantly higher than off chip. It decreases power consumption as driving external pins uses much more energy than on-chip communication. Another important benefit is the reduced physical size of devices.

Traditionally IP blocks are connected using a single bus or a hierarchy of buses. The parameters of these components could be manually chosen by a skilled engineer and the components themselves could be instantiated from a library to obtain a working system. However, this approach will not scale to designs having tens to hundreds of cores, because companies cannot afford increasing the engineering effort per device. Timing constraints become increasingly difficult to meet and verification becomes difficult to perform.

Analyzing the system from the performance point of view also becomes increasingly difficult. While the computation requirements for individual processors can be generally analyzed and verified for many real life applications, the communication performance requirements are less straightforward since the interactions between different IPs need to be taken into account. If the system fails to meet the performance requirements, redesigning the interconnect (or entire SoC) may be a time-consuming and costly operation. It is therefore desirable to have automated tools to dimension and verify the interconnect. These tools start with a high level system or application requirements and automatically generate an interconnect that the system components are attached to. This interconnect may also be verifiable by construction from the correctness and performance points of view.

The remainder of this paper is organized as follows. Section II describes the background of network on chip architecture design and their different topologies. Section III presents the proposed architecture and its design with a switch-by-switch interconnection scheme that can support a backtracking path-setup and a source-synchronous wave pipeline transmission of the data. Section IV. Finally, the conclusion and discussion for further research are given in Section V.

II. BACKGROUND

A. NOC Architecture

The function of an on-chip network is to deliver messages from source node to destination node and there exist many design alternatives to accomplish this job. Depending on the application requirements, how to choose suitable network architecture

Industrial Applications using Wastewater Treatment using PLC

¹C. Sakthivel ²R. Guruprasath ³K. Selvakumar ⁴R. Pradeep ⁵R. Rajasekaran

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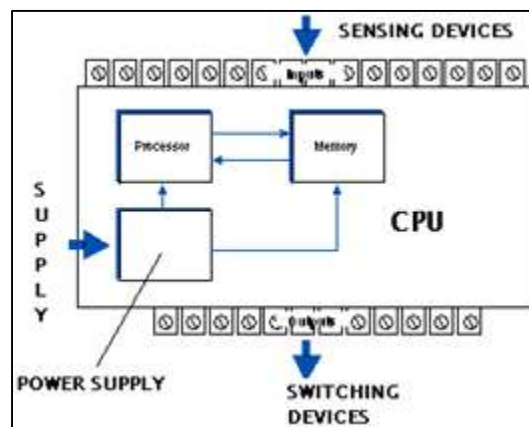
Abstract

Many industries have a need to treat water to obtain very high quality water for demanding purposes. Industrial wastewater treatment covers the mechanisms and processes used to treat waters that have been contaminated in some way by commercial activities prior to its release into the environment or its re-use. This is most commonly done by manually controlled devices. With the development in technology, this process can be automated. In this paper, we have described the automated industrial wastewater treatment process using PLC technology. This process involves treatment in two phases namely, primary and secondary stages. Here the steps are made automatic using sensors and timers of a PLC. The wastewater is first primarily treated where solid wastes settle down and lighter debris and grease rise to the surface to form a crust. In the primary stage, the working is based on the principle that when the water level drops enough so that the Low Level float switch is off (down), the PLC will open the valve to let more water in. Once the water level raises enough so that the High Level switch is on (up), the PLC will shut the inlet to stop the water from overflowing. The secondary stage involves biological treatment using the same principle. This treatment gives a new dimension for the automation of such manual processes.

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Seven Level Cascaded Multilevel Inverter for Power Quality Improvement in Induction Motor

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Abstract

Induction motors are the workhorses of any industry. The speed control of induction motor is mainly done through Variable Frequency Drives (VFD). The VFD includes IGBT or MOSFET based voltage source inverter which is fed from a rectifier. The output AC of the inverter contains more harmonic content and has square waveform. However sinusoidal PWM technique is used to get much more sinusoidal output AC. But the frequent switching of the switches will result in increasing the harmonic content which in turn increases the size of the output filter. To overcome this, a cascaded multilevel inverter is proposed to reduce the harmonic content and improve the power quality. The cascaded multilevel inverter produces nearly sinusoidal output compared to sinusoidal PWM switching. The common configuration of cascaded multilevel inverter includes separate DC sources for each H-bridge. The proposed 3 phase cascaded multilevel inverter has only one DC source. By choosing the adequate switching angles and appropriate carrier frequency, harmonics can be eliminated in the output waveform. Appropriate choice of a fundamental frequency switching pattern can produce a nearly sinusoidal output thereby improving the power quality. In this work, the aim to study the performance of an induction motor, which is used as a medium.

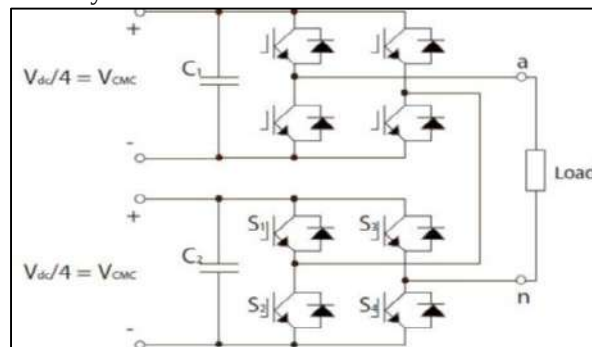
Keyword- Hybrid Cascaded Multilevel Inverter, Total Harmonic Distortion, Sinusoidal Multicarrier Pulse Width Modulation, In-Phase Disposition

I. INTRODUCTION

For the better quality of power the voltage and current waveforms should be sinusoidal, but in actual practice it is somewhat non-sinusoidal and this phenomena is called Harmonic Distortion. Voltage Harmonic Distortion which is generally present in supply of power from utility. The distortion in current waveform is called as current harmonic distortion which is generally injected by the nonlinear loads to the supply of utility and corrupts it.

II. HYBRID CASCADED SEVEN LEVEL INVERTER

One more alternative for a multilevel inverter is the cascaded multilevel inverter or series H-bridge inverter. It uses cascaded full-bridge inverters with separate DC-sources to buildup the stepped waveform. Each full-bridge can be seen as a module and it is only these modules that build up the Cascaded Multilevel Inverter topology. With its modularity and flexibility, the CMI shows superiority in high-power applications, especially shunt and series connected FACTS controllers. It should be noted that, unlike the diode-clamped and flying-capacitor topologies, isolated sources are required for each cell in each phase. In some systems these sources may be available through batteries or photovoltaic cells, but in most drive systems transformer/rectifier sources are used. The figure 4.6 shows the circuit diagram of the five level cascaded multilevel inverter. One full-bridge module is itself a three-level Cascaded Multilevel Inverter, and every module added in cascade to that extends the inverter with two voltage levels.



POSITION CONTROL OF SOLAR PANNEL

C.Sakthivel¹, V.Jethose², V.Kumaresan³

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JCT College of Engineering and Technology

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JCT College of Engineering and Technology

ABSTRACT

Photovoltaic systems normally use a maximum power point tracking (MPPT) technique to continuously deliver the highest possible power to the load irrespective of the temperature and irradiation conditions and of the load electrical characteristics. The main difference between the method used in the proposed MPPT system and other techniques used in the past is that the PV array output voltage is used to directly control the position of solar panel, thus reducing the complexity of the system. A simple method of tracking the maximum power points (MPP's) and forcing the system to operate close to these points is presented. This paper details the proposed work to design the solar tracking system based around the microcontroller programmable IC. The solar panel is in the form of array of photovoltaic cells. The operation of the solar panel is actuated by means of the final control element (FCE). The FCE used is stepper motor. For the optimum utilization of solar energy the position of solar panel in the form of photovoltaic array is controlled in accordance with the position of optical electronic sensors located at particular angle of elevation of light rays with respect to ground.

The physical model consists of solar panel in the form of photovoltaic cells; to which the stepper motor with its extended shaft is fabricated. The minimum necessary hardware interfacing circuit associated with microcontroller and the stepper motor is designed and fabricated. The control functions are implemented using 8051 Microcontroller based hardware and software. The proposed model resembles the features of solar tracking system, which can be used in usual practice. The experimental results show that the use of the proposed MPPT control increases the PV output power by as much as 10-15% and hence the resulting system has improved high-efficiency, lower cost and can be easily modified to handle more energy sources.

Key Words- Maximum power point tracking, microcontrollers, photovoltaic systems, solar array, battery charging.

I. INTRODUCTION

As Conventional sources of energy are rapidly depleting and the cost of energy is rising, photovoltaic array becomes a promising alternative source. The major advantages associated with PV array are that it is 1) abundant; 2) pollution free; 3) recyclable; 4) installation cost is considerably high and energy conversion is relatively low. To overcome these problems, the following two essential ways are used: 1) increase the efficiency of conversion for solar array and 2) maximize the output power from the array. With the development of technology, the cost of solar array is expected to decrease continuously in making them attractive for

Vehicle Security System using Embedded and GSM Technology

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Abstract

This paper deals with design and development of the theft control system for an automobile, which is being used to prevent or control the theft. The developed system makes use of an embedded system based on GSM technology. The designed and developed is installed in the vehicle. An interfacing mobile is also connected to the microcontroller which is in turn, connected to the engine. We need to give the password before starting it. Once an unauthorized person tries to run the vehicle by giving a wrong password an alert message is sent to the owner of the vehicle that the vehicle is being stolen. This information is passed on to the central processing system whereby sitting at a remote place, a particular number is dialed by them to the interfacing mobile that is with the hardware kit which is installed in the vehicle. By reading the signals received by the mobile, one can control the ignition of the engine, say to stop the engine immediately. Again it will come to the normal condition only after entering a secured password. The owner of the vehicle and the central processing system will know this secured password. The main concept in this design is introducing the mobile communication into the embedded system. The designed unit is very simple and low cost. The entire designed unit is on a single chip. When the vehicle is stolen, the owner of the vehicle may inform to the central processing system, then they will stop the vehicle, by just giving a ring to the secret number and with the help of SIM tracking knows the location of the vehicle and informs to the local police or stops it from further movement.

Keyword- GSM, Embedded, Security

I. INTRODUCTION

In recent years, vehicle thefts are increasing at an alarming rate around the world. People have started to use the theft control systems installed in their vehicles. The commercially available anti-theft vehicular systems are very expensive. Here, we make a modest attempt to design and develop a simple, low cost vehicle theft control scheme using an inbuilt microcontroller. This scheme involves a microcontroller and a mobile for the communication purposes.

Tracking of the stolen vehicle can be done through the internet interface. Once the position of the stolen vehicle is found out using the GPS, a location request is sent back to the central processing system, which takes care of the event to be performed using remote control systems.

Control functions of the tracking system allow us to perform many functions such as to stop or start the vehicle, automatic position reporting based on time or distance, over speed detection and reporting, etc.

This paper is organized in the following sequence. A small literature survey on the theft control system was given in the previous paragraphs. This is followed by the preview of the GSM mobile communication concepts, Microcontroller along with its peripherals, overview of the design and SIM tracking.

II. PRESENT ANTI-THEFT DEVICES

All vehicle theft prevention equipment's help to deter criminals. Many anti-theft devices are also effective in protecting your vehicle from burglaries & vandalism. Following are some of the anti-theft devices that are used now-a-days.

- Kill switch
- Tire/wheel locks
- Alarms
- Electronic keys
- Electronic tracking devices

The above mentioned anti-theft devices are not 100% save so to overcome this GSM based systems which are more reliable can be used.

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Control functions of the tracking system allow us to perform many functions such as to stop or start the vehicle, automatic position reporting based on time or distance, over speed detection and reporting, etc.

This paper is organized in the following sequence. A small literature survey on the theft control system was given in the previous paragraphs. This is followed by the preview of the GSM mobile communication concepts, Microcontroller along with its peripherals, overview of the design and SIM tracking.

II. PRESENT ANTI-THEFT DEVICES

All vehicle theft prevention equipment's help to deter criminals. Many anti-theft devices are also effective in protecting your vehicle from burglaries & vandalism. Following are some of the anti-theft devices that are used now-a-days.

- Kill switch
- Tire/wheel locks
- Alarms
- Electronic keys
- Electronic tracking devices

The above mentioned anti-theft devices are not 100% save so to overcome this GSM based systems which are more reliable can be used.

Vehicle Security System using Embedded and GSM Technology

¹C. Sakthivel ²Umar Muktar S ³Manikandan S ⁴Ravivarman G ⁵Kumaresan V

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Abstract

This paper deals with design and development of the theft control system for an automobile, which is being used to prevent or control the theft. The developed system makes use of an embedded system based on GSM technology. The designed and developed is installed in the vehicle. An interfacing mobile is also connected to the microcontroller which is in turn, connected to the engine. We need to give the password before starting it. Once an unauthorized person tries to run the vehicle by giving a wrong password an alert message is sent to the owner of the vehicle that the vehicle is being stolen. This information is passed on to the central processing system whereby sitting at a remote place, a particular number is dialed by them to the interfacing mobile that is with the hardware kit which is installed in the vehicle. By reading the signals received by the mobile, one can control the ignition of the engine, say to stop the engine immediately. Again it will come to the normal condition only after entering a secured password. The owner of the vehicle and the central processing system will know this secured password. The main concept in this design is introducing the mobile communication into the embedded system. The designed unit is very simple and low cost. The entire designed unit is on a single chip. When the vehicle is stolen, the owner of the vehicle may inform to the central processing system, then they will stop the vehicle, by just giving a ring to the secret number and with the help of SIM tracking knows the location of the vehicle and informs to the local police or stops it from further movement.

Keyword- GSM, Embedded, Security

I. INTRODUCTION

In recent years, vehicle thefts are increasing at an alarming rate around the world. People have started to use the theft control systems installed in their vehicles. The commercially available anti-theft vehicular systems are very expensive. Here, we make a modest attempt to design and develop a simple, low cost vehicle theft control scheme using an inbuilt microcontroller. This scheme involves a microcontroller and a mobile for the communication purposes.

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Design of Optimized Network on-Chip for Reliable Communication

¹Dr. Jayaprakash. M ²Manikandan. S ³Pradeep Kumar. S ⁴Sam Jasper. P ⁵Prakash. C

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Abstract

In this paper, a new mesh-typed NoC(Network on Chip) architecture is proposed which aims at enhancing network performance. Networks-on-Chips (NoCs) are a new design paradigm for scalable high throughput communication infrastructures, in Systems-on-Chips (SoCs) with billions of transistors. The idea of NoCs is dividing a chip into several independent clusters connected together by global communication architecture. As the number of cores integrated into System-on-Chip increases, the on-chip communication limits the performance and power consumption in current and next generation SoCs. The resultant NoC uses mesh topology along with virtual channel allocation methodology. The routing algorithm combined with mesh topology improves average latency and saturation traffic load.

Keyword- Systems-on-Chip, Multiprocessor Array, Network-on-Chip (Noc), Mesh Type Noc, Virtual Channel

I. INTRODUCTION

As the trend of device miniaturization continues the number of transistors per chip doubles every couple of years. The increasing density can be used in several ways: the size of the chips can be reduced, individual processing blocks can become more complex thus providing higher processing power, and more functional blocks can be integrated on the same chip. Reducing the size of chips, although beneficial from the cost point of view, cannot be done indefinitely because at a certain point the cost of packaging and terminals would become dominant. The direction that is left and is still promising is the integration functions that are traditionally performed by different devices into a single device.

Integration has several benefits: the cost of several packages is eliminated and the need for connections that would normally go to the outside of the chip is removed. Integration improves performance because communication bandwidth available on chip is significantly higher than off chip. It decreases power consumption as driving external pins uses much more energy than on-chip communication. Another important benefit is the reduced physical size of devices.

Traditionally IP blocks are connected using a single bus or a hierarchy of buses. The parameters of these components could be manually chosen by a skilled engineer and the components themselves could be instantiated from a library to obtain a working system. However, this approach will not scale to designs having tens to hundreds of cores, because companies cannot afford increasing the engineering effort per device. Timing constraints become increasingly difficult to meet and verification becomes difficult to perform.

Analyzing the system from the performance point of view also becomes increasingly difficult. While the computation requirements for individual processors can be generally analyzed and verified for many real life applications, the communication performance requirements are less straightforward since the interactions between different IPs need to be taken into account. If the system fails to meet the performance requirements, redesigning the interconnect (or entire SoC) may be a time-consuming and costly operation. It is therefore desirable to have automated tools to dimension and verify the interconnect. These tools start with a high level system or application requirements and automatically generate an interconnect that the system components are attached to. This interconnect may also be verifiable by construction from the correctness and performance points of view.

The remainder of this paper is organized as follows. Section II describes the background of network on chip architecture design and their different topologies. Section III presents the proposed architecture and its design with a switch-by-switch interconnection scheme that can support a backtracking path-setup and a source-synchronous wave pipeline transmission of the data. Section IV. Finally, the conclusion and discussion for further research are given in Section V.

II. BACKGROUND

A. NOC Architecture

The function of an on-chip network is to deliver messages from source node to destination node and there exist many design alternatives to accomplish this job. Depending on the application requirements, how to choose suitable network architecture



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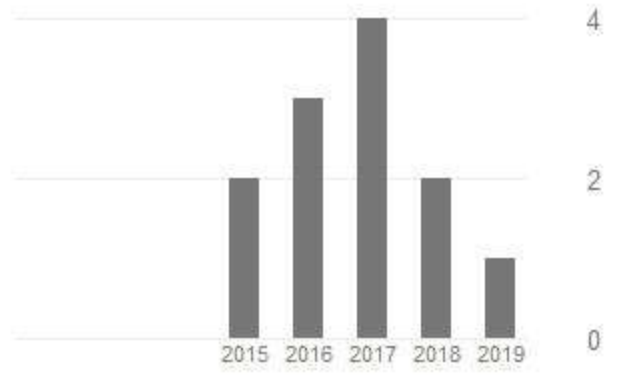
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N. Sivarajasekar^a, N. Mohanraj^b, S. Sivamani^c, J. Prakash Maran^d, I. Ganesh Moorthy^e, K. Balasubramani^f

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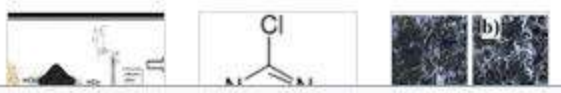
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- 2. Materials and methods
- 3. Results and discussions
- 4. Conclusions

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Journal of Molecular Liquids

Volume 241, September 2017, Pages 823-830

Full-screen Snap



Fixed-bed adsorption of atrazine onto microwave irradiated *Aegle marmelos* Correa fruit shell: Statistical optimization, process design and breakthrough modeling

N. Sivarajasekar^a, K. Balasubramani^b, N. Mohanraj^c, J. Prakash Maran^d, S. Sivamani^e, P. Ajmal Koya^f, V. Karthik^g

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DESIGN CONSIDERATION OF MOUNDED STORAGE VESSEL

S.Venkatesh Babu¹, Ajith .U²

Abstract -Pressure vessels are designed for many applications in Industrial, automobile, aeronautical, aerospace, chemical sectors and many more. They are specially designed to be light in weight and high in strength in order to meet the requirements of the market demands. In this paper we are going to analyse the design and considerations of the Mounded storage vessels. Designing process involves the determination of pressure and temperature of the pressure vessels that is whenever the pressure and temperature of the vessel changes it is considered as a new design. Hence the stress and thermal analysis of each vessel is carried out very carefully and designed in order to be very reliable and constant across the time. Design considerations are made using the PV Elite software and the standards are checked against the American Society of Mechanical Engineering (SEC VIII. DIV-2). For analysis variable pressure and temperature ranges are considered. To improve the lifetime of the pressure vessel fatigue analysis is also done in this consideration.

Keywords: Design, pressure vessel, ASME SEC.VIII, Pressure, stress, LPG Storage vessel.

1. INTRODUCTION

Pressure vessels have their extensive usage from the Industrial application to day to day life usages to store Liquefied gasses. A suitable temperature and pressure is maintained for the long term storage without any adverse effects of leaking and bursting. Hence these vessels are installed above the ground water level and the soil is used to cover them as a protective layer. This structure appears to be an soil mound, thereby they got their term as "Mounded Storage". While considering the design factor safety standards also plays a vital role to ensure the safe operation of the vessel. Their physical appearance are described as large cylindrical vessels built of steel with the curved ends buried inside a mound. There can be several tanks set beside in a single mound. The mound is completely sealed with the soil and only a dome or a manhole extend beyond the covered surface. For draining the gasses the vessels are sloped inside the mound at an angle of 1:200 min.

These containers are subjected to pressure both internally and externally. The liquefied gas stored inside reacts with the varying temperature and pressure as in boiler unit or sometimes they react with other chemicals in the plant. Hence high pressure has to be maintained in order to prevent the disasters. American Society of Mechanical Engineering (SEC VIII. DIV-2) is used to design the code for the construction of pressure vessel with the stress theory. According to this theory the thickness of the vessel increases with the pressure maintained. Hence for maximum pressure the thickness of the vessel should be increased. This increase in thickness limits the fabrication design of the metal used for construction. Mild steel with high ductile and low brittle properties is used for this purpose. Improper design consideration of the fabrication metal, wrong figures in the design data, improper design methods or insufficient testing leads to the failure of the storage tanks ending up in collateral damage. Hence to ensure the safe and fair operations design considerations are made carefully.

2. DESIGN CONSIDERATION OF PRESSURE VESSELS

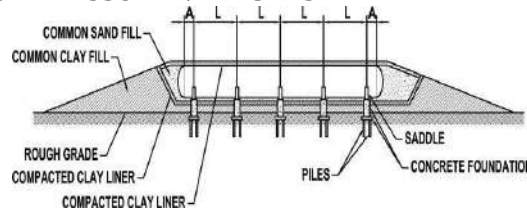


Fig.1.Mounded Storage Vessel

Fig.1. Shows the structure of the mounded storage vessel. The code for testing and design was approved either by PD-5500 or ASME SEC.VIII or equivalent. The considerations are made in specific to the following.

- Internal vapour and hydraulic pressure
- External loadings on the vessel
- Internal vacuum

¹ Professor, Département of Petr oléum Engineering, JCT College of Engineering & Technology Pichanur Coimbatore Tamilnadu.

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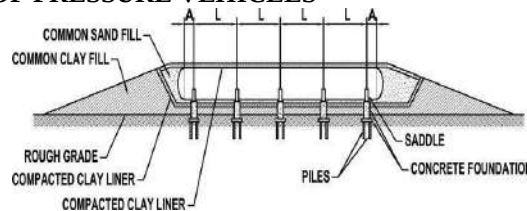


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RECOVERY OF PROPYLENE FROM LPG

Dr. S.Venkatesh Babu¹, Dr. G.Ramesh²

Abstract- LPG consists of an propylene, butylenes and many other hydro carbon mixtures. The allowable quantity of propylene in LPG is about 5%. Though Propylene has many adverse effects it is used as feedstock for many reactors and used as light power fuel. LPG is a form of natural gas which has rich portion of propylene in it. on demand necessity of lighter power fuel in the market demands for the more propylene supply. This paper reveals the promising removal technology of propylene from the LPG. Distillation and catalyst hydrogenation technologies are used for the separation of propylene from the hydrocarbons. But the later was costly when compared to the former. In our proposed technology cost effective methods are used for the same purpose. From our method about 95% pure propylene is being obtained.

Keywords: LPG, cumene, C3-C4 splitter, centrifugal pump, propylene.

1. INTRODUCTION

Liquefied petroleum gas commonly known as LPG are being a part of the day to day life since the last two decades. LPG consists of propylene, butylenes and many other hydrocarbons. They are also simply called as propane. Other than being used as cooking equipment they are also used as fuel, aerosol propellant, refrigerant, etc.

There is a maximum allowable limitation of 5% of propylene in the LPG. But due to the adulteration in LPG the propylene level is being raised in order to obtain the high profit in the propane fuel market.

Propylene also known as methyl ethylene is an fossil fuel and also comes as an by product during refining and processing of crude oil and natural gas. Hydrocarbons are cracked to give many other by products including propylene. Since hydrocarbons are much needed source of energy propylene is higher in demand in fuel market. Other than cracking of hydrocarbons propylene are also produced by other chemical methods like fractional distillation and refining. The propene obtained by this method is about 60-70%. Switching to Light steam cracking feedstocks with low propene has over taken the gasoline usage which causes the propylene to emerge as a in-demand product in the market there by increasing its production in a noticeable level.

2. PROPYLENEPRODUCING

2.1 Methods

2.1.1.Olefin Metathesis

Olefin metathesis, is an disproportionation method which involves the bond breakage between ethylene and butenes which are then reversed to produce propylene. Propylene produced by this method is about 90% in molecular weightage. This process is used as an optional when there is shortage of butene feedstock. Here ethylene is inputted to the ethylene-dimerization unit which outputs butene.

2.2. Dehydrogenation

In this method the propane is converted into propene by the removal of hydrogen molecules and the hydrogen is given as an by-product. The propene produced by this method is about 85% in molecular weightage. The by-products obtained from this method are used as fuel for this method itself thereby downsizing the external fuel requirement.

Many dehydrogenation plants are being constructed around the world for the production of propene. There are many techniques to produce the propene by this method. The differences in each method will be the reactor design, catalyst used and the conversion rates. So far five technologies has been identified and licensed.

3. FLUID CATALYTIC CRACKING

Fluid catalytic cracking (FCC) method uses traditional cracking technique under severe compressed conditions such as keeping high steam rate, high ratio of catalyst to oil under high temperature. These conditions are maintained so as to increase the amount of propylene produced. This unit is fed with the paraffin residue inputs to produce propylene weighting about 20-25 mol % also byproducing the gasoline.

In this technology large Olefins molecules (C4-C8) are cracked by the catalytic action so as to produce more propene and ethylene in fewer amount.

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RESEARCH ARTICLE

GROWTH AND CHARACTERIZATION - ORGANIC METAL CRYSTAL OF TETRAMETHYL AMMONIUM CADMIUM IODIDE

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Dielectric, Micro hardness.

ABSTRACT

The new organo-metallic crystal of tetramethyl ammonium cadmium iodide (TMACI) was grown by slow evaporation technique at room temperature. Crystal structure, lattice parameters and grain size were found using powder XRD technique. To confirm the functional group present in the synthesized grown crystal by FTIR analysis. Absorption spectra and transmittance spectra of the synthesized crystal were studied by UV-VIS method. Surface morphology was analysed by Scanning electron microscope. Dielectric constant is exponentially decreased with increase of frequency is observed by dielectric study.

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INTRODUCTION

Organic materials with delocalization of electron through conjugated electron systems have been gained considerable attention for chemists, optical physicists, material scientists; because of their excellent performance such as large NLO efficiency, ultra fast nonlinear response time, high optical damage (Zhang, 1994; Aggarwal, 1999; Dongfeng Xue, 1999; Arulchakkaravarthi, 2004; Gupta, 2001; Singh, 1993 and Meenatchi, 2014). Organo metal offers a huge variety of metals with distinctive oxidation states and ligands which could used in optoelectronic application. These non centro symmetric structures may be engineered by using ligands in complex metal centre. They have the general formula $[(CH_3)_4N] MX_3$ ($M=Cd, Zn, Mn, Mg$) ($X=Cl, Br, I$) at room temperature with hexagonal structure (Wang, 2010 and Breezewski, 2001) and possess large number of attractive properties such as optical window, good thermal stability and higher laser damage threshold (Perumal, 2016). Organo-metallic coordination compounds have attracted, because of their functionality of mixing the advantage of both organic and inorganic materials (Boopathi, 2015). The present work, deals with the tetramethyl ammonium cadmium iodide (TMACI) crystal was grown at slow evaporation method. The structural, spectral, optical and electric properties of the grown crystal was studied.

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EXPERIMENTAL METHODS

Crystal Growth: Tetramethyl ammonium cadmium iodide TMACI crystal was prepared by 2:1 ratio of tetramethyl ammonium and cadmium iodide salts, at room temperature by slow evaporation technique. The above two salts were mixed homogeneously with 20ml of water. The prepared solution was stirred using magnetic stirrer at room temperature. The saturated solution was transferred to a beaker with a whatman filter paper. The above prepared solution was kept at room temperature without any mechanical disturbance and free of dust particles with the period of 10-15 days, finally colourless transparent crystal harvested, and it in Figure (1). Among them, a few defect and good quality seed crystals were selected for recrystallization.

Characterization Method

The tetramethyl ammonium cadmium iodide TMACI crystal was subjected to powder X-ray diffraction (PXRD) using Enrof NORNUS cad 4 X ray diffractometer with $CuK\alpha$ radiation, to detect the lattice parameter and crystal system. The crushed powder sample was scanned over the 2θ range of 10° - 70° at a rate of $1^\circ/\text{min}$. FTIR spectrum of grown crystal TMACI was recorded in the range 4000 to 500 cm^{-1} using Bruker 66v FTIR spectrometer by KBr pellet technique. The UV-VIS absorption spectrum was recorded in the range of 200 to 1100nm. The scanning electron microscope (SEM) studies carried out using MODEL JSM – 6390LV. Dielectric studies on the grown crystal was carried out using a numeric Q impedance analyzer in the frequency range 50 HZ to 5MHz.



BIODEGRADABLE POLYMERS FOR SUSTAINABLE PACKAGING APPLICATIONS

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ABSTRACT

Stable life offered by the synthetic plastic and their nonrenewable source results in waste disposal and environmental pollution. Bio degradable plastics can be obtained from various combinations of agricultural biology and micro biology. Starch, cellulose based bio degradable waste plastics would exchange with the nonrenewable plastics with lots of comparable packaging properties. Packaging industries have large applications and need in this field. Shelf life improving characters is needed by food packaging industries while high mechanical properties is needed in industrial packaging in order to resist mechanical damaging. In this paper we have discussed about the suitability factors and emerging techniques that are involved in improving packaging properties of bio plastics.

Keyword: Biodegradability, Bioplastic, Packaging, Starch, Sustainability

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Biodegradable Polymers for Sustainable Packaging Applications, International Journal
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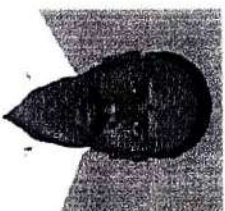
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1. INTRODUCTION

Packaging is one of the processes where the container or wrappers for the product are been designed and produced. It is one of the active tools for promoting and attracting the consumers to buy the products. The product should be very protective, handling and storage of the product should be easy, security and usability should be safe for handling etc. Packaging is done to in order to protect the products from impairment, impurities, drip, stealing things, vaporization, and contamination. Contents in the products can also be

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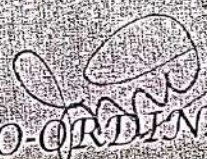
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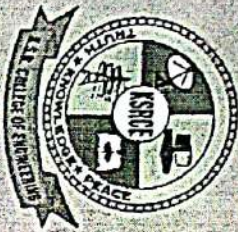
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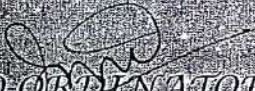
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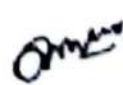
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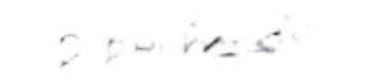
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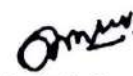
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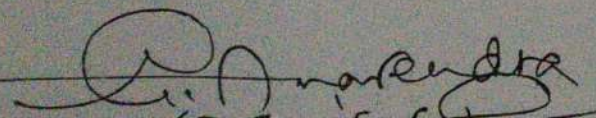


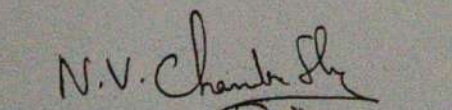
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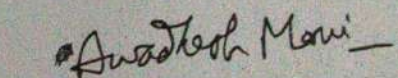


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Strengthening of Reinforced Concrete Beam using Glass Fiber Reinforced Polymer Composites

Nibin.M¹, Prof. A.Kumar²

P.G Student¹, Head of the Department²

Department of Civil Engineering

JCT College of Engineering and Technology, Pichanur, Coimbatore, India¹

Abstract:

Concrete is a composite material which is weak in tension and is often affected by cracking and scaling which are connected to plastic and hardened states and drying shrinkage. Worldwide a great deal of research is currently being conducted concerning the use of fiber laminates and sheets in the repair and strengthening of reinforced concrete members. Fiber-reinforced polymer (FRP) application is very effective way to repair and strengthen structures that have become structurally weak over their life span. FRP repair systems provide an economically viable alternative to traditional repair system and materials. In this paper Experimental investigations done on the behavior of the concrete strengthened using discontinuous chopped glass fiber are carried out with concrete mix of two different length of glass fiber (6mm and 12mm) at various percentage (0.25%, 0.50%, 0.75%) amount of addition by the total weight of concrete. Experimental data on load for compression, tensile and flexural tests have been carried out, strength variations and failure modes of each specimen were obtained.

Keywords: Compressive Strength Split Tensile Strength, Flexural Strength, Glass Fiber Mix, Optimum Value, Stiffness and Strength.

I. INTRODUCTION

The present day world is witnessing the construction of very challenging and difficult civil engineering structures. Quite often, concrete being the most important and widely used material is called upon to possess very high strength and sufficient workability properties. Efforts are being made in the field of concrete technology to develop such concretes with special characteristics. Researchers all over the world are attempting to develop high performance concretes by using fibers and other admixtures in concrete up to certain proportions. Many studies have shown that the mechanical properties of concrete can increase dramatically (by more than an order of magnitude) with the addition of fibers individually. This chapter deals with the details regarding the review of literature on studies pertaining to mechanical properties of glass fiber reinforced concrete

compressive, split tensile and flexural strength tests. It has been analyzed that the glass fiber addition to the concrete has the ability to improve the compressive strength at its 0.5% fiber addition, but the split tensile and flexural strength has achieved the maximum strength at its 1% of addition. , Since we know that the glass fiber has good water absorption capacity

III. MATERIALS

Cement: Ordinary Portland cement 53 grade was used for the experimental programme. It was tested for its physical properties in accordance with IS standards.

Fine Aggregates: The fine aggregates used for experimental programme was obtained from bed of river. The fine aggregates used passed through 4.75mm sieve and had a specific gravity of 2.68. The fine aggregates belonged to Zone II according to IS 383.

Coarse Aggregates: The coarse aggregates used were non-reactive and as per the requirements to produce a good and durable concrete. The coarse aggregates were of two different grading and as such a definite mix proportion was used to obtain the desired grading for coarse aggregates. One grade has maximum size of 12.5mm and minimum 10mm and for the other the maximum size was 20mm and minimum 12.5mm. This combination was used for casting cubes, cylinders and prisms. This is done to avoid the bleeding effect of concrete mix.

Water: Ordinary tap water which is safe and potable for drinking and washing was used for producing the concrete.

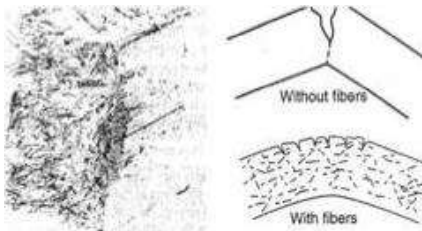


Figure. 1: Effects of fiber

II. LITERATURE SURVEY

Presently many experimental investigations are having been carried out with the addition of glass fibers of various type, composition and thickness. The testing involves the

An Experimental study on Effect of Square Slab using Rice Husk Ash and Glass Fibre on properties of Cement with partial replacement of Fine Aggregate by Quarry Dust

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Abstract: Fibre reinforced concrete is a composite material consisting of mixing of cements, fine aggregate, coarse aggregate and fibres. The fibre reinforced concrete exhibits better fatigue strength and increased static and dynamic tensile strength and compressive strength. In this project, the strength of fibre reinforced concrete was investigated partial replacement of cement with Rice Husk Ash and fine aggregate with quarry dust. Glass fibre was added in the order of 0.25% and 0.5% by weight of cement. Rice Husk Ash used to replace Ordinary Portland Cement by 10%, 20%, and 30% by weight of cement proportions. Quarry dust was used as partial replacement of fine aggregate by 20%.

Keywords: Compression strength, Tensile strength, Rice Husk Ash, Quarry dust and Glass fibre.

1 INTRODUCTION

Glass fibre reinforced cement (GRF) is a material made of a cementite's matrix composed of cement, sand, water and admixtures, in which short length glass fibre are dispersed. It has been widely used in the construction industry for many advantages such as, being light weight, fire resistance, good appearance and strength. Various application of GFRG shown in the study of the experimental test results, techno-economic comparison with other types, as well as the financial calculations presented, indicates the tremendous potential of GFRG as an alternative construction material.

2 OBJECTIVES

To determine the properties of Rice Husk Ash (RHA), Glass fibre and Quarry dust. To find the effect of Rice Husk Ash (RHA) on concrete by replacement of cement. To determine the behaviour of concrete produced from cement with combination of Rice Husk Ash (RHA), fine aggregate of Quarry dust and Glass Fibre at different properties. To determine the mechanical properties of concrete such as compressive strength, split tensile strength and flexural strength.

3 MIX PROPORTION

The mix ratio of the conventional M40 grade concrete by weight is arrived from IS code method (Ads per IS 10262:2009)

Table 1: Mix Proportion

Cement	431.82 kg/m ³
Water	190 kg/m ³
Fine Aggregate	696.8 kg/m ³
Coarse Aggregate	1045.2 kg/m ³
Water/cement ratio	0.44

Table 2: Mix Proportion for replacement materials

100% Cement	431.82 kg/m ³
10% RHA	43.2 kg/m ³
20%RHA	86.3 kg/m ³
30%RHA	129.5 kg/m ³
Water	190 kg/m ³
Remaining 80% Fine Aggregate	557.44 kg/m ³
Coarse Aggregate	1045.2 kg/m ³
0.25% Glass Fibre	1.079 kg/m ³
0.5% Glass Fibre	2.159 kg/m ³

4 EXPERIMENTAL INVESTIGATION

For any successful investigation, numerous tests have to be performed and the trend of result should be studied carefully before arriving at the final conclusion. To have reliable results from the tests experimental set up and testing procedure are required. The various tests to be performed for the investigation on the present topic are as follows, 1. Compression test on cube 2. Split tensile test on cylinder 3. Flexural test on prism 4. Flexural test on square slab.



An Experimental Study on Effect of Rice Husk Ash and Glass Fibre on Properties of Cement with Partial Replacement of Fine Aggregate by Quarry Dust

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Post Graduate Student¹, Assistant Professor²

Department of Civil Engineering

JCT College of Engineering and Technology, Pichanur, Coimbatore, Tamilnadu, India

Abstract:

Fiber reinforced concrete is a composite material consisting of mixtures of cement, fine aggregate, coarse aggregate and fibers. The fiber reinforced concrete exhibits better fatigue strength and increased static and dynamic tensile strength and compressive strength. In this project, the strength of fiber reinforced concrete was investigated partial replacement of cement with rice husk ash and fine aggregate with quarry dust. Glass fiber was added in the order of 0.25% and 0.5% by weight of cement. Rice husk ash was used to replace Ordinary Portland Cement by 10%, 20% and 30% by weight of cement proportions. Quarry dust was used as partial replacement of fine aggregate by 20%.

Keywords: Compressive strength, tensile strength, Rice husk ash, Quarry dust and Glass fiber.

TABLE. 1. MIX PROPORTION

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I. INTRODUCTION

Glass fiber reinforced concrete (GRF) is a material made of a cementite's matrix composed of cement, sand, water and admixtures, in which short length glass fiber are dispersed. It has been widely used in the construction industry for many advantages, such as being light weight, fire resistance, good appearance and strength. Various application of GFRC shown in the study of the experimental test results, techno-economic comparison with other types, as well as the financial calculations presented, indicate the tremendous potential of GFRC as an alternative construction material. The need to reduce the high cost of Ordinary Portland Cement in order to provide accommodation for the population has intensified research into the use of some locally available material that could be used as partial replacement for Ordinary Portland Cement (OPC) in Civil Engineering and Building Works. Supplementary cementite's materials have been proven to be effective in meeting most of the requirements of durable concrete and blended cements are now used in many parts of the world (Baker, Putrajaya and Abdulaziz, 2010).

II. OBJECTS

To determine the properties of Rice Husk Ash (RHA), Glass fiber and Quarry Dust. To find the effect of Rice Husk Ash (RHA) on concrete by replacement of cement. To determine the behaviour of concrete produced from cement with combination of Rice Husk Ash (RHA), Fine Aggregate of Quarry Dust and Glass Fiber at different proportions. To

determine the mechanical properties of concrete such as compressive strength, split tensile strength and flexural strength.

III. MIX PROPORTION

The mix ratio of the conventional M40 grade concrete by weight is arrived from IS code method (As per IS 10262:2009).

TABLE.2: MIX PROPORTION FOR REPLACEMENT MATERIAL

100% Cement	431.8 kg/m ³
10% RHA	43.2 kg/m ³
20% RHA	86.3 kg/m ³
30% RHA	129.5 kg/m ³
Water	190 kg/m ³
Remaining 80% Fine aggregate	557.44 kg/m ³
Coarse aggregate	1045.2 kg/m ³
0.25% Glass fiber	1.0795 kg/m ³
0.5% Glass fiber	2.159 kg/m ³

IV. EXPERIMENTAL INVESTIGATION

For any successful investigation, numerous tests have to be performed and the trend of result should be studied carefully before arriving at the final conclusions. To have reliable result from the tests experimental set up and testing procedure are required. The various tests to be performed for the investigations on the present topic are as follows. 1. Compression test on cubes 2. Split Tensile test on cylinders 3. Flexural test on prism.



Experimental Behaviour of Short Column using Coconut Shell Ash, Iron Powder and Steel Fibers to Enhance the Properties of Concrete

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Abstract:

Concrete is a material used in building construction, consisting of a hard chemically inert particulate substance, known as aggregate (usually made for different types of sand and gravel), that is bounded by cement and water. This paper presents an experimental investigation carried out to characterize the optimum percentage of coconut shell ash, iron powder with steel fiber. The concrete industry is constantly looking for supplementary cementations material with the objective of reducing the solid waste disposal problem. Steel fibers are used to increase flexural strength. The use of waste material like coconut shell ash, fly ash, rice husk ash, micro silica, iron powder, granite powder which are hazardous to the environment may be used as a partial replacement for cement and in addition by utilising the industrial wastes in the useful manner the environment pollution is reduced to a greater extent and which leads to sustainable development. The work also focuses on M30 concrete with replacement of cement by CSA with 4%, 8% and 12%, iron powder is kept constant with 10% replacement and 0.75% of constant addition of steel fibers to study the mechanical properties such as compressive, split tensile and flexural strength. This paper presents the results on the structural behaviour of CIS RC column and its comparison with ordinary RC column. The reinforced column size is 100mmx100mmx600mm were prepared to study the structural behaviour. The compressive behaviour of CIS concrete columns has been studied and the results are compared with ordinary RC columns. It has been observed from the experimental investigation of the columns, that the CIS columns also exhibited a lot of cracking, thus the crack width and crack spacing was small. The CIS columns exhibited higher deflection under constant load until failure, compared to ordinary RCC columns.

Key words: Coconut shell ash, Iron Powder, Steel fibers, Waste utilization

I. INTRODUCTION

Concrete is the single most widely used construction material in the world today. Various types of building materials are used during the construction work at different stages according to structural requirements. Coconut shells are considered as light weight aggregate and it should be often dumped as agricultural waste. The aim of this project is to spread awareness of using coconut shell ash as partial replacement of cement in concrete and determine its strength. The water cement ratio is obtained by conducting various workability tests. The obtained results are compared with that of conventional concrete.

II. MATERIALS AND METHOD

The materials used in this project were locally available. Use Ordinary Portland cement (OPC) and coconut shell ash as binding agent, river sand and Iron powder as fine aggregate and addition of hooked end steel fibers are used. Potable tap water was used for mixing and curing.

Cement: The cement used for this study is 53-ordinary portland cement.

S.No	Physical Property	Test Results
1	Specific gravity	3.15
2	Fineness of cement (%)	97
3	Initial setting time	30 mins
4	Final setting time	600 mins

Fine Aggregate: The sand used for all the specimens were Natural river sand. It plays very important role in concrete in both its plastic and hardened state.

S.No	Physical Property	Test Results
1	Specific Gravity	2.74
2	Water Absorption	1
3	Bulk density (kg/m ³)	1600

Coarse Aggregate: Aggregate have large influence on the properties of concrete. Use 20mm size aggregate are used.

S.No	Physical Property	Test Results
1	Specific Gravity	2.74
2	Water Absorption	0.5
3	Bulk density (kg/m ³)	1650

Coconut shell Ash: coconut shells are collected from nearby houses, temples to find out the properties of coconut shell ash

S.No	Physical Property	Test Results
1	Specific Gravity	1.3
2	Fineness (%)	4
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Experimental study on strength behaviour of Square Slab using Steel fiber, Glass fiber, Fly ash and Rice Husk Ash

Athira Omanakuttan¹, Aruna C.²

¹Post Graduate Student, ²Asst.Prof. in Civil Engineering Department, JCT College of Engineering and Technology, Pichanur, Coimbatore, Tamilnadu, India.

Abstract: *Hybrid Fiber-reinforced concrete is a composite material consisting of mixtures of cement, fine aggregate, coarse aggregate, steel fiber and glass fiber. The hybrid fiber reinforced concrete exhibits better fatigue strength and increased static and dynamic tensile strength. In this project, the strength of fiber reinforced concrete was investigated with partial replacement of cement with rice husk ash and fly ash. Steel fiber and Glass fiber was added in the order of 0.25%, 0.5% and 0.75% by volume of concrete and 0.25%, 0.5% by weight of cement. Rice husk ash was used to replace Ordinary Portland Cement by 20% and fly ash 20% by weight of cement proportions.*

Keywords: *Compression strength, Tensile strength, Rice Husk Ash, Quarry dust and Glass fibre.*

1.INTRODUCTION

Hybrid fiber-reinforced concrete is a type of fiber reinforced concrete characterized by its composition. Specifically, it contains at least two or more types of fibers of different sizes, shapes or origins. It is well known that cracking in fresh concrete can be effectively inhibited by glass fibers and that different sizes contribute to different mechanical properties. Considering that fibers of different types have different effects on the properties on fresh and hardened concrete, the use of hybrid fibers allows optimization of the properties of fiber reinforced concrete at all levels. Specific fibers retain their individual effects on the properties of fiber reinforced concrete. Fibre reinforced concrete (FRC) is Portland cement concrete reinforced with more or less randomly distribute fibres. (FRC) is concrete containing fibrous material which increases its structural integrity. So we can define fibre reinforced concrete as a composite material of cement concrete or mortar and discontinuous discrete and uniformly dispersed fibre. The addition of these fibers into concrete mass can dramatically increase the compressive strength, tensile

strength, flexural strength and impact strength of concrete. Steel fibre is one of the most commonly used fibre. Generally round fibres are used. The diameter may vary from 0.25 to 1 mm. Glass fibres have very high tensile strength. In this project, investigating the behavior and flexural strength of hybrid fiber reinforced concrete with partial replacement of cement with Fly ash and Rice husk ash. Two types of fibers such as steel and glass are used. Steel Fibers are added in the order 0.25%, 0.5%, and 0.75% by volume of concrete. Glass fibers are added 0.25% by weight of cement The Fly ash and Rice husk ash substitutes are to be used to replace Ordinary Portland Cement by each 20% by weight of cement proportions. The total replacement level is 40%. Superior properties of concrete can be developed with the help of hybridization concept mainly to increase in flexural strength of concrete. The hybrid fiber reinforced concrete composites specimens are to be tested for mechanical properties and durability related properties. The results are to be compared to the control specimen that contains no fibers and with Cement replacement materials. With the appropriate interpretation of the obtained results, it can be possible to determine the optimum fiber percentage.

2 OBJECTIVES

The hybrid fiber reinforced concrete composites specimens are to be tested for mechanical properties. The results are to be compared to the control specimen that contains with Cement replacement materials and without fibers. Results obtained from this study are expected to contribute to the efforts made to characterize the mechanical properties of hybrid fiber reinforced concrete with the utilization of fly ash and rice husk ash. With the appropriate interpretation of the obtained results, it can be possible to determine the optimum fiber percentage in hybrid fiber reinforced concrete with partial replacement of cement with Fly ash and Rice Husk Ash.

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Strength Studies of Concrete by Partial Replacement of Natural Sand with Manufactured Sand

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ABSTRACT: This paper presents a study conducted to determine the sustainability of partial replacement of sand with manufactured sand in M30 grade of concrete. The first phase is to find the maximum percentage of sand that can be replaced with manufactured sand for M30 grade concrete. Here the concrete mixes containing 40, 50 and 60% sand replacement levels were cast with superplasticizers as admixtures. Compressive strength, split tensile strength and flexural strength tests were conducted in accordance to the existing standards. Arrived results shows that 50% replacement of sand by manufactured sand gave maximum strength. Mix proportioning of concrete mix was worked and arrived as 1:2:3.42

KEYWORDS: Manufactured sand, Fine aggregate, Superplasticizer.

I. INTRODUCTION

Concrete has several characteristics that make it as a versatile and widely used construction material. New developments backed by years of research have provided today's concrete user with a unique, attractive, and practical product. Architects, engineers and builders have used concrete with imagination and skill to create exciting and distinctive structures. The global consumption of natural sand is very high due to the extensive use of it in concrete and mortar. In general, the demand of natural sand is quite high in developing countries to satisfy the rapid infrastructure growth, in this situation developing country like India facing shortage of good quality natural sand. Particularly in India, natural sand deposits are being depleted and causing serious threat to environment as well as the society. Manufactured sand offers viable alternative to natural sand and it is purpose made fine aggregate produced by crushing and screening.

II. MATERIALS

Cement:

Ordinary Portland cement of 53 grade is used in this study. The OPC is classified into three grades, namely 33 grade cement, 43 grade cement & 53 grade cement. Generally use of high grade cements offer many advantages for making stronger concrete. Although they are little costlier than low grade cement, they offer 10-20% savings in cement consumption and offer many other hidden benefits. One of the most important benefits is the faster rate of development of strength.



Carbon Fiber Reinforced Polymer Strengthening Of Reinforced Concrete Beam with Partial Replacement of Msand

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Abstract:

Here the project is supposed to study Carbon fiber reinforced polymer strengthening of Reinforced concrete beam with partial replacement of Msand. De-bonding of carbon fiber reinforced polymers (CFRP) sheets and plates from the concrete substrate is one of the major reasons behind premature failures of beams that are externally strengthened with such CFRP materials. To delay or prevent de-bonding and therefore enhancing the load carrying capacity of strengthened beams, several anchorage systems were developed and used. This paper investigates the use of CFRP mechanical anchorage of CFRP sheets and plates used to externally strengthen reinforced concrete beams under flexure.

Key Words: Manufactured Sand, Fine Aggregate, Super plasticizer, CFRP Sheets.

I.INTRODUCTION

Concrete has several characteristics that make it as a versatile and widely used construction material. New developments backed by years of research have provided today's concrete user with a unique, attractive, and practical product. Architects, engineers, and builders have used concrete with imagination and skill to create exciting and distinctive structures. In the previous study of work the optimum dosage of Manufacturing Sand was carried for M30 grade of concrete. The Manufacturing Sand proportions were added in the percentage of 0%, 25%, 50 It is observed from the study that the maximum strength of concrete is achieved by using 50% of replacement of Fine Aggregate by M sand. Existing reinforced concrete (RC) structures are in severe state of deterioration due to construction faults, carbonation, chloride attack, increase in live load, and corrosion of steel reinforcement. Ageing of RC structures has captured the attention of many researchers to find different materials and techniques to strengthen and retrofit deteriorated structures. The technique of externally strengthening RC slabs and beams in flexure by bonding CFRP plates and sheets to the beam's tensile surface (soffit) via epoxy adhesives had shown a considerable enhancement in the load-carrying capacity and stiffness of the strengthened specimens. Extensive experimental and numerical research studies had been conducted on strengthened RC beams in flexure and the results showed an increase in the flexural capacity of the strengthened beam specimens with CFRP laminates up to 100% over the control unstrengthened specimens when externally bonded to the tensile surface of such beams

in space applications with the combination of excellent performance and characteristic strength.

1.2 M-SAND

It is a substitute of natural river sand for construction purposes, sand produced from hard granite stone by crushing is used. The crushed sand is of cubical shape with grounded edges, washed and graded to as a construction material. The size of manufactured sand (M-Sand) is less than 4.75mm. It can be dust free; the sizes of m-sand can be controlled easily so that it meets the required grading for the given construction

1.3 SUPER PLASTICIZERS (CONPLAST SP430)

CONPLAST SP430 is a high range super plasticizing admixture. It is used in this study to achieve the required workability. The product has been primarily developed for applications in high-performance concrete where the highest durability and performance is required. It is based on Sulphonated Naphthalene Polymers and supplied as a brown liquid instantly dispersible in water. It has been specially formulated to give high water reduction upto 25% without loss of workability or to produce high quality concrete of reduced permeability.

1.4 COARSE AGGREGATE

The material which is retained on 4.75 mm sieve is termed as coarse aggregate. Crushed stones of size 20 mm are used as coarse aggregate. The coarse aggregate used in concrete cube should be hard, durable, clean, cubical, angular, and minimum of flat and elongated particles.

1.5 FINE AGGREGATE

The fine aggregate serve the purpose of filling all the open spaces in between the coarse particles. Thus, it reduces the porosity of the final mass and considerably increases its strength. The material which passes through 4.75 mm sieve is termed as fine aggregate

II.EXPERIMENTAL PROGRAMME

1.MATERIALS

1.1 CARBON FIBRE

Carbon fiber is the most expensive one and more commonly used reinforcement

Assessment of Greenhouse Gases and Parameters using Wireless Sensor Network

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ABSTRACT

Wireless sensor networks carry out cooperative activities due to limited resources and nowadays, the applications of these networks are copious, varied and the applications in agriculture are still budding. One interesting purpose is in environmental monitoring and greenhouse control, where the crop conditions such as weather and soil do not depend on natural agents. To control and observe the environmental factors, sensors and actuators are necessary. Under these conditions, these devices must be used to make a distributed measure, scattering sensors all over the greenhouse using distributed clustering mechanism. This paper reveals an initiative of environmental monitoring and greenhouse control using a sensor network.

Keywords: Sensor, sensor nodes, wireless sensor network (WSN), greenhouse control, environmental monitoring, CO₂ monitoring and distributed clustering.

1. INTRODUCTION

Military applications are very intimately related to the perception of sensor networks. In detail, it is very tough to say whether motes (nodes) were developed because of military and air defence needs or whether they were invented autonomously and were subsequently applied to army services. Regarding military applications, the area of attention ranges from information collection, generally to the enemy tracking or battlefield surveillance [1].

The avoidance of intrusion will be the answer of the defence system. One example project is "A line in the Sand" and refers to the deployment of several nodes which are gifted for detecting metallic objects. The ultimate goal was the tracking and categorization of moving items with metallic content, and specially the tracking of vehicles and weapon-carrying soldiers. Other civilians were uncared by the system. The principle here is to coordinate with a number of this category of sensors in order to keep sensing the moving object, thereby diminishing any information gaps about the track that could arise. Peacetime applications of wireless sensor networks like homeland security, possession-protection, surveillance, border patrol, etc., are the actions that possibly the future sensor network will be taking on.

The ability of a wireless sensor node to sense temperature, light and indoor air pollution could be employed for indoor and outdoor environmental monitoring applications. A chief wastage of energy takes place through needless heating or cooling of buildings. Sensor nodes could be integrated with heaters, fans and other related equipment at an economic way, leading to healthier environment and greater level of comfort for the residents. Other environmental applications are the lessening of fire and earthquake damages. Fire and smoke detections are something widespread today in buildings, and in many countries it is forced by relevant regulations.

Maintaining the faunas in remote areas is one of the vital applications of wireless sensor network. Their lifestyle could be analysed by placing wireless sensor nodes on their bodies.

Their migration in the areas where human intervention is merely impossible could be analysed and steps could be taken for their conservation. These sensor nodes will be grouped into dynamic clusters, and the collected information will be sent to the distantly located monitoring station. Management of precious assets like equipment, machinery and diverse stock or products could be predicament. The difficulty is extremely distributed as these companies increase all over the globe. A gifted technique to achieve asset tracking and cope with this crisis is believed to be with the employment of wireless sensor network.

The application [2] of wireless sensors in petroleum bunks refer to the storage supervision of barrels. The concept is that, the sensor nodes attached to these barrels will be able to position the nearby objects, detecting their content and alerting in case of impropriety with their own, etc. Healthcare systems can also profit from the use of wireless sensors. Applications in this group comprise of tele-monitoring human physiological data, monitoring of patients within the hospital, monitoring drug administrator in hospitals, etc. Cognitive disorders possibly leading to Alzheimer's could be monitored and controlled at their premature stages with these wireless sensors. The nodes can be used to outline the recent actions, and thus remind the senior citizens, point out the person's real actions or detect a growing problem.

A comparable approach employs Radio Frequency Identification (RFID) tags to examine the patient behaviour and customs by recording the frequency with which they touch particular objects. These applications include a display which will assist the care-giver with the exact information about the indisposed person unnoticeably and without hurting their mental feelings. Sensor nodes can also be used in order to study the behaviour of young children. The association of both static and mobile networks is accomplished with the help of mobile robots, which discovers the environment and deploys motes that operate as beacons. The beacons help the robots to explain the directions. The mobile robots can act as gateways into wireless sensor network. Examples of such

Enhanced Hybrid Clustering Scheme for Dense Wireless Sensor Networks

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ABSTRACT

Every cluster comprise of a leader which is known as cluster head. The cluster head will be chosen by the sensor nodes in the individual cluster or be pre-assigned by the user. The main advantages of clustering are the transmission of aggregated data to the base station, offers scalability for huge number of nodes and trims down energy consumption. Fundamentally, clustering could be classified into centralized clustering, distributed clustering and hybrid clustering. In centralized clustering, the cluster head is fixed. The rest of the nodes in the cluster act as member nodes. In distributed clustering, the cluster head is not fixed. The cluster head keeps on shifting form node to node within the cluster on the basis of some parameters. Hybrid clustering is the combination of both centralized clustering and distributed clustering mechanisms. This paper gives a brief overview on clustering process in wireless sensor networks. A research on the well evaluated distributed clustering algorithm Low Energy Adaptive Clustering Hierarchy (LEACH) and its followers are portrayed artistically. To overcome the drawbacks of these existing algorithms a hybrid distributed clustering model has been proposed for attaining energy efficiency to a larger scale.

Keywords: Wireless sensor network (WSN), distributed clustering algorithm, coverage based clustering, energy efficiency and network lifetime.

1. INTRODUCTION

A data repository or storage service is available at the gateway, in addition to data logging at each sensor. The repository may serve as an intermediary between the users and sensors thereby providing persistent data storage. Additionally, one or more data storage devices are attached to the IP network to archive the sensor data from a number of edge sensor networks. One of the major advantages of wireless sensor network is their ability to operate in unattended, harsh environments in which existing human-in-the-loop monitoring schemes are uncertain, inefficient and sometimes impossible. Therefore, wireless sensors are expected to be deployed randomly in the predetermined area of interest by a relatively uncontrolled manner. Given the huge area to be covered, the short lifespan of the battery-operated wireless sensors and the possibility of having damaged sensor nodes during deployment, large population of sensors are expected in the majority of wireless sensor applications. Generally a wireless sensor node consists of low power processor, tiny memory, radio frequency module, various kinds of sensing devices and limited powered batteries which finds applicable in target tracking, environmental monitoring and oceanography (figure 1). Much of energy consumption happens during wireless communications. The energy consumption when transmitting one bit of data equals to several thousands of cycles of CPU operations [1].

Hence the energy efficiency of a wireless communication protocol brutally affects the energy efficiency and lifetime of the network. Many researchers have projected several algorithms for WSNs to improve energy consumption and network lifetime. Since these wireless sensor devices are power-constrained, long-distance communications are not encouraged. Thereby direct communication between the nodes and base station is generally avoided. A proficient way is to arrange the network into several clusters and each

individual cluster has a cluster-head (CH). CH is one of the sensor nodes which is affluent in resources. Sensor nodes send their sensed information to the CH during their respective TDMA time-slots. The CH performs data aggregation process and forwards the aggregated data to base station (BS) [2]. Clustering follows some advantages like network scalability, localizing route setup within the cluster, uses communication bandwidth efficiently and makes best use of network lifetime. Since clustering uses the mechanism of data aggregation, unnecessary communication between the sensor nodes, CH and BS is avoided. In this paper, a model of distributed clustering algorithm is proposed which is based degree of capacity (DOC) of a node within a cluster. The DOC of a node is the combination of three parameters: the number of tasks assigned to a particular node, remaining energy and coverage with neighboring nodes. The node with highest DOC is selected as a CH for the current round. The primary objective of the proposed algorithm is to attain energy efficiency and extended network lifetime.

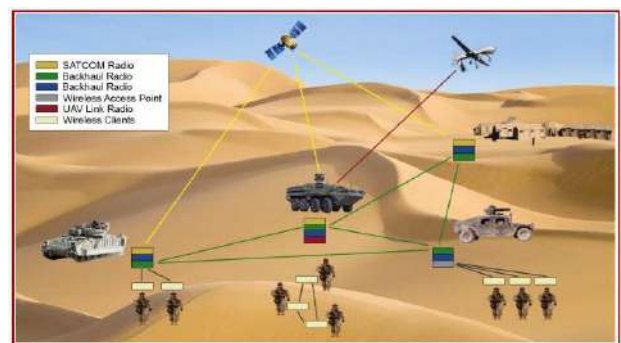


Fig.1. Military application of WSN

The rest of this paper is organized as follows. A review of existing distributed clustering algorithms is discussed in Section 2. An evaluation of LEACH and its followers are elaborated in Section 3. Section 4 sketches a model of the

Evaluation of Scalable and Effectual Clustering Architecture for Dense Wireless Sensor Networks

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ABSTRACT

One of the characteristic feature of WSNs compared to the traditional wireless communication networks, is the power awareness, due to the fact that the batteries of the sensor nodes have restricted lifetime and are difficult to be replaced. This is why we focus on power awareness, while the traditional wireless networks mainly focuses on the QOS. A typical sensor node consumes most of its energy during communication. However, energy expenditure takes place while performing sensing and data processing too. This work suggests the development of an advanced hierarchical routing technique, which gives improved performance over the existing techniques. Power consumption is highly reduced, thereby greatly reducing the cost of network and hence the lifetime of nodes can be greatly improved.

INTRODUCTION

WSNs consist of hundreds of even thousands of sensor nodes which may be sparsely distributed in remote locations. Thus, it becomes infeasible to recharge or replace the dead batteries of the nodes. As soon as, some of the sensor nodes in a WSN [1-2] run out of energy, they stop functioning causing progressive deconstruction of the network. Therefore, one of the most stringent limitations that the development of a WSN faces, is that of power consumption. Hence each and every protocols should be so designed, that minimum energy should be consumed during sensing, processing and communication

Three layers are involved in the functioning of a WSN. Physical and data link layers, of the protocol stack deals with energy awareness, radio communication hardware, low duty cycle issues, system partitioning and energy aware MAC protocols. At the Network layer, of the protocol stack, the main aim is to find ways for energy efficient route setup and reliable data transmission from the sensor nodes to the base station in order to prolong the overall network lifetime as much as possible. The routing protocols proposed have is the Hierarchical routing protocols. The main idea is that, every sensor node with in a WSN is grouped along with some other of its neighboring nodes so as to constitute a specific cluster. Data collected by the sensor nodes are not directly transmitted to the Base station. Instead, a node of the cluster called Cluster head, collects these data and forwards them to the base station after possibly having performed appropriate data aggregation. The major hierarchical routing algorithms [3] for sensor networks are LEACH, TEEN and SHPER.

The initial step in the generation of LEACH (Low Energy Adaptive clustering of Hierarchy), is the formation of clusters. More precisely, each sensor nodes decides whether or not to become the cluster head for the current round. The decision is based on the priority and also on the number to time the node has been a cluster head so far. The cluster nodes collect the data and send them to the cluster head. The radio to each cluster nodes can be turned off when there is no sensing

takes place. When all the data have been received the cluster head aggregates the data in to a single composite signal. The composite signal is sent to the base station.

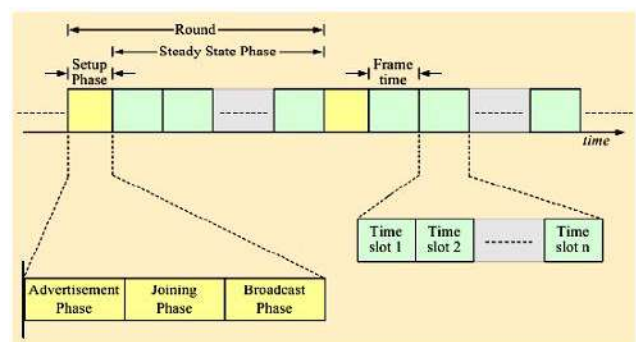


Figure 1: Time line of LEACH protocol

In case of TEEN (Threshold sensitive Energy Efficient Network) protocol, the initial stage is the formation of clusters. In this mechanism each cluster member nodes becomes cluster head for a time interval called cluster period.

$$T(n) = \begin{cases} \frac{P}{1 - p \times (r \bmod \frac{1}{p})} & \text{if } n \in G \\ 0 & \text{otherwise} \end{cases} \quad (1)$$

The SHPER (Scaling Hierarchical Power efficient Routing) protocol includes base station and sensor nodes which are randomly distributed over a bounded area of interest. Both the Base station and sensor nodes are found to be stationary. The end users can access the data from the base station, which is located far away from the sensor field. All the cluster nodes are grouped in to cluster. Within each cluster, one of the cluster nodes is elected to be the cluster head. The election of cluster heads in SHPER is based purely on the residual energy. The cluster heads that are nearer to the base station, that can communicate with the base station with reasonable power consumption is considered to the highest level cluster head. Similarly, the cluster head which is located far away

Evaluation of Scalable and Effectual Clustering Architecture for Dense Wireless Sensor Networks

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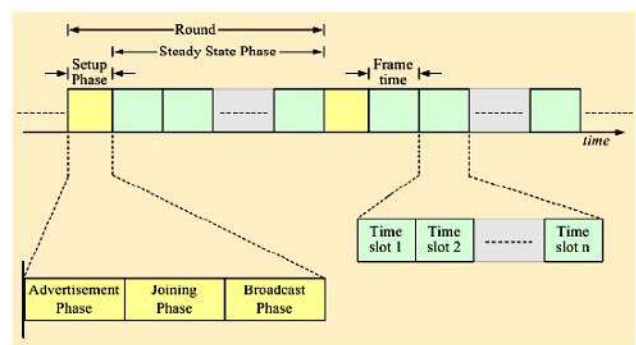


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Novel Approach based Smart Grid Involved in Energy Consumption using Signal Transmission

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Abstract— The objective of this deliverable is to explore several cases for smart grid in the ICT point of view and identify necessities and architectural consideration. There is a use case for demand response signal generation for scheming home appliances. Electricity service provider's operating system makes several of DR (Demand Response) signals that is generated by multiplication of individual CBL (Customer Baseline Load) in lieu of the customer's electricity usage patterns and dynamic pricing from power exchanges. And DR signals in the operating system are transmitted to the gateway in customer houses. DR signal pass to the consumer electronics and appliances. Power consumption of appliances varies depending on DR signal.

Key words: Smart Grid, Networks, Wireless Technologies

I. INTRODUCTION

In the 20th century local grids grew over time, and were eventually interconnected for economic and reliability reasons. By the 1960s, the electric grids of developed countries had become very large, mature and highly interconnected, with thousands of 'central' generation power stations delivering power to major load centre's via high capacity power lines which were then branched and divided to provide power to smaller industrial and domestic users over the entire supply area. The topology of the 1960s grid was a result of the strong economies of scale: large coal-, gas- and oil-fired power stations in the 1 GW (1000 MW) to 3 GW scale are still found to be cost-effective, due to efficiency-boosting features that can be cost effective only when the stations become very large. Power stations were located strategically to be close to fossil fuel reserves (either the mines or wells themselves, or else close to rail, road or port supply lines). Sitting of hydro-electric dams in mountain areas also strongly influenced the structure of the emerging grid. Nuclear power plants were cited for availability of cooling water. Finally, fossil fuel-fired power stations were initially very pollute and were cited as far as economically possible from population centers once electricity sharing networks permitted it. By the late 1960s, the electricity grid reached the overwhelming majority of the population of developed countries, with only outlying regional areas remaining 'off-grid'. Metering of electricity consumption was necessary on a per-user basis in order to allow appropriate billing according to the (highly variable) level of consumption of different users. Because of limited data collection and processing capability during the period of growth of the grid, fixed-tariff arrangements were commonly put in place, as well as dual-tariff arrangements where night-time power was charged at a lower rate than daytime power. The motivation for dual-tariff arrangements was the lower night-time demand. Dual tariffs made possible the use of low-cost night-time electrical power in

applications such as the maintaining of 'heat banks' which served to 'smooth out' the daily demand, and reduce the number of turbines that needed to be turned off overnight, thereby improving the utilization and profitability of the generation and transmission facilities. The metering capabilities of the 1960s grid meant technological limitations on the degree to which price signals could be propagated through the system. During the 1970s to the 1990s, growing demand led to increasing numbers of power stations. In some areas, supply of electricity, especially at peak times, could not keep up with this demand, resulting in poor power quality including blackouts, power cuts, and brownouts. Increasingly, electricity was depended on for industry, heating, communication, lighting, and entertainment, and consumers demanded ever higher levels of reliability. Towards the end of the 20th century, electricity demand patterns were established: domestic heating and air-conditioning led to daily peaks in demand that were met by an array of 'peaking power generators' that would only be turned on for short periods each day. The relatively low utilization of these peaking generators (commonly, gas turbines were used due to their relatively lower capital cost and faster start-up times), as one with the necessary redundancy in the electricity grid, resulted in high costs to the electricity companies, which were passed on in the form of increased tariffs. In the 21st century, some developing countries like China, India, and Brazil were seen as pioneers of smart grid deployment.[7]

II. RECONSTRUCTION OPPORTUNITIES

Since the early 21st century, opportunities to take advantage of improvements in electronic communication technology to resolve the limitations and costs of the electrical grid have become apparent. Technological limitations on metering no longer force peak power prices to be averaged out and passed on to all consumers equally. In parallel, growing concerns over environmental damage from fossil-fired power stations has led to a desire to use large amounts of renewable energy. Dominant forms such as wind power and solar power are highly variable, and so the need for more sophisticated control systems became apparent, to facilitate the connection of sources to the otherwise highly controllable grid.[8] Power from photovoltaic cells (and to a lesser extent wind turbines) has also, significantly, called into question the imperative for large, centralized power stations. The rapidly falling costs point to a major change from the centralized grid topology to one that is highly distributed, with power being both generated and consumed right at the limits of the grid. Finally, growing concern over terrorist attack in some countries has led to calls for a more robust energy grid that is less dependent on centralized

Energy Saving From Sunlight with Microcontroller Using Proteus Software Design

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Abstract-- This paper focuses on the optimization of the electric energy production by photovoltaic cells through the development of a Dual axis sun-tracking system. The developed tracking system is innovative in relation to the usual sun tracking systems available in the market. In fact, the developed solution has many advantages in relation to similar existing devices, in this paper; a new proteus software design using micro-controller based solar-tracking system is proposed, implemented and tested. The scheme presented here can be operated as independent of the geographical location of the site of setting up. The system checks the position of the sun and controls the movement of a solar panel so that radiation of the sun comes normally to the surface of the solar panel. The developed-tracking system tracks the sun both in the azimuth as well as in the elevation plane. PC based system monitoring facility is also included in the design. As this system is autonomous regarding the information needed to process the optimal orientation and is intelligent in a way that it performs on-line monitoring of the photovoltaic energy production. An experimental prototype is built and field results have proven the good performance of the developed tracking system.

Keywords-- Elevation, Azimuth, Altitude, LDR, AutoCAD, Sketch Up, Proteus, Arduino Microcontroller.

I. INTRODUCTION

A solar collector or photo-voltaic module receives the maximum solar-radiation when the Sun's rays strike it at right angles. Tilting it from being perpendicular to the Sun will result in less solar energy collection by the collector or the module. Therefore, the optimal tilt angle for a solar energysystem depends on both the site latitude and the application for which it is to be used. Many solar applications mounted either on a fixed rack or on a tracking rack. Fixed collectors or modules producing heat or electricity throughout the year are usually installed and tilted at an angle equal to the latitude of the site in which the collector or module faces directly the Sun. Of course, the optimal position is suitable for the time when the Sun is at midpoint in the sky (i.e. spring and fallseasons). The energy collected by the solar system in both winter and summer is far less due to several reasons such as clouds in winter and temperature scattering in summer in addition to the Suns changing altitude. But nevertheless in such cases, it is desirable that the average yearly collection ofenergy is maximized (i.e. the angle position of the collector or module is adjusted to receive maximum energy). A Sun-tracking mechanism increases the amount of solar energy that can be received by the solar collectors or photovoltaic modules consequently this would result in a higherdaily and annual output power harnessed. The use of a tracking system is more expensive and more complex than fixed mounts: however they can become cost-effective in many cases because they provide more power output throughout the year and in many cases this increase exceeds 25% [1]. Commercially, tracking systems are available either as a single-axis or a dual-axis design. The single-axis tracker

follows the Suns apparent east-to-west movement across the sky, while the dual-axis tracker, in addition to east-west tracking, tilts the solar collector or module to follow the Sun's changing altitude angle. To investigate the improvement in the daily output power of a photo-voltaic module, a single-axis Sun-tracking system is designed based on a programmable logic controlling unit. A suitable controlling program is also developed to accomplish the control operation with the possibility of implementing this arrangement as a data-acquisition system for solar radiation values during daytime.

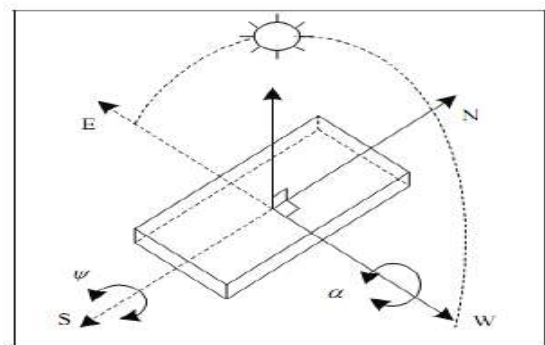


Figure 1: Two axis position control of the solar Panel

Efficient collection of maximum solar irradiation on a flat panel requires adjustments of two parameters of the energy collecting surface namely the angle of azimuth, ψ and the angle of tilt, α , of the surface to be illuminated in Figure 1.

II. THE ORIENTATION PRINCIPLE OF THEPHOTOVOLTAIC PANELS

The orientation principle of the PV panels is based on the input data referring to the position of the sun on the sky dome (fig. 2). For the highest conversion efficiency, the sunrays have to fall normal on the receiver surface so the system must periodically modify its position in order to maintain this relation between the sunrays and the panel. The positions of the Sun on its path along the year represent input data for the design process of the tracking systems.

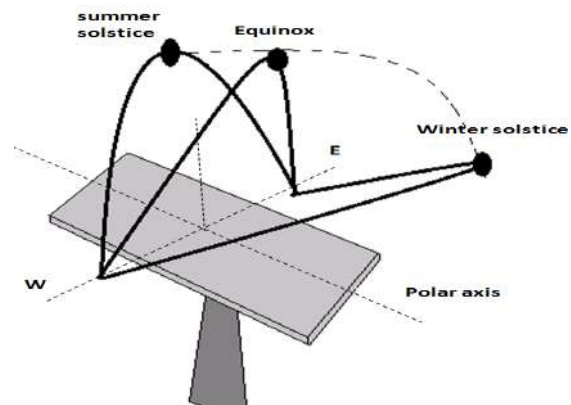


Figure 2: Position of the sun on the sky dome

The Earth describes along the year a rotational motion following an elliptical path around the sun. During one day,

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Single-Phase H-Bridge Cascaded 15-Level Inverter with D-Statcom Capability for Harmonic Reduction

¹Jothish George, ²Madheswari.J and ³Ravivarman.G,

¹UG Scholar, ^{2,3}Assistant Professor,

^{1,2,3}Department of Electrical Engineering, JCT College of Engineering and Technology, Pichanur, Coimbatore, Tamilnadu, India

Abstract— A new single-phase h-bridge cascaded 15-level inverter with D-STATCOM is proposed in this project. It is used for reducing the harmonics, voltage stress, size and loss. This system regulates both reactive and active power. The proposed inverter is located in between the source and distributed energy systems. There are various energy sources which use renewable energy like wind energy, solar energy, biomass etc. Concerning good power quality, minimum total harmonic distortion is one of the most important requirements from the multilevel inverter. This paper presents the minimum total harmonic distortion in h-bridge cascaded 15-level inverter with D-STATCOM capability and also keeping the constant power factor. The developed proposed cascaded topology requires fewer numbers of IGBTs, driver circuits, power diodes, and dc voltage sources than other presented cascaded topologies. The result gives switching strategy, unity power factor, computational time and waveform accuracy have been analysed in MATLAB simulation.

Index Terms—Basic unit, D-STATCOM, H-bridge, cascaded multilevel inverter.

I. INTRODUCTION

The power electronics devices are used for the converting the renewable or non-conventional energy into power grids in the form of voltage and frequency. It eliminates the use of capacitors and FACT device. The main aim of this paper is to supply the active and reactive power. It is impossible to connect a power semiconductor devices to a high-voltage network directly. Therefore, 15 level inverter has been introduced. In proposed system, 15-level inverters used for reducing THD and also improve the PF. This inverter consists of 2 basic modules of 3 dc voltage sources, 5 unidirectional power switches. Total number of switches are 16. Dc-dc converter consists of coupled inductor with a multi-terminal output (multi-winding transformer) of 80V. PI controller consists of a dsPIC33F microcontroller for generating switching pattern. The inverter is able to generate 15 levels by using H-bridge (seven positive levels, seven negative levels, and one zero level) with the maximum amplitude of 600V at the output. Then, to get all positive and negative levels at the output, an H-bridge are going to be accessorial to the present inverter as a result of the projected inverter solely generates positive levels. This inverter is termed the developed proposed cascaded multilevel inverter. In order to get all voltage levels the output, four totally different algorithms are proposed. Several comparisons are also done between the developed cascaded multilevel inverter and its projected algorithms with the standard cascaded inverters. supported these comparisons, the developed cascaded inverter needs the minimum range of power switches, IGBTs, power diodes, driver circuits, and dc voltage sources. Finally, so as to analyse the capability of the developed cascaded inverter to get all voltage levels, the experimental results of a 15-level inverter are used.

In this paper new plan is enforced for single phase renewable supply like wind energy. During this AC transmission system used the FACTS devices for dominant and PF correction purpose or protection of our system and to manage the active and reactive power so that to style and implement the wind energy inverter to flexible AC transmission system with the assistance of fact capability. The most aim of this technique is to eliminate the utilisation of capacitors and FACT devices to PF correction of distribution energy system. The designed electrical converter is placed in between the turbine and therefore the grid same as regular wind energy inverter to manage the active and reactive power of wind to the grid by exploitation this new technique. This desired technique is introduced to extend the employment of most renewable energy into the distribution systems. Therefore this technique is scaled back the price of renewable energy system by exploitation this system as a result of not use this further capacitor and fact devices to scale back the price of a system. The most aim of this paper is to provide the active and reactive power of wind facet to the grid face by exploitation this inverter and D-STATCOM system and regulate active power by adjusting the power angle and reactive power by modulation index. The general topology is employed during this technique is MMC standard multilevel converter to gather the all info and record of this Tai total harmonic distortion, efficiency and quantity of the whole system. The overall system works steady and constant PF. The simulation of this multilevel inverter is simulated exploitation MATLAB software. The projected designed inverter with D-STATCOM is connected with parallel to the system in between the turbine and grid facet.

II. CONFIGURATION OF INVERTER WITH D-STATCOM CAPABILITY

Complete configuration of projected system consists of an inverter that is placed in between the turbine facet side grid side like distribution side. The projected system management the active and reactive power by this method in which the active power transfer to the wind facet to ac to convert dc by rectifier and MPPT then dc power from the dc link to convert AC by inverter and D-STATCOM and so this power transfer to active filter to reduces the harmonics and once more transfer to distribution system to mend the PF by mistreatment the fact device and distribution transformer.

Complete configuration of proposed system

The main approach of snubber circuit is to regulate the rate of modification of voltage and current by RC network as a result of in switch time i.e. once the switch is on there's fast change in current and at the time of turn off the voltage will increase. The utilisation of snubber circuit provides an advantage of value effectiveness therefore on overcome the utilisation of additional capacitors and fact devices. Thus the main style of wind energy inverter is to use MMC technique to manage the role of HVDC presentation.

High-Voltage Gaine Boost Converter in Single Conversion Stage

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Abstract—This paper presents a sine wave inverter based on a novel high-voltage gain boost converter topology. The DC converter is based on a three-state commutation cell for battery charging using PV panels and a reduced number of conversion stages and it operates in zero-voltage switching (ZVS) mode for all switches, which results in low voltage stress across the active switches, low input current ripple, and simply results in higher efficiency. By using the new concept of single-stage approaches, the converter can generate a dc bus with a battery bank or a photovoltaic panel array, allowing the simultaneous charge of the batteries according to the radiation level. The operation principle, design specifications, and experimental results from a 500-W prototype are presented in order to validate the proposed structure.

Index Terms-- DC-DC power conversion, ZVS method, battery chargers

I. INTRODUCTION

The increasing use of renewable energy in applications regarding distributed generation systems such as photovoltaic panels, fuel cells, and wind turbines leads power electronics researchers to new challenges. High-voltage gain boost converter topology based on the three-state commutation cell for battery charging using PV panels and a reduced number of conversion stages. By using a new method single – stage conversion.

In a survey of high step up dc–dc converters based on coupled inductors and multiplier cells are presented by the certain section. Some topologies employ coupled inductors, with consequently reduce the voltage stress across the switches. A voltage double rectifier as the output stage of an interleaved boost converter with coupled inductors performed voltage gain is twice that of traditional boost converters due to the double stage, as coupled inductors provide additional voltage gain although voltage stress across the switches is not increased.

High step-up dc–dc converter based on quadratic boost converter with coupled inductor in the second boost converter. The use diodes and coupled windings instead of active switches to realize functions similar to those of active clamps. The interleaved configuration allows the very reduction of the input inductors and the output capacitors, at the cost of high component count as additional multiplier cells are included. High voltage gain with reduced voltage stress across the switch. However, the use of such converter is limited to duty cycle value higher than 0.5.

The traditional high-frequency isolated converters typically required a transformer responsible for processing the total rated power, with consequent increase of size, weight, and volume and reduction of efficiency. Converters with switched capacitors develop significant current peaks which limit the efficiency and the maximum processed power.

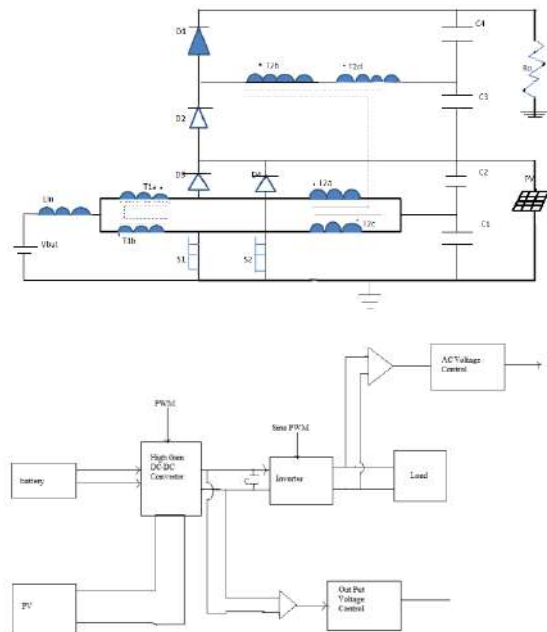
high step up dc–dc converters based on coupled inductors and multiplier cells are presented and the major challenges were

summarized. Some topologies employ coupled inductors, with consequently reduce the voltage stress across the switches, although the input current is discontinuous and the use of an LC filter may be necessary. A voltage doubler rectifier as the output stage of an interleaved boost converter with coupled inductors was present.

Although the development of novel topologies with wide conversion ratio and high efficiency is necessary, their interconnection with photovoltaic panels (PV), battery banks, and the inverters dc link has a great interest for both industry and academy.

II. PROPOSED TOPOLOGY

Shows the projected basic unit. As shown in Fig. 1,



The proposed block diagram in the fig 2

A. Conception of the Topology

In the low voltage side, the bidirectional characteristic of the topology allows the MOSFET bridge to be supplied by either the battery or the PV array. Besides, the use of resonant capacitors in the full-bridge capacitors provides zero voltage switching (ZVS) of the switches. system the certain bridge converter is change in to normal type converter as in the certain converter the switching loss will be very less in the excited system and efficiency will be increment in this system. Hence providing the advantage like the cost reduction, increment the efficiency.

As in the proposed system the consist of six mode of operations present as in the given circuit diagram is given bellow In this circuit diagram The proposed topology is formed by one input inductor L_{in} , four controlled power switches $S1-S4$, two rectifier diodes $D1$ and $D2$, two transformers $T1$ (windings $T1a$

Single-Phase H-Bridge Cascaded 15-Level Inverter with D-Statcom Capability for Harmonic Reduction

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Abstract— A new single-phase h-bridge cascaded 15-level inverter with D-STATCOM is proposed in this project. It is used for reducing the harmonics, voltage stress, size and loss. This system regulates both reactive and active power. The proposed inverter is located in between the source and distributed energy systems. There are various energy sources which use renewable energy like wind energy, solar energy, biomass etc. Concerning good power quality, minimum total harmonic distortion is one of the most important requirements from the multilevel inverter. This paper presents the minimum total harmonic distortion in h-bridge cascaded 15-level inverter with D-STATCOM capability and also keeping the constant power factor. The developed proposed cascaded topology requires fewer numbers of IGBTs, driver circuits, power diodes, and dc voltage sources than other presented cascaded topologies. The result gives switching strategy, unity power factor, computational time and waveform accuracy have been analysed in MATLAB simulation.

Index Terms—Basic unit, D-STATCOM, H-bridge, cascaded multilevel inverter.

I. INTRODUCTION

The power electronics devices are used for the converting the renewable or non-conventional energy into power grids in the form of voltage and frequency. It eliminates the use of capacitors and FACT device. The main aim of this paper is to supply the active and reactive power. It is impossible to connect a power semiconductor devices to a high-voltage network directly. Therefore, 15 level inverter has been introduced. In proposed system, 15-level inverters used for reducing THD and also improve the PF. This inverter consists of 2 basic modules of 3 dc voltage sources, 5 unidirectional power switches. Total number of switches are 16. Dc-dc converter consists of coupled inductor with a multi-terminal output (multi-winding transformer) of 80V. PI controller consists of a dsPIC33F microcontroller for generating switching pattern. The inverter is able to generate 15 levels by using H-bridge (seven positive levels, seven negative levels, and one zero level) with the maximum amplitude of 600V at the output. Then, to get all positive and negative levels at the output, an H-bridge are going to be accessorial to the present inverter as a result of the projected inverter solely generates positive levels. This inverter is termed the developed proposed cascaded multilevel inverter. In order to get all voltage levels the output, four totally different algorithms are proposed. Several comparisons are also done between the developed cascaded multilevel inverter and its projected algorithms with the standard cascaded inverters. supported these comparisons, the developed cascaded inverter needs the minimum range of power switches, IGBTs, power diodes, driver circuits, and dc voltage sources. Finally, so as to analyse the capability of the developed cascaded inverter to get all voltage levels, the experimental results of a 15-level inverter are used.

In this paper new plan is enforced for single phase renewable supply like wind energy. During this AC transmission system used the FACTS devices for dominant and PF correction purpose or protection of our system and to manage the active and reactive power so that to style and implement the wind energy inverter to flexible AC transmission system with the assistance of fact capability. The most aim of this technique is to eliminate the utilisation of capacitors and FACT devices to PF correction of distribution energy system. The designed electrical converter is placed in between the turbine and therefore the grid same as regular wind energy inverter to manage the active and reactive power of wind to the grid by exploitation this new technique. This desired technique is introduced to extend the employment of most renewable energy into the distribution systems. Therefore this technique is scaled back the price of renewable energy system by exploitation this system as a result of not use this further capacitor and fact devices to scale back the price of a system. The most aim of this paper is to provide the active and reactive power of wind facet to the grid face by exploitation this inverter and D-STATCOM system and regulate active power by adjusting the power angle and reactive power by modulation index. The general topology is employed during this technique is MMC standard multilevel converter to gather the all info and record of this Tai total harmonic distortion, efficiency and quantity of the whole system. The overall system works steady and constant PF. The simulation of this multilevel inverter is simulated exploitation MATLAB software. The projected designed inverter with D-STATCOM is connected with parallel to the system in between the turbine and grid facet.

II. CONFIGURATION OF INVERTER WITH D-STATCOM CAPABILITY

Complete configuration of projected system consists of an inverter that is placed in between the turbine facet side grid side like distribution side. The projected system management the active and reactive power by this method in which the active power transfer to the wind facet to ac to convert dc by rectifier and MPPT then dc power from the dc link to convert AC by inverter and D-STATCOM and so this power transfer to active filter to reduces the harmonics and once more transfer to distribution system to mend the PF by mistreatment the fact device and distribution transformer.

Complete configuration of proposed system

The main approach of snubber circuit is to regulate the rate of modification of voltage and current by RC network as a result of in switch time i.e. once the switch is on there's fast change in current and at the time of turn off the voltage will increase. The utilisation of snubber circuit provides an advantage of value effectiveness therefore on overcome the utilisation of additional capacitors and fact devices. Thus the main style of wind energy inverter is to use MMC technique to manage the role of HVDC presentation.

Direct Torque Control of Induction motor using fuzzy logic

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ABSTRACT

This paper presents of induction motors has increased tremendously since the day of its invention. They are being used as actuators in various industrial processes, robotics, house appliances (generally single phase) and other similar applications. The reason for its day by day increasing popularity can be primarily attributed to its robust construction, simplicity in design and cost effectiveness. These have also proved to be more reliable than DC motors. Apart from these advantages, they have some unfavorable features like their time varying and non-linear dynamics. Speed control is one of the various application imposed constraints for the choice of a motor. Hence, in the last few years various methods for the speed control have been developed

KEYWORDS: Micro Grid Protection, Earthling Systems, Fault Current, Touch Voltage, Micro Sources and Inverters

INTRODUCTION

The induction motor finds its place amongst more than 85% of industrial motors as well as in its single-phase form in various domestic usages. Markedly a constant-speed motor with shunt characteristic, speed drops only by a few percent from no-load to full load. Hence in the past, induction motors have been used primarily in constant speed applications. Traditional methodologies employing speed control have either been high-priced or very inefficient, unlike the dc motor in which the presence of commutator and brushes require recurrent maintenance make dc motor drives improper for use in hazardous and polluted environments. On the other hand, owing to the simple, rugged, cheaper, smaller and subsequently lighter build of induction motor drives (particularly squirrel-cage type), they are designed for fans, blowers, cranes, traction, conveyers, etc. in spite of finding stiff competition from dc drives for such applications

Principle of rotating magnetic field:

When a three phase voltage is applied to the stator winding, a rotating magnetic field is produced. It is called a rotating field since its poles do not remain in a fixed position on the stator but go on shifting their positions surrounding the stator. The magnitude of this field is constant and equal to $1.5\phi_m$, where ϕ_m is the maximum flux due to any phase. On energizing the three phase stator from a three phase supply, a rotating magnetic field sets up round the stator which rotates at synchronous speed n_s . This field passes through the air-gap and cuts the stationary rotor conductors. Owing to the relative speed between the rotating flux and the static rotor, electromotive forces are induced in the rotor conductors. For the reason that the rotor circuit is short-circuited, currents start flowing in the rotor conductors. Again, these conductors are placed in the magnetic field produced by the stator. As a result, mechanical force acts on the rotor conductors. A torque, produced as a result

Modified SEPIC Converter with High Static Gain for Renewable Energy Applications

C. Sakthivel^{*}, K. Selvakumar^{**} and T. Venkatesan^{***}

Abstract: In the modified SEPIC converter, two high static step-up DC-DC converters are implemented in this Paper. In the proposed type presents, reduced the switching voltage and increases the static gain of the converter for low input voltage and high output voltage application. The modified SEPIC configuration are magnetic and without magnetic coupling. Magnetic coupling can increase the static gain and switching voltage at lower level. In the module input voltage is 15 Volts. The efficiency at nominal power obtained with the prototype without magnetic coupling was equal to 91.9% and output voltage is 150. The prototype with magnetic coupling operating with an output voltage equal to 300 V, presents efficiency at nominal power equal to 92.2%. The performance of the proposed method and achievement of desired compensation are confirmed by the results of the simulation using MATLAB/ Simulink.

Keywords: SEPIC converter, Static Gain, Magnetic coupling.

1. INTRODUCTION

Nowadays, Renewable power generation is the most importance in power sector. The important researches are going on the high static gain DC-DC converters for several applications supplied by low dc output voltage power sources. Some examples are renewable energy sources as low power wind turbine, photovoltaic (PV) modules and other applications as fuel cells, embedded systems, portable electronic equipment's, uninterruptable power supply, and battery powered equipment. Some of the requirement are necessary in this application such as reduced losses, high power density, low weight, and volume. An application where the proposed converters can be applied is the photovoltaic energy generation in grid-connected systems using the ac module or micro inverter structure. The usually in high-power grid-connected photovoltaic generation PV modules are connected in series in order to obtain the DC voltage level necessary for the inverter operation and energy can be transferred to the grid with low-current harmonic distortion. However, a common problem in this structure is the power losses due to the centralized maximum power point tracking (MPPT), mismatch losses among the PV modules, and generation reduction due to a partial shading of the series-connected PV modules. These problems are rectified by the Multi string structure where reduced strings are connected with DC-DC converters with the MPPT algorithm and the output of these DC-DC converters are connected to the inverter input. In the home or domestic based application, most research is focused on the module-integrated converters where energy generated by the PV module is transferred to the grid through the high gain converter they can integrated with the PV module system. Some of the main advantages of this PV generation structure are the modularity, allowing an easy increase of the installed power, the individual MPPT and reduction of the partial shading and panel mismatching effects, thus improving the energy-harvesting capability. However, Efficiency improvement, cost reduction, and the reliable operation throughout the module lifetime are some design challenges in ac module system.

In the base topology presented in the paper is modification of the SEPICDC-DC converter and the main operation characteristics obtained with this modification complete with the requirements in high static gain applications. The basic design of without magnetic coupling, Static gain is twice and switching voltage is close to half of the value presented in the classical boost converter in the operation with high values of

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Design and implementation of a converter model for hybrid electric vehicle energy storage system

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Abstract

The simulation of a hybrid electric vehicle motor-drive system used to investigate power flow at the conditions of both motoring and regeneration is presented in the paper. The proposed control strategy includes a bidirectional switched capacitor dc/dc converter, which is applicable for a hybrid electric vehicle energy storage system. Topographies of voltage step up/down and bidirectional power are incorporated into a single circuit, and are verified by Simulation using MATLAB/Simulink.

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**INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH
TECHNOLOGY****HERBAL ANTIOXIDANTS- A REVIEW****Swathi K, Priyenka Devi K S*, Sangeetha A**

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ABSTRACT

Reactive oxygen species, circulating in the human body tend to react with the electron of other molecules which may initiate the chain reaction and contribute to adverse health effects in the body. Antioxidants possess anti-inflammatory property, antitumor property, anticarcinogenic property, antimutagenic property and metal chelating potential which in turn terminates the chain reaction by arresting free radical intermediates. Natural antioxidants derived from plant sources are effective and nontoxic to meet the increasing consumer demands. The present review aims at reviewing (1) the mechanism of oxidation and anti-oxidation; (2) methods available for the measurement of antioxidant capacity (3) the potential source of herbal antioxidants.

KEYWORDS: Natural antioxidant, antioxidant analysis, anticarcinogenic property, anti-inflammatory property.

INTRODUCTION

Oxidation reaction produces free radicals in human body which start the chain reaction and has the capability to damage the active human cells. Many health effects are caused, by the reaction of free radicals with the electron of other molecules in the body which may contribute to condition such as cancer, ischemia, aging, adult respiratory distress and rheumatoid arthritis (Kokate *et al.* 2008). Antioxidant agents terminate those chain reactions by arresting free radical intermediates (Sies 1996). Generally antioxidant capacity is due to its effectiveness either in absorbing and neutralizing the free radicals, or quenching singlet and triplet oxygen (Zhang *et al.* 2010). Similar property of antioxidant permits them to act as reducing agents and hydrogen donors. Some of the properties of antioxidant include anti-inflammatory property, antitumor property, anticarcinogenic property, antimutagenic property and metal chelating potential.

Antioxidant plays a vital role in effective functioning of the human body due to the invasion of life threatening diseases like coronary heart disease and cancer. There is an increasing demand for the antioxidants among the eminent food manufacturers. The total antioxidant capacity and the antioxidant property of a plant material depend on the nature of the phenols, composition of the phenols, climatic conditions and the growth factors. Antioxidants can be natural, nature identical or synthetic components. Synthetic antioxidants like butylated hydroxyl anisole (BHA), butylated hydroxyl toluene (BHT), tetrabutylated hydroxy quinone (TBHQ) are currently used in food industries which have the ability to suppress the rate of oxidation. Continuous consumption of synthetic antioxidants results in liver damage and kidney failure. Such drawback of synthetic antioxidants is replaced by natural antioxidants. Natural antioxidants derived from plant sources are effective and nontoxic to meet the increasing consumer demands. The research on the extraction of synthesis antioxidants from plant and other sources are in intensive care among the food scientists. Our paper aims in reviewing the mechanism of oxidation and anti-oxidation, methods of antioxidant analysis and the potential source of herbal antioxidants.

MECHANISM OF OXIDATION

Oxygen is important for living organisms and acts as a source of endogenous oxidants. Normal metabolic processes produce various reactive species that are either radicals or non-radicals which has a potential of producing radical species. Oxidative stress leads to cancer, cardiovascular, neurodegenerative and oncological disease. Auto-oxidation

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Abstract

This study has been carried out to investigate the production of biogas by anaerobic digestion of solid-phase kitchen food waste using an artificial neural network. The network was used to model and optimise biogas production using mixed substrates of food waste with cow dung. The substrate mix percentage, plant pH level, digestion period and digester temperature were used as input parameters for the model, with biogas yield as the output. Food waste and cow dung were mixed at different compositions to a total mass of 2 kg and placed in 21 miniature digesters. The input and output parameters from the digesters were then considered in the model. The highest biogas performance level of 375 ml/g volatile solids on the 25th day of digestion was achieved by a substrate profile of 80% food waste and 20% cow dung at a temperature range of 30–40°C. On the basis of these results, kitchen food waste is shown to be highly biodegradable and an effective source of biogas

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A Temperature Gradient based Harvesting of Solar Energy using a TEG Device

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Abstract

There has been an increasing demand for energy since the last decade especially due to the rapid depletion of non-renewable sources of energy. Technological advancements in the area of renewable sources of energy has been ever since increasing utilizing wind, solar bio gas sources of energy for power generation. A more recent research interest is towards tapping of solar energy from saline lakes or ponds which are manmade. It proves to be a cost effective strategy over the solar radiation harvesting using solar cells for small power generation system. Research analysis and contributions have reported temperatures ranging from 700–800C being trapped in the saline solutions of the lake which could be effectively utilized for energy harvesting. The proposed work aims to derive energy based on the concept of thermo electric devices which constitute a current flow due to differences in the temperature gradient of the saline solution. Salinity-gradient solar ponds can collect and store solar heat at temperatures up to 80C. As a result, these water bodies act as a renewable source of low grade heat which can be utilized for heating and power generation applications. In addition to utilizing thermo electric modules as power generators in this paper, A potential advantage of such a system is its ability to continue to provide useful power output at night time or on cloudy days because of the thermal storage capability of the solar pond.

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Research Article

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Effect of process parameters on the phenol removal rate from petrochemical effluents using electrochemical method

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ABSTRACT

The present work is to degrade the phenolic waste from petrochemical industry by electrochemical method using Titanium doped with SnO₂-Sb as anode and AISI 305 stainless steel as cathode. The degradation rate depends on the current supplied and the rate of agitation of the cylindrical stainless steel cathode rod placed inside Hexagonal shaped Titanium anode. Experimental studies were conducted in stagnant condition and parameters like pH, current density, temperature, initial concentration and cathode speed were varied. The phenol removal rates possess its maximum at pH 3 and began to decrease at pH 5 and pH 6. It was observed that the phenol degradation rate increased with increase in current density, electrolysis temperature and cathode speed. High initial concentration of phenol was found to undergo relatively lesser mineralization.

Keywords: Electrochemical treatment, phenol degradation, petrochemical industry effluents

INTRODUCTION

A wide variety of synthetic organic compounds have been brought into the environment by human activities, and many organic compounds are contaminating the ground and surface water. Many industries use phenolic materials in their manufacturing processes. Phenol is also used in the production of drugs, weed killers and synthetic resins. Phenol and its derivatives are also present in the wastewater of industries like coking, paint dyes, wine distilleries, synthetic rubber, textiles pharmaceuticals, solvents, manufacture of pesticides, paper and wood etc [1 – 2]. Occupational exposure to phenol has been reported during its production and use, as well as in the use of phenolic resins in the wood products industry. It has also been detected in automotive exhaust and tobacco smoke [3]. Toxic organic contaminants such as heterocyclic and phenolic compounds, causes serious environmental risks and should be eliminated before discharge into natural water bodies. Over 2mg/L phenol concentration is toxic to fish and concentration between 10 to 100 mg/L would result in death of aquatic life within 96 hours.

Phenol and its vapour are corrosive to eyes, skin and respiratory tract. Repeated or prolonged skin contact with phenol may cause dermatitis or even second and third degree burns due to phenol's caustic and defatting properties. Inhalation of phenol vapor may cause lung edema. The substance may also cause harmful effects on the central nervous system and heart, resulting in dysrhythmia and coma. Many technologies have been investigated for the degradation of phenolic compounds and are well known to be characterized by higher salinity, acidity, chemical oxygen demand value and low biodegradability which means that the effluent cannot be treated by the conventional process [4 – 5]. The phenolic compounds in the industrial effluents that are not removed by biological treatment can be eliminated by advanced waste water treatment methods, among which the most frequently used is the Fenton process. Despite the substantial effectiveness of the process in removing organics and surfactants, it has some drawbacks, such as production of large quantities of sludge, the consumption of chemicals and the necessity of

Effect of Temperature on Removal of Cr (VI) From Tannery Sludge through Bioleaching: Studies and Kinetics

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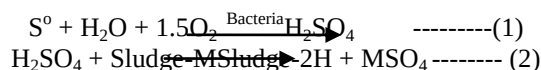
Abstract: Tannery industries generally produce huge quantity of Cr(VI) laden sludge that poses a serious threat to the environment while disposing it in landfill without proper treatments. Bioleaching is found to be the attractive technology for treating this kind of sludge to remove heavy metals because of its environmentally friendly nature and cost benefits. But, there are several process parameters including temperature play vital role for efficient bioleaching due to microbial sensitivity with temperature. In the present study, the influence of temperatures on the removal efficacy of Cr(VI) from tannery sludge was investigated using the bacteria, *Acidithiobacillus ferrooxidans* in the shake flask. Results showed that the maximum of 91.2% Cr was removed from the sludge under the temperature maintained at 310 K. The obtained bioleaching data were subjected to kinetic studies for rate-controlling step. It was found that the analysis using shrinking core model on bioleaching data indicated that the chemical reaction control model holds good. This study gives a design strategy with respect to temperature for treating tannery sludge to remove toxic Cr by bioleaching.

Keywords: Bioleaching, Chromium(VI), Rate controlling step, *Acidithiobacillus ferrooxidans*, Shrinking core model.

I. INTRODUCTION

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Almost all the sludge that is generated in the industries is disposed of in open fields due to lack of appropriate disposal facilities[5]. In order to get rid of various health hazards caused due to this tannery sludge disposal, it is necessary to give more importance for Cr(VI) removal from the sludge. Several studies have shown that there are various physical and chemical methods available for removal of metals from sludge. Though they have been widely applied in practice, they also possess several limitations such as high cost and low efficiency[4]. Alternatively, biological method that employs microbes as the leaching catalyst for removing metals which is known as bioleaching. It is proven to be more economical and environmentally acceptable. Bioleaching process was originally developed for recovery of metals from low quality ores by the mining industry[6]. Bioleaching processes are based on the sulphur oxidation or iron oxidation by chemolithotrophic bacteria or filamentous fungi. The intensively used microorganism in the bioleaching processes is seen to be *Acidithiobacillus ferrooxidans*[7]. They obtain energy by oxidizing elemental sulphur (S⁰) [8]. It has been reviewed from the literature that indirect leaching was found to be more efficient than the direct method[6]. In indirect mechanism, elemental sulfur (S⁰) is oxidized first to sulfuric acid (Eq. 1) by the action of bacteria and then sulfuric acid aids the dissolution of metals. (Eq. 2) [8]:



Here M is the bivalent metal. There are different works that have been carried out on different parameters on sludge bioleaching, but only a few demonstrate bioleaching kinetics[9]. In the present study, the influence of temperature in the bioleaching of chromium from tannery sludge and rate controlling-kinetics of leaching process using the procured culture *A. ferrooxidans* has been carried out.

Rheological Behavior of Eco-accommodating Drilling Fluids from Biopolymers

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Abstract: The rheological properties of drilling liquids adjusted with two biopolymers – lignin, and polyanionic cellulose (PAC-R) have been contemplated. The impact of centralization of the biopolymers on the boring liquid was additionally reported. The altered boring liquids were found to obey Herschel Bulkley rheological model. The liquids were additionally observed to be pseudo-plastic with shear diminishing conduct. Polyanionic cellulose demonstrated the most astounding shear rate and shear stress than lignin. This can be ascribed to the straight open long chain structure of PAC-R and its capacity to associate with water, solids and with itself. It likewise went about as a superior viscosifier due to the more negative charge it conveys. Likewise, the plan of biopolymer boring liquid with bentonite has demonstrated to enhance the consistency than that experienced in typical traditional drilling liquids.

Keywords: rheology, biopolymers, drilling fluids, natural polymers, Herschel-Bulkley model

1. Introduction :

Drilling liquids properties are imperative for the achievement of any boring operation. The liquids were initially intended to guarantee that turning boring of underground developments is conceivable and prudent. The drilling liquids accomplish this by (i) moving drill cuttings to the surface, (ii) cooling and cleaning the bore, (iii) decreasing erosion, (iv) keeping up wellbore dependability, and (v) keeping pore liquids from rashly streaming into the wellbore. Also, the boring liquids are basically intended to fabricate a channel cake, which is essentially expected to diminish filtrate misfortune to the arrangement, be thin and hold the drilling liquid in the wellbore [1]. A standout amongst the most basic elements of boring liquids is to minimize the measure of drilling liquid filtrate entering the hydrocarbon bearing development which can prompt arrangement harm in view of rock wettability changes, fines movement, boring liquid solids stopping and development water science incompatibilities [2]. Rheological conduct of drilling liquids is imperative in their appropriate choice for any well. Rheological properties of boring muds are vital on the grounds that they are utilized to describe properties of the mud, for example, its well purifies, disintegration conservation, cutting material expulsion, water powered count, and pump framework [3]. The rheological standards can be utilized to decide the dynamic execution of a boring liquid conduct in taking care of issues of cleaning gap, suspension of cuttings, water driven counts and mud treatment [4]. The accomplishment of any boring operation depends essentially on the execution and cost viability of the boring liquid utilized [5,6,7]. As indicated by Douglas et al [8,9,10], boring liquids are for the most part ordered into: (i) air or froth based liquids which are utilized where fluid drilling liquid is not the most attractive coursing medium; (ii) oil-based liquid, and (iii) water-based liquid. In light of ecological and cost contemplations, water-based liquids offer properties that are for the most part favored over that of oil-based liquids [11]. Drilling liquids ought to be ecologically amicable and contain the most reduced conceivable measure of contaminations. Subsequently, care ought to be taken in the choice and definition of crude materials [12]. These days, different polymers, which can be as normal (e.g. starch), engineered, and/or adjusted (e.g. carboxymethyl cellulose or) polymers, are utilized as a part of request to control the liquid misfortune and thickness of drilling liquids. In oil-drilling, these polymers decrease filtrate, alter rheological properties, balance out shale and diminish drag, and can be utilized as a part of cutting edge oil recuperation (EOR) forms [13,14]. The deluge of the fluid stage, known as filtrate, in beneficial zones can bring about a noteworthy decrease of porousness and henceforth bring down well profitability [15,16]. The consolidation of normal gums and starch-based materials in boring liquids structures was the essential answer for control this wonder [6]. Various studies on polymers and their utilization in water-based drilling liquids have been done [6,17,18,19]. Dim and Darly, [6] examined the utilization of polymers like guar gum, carboxymethyl cellulose, and hydroxypropylstarch as filtration control operators and as boring liquids. They inferred that filtration parameters like sorptivity and diffusivity of these polymers are subject to temperature. Sorptivity is a measure of the resistance against the liquid coursing through the channel cake, while diffusivity is a measure of the rate of stream of liquid [20]. The impact of polymers on the rheological properties of KC1/polymer-sort boring liquids was concentrated on by Kok and Alikaya, [19]. This study concentrated on the impact of expansion of polymers on consistency file, stream conduct list, and shear stress. The creators watched that consistency record expanded as polymer focus expanded. Consistency list is a measure of the general thickness of a liquid, while stream list is a measure of the level of stream conduct of a liquid [17,21]. The resistance of the liquid to the connected rate of shear or compel is known as the shear stress, which in oil field terms is closely resembling the pump weight [19,22,23]. In the present paper, the impacts of including

Effect of Temperature on Removal of Cr (VI) From Tannery Sludge through Bioleaching: Studies and Kinetics

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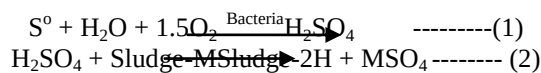
Abstract: Tannery industries generally produce huge quantity of Cr(VI) laden sludge that poses a serious threat to the environment while disposing it in landfill without proper treatments. Bioleaching is found to be the attractive technology for treating this kind of sludge to remove heavy metals because of its environmentally friendly nature and cost benefits. But, there are several process parameters including temperature play vital role for efficient bioleaching due to microbial sensitivity with temperature. In the present study, the influence of temperatures on the removal efficacy of Cr(VI) from tannery sludge was investigated using the bacteria, *Acidithiobacillus ferrooxidans* in the shake flask. Results showed that the maximum of 91.2% Cr was removed from the sludge under the temperature maintained at 310 K. The obtained bioleaching data were subjected to kinetic studies for rate-controlling step. It was found that the analysis using shrinking core model on bioleaching data indicated that the chemical reaction control model holds good. This study gives a design strategy with respect to temperature for treating tannery sludge to remove toxic Cr by bioleaching.

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**BIOLEACHING KINETICS OF CHALCOPYRITE CONCENTRATE USING *LEPTOSPIRILLUM FERRIPHILUM*: EFFECT OF SILVER ION****Venkatesa Prabhu S*, Barathiraja P., Karthik R and Ragul V**Department of Petroleum Engineering, JCT College of Engineering and Technology, Pichanur,
Coimbatore, Tamil Nadu, India**ARTICLE INFO****Article History:**Received 9th July, 2016Received in revised form 5th August, 2016Accepted 28th September, 2016Published online 28th October, 2016**Key words:**Chalcopyrite pH; silver ion; copper; iron and *L. ferriphilum*.**ABSTRACT**

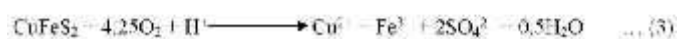
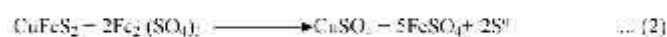
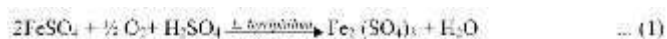
Bioleaching is a proven eco-friendly biological method to extract metals from their ores. One of the important problems faced in bioleaching is the low leaching rate, which consumes high residence time. In this study, the catalytic effect of silver ion (Ag^+) on bioleaching of copper and iron from chalcopyrite concentrate was investigated using isolated bacteria, *Leptospirillum ferriphilum*, for enhancing the leaching rate. The bioleaching data were collected for Cu and Fe extraction from chalcopyrite concentrates using different concentrations of silver ion (1–5 mg/L) with the following fixed parameters: initial pH, 1.5; pulp density, 1% (w/v); particle size, 200 μm ; and agitation speed, 180 rpm. From the obtained results, it was found that the maximized leaching of Cu (87.73%) and Fe (74.73%) occurred while using 4 mg/L silver ion concentration. The kinetic study on bioleaching data indicated that the rate constants for Cu and Fe leaching were found to be maximum (0.078 and 0.054 d^{-1} , respectively) at Ag^+ concentration 4mg/L. The leaching data were analyzed using shrinking core model for determining the rate-controlling step. It explicated that the diffusion through product layer forms on the mineral surface controls the rate of leaching.

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INTRODUCTION

Copper is the second largest metallic chemical element widely used in the world. It is a ductile metal that conducts heat and is resistant to corrosion. This results in the usage of copper as a material of choice in various domestic, industrial, and high-technology applications. The world's production and consumption of copper have increased dramatically in the past 25 years. Copper is obtained from different ore deposits such as chalcopyrite, chalcocite, covellite, bornite, tetrahedrite, cuprite, tennantite, azurite, and malachite. Of these, chalcopyrite is one of the most important sulfide minerals of copper [1,2]. Generally, copper is extracted by pressure hydrometallurgy process; otherwise, it is treated via flotation concentration followed by smelting [3]. This method has several disadvantages such as more chemical usage and high cost, and has also several environmental restrictions. To overcome these problems, the copper industry has moved toward biohydrometallurgical processes. Bioleaching is a technique of biohydrometallurgical processes by which dissolution of minerals due to direct or indirect action of microorganisms takes place [4]. Dissolution of minerals occurs due to the microbial oxidation of insoluble metal sulfides to soluble metal sulfates. This method has many potential advantages over conventional metal extraction techniques because it can be applied to all ore grades and to waste materials produced by conventional ore dressing. In addition, it is an environmentally sound technique as it does not give rise to atmospheric pollution and also requires very low energy.

The microorganisms used in this process are acidophilic bacteria that have the ability to survive at low pH and high metal concentrations, and are capable of iron and/or sulfur oxidation [5]. An iron-oxidizing bacterium (IOB), *Leptospirillum ferriphilum*, is one of the most important bacteria for bioleaching because it can tolerate lower pH, is more extremophile, and can withstand higher cultivation temperature [6]. Thus, it was chosen as a bioleaching microorganism in this study. *L. ferriphilum* obtains energy through oxidation of Fe(II) iron to Fe(III) iron, which acts as oxidizing agent for metal sulfides. The energy transduction is catalyzed by a specific protein called *Iro*protein, which was proposed to be involved in the iron respiratory transport chain [7-10]. The exploitation of chalcopyrite by *L. ferriphilum* for extracting copper in the form of soluble copper sulfate can be described by the following equations.



However, a general problem associated with bioleaching is its low leaching rate. It takes approximately 1–2 years to complete the heap or dump leaching operation. This is the major disadvantage for commercialization of bioleaching and hinders its success [11]. Consequently, several engineering efforts should be made on different influencing parameters to improve the leaching rate in bioleaching process.

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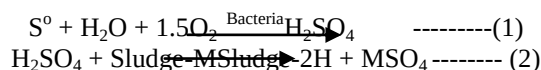
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Optimization of Anaerobic Conditions for the Treatment of Textile Dye Wastewater using Mixed Culture

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ABSTRACT

In this study, anaerobic digestion of textile dye wastewater was carried in a batch reactor using mixed culture. Textile dye wastewater was collected and characterized. Response surface methodology (RSM) was employed to study the effect of process variables like pH, temperature, textile dye wastewater dilution ratio and MLVSS on dye decolourization and COD removal efficiency. The optimum condition was found for the maximum decolourization and COD removal efficiency. They are: pH – 7.1, temperature – 31.5 °C, wastewater dilution ratio 1:2, and MLVSS – 6200 mg/L. The maximum decolourization and COD reduction was found to be 70.3% and 72.6% at the RSM optimized conditions.

1. Introduction

Dyes are widely utilized in numerous industries such as textile, paper, printing, cosmetics, pharmaceuticals, colour photography and petroleum. Among these industries, textile dyeing industries produces huge amount of wastewater. They employ large amount of water during processing and also generate substantial amount of wastewater. During dyeing, about 10–15% of the dyes are lost in the wastewater [1] and causes detrimental effects to the human being and environment. Along with color, it also comprises pollutants like degradable organics, nutrients, pH altering agent, salts, sulfur, toxicants and refractory organics [2, 3].

Dye wastewater is generally treated by physical, chemical and biological methods. Physical and chemical methods are mostly ineffective, expensive and produce side reactions, high sludge and by products formation and not suited to degrade all dyes [4, 5]. The biological treatment is found as the best alternative because of low operational cost [6, 7]. Many works have been reported for decolorization of dye using aerobic microbes [8, 9]. Few works are carried out on anaerobic digestion of textile dye wastewater [10–12]. Hence this study is focused on anaerobic digestion of textile dye wastewater using mixed culture. The process variables are optimized using Response Surface Methodology (RSM). RSM is widely used to study the effects of the variables towards their response. This method is suitable for fitting a quadratic surface and it helps to optimize the effective parameters with a minimum number of experiments, as well as to analyze the interaction between the parameters [13]. It is successfully employed in biotechnology and environmental biotechnology [14, 15].

2. Experimental Methods

2.1 Materials

Textile dye wastewater was collected from a small scale industry located at Tiruppur, Tamilnadu, India. The collected wastewater was characterized by analyzing pH, colour, COD, BOD, TS etc. The analysis was performed according to the procedure given in APHA (1999) [16] and given in Table 1. The wastewater was stored at 4±1 °C in air tight plastic containers. Mixed culture was collected from a textile dye wastewater pond. It is maintained at 4 °C in a freezer.

Table 1 Characteristics of textile dye industry wastewater

Parameters*	Values
pH	7.1-7.6
Colour	Brown
Total Suspended Solids	510
Total Dissolved Solids	3880
BOD	1132
COD	2450
Sulphates	232
Chlorides	1465

*All values except pH and colour are in mg/L

In this study, Box-Behnken design was employed for the optimization of process variables. In order to determine the existence of a relationship between the factors and the response variables, the data collected is analyzed in a statistical manner, using regression. A regression design is normally employed to model a response as a mathematical function of a few continuous factors and good model parameter estimates are desired.

The coded values of the process variables are determined by the following equation.

$$x_i = \frac{X_i - X_0}{\Delta X} \quad (1)$$

where x_i – coded value of the i th variable, X_i – uncoded value of the i th test variable and X_0 – uncoded value of the i th test variable at center point.

The regression analysis was performed to estimate the response function as a second order polynomial.

$$Y = \beta_0 + \sum_{i=1}^k \beta_i X_i + \sum_{i=1}^k \beta_{ii} X_i^2 + \sum_{i=1}^{k-1} \sum_{j=i+1}^k \beta_{ij} X_i X_j \quad (2)$$

Where Y is the predicted response, b_i , b_{ii} , b_{ij} are coefficients estimated from regression. They represent the linear, quadratic and cross products of x_1 , x_2 , x_3 on response.

The regression and graphical analysis with statistical significance are carried out using Design-Expert software (version 7.1.5, Stat-Ease, Inc., Minneapolis, USA). To find the relationship between the experimental variables and responses, the response surface and contour plots are generated from the models. The optimum values of the process variables are obtained from the response surface.

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Anaerobic Treatment of Textile Dye Wastewater using Mixed Culture in Batch Reactor

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ABSTRACT

Anaerobic treatment of textile dye wastewater was carried in a batch reactor using mixed culture obtained from cow dung. The textile dye wastewater was collected from a small scale industry. Statistical design (Response surface methodology, RSM) was employed to study the effect of variables like pH, temperature, textile dye wastewater dilution ratio and MLVSS on dye decolourization and COD removal efficiency. The optimum condition was found for the maximum decolourization and COD removal efficiency. They are: pH – 7.3, temperature – 30.6 °C, wastewater dilution ratio 1:2, and MLVSS – 7000 mg/L. The maximum decolourization and COD reduction was found to be 60.8% and 66.7% at the RSM optimized conditions.

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2.2 Experimental Procedure

Experiments were carried out in a 500 mL Erlenmeyer flask, according to the Box-Behnken design given in Table 1. The process parameters chosen for this study were pH, temperature, wastewater dilution ratio and inoculum concentration. The pH of the wastewater was adjusted to 6.5, 7.5 and 8.5 by adding acid or base as required. Experiments were carried out by varying the temperature to 28 °C, 32 °C and 36 °C respectively. Wastewater dilution was varied as raw, 1:1 and 1:2 with normal water. Mixed liquor volatile suspended Solids (MLVSS) was varied between 4500 to 7000 mg/L. Dye concentration was measured in bio-spectrophotometer (Model: BL-200, ELICO, India) at a wavelength of 390nm. COD of the sample was analysed using the procedure given in APHA.

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Activities of Root-Derived Phytochemicals of *Withania Somnifera* on Cancer Kinase: Computational Approach

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ABSTRACT: Cancer is an uncontrolled growth of abnormal cells in the body. Cancerous cells are malignant in nature and kinase enzyme is essential for the survival and/or proliferation of the cancer cell. In this context, kinase inhibitors have been extensively investigated as anti-cancer drugs. In the presence of kinase inhibitors, the cancer is unable to proliferate or survive. Natural compounds are important sources of drugs. The present investigation concentrates on discovering anti-cancer compounds that are present in *Withania somnifera*, a medicinal plant belonging to Solanaceae family. In the current study, phytochemicals of *Withania somnifera* (Root) is identified using Gas Chromatography-Mass Spectroscopy analysis (GC-MS) to dock against the enzyme cancer kinase (PDB ID: 3COI-Crystal structure of p38delta kinase) using iGEMDOCK v2.5.0. The results of enzyme-substrate interaction energies show that these compounds are active against cancer kinase. Oleic acid, a phytochemical of *Withania somnifera* gave best binding energy of -84.26 kcal/mol and showed low toxic hazard with class I in Toxtree v2.5.0. Further research on *Withania somnifera* will be useful in drug designing against cancer.

KEYWORDS: Cancer kinase, Phytochemicals, *Withania somnifera*, Drug designing.

I. INTRODUCTION

Drug discovery in the area of Oncology has benefited significantly right from progress in understanding how to target kinases with small molecules relative to other disease indications. One reason for this is that many kinases have been found to be intimately involved in the processes leading to tumour cell proliferation and survival [1]. First, there are kinase targets that have become impervious to normal regulatory mechanisms following genetic mutation or translocation. These kinases have transforming capacity and are therefore considered to be oncogenic. The constitutive activity of this class of kinase target makes them essential for survival and/or proliferation of the cancer cell [2]. This so-called oncogene addiction renders the cancer cell exceptionally susceptible to the appropriate kinase inhibitor. The success of mutationally marked kinases as drug targets has motivated an intensive effort to survey the kinome across a broad range of tumour types for mutations [3]. These studies have uncovered a large number of kinases bearing mutations, which are currently in the process of being functionally characterized. This study aims to screen for inhibitors of cancer kinase so that the proliferation of cancer cells can be stopped.

Single Crystal EPR and Optical Studies of VO (II) Ion Doped in Triglycine Acetate

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Abstract: Electron paramagnetic resonance studies on single crystals of Triglycine acetate doped with VO(II) are carried out in the room temperature at X-band frequencies. Single crystal rotation in each of the three mutually orthogonal crystallographic planes namely *ab*, *ac** and *bc** indicate two chemically equivalent sites, with differing intensities. Angular variation studies in all the three orthogonal planes confirm that the two intense vanadyl sites referred as I and II, are found to be magnetically inequivalent, have occupied interstitial positions in the lattice. The spin Hamiltonian parameters obtained for the two sites are Site I: $g_{xx}=1.9818$; $g_{yy}=1.9646$; $g_{zz}=1.9346$; $A_{xx}=7.295$ mT; $A_{yy}=6.396$ mT; $A_{zz}=18.456$ mT. Site II: $g_{xx}=1.9815$; $g_{yy}=1.9713$; $g_{zz}=1.9348$; $A_{xx}=5.609$ mT; $A_{yy}=7.140$ mT; $A_{zz}=17.942$ mT. However the analysis of the powder spectrum reveals the presence of only one site. Admixture coefficients, Fermi contact and dipolar interaction terms have also been evaluated. UV-Visible data of doped complex confirm the structure and symmetry of the host lattice.

Keywords: crystal growth; single crystal EPR studies; optical studies;

1. Introduction

Non-Linear Optical (NLO) material for optical second harmonic generation (SHG) have received consistent attention for applications in the field of telecommunication, optical computing, optical information processing, optical disk data storage, laser remote sensing, laser driven fusion, color displays material diagnostics and optical switches in inertial confinement laser fusion experiments [1-6]. In general, organic materials (amino group) show a good efficiency for SHG. Most organic NLO crystals have usually poor mechanical and thermal properties and are susceptible to damage in applications. It is difficult to grow large optical quality crystals of these materials for device applications. Crystals of amino acids are good candidates for NLO application. In recent years Electron Paramagnetic Resonance (EPR) has been used as a tool to identify paramagnetic transition metal ions, trapped hole centers and electrons close to the conduction states in non-linear optical and photorefractive materials [7-9].

Vanadyl ion is the most stable biatomic ion [10] among a few molecular paramagnetic transition metal ions which is used extensively as an impurity probe for electron paramagnetic resonance studies. Due to short V=O bond, the unpaired electron is in a nondegenerate state. This leads to resolved electron paramagnetic resonance (EPR) spectra. The hyperfine interaction is anisotropic and therefore sensitive to orientation, conformation, and rotational relaxation [11]. As a result, interesting changes are found in the EPR and optical spectrum in different crystalline field environments [12-16].

Since, to our knowledge, there is no EPR data seem to exist for VO(II) ions introduced in diamagnetic glycine-organic acid compounds and in this work we report an EPR and optical study of VO(II) dopant ions in the single crystals of

Triglycine acetate (hereafter abbreviated as TGA) [17] whose crystal structure details are used for EPR.

2. Experimental

2.1 Crystal Growth

Single crystals of TGA were prepared by using the following procedure. The starting materials glycine and glacial acetic acid were taken in the ratio 3:1. The calculated amount of salt was dissolved in deionized water at room temperature with continuous stirring [17]. One percent by weight of vanadyl sulphate was added as dopant during crystal growth. The synthesized solution was left to dry at room temperature. Single crystals of VO(II)/TGA were obtained within 15 days by slow evaporation of the solution at room temperature.

2.2 Crystal Structure

TGA belongs to monoclinic crystal symmetry, and having unit cell parameters $a = 0.5102$ nm, $b = 1.1970$ nm, $c = 0.5461$ nm, $\alpha = \gamma = 90^\circ$, $\beta = 111.7665^\circ$. The cell volume $V = 309.7863 \text{ \AA}^3$.

2.3 EPR Recording

EPR spectra were recorded at room temperature using a JEOL JES TE100 ESR spectrometer operating at X-band frequency, having a 100 kHz field modulation. Single crystal of VO(II) doped TGA with proper shape and size was selected for rotations in the three mutually orthogonal planes namely *ab*, *ac** and *bc**. Angular variations of the crystal were made at room temperature by rotating the single crystal along the three mutually orthogonal axes *a*, *b* and *c**.



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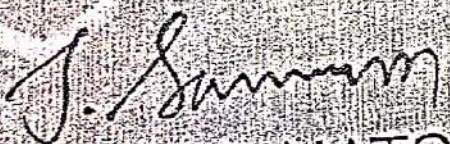
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Energy Saving From Sunlight with Microcontroller Using Proteus Software Design

¹Parameswari A, ²Kavithamani.V and ³Vedha vinodha.D
^{1,2,3}Assistant Professor

^{1,2,3}Electronics & Communication Engineering Department, J.C.T College of Engineering and Technology

Abstract-- This paper focuses on the optimization of the electric energy production by photovoltaic cells through the development of a Dual axis sun-tracking system. The developed tracking system is innovative in relation to the usual sun tracking systems available in the market. In fact, the developed solution has many advantages in relation to similar existing devices, in this paper; a new proteus software design using micro-controller based solar-tracking system is proposed, implemented and tested. The scheme presented here can be operated as independent of the geographical location of the site of setting up. The system checks the position of the sun and controls the movement of a solar panel so that radiation of the sun comes normally to the surface of the solar panel. The developed-tracking system tracks the sun both in the azimuth as well as in the elevation plane. PC based system monitoring facility is also included in the design. As this system is autonomous regarding the information needed to process the optimal orientation and is intelligent in a way that it performs on-line monitoring of the photovoltaic energy production. An experimental prototype is built and field results have proven the good performance of the developed tracking system.

Keywords-- Elevation, Azimuth, Altitude, LDR, AutoCAD, Sketch Up, Proteus, Arduino Microcontroller.

I. INTRODUCTION

A solar collector or photo-voltaic module receives the maximum solar-radiation when the Sun's rays strike it at right angles. Tilting it from being perpendicular to the Sun will result in less solar energy collection by the collector or the module. Therefore, the optimal tilt angle for a solar energysystem depends on both the site latitude and the application for which it is to be used. Many solar applications mounted either on a fixed rack or on a tracking rack. Fixed collectors or modules producing heat or electricity throughout the year are usually installed and tilted at an angle equal to the latitude of the site in which the collector or module faces directly the Sun. Of course, the optimal position is suitable for the time when the Sun is at midpoint in the sky (i.e. spring and fallseasons). The energy collected by the solar system in both winter and summer is far less due to several reasons such as clouds in winter and temperature scattering in summer in addition to the Suns changing altitude. But nevertheless in such cases, it is desirable that the average yearly collection ofenergy is maximized (i.e. the angle position of the collector or module is adjusted to receive maximum energy). A Sun-tracking mechanism increases the amount of solar energy that can be received by the solar collectors or photovoltaic modules consequently this would result in a higherdaily and annual output power harnessed. The use of a tracking system is more expensive and more complex than fixed mounts: however they can become cost-effective in many cases because they provide more power output throughout the year and in many cases this increase exceeds 25% [1]. Commercially, tracking systems are available either as a single-axis or a dual-axis design. The single-axis tracker

follows the Suns apparent east-to-west movement across the sky, while the dual-axis tracker, in addition to east-west tracking, tilts the solar collector or module to follow the Sun's changing altitude angle. To investigate the improvement in the daily output power of a photo-voltaic module, a single-axis Sun-tracking system is designed based on a programmable logic controlling unit. A suitable controlling program is also developed to accomplish the control operation with the possibility of implementing this arrangement as a data-acquisition system for solar radiation values during daytime.

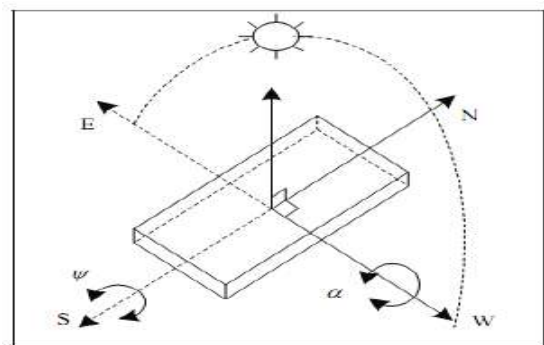


Figure 1: Two axis position control of the solar Panel

Efficient collection of maximum solar irradiation on a flat panel requires adjustments of two parameters of the energy collecting surface namely the angle of azimuth, ψ and the angle of tilt, α , of the surface to be illuminated in Figure 1.

II. THE ORIENTATION PRINCIPLE OF THEPHOTOVOLTAIC PANELS

The orientation principle of the PV panels is based on the input data referring to the position of the sun on the sky dome (fig. 2). For the highest conversion efficiency, the sunrays have to fall normal on the receiver surface so the system must periodically modify its position in order to maintain this relation between the sunrays and the panel. The positions of the Sun on its path along the year represent input data for the design process of the tracking systems.

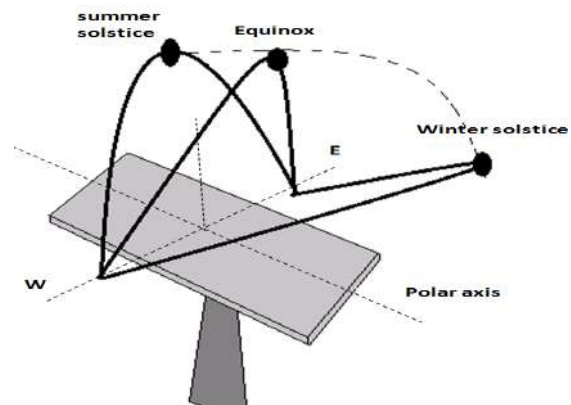


Figure 2: Position of the sun on the sky dome

The Earth describes along the year a rotational motion following an elliptical path around the sun. During one day,



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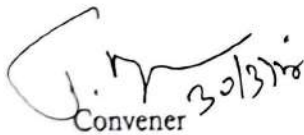
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at

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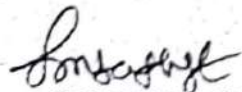


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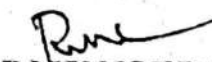
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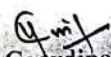
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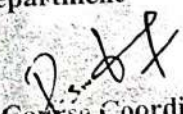
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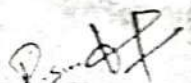
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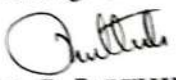
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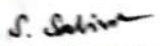
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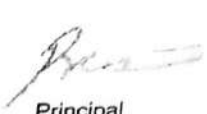
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STRENGTH AND FRACTURE PROPERTIES OF HYBRID FIBRE REINFORCED CONCRETE*

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¹Assistant Professor in Civil Engineering, S.S.M College of Engineering, Komarapalayam, India

²Principal, N.S.N College of Engineering and Technology, Karur, India

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Abstract– This paper investigated the shear, impact and fracture strengths of high-strength concrete reinforced with two different industrial waste fibres. Locally available steel lathe waste and nylon waste were used at different volume fractions as fibre cocktails in concrete. Steel lathe wastes were used as-received lengths and nylon fibres were chopped into 40 mm lengths in this investigation. In total, 12 hybrid mixes were casted and tested at four different volume fractions (0.5%, 1.0%, 1.5% and 2.0%). The experimental programme was used the slump test and the air content test on the fresh concrete. The hardened concrete was tested for its shear and impact strength. A flexural test on notched beams under three-point bending was also carried out according to the RILEM 50-FMC committee recommendations. Load vs. mid-span deflection and load vs. crack mouth opening displacement were obtained and the fracture energy was evaluated. The best performance was obtained in hybrid which was enhanced due to the hybrid nature of the fibre cocktails of all the mixes, 2% volume fraction with a combination of steel $\frac{1}{2}$ + nylon $\frac{1}{2}$ fibres gives the best performance. The steel lathe waste fibres mainly contributed to limiting the crack initiation and lightweight non-metallic nylon fibres restricted the crack propagation. The combined advantages of these fibres provide high mechanical and fracture strength. Hence this hybrid fibre reinforced concrete with industrial waste fibres is doubly advantageous as it provides a superior performance without increasing the cost of the concrete.

Keywords– Fibre reinforcement, high-strength concrete, mechanical properties, fracture energy, industrial waste

1. INTRODUCTION

Investigations on overcoming the brittle response and limiting post-yield energy absorption of concrete led to the development of fibre reinforced concrete using discrete fibres within the concrete mass. The fibres were introduced to develop concrete with enhanced flexural and tensile strength. The fibres were included in the concrete in order to delay and control the tensile cracking of the composite materials. The fibres transform the inherent unstable tensile crack propagation into a slow, controlled growth of the crack. Thus, the fibre reinforcement delays the initiation of flexural and shear cracking. It strongly influences the post-cracking behavior and significantly enhances the toughness of the composite. Fibres of different materials such as metallic, polymeric and cellulose are presently used in high-strength concrete for various infrastructural applications. Among them, metallic steel fibres contribute considerably to the improvement in tensile strength toughness, and the resistance to shrinkage, by arresting the crack propagation in the matrix [1]. Whereas low-density polymeric fibres such as polypropylene, glass and nylon restrain the plastic cracks in the matrix [2], high-strength concrete with single fibres of either type does not offer a

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LABORATORY STUDIES ON CONVERSION OF BIOMASS INTO ENERGY SOURCE USING EFFECTIVE MICROORGANISIM

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ABSTRACT

Biomass generation, treatment and disposal are both economic and environmental problem of concern for the urban communities, especially in fast population exploding countries like India. Biomass is the constitution of all plants, broken branches, Residues of agriculture wastes like rice husk, straw, leaves, sugar cane, etc., forest leaves, broken branches, wood chipping, timber mill residues, water hyacinth, algae, dropping of birds, animals, industrial wastes from food processing, sugar industries, slaughter house, meat packing plants, tanneries, etc., municipal wastes solid waste, sewage treatment plant sludge, etc., The present study deals the sources, treatment and strategies for future management of biomass. In this study a detailed analysis of the quantification, characterization and leachate analysis of the biomass from JCT campus and developed a procedure for conversion of compost from biomass using simple and inexpensive equipment of the type commonly available in the urban and rural households. Further, a lab scale biomass reactor and produce vermicompost using earthworm has developed and performance analysis of biomass were analysed. During the study, necessary convention techniques and analysis of the wastes had been undertaken. Similarly, the model prototype of the reactor and performance were evolved with necessary recommendations incorporated in the study.

Keywords: Biomass, Reactor, EM solution, pH meter and Thermometer.

I. INTRODUCTION

Biomass generation, treatment and disposal are both economic and environmental problem of concern for the urban communities, especially in fast population exploding countries like India. The growth of biomass in our urban centers has outpaced the population growth in recent years. This trend can be ascribed for our changing lifestyles, food habits, and change in living standards. Biomass in cities are collected by respective municipalities and transported to designated disposal sites, which are normally low lying areas on the outskirts of the city. The limited revenues embarked for the municipalities make them ill equipped to provide for high costs involved in the collection, storage, treatment, and proper disposal of biomass. The insanitary methods



Synthesis of Biogas as a Renewable Energy from Organic Waste Mixture by Anaerobic Fermentation

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Key Words:

Animal waste
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ABSTRACT

An alternative method of obtaining gaseous fuel is through the anaerobic fermentation of wet livestock (animal and vegetable) wastes to produce biogas which is a mixture of methane (45-75%) and carbon dioxide. The process occurs in two stages. In the first stage, the complex organic substance contained in the waste is acted upon by a certain kind of bacteria called acid formers and are broken into small chain simple acids. The second stage produces methane and carbon dioxide by another kind of bacteria. The calorific value of this biogas ranges from 16000-25000 kJ/m³. It is an excellent fuel for cooking and lighting as well. When blended with diesel, it is a very good alternate fuel for compression ignition engines and can yield diesel savings of 72 to 80%. Thus, by means of suitable apparatus, biogas is produced from animal waste and vegetable waste with high calorific value (more than 16000-25000 kJ/m³).

INTRODUCTION

Due to the increase in the price of petroleum and its demand, the environmental concerns about pollution from burning gases, biogas is becoming a booming area of high concern. The attractive features of biogas are (1) it is plant derived, not a fossil fuel and as such, its combustion does not increase current net atmospheric levels of carbon dioxide, a greenhouse gas, additionally. (2) It can be domestically produced, offering the possibility of reducing petroleum import. (3) It is biodegradable and relative to convectional gas fuel (Selvamurugan et al. 2013).

Biogas is distinct from other renewable energies because of its characteristics of using, controlling and collecting organic wastes and at the same time producing fertilizer and water for use in agricultural irrigation. Biogas does not have any geographical limitations nor does it require advanced technology for producing energy, also it is very simple to use and apply. Biogas is a gas mixture and obtained by disintegration of organic materials in anaerobic conditions. 1m³ biogas has 5000-5500 kcal energy, according to methane rate. It is an uncoloured and odourless and weaker than air. Its density rate, according to air is 83% and the octane number is 110. Subject of waste management, legislated and selling of electricity obtained from biogas is given an incentive bonus for increasing speed of this development. Nowadays, one of the most important problems of the world is environmen-

tal pollution. Increase of CO₂ emission because of using fossil energy sources cause global warming and climate change, which affects human life negatively. Biogas process can help reduce CO₂ emission born of using fossil energy sources, and also it reduces demand of fossil energy resources (Aremu & Agarry 2013).

Anaerobic digestion has been found a very good method to reduce organic matter and odours, destroy pathogens and produce energy (methane). Furthermore, anaerobic digestion is a good option to reduce mass volume of animal and vegetable wastes in the present environment. The objective of this study is to analyse, in terms of quantity and quality, the release of biogas and methane from animal waste and biodegradable vegetable waste and select the optimum ratio of the mixture as 60:40 for the study.

MATERIALS AND METHODS

Collection of Raw Materials

The vegetable waste was collected from Anna market, and animal waste from rural areas of Coimbatore, Tamilnadu. The mass of raw material for the mixture in the ratio of 60:40 as given in Table 1.

Preparation of Raw Materials

It was ensured that foreign materials like earth, sand, gravel, sawdust, etc., did not enter the digester. The slurry was pre-

An Experimental Study on the Effects of Size of Coarse Aggregate in Polypropylene Fibre Reinforced Self Compacting Concrete

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ABSTRACT

Self-Compacting Concrete (SCC) is considered as the most revolutionary development in concrete construction. It can flow through and fill the gaps of reinforcement and corners of moulds without any need for vibration and compaction during the placing process. This paper presents an experimental investigation carried out to identify the effective size of coarse aggregate for Self-Compaction Concrete. Here the grade of SCC used for comparing various properties of concrete is M30. This paper also tried to investigate the performance of SCC at hardened state when added by a fixed amount of Polypropylene fibre. Polypropylene fibre content was taken as 0.3% by weight of cement used for each mix of concrete. Workability tests for SCC mixes were carried out in this investigation to check the guidelines given by European Federation of Producers and Applicators of Specialist Products for Structures (EFNARC) using Slump flow apparatus, L-box, V-Funnel, J-Ring and U-box test methods. At the end of this investigation usage of 20mm sized coarse aggregate was found to be effective in taking compressive forces while 16mm in tensional forces. Addition of Polypropylene fibre was found to be effective in increasing the tensile strength only.

Key words: Self Compaction Concrete (SCC), Polypropylene Fibre, Superplasticizer, Compressive strength, Split tensile strength, Flexural strength, Polypropylene Fibre Reinforced Self Compaction Concrete (PFRSCC).

INTRODUCTION

Self-compacting concrete (SCC) is a concrete, which flows and compacts only under gravity. It fills the moulds completely without any defects. Usually self-compacting concretes have compressive strengths in the range of 60-100 N/mm². However, lower grades can also be obtained and used depending on the requirement.

SCC was originally developed at the University of Tokyo in Japan with the help of leading concrete contractors during 1980's to be mainly used for highly congested reinforced

An Experimental Study on Glass Fibre Reinforced Self Compacting Concrete using Copper Slag as a Partial Replacement of Fine Aggregate

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ABSTRACT

Development of self-compacting concrete (SCC) is a desirable achievement in the construction industry in order to overcome problems associated with cast-in-place concrete. Since, common river sand is expensive and also large scale depletion of these sources creates environmental problems, a substitute or replacement product for concrete industry is the need of the hour. In such a situation, the Copper Slag can be an economic alternative to the river sand, which is an industrial by-product obtained from the manufacturing of copper. SCC was added with relatively short, discrete, and discontinuous glass fibres to produce Glass Fibre Reinforced Self Compacting Concrete (GFRSCC), to avoid cracking on loading due to low tensile strength of concrete. The use of glass fibres in SCC improves the engineering properties such as tensile strength, ductility, post crack resistance and energy absorption capacity. This work aims at the partial replacement of sand by copper slag and the strength variations observed by the incorporation of glass fibres are studied and compared with the strength properties of control mix SCC. Mix proportioning has to be done for M30 SCC and Self Compactability is checked by various flow tests of slump flow test, J-ring test, U-box, V-funnel and L- Box. Sand is replaced with copper slag in proportions of 0%, 20%, 30%, 40%, 50% and 60% with constant proportion of glass fibre i.e., by 0.1% by volume of concrete. All the trial mixes are planned to be tested and then the optimum mix which gives the maximum strength criteria is to be found out.

Key words: Self Compacting Concrete (SCC), Glass Fibre Reinforced Self Compacting Concrete (GFRSCC), Copper Slag, Super plasticiser, Ductility, Strength tests, workability tests.

INTRODUCTION

Recent changes in construction industry demand improved durability of structures. At present there is a large emphasis on performance aspect of concrete. One such thought has lead to the development of Self Compacting Concrete (SCC). It is considered as “The most revolutionary development in concrete construction”.

SCC is a new kind of High Performance Concrete (HPC) with excellent deformability and segregation resistance and can be considered as a concrete with high flow ability that can be

A PILOT SCALE STUDY ON IN-VESSEL COMPOSTING OF ORGANIC WASTE USING FORCED AERATION

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ABSTRACT

The conventional composting processes are viable sludge disposal options that produce marketable end products. The conventional process is based on natural ventilation whereas the aerated method uses forced mechanical aeration. This study is based on the experimental data on biodegradation of organic wastes with different C:N ratios. Further, their conditions in-vessel composting units have been presented and detailed analysis on the stabilization of organic wastes was performed. The study was executed under natural and forced aeration. Four separate amendment conditions were applied to stimulate varying degrees of bioconversion rate. Optimum conditions were maintained inside the vessel by means of proper aeration, moisture and sufficient mixing. Several of nutrient values (carbon, nitrogen, phosphorus, potassium) during temperature, pH and volatile solids were carried out on alternate days. The process was carried out in the laboratory scale reactors using different types of organic wastes such as paper and pulp, dairy sludge, sugar industry wastes, saw dust and municipal solid waste. Then their compost stability was assessed.

Key Words : MSW, Saw dust, Pulp and paper mill sludge, Dairy effluent, Sugar industry sludge, EM solution

INTRODUCTION

Rapid urbanization, increase in population and change in life style in India have resulted in a dramatic increase in Municipal Solid Waste (MSW) constitutes an immediate and serious environmental problem in many developing countries. Accumulation of a large amount of waste may create several problems to inhabiting populations. Composting is the biological decomposition of biodegradable organic substrates carried out by successive microbial inhabitants combining both mesophilic and thermophilic activities, under controlled predominantly aerobic conditions to a state that is sufficiently stable for nuisance-free storage and handling and is satisfactorily matured for safe use in environment.^{1,2} The In-vessel composting is a number of integrally related components

including : material amendment, recycle, handling, storage, mixing, reactor system, odour control system, aeration system, exterior curing with storage facilities and marketing of produced compost³. The study also explored changes in microbiological and physico-chemical parameters during single batch composting of municipal organic waste. The inter-relationship between the microbial biomass as well as physico-chemical parameters such as pH, temperature and moisture content were also evaluated. The present study included the design and testing of a compost reactor working aerobically, which was inoculated with cow dung containing compost accelerating microorganisms and bulking agent such as saw dust to achieve substantial and rapid volume reduction of the bio-waste. The compost from the designed aerobic reactor

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Experimental Study on Glass Fibre Reinforced Steel Slag Concrete with Fly Ash

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ABSTRACT:- The scope of this project is to establish the use of steel slag, fly ash and glass fibre in many effective ways to achieve high strength than conventional concrete. This project shows the experimental studies on the enhancement of strength in concrete blocks by the application of using waste steel slag, glass fibre for increasing the strength and fly ash for replacing cement for good workability and also to achieve high strength than a conventional concrete. The proposed experiment was done and all the tests were done by us at our college campus laboratory. Grade of concrete is taken as M30. Fly ash was added in three different percentages (i.e. 5%, 10%, and 15%) by replacing of cement. And also fine aggregate in the concrete is replaced by steel slag in a constant percentage (30%), throughout the experimental studies. To find the optimum value of steel slag, steel slag concrete test analysis is also being done. The percentage of steel slag added was (20%, 30% and 40%). Glass fiber is an additive used with the concrete in order to achieve good properties. For that 1% of glass fibre is added to the volume of concrete. By using this replaced concrete - cubes, cylinders and prisms were casted and tested for their strength and then the result was compared with conventional concrete.

I. INTRODUCTION

Concrete is a mixture of cement, fine aggregate, coarse aggregate and water. Globally concrete is the backbone for the large development of infrastructure viz., buildings, industrial structures, bridges and highways etc., leading to the utilization of large quantity of concrete. Glass fiber reinforced concrete (GFRC), in simplest terms, is the replacement of conventional large aggregate and steel rebar with a homogeneously dispersed network of tiny strands of glass in a slurry of cement and sand. Fly ash is finely divided residue resulting from the combination of ground or powdered coal. They are generally finer than cement and consist mainly of glassy spherical particles as well as residue of hematite and magnetite, char and some crystalline phases formed during cooling.

Steel slag is a by-product obtained either from conversion of iron to steel in a Basic Oxygen Furnace (BOF), or by the melting of scrap to make steel in the Electric Arc Furnace (EAF). The steel slag is obtained as a waste product after undergoing several industrial processes for the production of steels. Steel slag is having similar particle size characteristics likely to that of coarse aggregate. Likewise, many of this property match best with that of coarse aggregate. Hence, it is a better approach in using the slag as the replacement for coarse aggregate.

II. MATERIALS USED AND ITS PROPERTIES

1. CEMENT

Cement is the most important binding material of concrete. The cement used for this experimental study is Ordinary Portland Cement conforming to IS 269-1976 and IS 4031-1968 of 53 grade.

Experimental Study on Hybrid Fibre Reinforced Concrete Property Using Silica Fume and Steel Slag

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ABSTRACT: Concrete is the most widely used everyday construction material. The advancement of concrete technology can reduce the utilization of natural resources and energy sources and lessen the burden of pollutants on environment. Presently large amounts of silica fume and steel slag are generated in industries with an impact on environment and humans. Conventional concrete has two major defects: low tensile strength and a destructive and brittle failure. In an attempt to increase concrete ductility and energy absorption, fibre reinforced concrete has been introduced. The present investigation revealed the effect of using silica fume and steel slag as a partial replacement of cement and fine aggregate along with optimum percentage of polypropylene and steel fiber. For this study (M30) grade concrete is designed. Partial replacement of cement with silica fume will be made for varying percentages such as by weight 0%, 5 %, 10% and 15% .Along with a fixed amount of (30%) of steel slag as fine aggregate and with optimum fibre percentage as polypropylene (0.2%) and steel fiber (0. 8%) respectively. From this study the strength properties of the concrete have been investigated.

KEYWORDS: Silica Fume, Steel Slag, Hybrid Fibres, Compressive Strength, Split Tensile Strength, Flexural Strength

I. INTRODUCTION

Concrete is an important construction material consisting of ingredients which are mainly inert materials such as coarse and fine aggregate and cement as binding material. It is a composite material composed of coarse granular material enclosed in a hard matrix of material that fills the space among the aggregate particles and glues them together. It can be cast in diverse shapes. Today, concrete is the most extensively used man-made material. The concrete has high compressive strength, stiffness, low thermal conductivity, low combustibility and low resistance tensile strength, limited ductility and little resistance to cracking. Waste can be used as additive material in concrete, admixtures in cement and raw material in cement clinker, or as aggregates in concrete. Ordinary Portland cement (OPC) is acknowledged as the major construction material throughout the world. Most of the increase in cement need could be met by the use of supplementary cementing materials, in order to reduce the green gas emission. If alternative cheap cement can be produced locally, the demand for Portland cement will reduce. Industrial by-products being used as supplementary cement replacement materials and in recent times agricultural wastes are also being used as pozzolanic materials in concrete. When pozzolanic materials are fused to concrete, the silica present in these materials react with the calcium hydroxide released during the hydration of cement and forms extra calcium silicate hydrate (C – S – H), which improve durability and the mechanical properties of concrete. Therefore, for overcoming of this massive problem, the artificial manufactured aggregates viz., steel slag and silica fume generated from the industrial wastes can be utilized as an alternative. Concrete is a delicate material with low tensile strength and low strain capacity that result in low resistance to cracking. To improve such properties, fibre reinforced concrete has been developed. Fibres are intended to improve tensile strength, flexural strength, toughness and impact strength ,to modify failure mode by means of improving post-cracking ductility, and to control cracking .Tensile strength of the composite, related more to

STRENGTH STUDY ON ACTIVATED FLY ASH CONCRETE WITH GLASS FIBER USING BEAM

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Abstract: *Concrete has become an indispensable construction material and it is now used in greater quantities than any other material. In the current era, the concept of durability and the sustainable development are the key issues for the development. The replacement of cement with fly ash benefits cost saving, energy saving environmental protection and conservation of resources. The replacement of cement with fly ash decreases the early strength and increases setting time. But chemical activation is simple and economical. The chemical activators destroy the crystalline structure and produces calcium silicate hydrate which enhances the strength and durability of concrete. In this study fly ash is activated using chemicals like calcium oxide (CaO) and sodium silicate (Na₂SiO₃) in the ratio of 1:8 for the effective inclusion of fly ash as replacement to cement. The percentages of replacement of activated fly ash (AFC) are 30%. The hardened concrete properties are studied and compared with control mix with PPC and fly ash concrete without activation. In general the concrete is weak in tension to increase the tension nature in the concrete addition of fiber is taken place. So we are using glass polymer fiber to gain such tensile strength. The proportion of the fiber we are used 0.5% and 1% from the weight of cement.*

Keywords : Fly Ash, Activated Fly Ash, Glass fiber, workability, strength

I. INTRODUCTION

Fly ash is being increasingly used in concrete to lower the costs and improve the properties of concrete. However the replacement of Portland cement with fly ash especially in high volume decreases the earlier strength of the concrete.

Fly ash contributes the strength of concrete in three ways,

- By reduction of water requirement for a given slump.
- By increasing the volume of paste there by improvement of workability.
- By pozzolanic reaction between fly ash and CaO.

The first two aspects are beneficial to the earlier strength. Thus, the decrease of earlier strength of concrete containing fly ash is attributed to the slow pozzolanic reaction between fly ash and CaO.

Little work has been done on the chemical activation of the reactivity of fly ash. Earlier studies have indicated that the addition of chemical activators can effectively accelerate or improve the pozzolanic reaction of natural pozzolans. In a primary study, it was found that the reactivity of fly ash could be

significantly increased by addition of CaO and Na₂SiO₃. This study examines the effect of chemical activators CaO and Na₂SiO₃ on early microstructure development of lime fly ash pastes and the strength of concrete compared to ordinary Portland cement and inactivated fly ash. The M₂₀ grade of concrete was used with mix proportion of 1:1.28:2.78 kg/m³ at 0.50 water binder ratio. The mechanical properties such as cube compressive strength, split tensile strength & flexural strength were studied at 7 and 14 days.

II. MATERIALS AND METHODS

FLY ASH: Fly ash is one of the residues generated in the combustion of coal. Fly ash is generally captured from the chimneys of power generation facilities, whereas bottom ash is, as the name suggests, removed from the bottom of the furnace. In the past, fly ash was generally released into the atmosphere via the smoke stack, but pollution control equipment mandated in recent decades now require that it be captured prior to release. It is generally stored on site at most US electric power generation facilities. Depending upon the source and makeup of the coal being burned, the components of the fly ash produced vary considerably,

Experimental Study on Sisal Fibre Reinforced concrete With Partial Replacement of Cement by Ground Granulated Blast furnace Slag

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Abstract: The study focuses on the compressive strength, split tensile strength, flexural strength performance of the blended concrete containing sisal fibre and different percentage of slag as a partial replacement of OPC. The cement in concrete is replaced accordingly with the percentage of 10 %, 20% and 30% by weight of slag and 1% of sisal fibre is added by weight of cement. Concrete cubes are tested at the age of 7, 14, and 28 days of curing. Finally, the strength performance of slag blended fibre reinforced concrete is compared with the performance of conventional concrete. From the experimental investigations, it has been observed that, the optimum replacement of Ground Granulated Blast Furnace Slag Powder to cement is 20 % for M30 grade

Keywords: Sisal fibre, ground granulated blast furnace slag, compressive strength, split tensile strength, flexural strength

1. Introduction

The manufacture of concrete, primarily its ingredients; cement and aggregates; presents various sustainability issues that need to be dealt. The production of concrete has always lead to massive exploitation of natural resources. Manufacturing 1 tonne of Portland cement requires quarrying 1.5 tonnes of limestone and clay (Civil and Marine, 2007). Moreover, continuous extraction of natural aggregate; sand and gravel; from river beds, lake and other water bodies over the years have led to erosion which eventually leads to flooding and landslides. Further, there is less filtration of rainwater due to reduced amount of natural sand, causing contamination of water needed for human consumption. 1.4 tonnes of Ordinary Portland cement being produced yearly around the globe contributes to 5 percent of greenhouse gas, carbon dioxide, emissions worldwide (Civil and Marine, 2007). Not only burning fuel to heat the kiln emits carbon dioxide, but also decomposition of limestone emits even more gas. These identified problems clearly, contribute significantly to climate change. The ideal target to partly solve the above phenomenon is to develop a sustainable system loop which can turn resources which are landfilled as waste materials into useful products in the construction industry, thus preserving the natural resources.

Concrete is a tension-weak building material, which is often crack ridden connected to plastic and hardened states, drying shrinkage, and the like. The cracks generally develop with time and stress to penetrate the concrete, thereby impairing the water proofing properties and exposing the interior of the concrete to the destructive substances containing moisture, bromine, acid sulphate, etc. The exposure acts to deteriorate the concrete, with the reinforcing steel corrosion. To counteract the cracks, a fighting strategy has come into use, which mixes the concrete with the addition of discrete fibres and pozzolanic materials. Experimental studies have shown that fibres and pozzolanic materials improve the mechanical properties of concrete such as flexural strength,

compressive strength, tensile strength, creep behaviour, impact resistance and toughness. Moreover, the addition of fibres and pozzolanic materials makes the concrete more homogeneous and isotropic.

2. Materials Used

Cement

Ordinary Portland cement of Grade 53 has been used in the study. Table 1 shows the physical characteristics of cement used, tested in accordance with IS: 4031-1988.

Table 1: Physical properties of cement

Sl.NO	Specifications	Results
1	Type	OPC
2	Specific Gravity	3.10
3	Initial setting time	40 minutes
4	Final setting time	450 minutes
5	Fineness	2%

Fine aggregates

The fine aggregate used was locally available river sand without any organic impurities and conforming to IS: 383 – 1970. The fine aggregate was tested for its physical requirements such as gradation, fineness modulus, specific gravity and bulk density and is shown in table 2.

Table 2: Properties of fine aggregate

Sl.NO	Specifications	Results
1	Type	River sand
2	Specific gravity	2.6
3	Grading	Zone III

Coarse Aggregate

The crushed coarse aggregate obtained from the local crushing plant is used in the present study. The physical properties of coarse aggregate like specific gravity, water absorption and fineness modulus are tested in accordance with IS: 2386 are given in Table 3.

Experimental Study on Strength Properties of Triple Blended Self Compacting Concrete

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ABSTRACT

Self-compacting concrete (SCC) is one of the most outstanding development in concrete technology during the recent years. Self compacting concrete is a flowable concrete which is able to consolidate under its own weight. The highly fluid nature of SCC makes it suitable for placing in difficult situation and in sections with congested reinforcement. In this investigation a study has been conducted to determine the Strength Characteristics of Self-Compacting Concrete. The aim of the study is to make use of Fly Ash, Ground Granulated Blast Furnace Slag and Silica Fume as replacements of cement and understand its effect on the fresh and hardened properties of concrete. In this study Nan Su method was used for mix design and SCC was designed for M30 grade. The investigation includes the concept of triple blending of Fly ash, GGBS and Silica Fume in different percentages, this triple blend exploits the beneficial characteristics of Pozzolanic materials in producing a better concrete. By making use of these industrial by products an eco friendly concrete can be produced.

Key words: Self Compacting Concrete, Fly ash, Ground Granulated Blast Furnace Slag, Silica Fumes, Compressive strength, Split Tensile strength, Flexural strength.

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INTRODUCTION

The self compacting concrete is one of the most widely used concrete types mainly because of its self compacting characteristics and additional strength benefits. No matter what type of building structure it is, the concrete should be sturdy and well compacted. Proper compaction not only provides additional strength to the structure but also good finish and appearance to

Experimental Study On Fibre Reinforced Concrete By Partial Replacement Of Cement Using Metakaolin And Fine Aggregate Using Quarry Dust

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ABSTRACT

The scarcity of river sand is one of the major problems in the construction industry. Generally, studies were conducted to find out feasibility of using quarry dust to partially replace sand in concrete. These studies revealed that due to increased fineness, the combination requires an increased water cement ratio which results in strength reduction. The use of pozzolanic supplementary cementing materials such as silica fume, metakaolin etc in concrete and mortar improves the strength. Metakaolin is a supplementary cementitious material, calcined kaolinite is available at moderate cost. In this paper the study presents the results to use metakaolin in concrete as a partial replacement of cement where, quarry dust was used as a partial replacement of fine aggregate with constant super plasticizer dosage. In some cases there occurs a gradual decrease in the strength in quarry rock dust based concrete. Hence to overcome this disadvantage polypropylene fibres are added to the varying mixes. The study focuses on the compressive strength, split tensile strength, flexural strength performance. The cement in concrete is replaced accordingly with the percentage of 5%, 10%, 15%, 20% by weight of metakaolin and quarry dust is replaced at 25% by weight of fine aggregate. Finally the strength performance of metakaolin blended fibre concrete is compared with the performance of nominal concrete. From the experimental studies it has been observed that, the optimum replacement of metakaolin to cement is 15% for M30 grade mix.

Key words: OPC 53 grade, Metakaolin, Quarry Rock Dust, Polypropylene Fibres, Super Plasticizers, Strength, Results.

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INTRODUCTION

Concrete is the dominant construction material used around the world and its properties have been undergoing changes through the recent years of advancement. Various type of concrete has been developed to enhance the different properties of concrete. This development can be divided into four stages. The earliest is the conventional concrete which is composed of

Behaviour of Glass Fibre Reinforced Concrete Using Ultra Fine Micro silica and Copper Slag

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ABSTRACT

Concrete is a widely used construction material around the world, and its properties have been undergoing changes through technological advancement. Numerous types of concrete have been developed to enhance the different properties of concrete. The earliest is the traditional normal strength concrete which is composed of only four constituent materials, which are cement, water, fine aggregate and coarse aggregate. With a fast population growth and a higher demand for housing and infrastructure, accompanied by recent developments in civil engineering, higher strength concrete was needed.

This thesis work focuses on investigating the characteristics of M30 grade concrete with partial replacement of cement using ultra-fine micro silica and sand by copper slag. Different series of concrete mixtures were prepared for this experimental study. Cement is replaced with ultra-fine micro silica at proportions involving 0%, 5%, 10% and 15% and sand is replaced with copper slag at constant proportion 20%, 40% and 60%. All specimens were cured for 7 days and 28 days to investigate the compressive strength, split tensile strength and flexural strength. It is found that by the partial replacement of cement using ultra fine micro silica and sand by copper slag helped in improving the strength and enhanced mechanical properties of the concrete substantially compared to the normal mix concrete.

Key words: Copper Slag, Glass Fibre, Superplasticizer, Ultra Fine Micro Silica, Compressive Strength, Flexural Strength, Split Tensile Strength.

INTRODUCTION

Concrete is composite material containing hydraulic cement, water, coarse aggregate and fine aggregate. The resulting material is a stone like structure which is formed by the chemical reaction of the cement and water. This stone like material is a brittle material which is strong in compression but very weak in tension. This weakness in the concrete makes it to crack under small loads, at the tensile end. These cracks gradually propagate to the compression end of the member and finally, the member breaks. The formation of cracks in the concrete may also

Experimental Study on the Effect of Metakaolin and Fly ash on Steel Fibre Reinforced Concrete

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ABSTRACT

Cement production is the reason for increase to CO₂ emissions generated by the calcinations of CaCO₃ and by the fossil, being responsible for about some percentage of the CO₂ emissions in the world. This can be substantially reduced if cement replacement materials such as fly ash and Metakaolin are used. The vast improvements achieved by the addition of fibers to concrete, there are different applications where Fibers Reinforced Concrete (FRC) can be intelligently and beneficially use. The present report deals with the effects of admixtures, by partial replacement of cement in steel fibre reinforced concrete, in terms of improved performance on compressive, split tensile and flexural strengths. The main aim of this experimental project was to study the effect of Fly-ash and Metakaolin on Steel Fibre Reinforced Concrete. The compressive strength of concrete was measured by the cubes of 150 x 150 x 150 mm for 28 days. Cement was replaced by Fly-ash with 15 % and Metakaolin by 5%, 10%, 15%, 20%. A constant amount of Super plasticiser was used was by weight of cement. The water-cement ratio adopted in this work was 0.45 in all mixtures of Cement + Fly-ash + Metakaolin. The value of water cement ratio in the presence of Fly-ash and Metakaolin affected the results. The steel fibres were added 1% by volume of concrete. The results will compare with the specimens of Conventional Cement Concrete and steel fibre reinforced Concrete with Metakaolin, Fly ash.

Key words: Normal Concrete (NC), Steel Fibre, Metakaolin, Fly Ash, Super plasticiser, Ductility, Strength tests, workability tests.

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INTRODUCTION

The brittleness property was increased by using short discrete and discontinuous, reinforcement from the ancient days what is called "fibre". Addition of fibre in the concrete has shown wide improvements in engineering properties in the recent decade. The improvement in properties depends on various parameters such as type of fibre, aspect ratio, elastic properties, size and shape of fibre, method of preparation etc. By varying these parameters respective investigation have been conducted already.

Experimental Study On Fibre Reinforced Concrete By Partial Replacement Of Cement Using Metakaolin And Fine Aggregate Using Quarry Dust

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ABSTRACT

The scarcity of river sand is one of the major problems in the construction industry. Generally, studies were conducted to find out feasibility of using quarry dust to partially replace sand in concrete. These studies revealed that due to increased fineness, the combination requires an increased water cement ratio which results in strength reduction. The use of pozzolanic supplementary cementing materials such as silica fume, metakaolin etc in concrete and mortar improves the strength. Metakaolin is a supplementary cementitious material, calcined kaolinite is available at moderate cost. In this paper the study presents the results to use metakaolin in concrete as a partial replacement of cement where, quarry dust was used as a partial replacement of fine aggregate with constant super plasticizer dosage. In some cases there occurs a gradual decrease in the strength in quarry rock dust based concrete. Hence to overcome this disadvantage polypropylene fibres are added to the varying mixes. The study focuses on the compressive strength, split tensile strength, flexural strength performance. The cement in concrete is replaced accordingly with the percentage of 5%, 10%, 15%, 20% by weight of metakaolin and quarry dust is replaced at 25% by weight of fine aggregate. Finally the strength performance of metakaolin blended fibre concrete is compared with the performance of nominal concrete. From the experimental studies it has been observed that, the optimum replacement of metakaolin to cement is 15% for M30 grade mix.

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Experimental Investigation on Hybrid Fibre Reinforced Concrete with the Addition of Silica fume And Partial Replacement of Iron Slag to Fine Aggregate

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Abstract:

The lifetime of many metal products can be longer than 10 years and sometimes longer than 50 years, for instance products for building and construction, there is an accumulation of metal in use since the beginning of the industry. As the disposal of this waste is posing serious problem to the environment it is better to use this type of material in making concrete so that a waste material can be disposed by cleaner technology. This methodology will also prevent degradation in environment. Iron slag which is generated in large quantities as waste is hardly being used in the preparation of concrete. The material can be crushed and screened to meet specified grade requirements using fine aggregate processing equipment. Special quality control procedures may be required to address the lack of consistency in some properties such as gradation, specific gravity, and absorption. But iron slag is found to possess properties that are required for suitable replacement of fine aggregate. Hence the project is proposed to study the effectiveness of iron slag as substitute for fine aggregate. Control concrete with 10%, 20% 30% and 40% fine aggregate replacement with Iron slag were made. Blast furnace slag is mildly alkaline and exhibits a pH in solution in the range of 8 to 10 ppm. Although blast furnace slag contains a small component of elemental sulfur (1 to 2 %), the leachate tends to be slightly alkaline and does not present a corrosion risk. Concrete obtained by this method may have more self-weight than the conventional concrete, but it is expected to provide more strength than the conventional concrete

1.INTRODUCTION

Concrete is by far the most widely used construction material today. It is versatile, has desirable engineering properties, can be moulded into any shapes and more importantly is produced with cost-effective materials. There is an old saying that broken stone, sand, and cement make good concrete. But the same proportions the broken stone, sand and cement also make bad concrete. To make good concrete now variety of innovative materials such as fibres, admixtures and construction chemicals, pozzolanes and different concrete making techniques are adopted in present day construction. In recent years, intensive research has resulted in advances and innovation in the technology of fibres such that glass, polypropylene, carbon, steel, etc., and more basic knowledge has been gained on the behaviour of cement concrete containing these fibres. Concrete containing hydraulic cement, water, aggregate, and discontinuous discrete fibres is called fibre-reinforced concrete. The incorporation of short discrete fibres (steel, polypropylene, glass, carbon) can lead to useful improvements in the mechanical behaviour of tension weak concrete.

HISTORICAL PERSPECTIVE

The concept of using fibres as reinforcement is not new. Fibres have been used as reinforcement since ancient times. Historically, horse hair was used in mortar and straw in mud bricks. In the early 1900s, asbestos fibres were used in concrete, and in the 1950s the concept of composite materials came into being and fibre reinforced concrete was one of the topics of interest. There was a need to find a replacement for the asbestos used in concrete and other building materials once the health risks associated with the substance were discovered by the 1960s steel, glass,

synthetic fibres such as polypropylene fibres were used in concrete and research in new fibre reinforced concretes continuous today.

MAIN SCOPE OF THIS PROJECT

The present project is directly towards developing a better understanding on the contribution of constant in volume of concrete in steel fibre (0.60%) and polypropylene fibres (0.40%) on concrete to study the concrete compressive strength split tensile strength to the normal concrete. The experiments are to be carried out by adopting a constant water-cement ratio of 0.45 for M30.

OBJECTIVE OF THIS PROJECT

- To determine strength of the concrete to replacement the iron slag (10%, 20%, 30%, 40%) in various percentage to fine aggregate.
- To addition of super plasticizer is added 0.3% by weight of cement.
- The replacement of silica fume is 20% in constant ranges the weight of cement.

The strength properties being studied in our thesis are as follows:

1. Compressive strength
2. Split tensile Strength
3. Flexural strength

These properties are then compared to the plain cement concrete.

FIBRE MECHANISM

Fibre work with concrete utilizing two mechanisms: the spacing mechanism and the crack bridging mechanism. The spacing mechanism requires a large number of fibres well distributed within the concrete matrix to arrest any existing

An Experimental Investigation on the Effects of Concrete by Replacing Cement with GGBS and Rice Husk Ash with the Addition of Steel Fibers

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Abstract: *There has been a tremendous increase in the use of mineral admixture by industries during the late 20th century and the rate is expected to increase. Concrete is an artificial material, which is made up of cement, fine aggregates, coarse aggregates and water. The increasing demand for cement and concrete is met by the partial cement replacement by addition of supplementary cementing materials which leads to several improvements in the concrete composites and to the overall economy. Mineral admixtures are used in concrete because they improve the properties of concrete. The lower cement content leads to a reduction for CO₂ generated by the production of Portland cement. An attempt is made to replace the cement with GGBS with 20%, 30% 40% and RHA and steel fiber by constant proportion (10% and 1%) for minimum grade concrete i.e., M30 and is tested for fresh and hardened properties at 7, 14 and 28 days to identify the optimum percentage of GGBS in concrete. Replacement of cement by GGBS in M30 grade concrete in compressive strength split tensile test and flexural strength improvement up to the replacement of 30% in all ages.*

Keywords: GGBS, RHA, steel fibers, compressive strength, tensile strength and flexural strength

1. Introduction

Concrete has been the major instrument for making steady and reliable infrastructure since the days of Greek and Roman civilization. Concrete is the most world widely used construction material. Concrete is a blend of cement, water, and aggregates with or without chemical admixtures. The most important part of concrete is the cement. Use of cement alone as a binder material produces large heat of hydration. Since the production of this raw material produces lot of CO₂ emission. The CO₂ emission from the cement source is very harmful to the environmental changes. Nowadays many experiments have been carried out to reduce the CO₂. The productive way of minimizing CO₂ emission from the cement industry is to use the industrial by products or use of supplementary cementing material such as Ground Granulated Blast Furnace Slag (GGBS), Fly Ash (FA), and Metakaolin (MK). In this present experimental work an attempt is made to replace cement by GGBS and RHA by constant proportion with the addition of steel fibers to overcome these problems.

1.1. Ground Granulated Blast Furnace Slag (GGBS)

Ground Granulated Blast Furnace is a byproduct from the Blast furnace slag is a solid waste discharged in large quantities by the iron and steel industry in India. These works at a temperature of about 1500 degree centigrade and are fed with a carefully regulated mixture of iron. The parent rock is reduced to iron and remaining materials from slag that floats on top of the iron. This slag is regularly tapped off as a molten liquid and if it is to be used for the manufacture of GGBS it has been rapidly quenched in large volumes of water. The quenching optimizes the cementitious properties and produces flakes similar to coarse sand. This granulated

slag is then dried and ground to a fine powder. The main ingredient of slag is lime (CaO) and silica (SiO₂). Portland cement also contains these constituents. The principal constituent of slag is soluble in water and shows an alkalinity like that of cement or concrete.

1.2. Rice Husk Ash (RHA)

Rice husk is an agricultural residue consisting of non-crystalline silicon dioxide with high surface area and high pozzolanic reactivity, thus due to increasing environmental concern and the need to protect energy and resources, utilization of industrial and biogenic waste as supplement material has become an essential part of concrete construction. Pozzolonas improve strength because they are small in size when compared to the cement particles, and can pack in between the cement particles and provide a superior pore structure. RHA has two roles in concrete manufacture, as a substitute for Portland cement, reducing the cost of concrete in the manufacturing of low priced building blocks, and as an admixture in the production of high strength concrete.

1.3. Objective

1. To study the mechanical properties such as compressive strength, split tensile strength and flexural strength of the specimen.
2. To compare the results of different tests with varying proportions of GGBS (20%, 30% and 40%) keeping RHA and steel fiber content constant (10% and 1%).
3. To find the optimum percentage of replacement of cement with GGBS.
4. To find the effects of GGBS and RHA on concrete with addition of steel fibres.

EXPERIMENTAL STUDY ON UTILIZATION OF RED MUD AND IRON SLAG ON FIBRE REINFORCED CONCRETE

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ABSTRACT

In worldwide, variety of waste is generated in different forms, shape and texture. These industrial wastes mostly possess effect to the environment and the society living nearby. Various researches has been done on this waste material to either decompose or to utilize it in some or the other way. One such hazardous waste generated by industry is Red mud. Red mud is the residual waste generated by Bayer's Process of aluminum extraction. Iron slag is a by product of steel industry. In this study M30 grade of concrete has been used. The demand for aggregate in construction industry is increasing day by day and so is the demand for concrete. In this study, taking cementitious behavior of the red mud into account, an experimental study was carried out to partially replace the cement by red mud in concrete for different percentages, also the behaviour of iron slag in account to partial replacement of fine aggregate for different percentages also its effects on the strength of the concrete. In this experiment and red mud is replacing partially as 0%, 5%, 10%, 15% and 20% with weight of cement, iron slag is constant partial replacement as 30% with fine aggregate And glass fibre has been used as 1% of the volume of the concrete. Studies on compressive strength, tensile strength and flexural strength will be made to evaluate the optimum percentage of industrial wastes replacement.

Key words: Industrial Waste, Red mud, Iron slag, Glass Fibre, Cement mortar, Compressive strength, split tensile strength, flexural strength

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INTRODUCTION

Due to industrialization, the infrastructure development and soft housing policy of Government of India, the construction industry is in full bloom due to which within short span of time there is a tremendous increase in the utilization of cement and concrete in various construction activities. It is expected that the same rate will continued in the next decade and this may cause the threat to the environment. Availability of raw material required for manufacturing of cement and production of concrete are reducing in nature. This increased demand will lead to fast depletion of natural resources and will cause big curse to environment. So to overcome this problem it is very much essential to utilization for the industrial waste materials and by-products

Experimental Study on the Influence of Fly Ash, Lime Powder and Hybrid Fibres on the Properties of Concrete

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Assistant Professor, Department of Civil Engineering, JCT College of Engineering and Technology, Coimbatore, TamilNadu, India²

ABSTRACT: This study is to characterize the optimum percentage of fly ash, Lime powder with hybrid fibres (steel and polypropylene). The above blending is to be tried, to meet the strength requirements in compression, split and flexural along with durability tests. The steel fibres are used to increase the strength of concrete. The addition of fly ash and lime powder by replacing the cement content. Specimens are cast with M₃₀ concrete. To save our earth resources to control the pollution from the manufacturing of cement (1 ton of cement releases 1 ton of CO₂) we have to utilize the easy available and waste materials like Fly ash & Lime powder. Polypropylene fibres and steel fibres are used to increase the flexural strength. Addition of the Supplementary Cementitious Materials (SCMs) not only reduces the permeability of concrete, but also increases the concrete strength. Steel fibres increases the compressive strength from 6% to 17%, tensile strength from 18% to 47%, flexural strength from 22% to 63%.

KEYWORDS: Fly Ash, Lime Powder, Hybrid Fibres, Compressive Strength, Split Tensile Strength, Flexural Strength.

I. INTRODUCTION

Recycling of large amount of waste materials such as fly ash, Lime powder (LP) etc is being done in large amount in the manufacture of cement. Addition of these Supplementary Cementitious Materials (SCMs) not only reduces the permeability of concrete, but also increases the strength of concrete by the formation of CHS gel by reacting with lime which is a by-product during cement reaction with water. This pozzolanic property of SCMs has been the reason for the enormous utilization of SCMs in cement. The replacement of cement by supplementary material not only results in savings of the materials, but also reduces the CO₂ emission in the atmosphere, since one ton of cement production results in one ton of CO₂ emitted in the atmosphere.

Use of admixtures in concrete has been practiced since 1900. In the early days, asbestos fibres was used in concrete. And in the 1950s the concept of composite materials came and the use of fibre reinforced concrete were introduced in large extend. By the 1960s, steel, glass (GFRC) and polypropylene fibres were used in concrete, and research into new fibre reinforced concrete continues today. Many of work have been done on replacement of cement with fly ash, which has shown good results with respect to strength and durability. Fly ash has given excellent results up to a replacement of 20% addition and have increased the performance of concrete with about 15% replacement in most of the research findings. Ternary blended pozzolanic material with LP contributes to hydration improving the early age and the long term compressive and flexural strengths also with durability which was verified by acid test and chloride ion penetration tests. The corrosion resistance of ternary blend mortar is higher than that of containing single pozzolano and the use of ternary blend OPC and FA is very effective in reducing chloride induced corrosion of mortar.

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An Experimental Investigation on the Effects of Concrete by Replacing Cement with GGBS and Rice Husk Ash with the Addition of Steel Fibers

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4. To find the effects of GGBS and RHA on concrete with addition of steel fibres.

Cluster Initialization in Dense Distributed Wireless Sensor Networks using Jumping Ants

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Abstract— A wireless sensor network is used as an effective tool for collecting data in various situations. Recent researches in wireless communications and electronics has enabled the development of low-cost wireless sensor network. Wireless sensor networks are group of sensor nodes with a set of processors and limited memory unit embedded in it. Reliable routing of packets from sensor nodes to its base station is the most important task for these networks. Clustering is an important task for attaining some valued outputs like improved energy efficiency, reduced delay, increased throughput and reduced data losses. In order to produce well balanced clusters, the cluster head is rotated periodically with the help of a distributed algorithm. This paper gives a detailed study of various distributed clustering approaches. A detailed research is made on optimized cluster initialization based on jumping ant approach in order to avoid random cluster initialization. Also this mechanism shows directions on how to rotate the cluster head periodically and energy efficiently. The algorithm consists of three stages. In the first stage, the ants move towards the available food. In the second stage, the ants that gets sufficient food stays in that cluster. In the third stage, the foodless ants jumps and form another cluster. This mechanism clearly shows an excellent improvement over those with random initializations.

Keywords—Wireless sensor network, distributed clustering algorithm, ant colony optimization, jumping ant, energy efficiency, network lifetime.

I. INTRODUCTION

A Wireless Sensor Network consists of a group of spatially distributed sensor nodes which are interconnected without using wires. Each of the distributed sensor nodes typically consists of one or more sensing elements, a data processing unit, communicating components and a power source, which is usually a battery. The sensed data is collected, processed and routed them back to the desired end user through a designated sink point, referred as base station. Now it has become feasible to construct multifunctional sensor nodes with advanced capabilities. Such sensor nodes are relatively of smaller size, lower cost and lesser power consumption. WSNs are originally motivated for the use in military applications, such as border monitoring. In a typical sensor network, each sensor node has a microprocessor and a small amount of memory for signal processing and task scheduling. Each node is also equipped with one or more sensing devices such as acoustic microphone arrays,

video or still cameras, infrared (IR), seismic, or magnetic sensors [1].

Each sensor node communicates wirelessly with a few other local nodes within its radio communication range. Sensor networks extend the existing Internet deep into the physical environment. The resulting new networks is orders of magnitude more expansive and dynamic than the current TCP/IP network and is creating entirely new types of traffic that are quite different from what one finds on the Internet now. Information collected by and transmitted on a sensor network describes conditions of physical environments—for example, temperature, humidity, or vibration and requires advanced query interfaces and search engines to effectively support user-level functions [2]-[5].

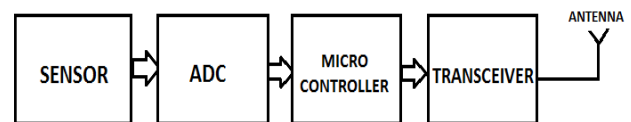


Fig.1: Components in a sensor network

Sensor networks may inter-network with an IP core network via a number of gateways. A gateway routes queries or commands to appropriate nodes in a sensor network. It also routes sensor data, at times aggregated and summarized to users who have requested it or are expected to utilize the information. A data repository or storage service may be present at the gateway, in addition to data logging at each sensor. The repository may serve as an intermediary between users and sensors, providing a persistent data storage. Additionally, one or more data storage devices may be attached to the IP network, to archive sensor data from a number of edge sensor networks and to support a variety of user-initiated browsing and searching functions [6]-[11].

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Trusted Cloud Computing Methods using to Protected File Encryption Performance

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Abstract

In private cloud system, data is shared among the persons UN agency square measure therein cloud. For this, security or personal data concealing method hampers. though Cloud computing has achieved an excellent success in varied industries whether or not it's a software package trade, during this paper we've got projected new security design for cloud computing platform. the shoppers in faithfully distinguishing trustworthy cloud suppliers multi-faceted Trust Management (TM) system design for a cloud computing marketplace is additionally attainable to let technical agents monitor every other's behavior and respond consequently by increasing or decreasing trust. It ensures secure communication system and concealing data from others. during this system give Blowfish algorithmic rule for file secret writing and RSA primarily based secured communication. During this paper deals with varied problems related to Security and focus in the main on the info security and strategies of providing security by encryption. varied secret writing strategies of block cipher algorithms like RSA, Blowfish square measure mentioned for providing solutions to cloud security. The system exploitation totally different key for each secret writing and coding and increasing overall performance of cloud service supplier exploitation Fair-Share hardware. that the customers simply determine a decent or poor quality cloud supplier.

Keywords: Cloud Computing, Trust management, CAIQ, Blowfish, RSA, Fair Share Scheduler, Virtual Machine Monitoring, Performance.

1. Introduction

Cloud computing is the concept of using remote services through a network using various resources. It is basically meant to give maximum with the minimum resources i.e. the user end is having the minimum hardware requirement but is using the maximum capability of computing. This is possible only through this technology which requires and utilizes its resources in the best way. Clouds are of particular commercial interest not only with the growing to outsource IT so as to reduce management overhead and to extend existing, limited IT infrastructures, but even more importantly, they reduce the entrance barrier for new service providers to offer their respective capabilities to a wide market with a minimum of entry costs and infrastructure requirements in fact, the special capabilities of cloud infrastructures allow providers to experiment with novel service types at the same time reducing the risk of wasting resources. Cloud is not only simple collecting the computer resource, but also provides a management mechanism and can provide services for millions of users simultaneously. Cloud computing is the broader concept of infrastructure convergence. This type of data centre environment allows enterprises to get their applications up and running faster, with easier manageability and less maintenance to meet business demands.

LBMP SO Algorithm for Balancing the Load in Grid Environment

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Abstract—Grid computing is the collection of computer resources from multiple locations to reach a common goal. The grid can be thought of as a distributed system with non-interactive workloads that involve a large number of files. Grid computing is distinguished from conventional high performance computing systems such as cluster computing in that grid computers have each node set to perform a different task/application. In this paper, a heuristic approach based on particle swarm optimization algorithm is adopted to solving task scheduling problem in grid environment. By reviewing through different author papers, it can be seen that particle swarm optimization gives better performance in terms of time, efficiency and balanced workload, etc. This approach aims to propose mathematical model multi-objective Load Balancing Mutation particle swarm optimization (LBMP SO) to schedule and allocate tasks to resource. LBMP SO considers two objective functions to minimize makespan and total cost.

Keywords—Grid computing, Scheduling, Particle swarm optimization.

I. INTRODUCTION

Heterogeneous Computing (HC) systems consist of mixed group of machines, communication protocols and programming environments and offer a diversity of architectural capabilities that has different execution requirements. One of the key challenges of HC system is the task scheduling problem. In general, scheduling is concerned with distribution of limited resources to certain tasks to optimize few performance criterions, like the completion time, waiting time. Task assignment problems can be classified into two categories based on the types of tasks [1]: scheduling a meta-task composed of independent tasks with no data dependencies and assigning an application composed of tasks with precedence constraints.

PSO has been found to be robust and is successfully applied in solving nonlinear, no differentiable multi-modal problems quickly. It is still in its infancy. Many research works have mentioned application of PSO in task scheduling. PSO is most successful met heuristic for generations of optimal scheduling solutions. PSO scans over solution space during each iteration and accumulates global best and local best solutions. This section presents review of recent proposals which considered PSO in the field of task scheduling in cloud environment. Originally PSO was proposed where PSO was

proposed as an optimization tool. Two types of PSO namely, Discrete PSO and Continuous PSO versions were proposed. With several passes over the search space and updating local best and global best solutions during each pass, PSO performed much faster than ACO or GA. In [2] authors introduced the concept of inertia weight into the original PSO. With introduction of inertia weight PSO could converge even faster. Initially inertia weight was proposed to lie in the range [0.9, 1.2], which can improve performance of PSO. Different values of inertia allowed better control over solution search space. Higher values of inertia weight will result in overshooting the and lower values will trap search in definite area in search space. A Cost Aware Modified PSO (CA-PSO) was proposed in [3]. In [4] authors exploit PSO for optimizing overall tasks completion cost in a workflow and respecting the given deadline constraints. The proposed met heuristic approach based on PSO succeeds whereas IC-PCP fails to meet application's deadline. In comparison IC-PCP failed to meet deadline constraints as IC-PCP ignored VM boot time. Results prove that PSO performs better than current state-of-the-art algorithms.

Proposal considered deadline constraint. Proposal generates constraint makespan and performs cost evaluation for various workflows like Montage, Ligo etc. When compared to SCS, proposed algorithm is capable of generating better schedules and achieved cost optimization. In authors proposed mathematical model using a Load Balancing Mutation (balancing) Particle Swarm Optimization (LBMP SO) and considered reliability and availability as the objective parameters of proposals.

LBMP SO used an algorithm to generate schedule and allocation for Grid computing environment. Algorithm considered available resources for generation of schedule and allocation patterns. Basic PSO suffers from free VMs, allocation of more than one task to same VM, allocation of same tasks to multiple VMs and premature convergence. LBMP SO takes into account execution time, transmission time, make span, round trip time, transmission cost and load balancing between tasks and achieved reliability in task scheduling. Idea of LBMP SO is to reschedule failure tasks to available VM. LBMP SO performance was compared with standard PSO, random algorithm and

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A HIERARCHICAL FUZZY RELATIONAL CLUSTERING ALGORITHM FOR SENTENCE LEVEL TEXT CLUSTERING

Authors K Sivakumar, P Sivakumar, N S Nithya

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Cluster Initialization in Dense Distributed Wireless Sensor Networks using Jumping Ants

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Abstract— A wireless sensor network is used as an effective tool for collecting data in various situations. Recent researches in wireless communications and electronics has enabled the development of low-cost wireless sensor network. Wireless sensor networks are group of sensor nodes with a set of processors and limited memory unit embedded in it. Reliable routing of packets from sensor nodes to its base station is the most important task for these networks. Clustering is an important task for attaining some valued outputs like improved energy efficiency, reduced delay, increased throughput and reduced data losses. In order to produce well balanced clusters, the cluster head is rotated periodically with the help of a distributed algorithm. This paper gives a detailed study of various distributed clustering approaches. A detailed research is made on optimized cluster initialization based on jumping ant approach in order to avoid random cluster initialization. Also this mechanism shows directions on how to rotate the cluster head periodically and energy efficiently. The algorithm consists of three stages. In the first stage, the ants move towards the available food. In the second stage, the ants that gets sufficient food stays in that cluster. In the third stage, the foodless ants jumps and form another cluster. This mechanism clearly shows an excellent improvement over those with random initializations.

Keywords—Wireless sensor network, distributed clustering algorithm, ant colony optimization, jumping ant, energy efficiency, network lifetime.

I. INTRODUCTION

A Wireless Sensor Network consists of a group of spatially distributed sensor nodes which are interconnected without using wires. Each of the distributed sensor nodes typically consists of one or more sensing elements, a data processing unit, communicating components and a power source, which is usually a battery. The sensed data is collected, processed and routed them back to the desired end user through a designated sink point, referred as base station. Now it has become feasible to construct multifunctional sensor nodes with advanced capabilities. Such sensor nodes are relatively of smaller size, lower cost and lesser power consumption. WSNs are originally motivated for the use in military applications, such as border monitoring. In a typical sensor network, each sensor node has a microprocessor and a small amount of memory for signal processing and task scheduling. Each node is also equipped with one or more sensing devices such as acoustic microphone arrays,

video or still cameras, infrared (IR), seismic, or magnetic sensors [1].

Each sensor node communicates wirelessly with a few other local nodes within its radio communication range. Sensor networks extend the existing Internet deep into the physical environment. The resulting new networks is orders of magnitude more expansive and dynamic than the current TCP/IP network and is creating entirely new types of traffic that are quite different from what one finds on the Internet now. Information collected by and transmitted on a sensor network describes conditions of physical environments—for example, temperature, humidity, or vibration and requires advanced query interfaces and search engines to effectively support user-level functions [2]-[5].

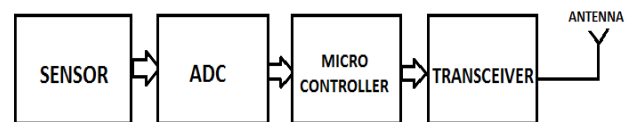


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REAL-WORLD APPLICATION SCENARIOS AND THEIR CORRESPONDING ISSUES TOWARDS CLUSTER FORMATION IN HYBRID WSNS

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ABSTRACT

A remote sensor hub is poised by a processor, proximate memory, sensors, radio, battery and a base station responsible for getting and preparing information gathered by the hubs. They complete supportive exercises because of restricted assets, for example, battery, processor and memory. These days, the utilizations of these systems are bounteous, shifted and the applications in agri-business are as yet sprouting. One intriguing reason for existing is in ecological checking and nursery control, where the product conditions, for example, climate and soil don't rely upon common specialists. To control and watch the ecological elements, sensors and actuators are vital. Under these conditions, these gadgets must be utilized to make an appropriated measure, dissipating sensors everywhere throughout the nursery utilizing dispersed grouping component. This paper uncovers an activity of ecological checking and nursery control utilizing a sensor arrangement. The equipment response indicates occasional observing and control of ozone harming substances in an upgraded way. Future exertion is crammed in use of a similar system utilizing remote sensors arrangement.

Keywords: Sensor, sensor hubs, remote sensor, nursery control, ecological checking, CO₂ observing, appropriated grouping.

INTRODUCTION

A remote sensor system could be a useful design for the sending of the sensors utilized for flame recognition and checking. The most basic elements for the quality and yield of plant development are temperature, moistness, light

and the level of the carbon dioxide. Consistent checking of these natural factors offers data to the cultivator to more readily see, how every viewpoint influences development and how to direct maximal harvest productiveness. The most ideal nursery atmosphere change can encourage us to propel efficiency and to get momentous vitality sparing, transcendently amid the winter in northern nations. In the past age band, nurseries it was sufficient to have one cabled measurement point in the center to offer the data to the nursery computerization framework. The course of action itself was commonly straightforward without chances to regulate locally warming, light, ventilation or some different activities which were influencing the nursery inside atmosphere [1]. The prototype size of the nursery itself is substantially bigger than it was previously, and the nursery offices manage the cost of a few choices to make nearby changes in accordance with light, ventilation and other nursery emotionally supportive networks. In any case, included estimation information is additionally expected to set up this sort of robotization framework to work appropriately. Expanded number of estimation focuses ought to not significantly enlarge the robotization framework cost. It ought to likewise be plausible to effectively modify the area of the estimation directs agreeing toward the specific needs, which rely upon the positive plant, on the conceivable changes in the outer climate or nursery game plan and on the plant situation in the nursery. Remote sensor system can shape a supportive piece of the robotization framework design in contemporary nurseries usefully. Remote correspondence can be utilized to gather the estimations and to convey between the incorporated control and the actuators situated to

Design and Analysis of BEC and GDI Technique Using Carry Select Adder

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Abstract: *The overture of the work is focused on Carry Select Adder (CSLA), one of the fastest adders used to perform arithmetic functions. The logic operations involved in conventional carry select adder (CSLA) and Binary to Excess-1 Converter (BEC)-based CSLA are analyzed to review the data dependence and to identify redundant logic operations. All the redundant logic operations found in the conventional CSLA are removed and a new logic formulation for CSLA has been proposed. Because of complex digital signal processing (DSP) system involves several adders, an efficient adder design essentially improves the performance of a complex DSP system and FCSA does this work. Modified GDI logic architecture concentrates on the area level & fast carry selections. The fixed Carry Selections of different stage parallel adder i.e. ($C_{in}=0, 1$) is directly based on the GDI technique. This concept provides less area and low delay than previous SQRT-BEC CSLA.*

Keywords: DSP, SQRT, BEC, FCSA, CSLA

1. Introduction

The integrated circuits production capability, dependability, and building-block approach to circuit design ensured the fast adoption of standardized ICs in situ of designs using discrete transistors. Here the hot spot is combinational circuit, that the basic portion of the combinational circuit is Adder. A complex digital signal processing (DSP) system involves many adders. A ripple carry adder (RCA) uses a simple design, however carry propagation delay (CPD) is the main worry in this adder. Carry look-ahead and carry select (CS) methods have been suggested to reduce the CPD of adders [1],[2]. Low power, area-efficient, and high-performance VLSI systems are progressively employed in compact and mobile equipments, wireless receivers, and bio medical instrumentation [2][3]. A conventional CSLA has less CPD than RCA, however the design is not appealing because it uses a dual RCA. Few tries have been made to avoid dual use of RCA in CSLA design. A conventional carry select adder (CSLA) is a dual RCA arrangement that generates a duo of sum words and output carry bits analogous to the anticipated input-carry ($C_{in}=0$ and 1) and chooses one out of each duo for final-sum and final output carry. Within the previous strategies of adder designs, logic is optimized while not giving any consideration to the data dependence [1]. In this proposal, we made an analysis on logic operations involved in conventional and BEC-based CSLAs with GDI.

The carry selections in the GDI technique are taken into account to study the data dependence and to identify redundant logic operations. As well as on the basis of this analysis, we have proposed a logic formulation for the GDI CSLA. The main contribution is the logic formulation based on data dependence and optimized carry generator (CG) and CS design. On the basis of the proposed logic formulation, we have derived a productive logic design for CSLA. Due to optimized logic units, the proposed CSLA involves significantly reduced ADP than the existing BEC-CSLAs. We have shown that the GDI based SQRT-CSLA using the

proposed CSLA design involves nearly 45% less ADP and consumes 40% less energy than that of the corresponding SQRT-CSLA.

Carry Select Adder

A conventional carry select adder (CSLA) is an RCA–RCA configuration that produces a pair of sum words and output carry bits analogous to the anticipated input-carry ($C_{in}=0$ and 1) and chooses one out of each duo for final-sum and final output-carry. A conventional CSLA has less CPD than an RCA, but the design is not attractive because it uses a dual RCA. Few tries have been made to avoid dual use of RCA in CSLA design. Layout of area and power adeptive high speed data path logic systems is one of the major substantial areas of research to perform arithmetic calculations in VLSI design. There is a scope for reducing area and delay in digital adders, the speed of addition is restricted by the time required to propagate through the adder. The sum for each bit position in an elementary adder is generated gradually only after the preceding bit position has been summed and a carry propagated into the later position. The CSLA is used in many computational systems design to moderate the problem of carry propagation delay by separately producing multiple carries and then select a carry to produce the sum. It uses independent ripple carry adders (for $C_{in}=0$ and $C_{in}=1$) to produce the sum. But, the regular CSLA is not area and speed efficient as a result of it uses multiple pairs Ripple Carry Adders (RCA) to produce partial sum and carry by considering carry input. The final sum and carry are selected by the multiplexers (MUX). Due to the use of two independent RCAs the area will increase which leads to an increase in delay. To overcome the above problem, the basic idea of the proposed work is to use n-bit binary to excess-1 code converters (BEC) to improve the speed of addition. This logic can be replaced in RCA for $C_{in}=1$ to further improves the speed and thus reduces the delay. Using Binary to Excess-1 Converter (BEC) instead of RCA in the regular CSLA will achieve lower area, delay which speeds up the addition operation.

Performance Enhancement In Single Phase Induction Motor – A Novel Approach Using Labview

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ABSTRACT

Single phase induction motors have numerous and diversified applications, both in homes and the industry. It is safe to say that single phase induction motor applications far outweigh three phase motor applications in the domestic sector. But it operates at low power factors and is less efficient than three phase induction motors. So even a small amount of improvement in efficiency will have a bigger effect in conserving energy. This paper incorporates performance analysis of single phase induction motor where auxiliary winding is connected with capacitive load when the SIPM achieves the Rated speed using LabVIEW technology. The auxiliary winding which is used to start the Single phase induction motor gets disconnected when the speed of the motor reaches 75% of the rated speed. Then the motor will run by the excitation of the main winding. When the motor starts running with main winding, the part of the generated flux will induce an emf in the auxiliary winding. The emf which induces in the auxiliary winding is not utilized as it is an open circuit end. By closing the circuit with a Capacitive Load across the auxiliary winding causes a tremendous change in the power quality metrics of the machine. As a result the efficiency of the Single phase induction motor is increased.

KEYWORDS: Single phase Induction Motor, LabVIEW, Auxiliary Winding, Resistive Load.

INTRODUCTION

Among electrical motors, induction motors are the most used both for home appliances and in various industries. Most of the electrical energy produced is consumed by these motors. In an effort to improve the efficiency, there have been improvements in materials, design and construction techniques. However motor losses are still greatly dependent on control strategies, especially when the motor operates at light load.

Single Phase Induction Motors (SPIMs) is a highly efficient machine when operated close to its rated torque and speed. However, at light loads, no balance in between copper and iron loss, results in considerable decrease in efficiency [9, 10]. To achieve better efficiency induction motor has to be controlled by some control techniques. Variable frequency drives serve the purpose to a good extent but it is not economical to use inverters for a low rating motor as the cost of inverter might exceed the cost of motor.

Induction motors are the most extensively used motors for appliances like industrial control, and automation; hence, they are often called the work horse of the motion industry. As far as the robustness, reliability, durability, power factor, ripples, stable output voltage and torque are concerned, Single phase induction motor stands at the top of the order, to be used for motor control in place of mechanical gears. But the Motor efficiency is considerably Low.

NEW ADVANCEMENT IN THE PERFORMANCE IMPROVEMENT OF SYNCHRONOUS RELUCTANCE MOTOR

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ABSTRACT

The three-phase synchronous reluctance motor is an alternative drive in all-electric applications. Stator of this motor consists of three phase windings and the saliency is made in the rotor to operate as a reluctance motor. Reluctance motors are generally employed in synthetic fiber industry, glass machinery and textile industry where the speed is need to be constant. A new advancement in the synchronous reluctance motor is suggested in which stator consists of two sets of three phase windings and a reluctance rotor. Saliency is made in the rotor by removing set of rotor teeth alternatively in uniform distances around the rotor periphery. In order to verify, A 3 kW, 415V, 1500 rpm, Double Winding Synchronous Reluctance Motor (DWSyRM) has been designed, fabricated and tested. When a three phase supply is given to the stator winding, a revolving magnetic field of constant magnitude is developed in the air gap. Rotor poles are pulled into synchronism by reluctance torque. Out of two windings in the stator, one winding is used to meet the mechanical load while a three phase EMF is induced in the second winding works as an Induction alternator (IA), to which a single phase or small three phase load can be connected. Since the machine runs at synchronous speed, the regulation of terminal voltage is improved. Both the windings can be loaded simultaneously. Machine can be operated at its maximum capacity for the given no load losses, to achieve better efficiency. Load tests with various combinations of electrical and mechanical loads have been conducted. Experiment results prove the improvement in the performance to a great extent compared to conventional Reluctance motor.

KEY WORDS - Double Winding Synchronous Reluctance Motor (DWSyRM), Reluctance torque, Induction Alternator (IA), Maximum capacity, Performance improvement

1. INTRODUCTION

Reluctance motors are special type of synchronous motors with a salient-pole rotor. In this type of rotor does not have windings and is constructed from inexpensive core material to avoid demagnetization issues [1]. Reluctance motors are mainly classified as switched and synchronous reluctance motors. A considerable progress is obtained in the design and control of switched reluctance motor. The design and control of synchronous reluctance motors are also simultaneously progressing. Converter fed Synchronous Reluctance motors has gained their importance over the other motors. The major observations are (a) the stator of Synchronous Reluctance Motor is similar to the stator three phase induction motor and rugged in construction. (b) Synchronous Reluctance Motor can be built with high power densities with respect to their size. (c) Separate starting mechanism is not required. (d) Due to saliency in the rotor, high starting torque is obtained compared to three phase induction motor [2-4]. The efficiency and power factor are the important targets to be reached in both industrial and commercial applications of electric drives. There are various methods to improve and optimize the efficiency of induction motor. Optimal control is the one of the techniques to obtain optimum efficiency which covers the broad approaches namely, loss model control (LMC) and search control (SC). Optimal design covers the design modifications of materials and construction in order to optimize efficiency of the motor and differential evolution are some techniques to optimize the efficiency [5]. In the conventional induction motor, only single output is available. The efficiency and power factor of the induction motor is depending on the load torque. Normally over rated motors are employed due to factor of safety and design specifications, and hence, induction motors are operated lower than their rated capacity. DWIM is developed to overcome the drawbacks of conventional induction motor in which two outputs are available. DWIM can be operated either in maximum efficiency mode or power balancing mode by using appropriate control circuit.

There is a voltage drop in the second stator winding due to the reduction in speed when the motor is loaded and this leads to poor voltage regulation. In order to improve the performance of DWIM, a new Double Winding Synchronous Reluctance Motor (DWSyRM) is suggested in this paper and the main motivation for this paper is to improve the efficiency and power factor of Double Winding Synchronous Reluctance Motor (DWSyRM). Double winding induction machine consists of two stator windings and a cage rotor. One stator winding acts as a motor and the other as a generator. By controlling the voltage supplied to the secondary or the generator winding, the rotor speed can be adjusted. The machine has a similar speed control characteristics to that of a slip-ring induction motor equipped with the rotor energy recovery scheme [23]. Introduction of double winding induction machine was suggested and implemented in the year 1930 for turbine alternators. In a Double Winding Induction Motor, When one of the windings is connected to a three phase supply, a revolving magnetic field of constant magnitude is developed in the air gap. The same field is utilized by both the stator windings to work as induction motor to meet mechanical load while, a three phase EMF is induced in the second set of winding [8]. The occurrence of circulating harmonic current common to traditional dual stator machine is completely eliminated by the dissimilar number of pole winding. The two stator windings can have different number of poles. Power is supplied to the two windings by two separate variable frequency inverter drives to provide two independently controllable torque components. At low speeds, the power supplied to one of the windings can produce torque which opposes the torque from the power applied to the other winding, so that very low speed and standstill operation can be achieved. At higher operating speeds, power is supplied to both the windings, so that the torques from the two windings is added up [9]. Dual stator induction motor suggested for energy conservation consists of two sets of RUN windings. The main RUN winding is energized to have sufficient MMF in order to produce

Power Quality Improvement using Bridgeless Buck boost Converter fed BLDC Motor Drive

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Abstract: Power factor is an important performance parameter of a system. If the power factor of a system is low; it draws more current from the supply. So improving power factor is very much essential for better and economic performance of a system. One of the modern techniques employed for power factor correction is the use of Single-Ended primary-Inductor Converter (SEPIC). It can be used as preregulator operating in discontinuous conduction mode. But an important drawback of the SEPIC is the use of diode bridge rectifier which results in the conduction losses and low Power factor at the front end. Also Presence of harmonics decreases the system performance. For class-A equipment (< 600 W, 16 A per phase) which comprises household equipment, IEC 61000-3-2 limits the harmonic current of different order such that the total harmonic distortion (THD) of the supply current should be beneath 19%. So to overcome this drawback, a Bridgeless Buck Boost Converter is being proposed which ensures inherent PFC operation and reduces complexity in control. The present work is aimed at designing and fabricating a prototype of the bridgeless buck boost converter and thus improving the power factor on the utility side. The converter will also be modelled and simulated in MATLAB and the results analysed

Keywords: BLDC motor, Power Factor Correction, THD.

I. INTRODUCTION

Traditional AC rectification is very incompetent progression, which leads to waveform distortion of the current drawn from the mains. This produces a large range of harmonic signals that may meddle with supplementary utensils [1]. At superior power levels (200 to 500 watts and higher) rigorous intervention with other electronic utensils may become perceptible due to these harmonics introduce into the power utility line [2]. Another crisis is that the power utility line cabling, the installation and the distribution transformer is designed to withstand these peak current values resulting in higher electricity expenditure for any electricity utility company [2]. Conventional AC rectification has the following main disadvantages

- (i) It injects harmonics and electromagnetic interference (EMI)
- (ii) It has deprived power factor. (iii) It induces high losses.
- (iv) It requires over-dimensioning of parts.
- (v) It reduces maximum power capability from the line.

In aforementioned years, single-phase switch-mode AC/DC power converters have been progressively more used in the commercial industrial, aerospace, residential, and military applications due to advantages of high smaller size, efficiency and weight. However, the propagation of the power converters draw pulsating input. current from the utility line, this not only diminish the input power factor of the converters but also interleave a substantive amount of harmonic current into the utility line To improve the power quality, various PFC schemes have been projected. There are harmonic norms such as IEC 1000-3-2 introduced for improving power quality [3]. By the introduction of harmonic norms now power supply manufacturers have to follow these norms strictly for the remedy of signal intervention problem .

The different methods of power factor correction can be classified as:

- (i) Passive power factor correction techniques.
- (ii) Active power factor correction techniques.

In passive power factor correction techniques, an LC filter is incorporate between the AC mains line and the input port of the diode rectifier of AC/DC converter.

This technique is rugged and uncomplicated but it has intense weight and immense size therefore power factor cannot be very high. Hence it is not valid for the recent trends of harmonic norms. Basically it is applicable for power rating of inferior than 25W [4]. For current power rating it will be bulky. In active power factor correction techniques approach, switched mode power supply (SMPS) method is used to shape the input current in phase with the input voltage. Thus, the power factor can reach upto unity. By the establishment of regulation standards IEC 1000-3-2 active power factor correction technique is used now a day. There are diverse topologies for implementing active power factor correction techniques. Fundamentally in this technique power factor correcting cell is used for tracking the input current in phase of input voltage such That input power factor come up to unity [5]. Comparing with the active PFC techniques, passive PFC techniques have many advantages such as abridged harmonics, high power factor, smaller size and light-weight.

Analysis the Performance of Multi Core Processor using Timed Loop Concept in LabVIEW

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Abstract

Paper describes about the performance of the processor core when more than one task is simulated at a time. Laboratory experiments are integral part of science and engineering education. LabVIEW (Laboratory Virtual Instrument Engineering Workbench) is a development environment based on graphical programming. LabVIEW relies on graphical symbols rather than text-based language to describe programming actions. Paper analyzes the performance of the processor core available in a computer using LabVIEW tools. Each module is designed independently using LabVIEW simulation tool. Each module is loaded into individual core in the multi core processor. Core utilization is monitored as a CPU usage percentage using task manager. Each module is made to run using for-loop for the same iterations and performance like Time taken (in LabVIEW) and CPU usage (in Task manager) are monitored. The timed loop incorporates a processor selection option to select a particular core from the available ones to execute the module. The execution can be stopped at any time using the sub-module stop. For-loops allow us to set the iteration, and the time to complete one loop is updated in the display module of the LabVIEW itself. In this way, the usage of core is monitored and controlled.

Keywords: Multi Core Processor, Distributed Simulation, Parallel Processing.

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1. Introduction

The proposed work is implemented using the LabVIEW tool sets. Analyze the utilization of core processor in the present. Timed loop incorporates processor selection option to select the core from the available one. A Virtual Instrument (VI) is a LabVIEW programming element. A VI consists of a front panel, block diagram, and an icon that represents the program. The front panel is used to display controls and indicators for the user, and the block diagram contains the code for the VI. The icon, which is a visual representation of the VI, has connectors for program inputs and outputs.

NEW ADVANCEMENT IN THE PERFORMANCE IMPROVEMENT OF SYNCHRONOUS RELUCTANCE MOTOR

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ABSTRACT

The three-phase synchronous reluctance motor is an alternative drive in all-electric applications. Stator of this motor consists of three phase windings and the saliency is made in the rotor to operate as a reluctance motor. Reluctance motors are generally employed in synthetic fiber industry, glass machinery and textile industry where the speed is need to be constant. A new advancement in the synchronous reluctance motor is suggested in which stator consists of two sets of three phase windings and a reluctance rotor. Saliency is made in the rotor by removing set of rotor teeth alternatively in uniform distances around the rotor periphery. In order to verify, A 3 kW, 415V, 1500 rpm, Double Winding Synchronous Reluctance Motor (DWSyRM) has been designed, fabricated and tested. When a three phase supply is given to the stator winding, a revolving magnetic field of constant magnitude is developed in the air gap. Rotor poles are pulled into synchronism by reluctance torque. Out of two windings in the stator, one winding is used to meet the mechanical load while a three phase EMF is induced in the second winding works as an Induction alternator (IA), to which a single phase or small three phase load can be connected. Since the machine runs at synchronous speed, the regulation of terminal voltage is improved. Both the windings can be loaded simultaneously. Machine can be operated at its maximum capacity for the given no load losses, to achieve better efficiency. Load tests with various combinations of electrical and mechanical loads have been conducted. Experiment results prove the improvement in the performance to a great extent compared to conventional Reluctance motor.

KEY WORDS - Double Winding Synchronous Reluctance Motor (DWSyRM), Reluctance torque, Induction Alternator (IA), Maximum capacity, Performance improvement

1. INTRODUCTION

Reluctance motors are special type of synchronous motors with a salient-pole rotor. In this type of rotor does not have windings and is constructed from inexpensive core material to avoid demagnetization issues [1]. Reluctance motors are mainly classified as switched and synchronous reluctance motors. A considerable progress is obtained in the design and control of switched reluctance motor. The design and control of synchronous reluctance motors are also simultaneously progressing. Converter fed Synchronous Reluctance motors has gained their importance over the other motors. The major observations are (a) the stator of Synchronous Reluctance Motor is similar to the stator three phase induction motor and rugged in construction. (b) Synchronous Reluctance Motor can be built with high power densities with respect to their size. (c) Separate starting mechanism is not required. (d) Due to saliency in the rotor, high starting torque is obtained compared to three phase induction motor [2-4]. The efficiency and power factor are the important targets to be reached in both industrial and commercial applications of electric drives. There are various methods to improve and optimize the efficiency of induction motor. Optimal control is the one of the techniques to obtain optimum efficiency which covers the broad approaches namely, loss model control (LMC) and search control (SC). Optimal design covers the design modifications of materials and construction in order to optimize efficiency of the motor and differential evolution are some techniques to optimize the efficiency [5]. In the conventional induction motor, only single output is available. The efficiency and power factor of the induction motor is depending on the load torque. Normally over rated motors are employed due to factor of safety and design specifications, and hence, induction motors are operated lower than their rated capacity. DWIM is developed to overcome the drawbacks of conventional induction motor in which two outputs are available. DWIM can be operated either in maximum efficiency mode or power balancing mode by using appropriate control circuit.

There is a voltage drop in the second stator winding due to the reduction in speed when the motor is loaded and this leads to poor voltage regulation. In order to improve the performance of DWIM, a new Double Winding Synchronous Reluctance Motor (DWSyRM) is suggested in this paper and the main motivation for this paper is to improve the efficiency and power factor of Double Winding Synchronous Reluctance Motor (DWSyRM). Double winding induction machine consists of two stator windings and a cage rotor. One stator winding acts as a motor and the other as a generator. By controlling the voltage supplied to the secondary or the generator winding, the rotor speed can be adjusted. The machine has a similar speed control characteristics to that of a slip-ring induction motor equipped with the rotor energy recovery scheme [23]. Introduction of double winding induction machine was suggested and implemented in the year 1930 for turbine alternators. In a Double Winding Induction Motor, When one of the windings is connected to a three phase supply, a revolving magnetic field of constant magnitude is developed in the air gap. The same field is utilized by both the stator windings to work as induction motor to meet mechanical load while, a three phase EMF is induced in the second set of winding [8]. The occurrence of circulating harmonic current common to traditional dual stator machine is completely eliminated by the dissimilar number of pole winding. The two stator windings can have different number of poles. Power is supplied to the two windings by two separate variable frequency inverter drives to provide two independently controllable torque components. At low speeds, the power supplied to one of the windings can produce torque which opposes the torque from the power applied to the other winding, so that very low speed and standstill operation can be achieved. At higher operating speeds, power is supplied to both the windings, so that the torques from the two windings is added up [9]. Dual stator induction motor suggested for energy conservation consists of two sets of RUN windings. The main RUN winding is energized to have sufficient MMF in order to produce

Power Quality Improvement using Bridgeless Buck boost Converter fed BLDC Motor Drive

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Abstract: Power factor is an important performance parameter of a system. If the power factor of a system is low; it draws more current from the supply. So improving power factor is very much essential for better and economic performance of a system. One of the modern techniques employed for power factor correction is the use of Single-Ended primary-Inductor Converter (SEPIC). It can be used as preregulator operating in discontinuous conduction mode. But an important drawback of the SEPIC is the use of diode bridge rectifier which results in the conduction losses and low Power factor at the front end. Also Presence of harmonics decreases the system performance. For class-A equipment (< 600 W, 16 A per phase) which comprises household equipment, IEC 61000-3-2 limits the harmonic current of different order such that the total harmonic distortion (THD) of the supply current should be beneath 19%. So to overcome this drawback, a Bridgeless Buck Boost Converter is being proposed which ensures inherent PFC operation and reduces complexity in control. The present work is aimed at designing and fabricating a prototype of the bridgeless buck boost converter and thus improving the power factor on the utility side. The converter will also be modelled and simulated in MATLAB and the results analysed

Keywords: BLDC motor, Power Factor Correction, THD.

I. INTRODUCTION

Traditional AC rectification is very incompetent progression, which leads to waveform distortion of the current drawn from the mains. This produces a large range of harmonic signals that may meddle with supplementary utensils [1]. At superior power levels (200 to 500 watts and higher) rigorous intervention with other electronic utensils may become perceptible due to these harmonics introduce into the power utility line [2]. Another crisis is that the power utility line cabling, the installation and the distribution transformer is designed to withstand these peak current values resulting in higher electricity expenditure for any electricity utility company [2]. Conventional AC rectification has the following main disadvantages

- (i) It injects harmonics and electromagnetic interference (EMI)
- (ii) It has deprived power factor. (iii) It induces high losses.
- (iv) It requires over-dimensioning of parts.
- (v) It reduces maximum power capability from the line.

In aforementioned years, single-phase switch-mode AC/DC power converters have been progressively more used in the commercial industrial, aerospace, residential, and military applications due to advantages of high smaller size, efficiency and weight. However, the propagation of the power converters draw pulsating input. current from the utility line, this not only diminish the input power factor of the converters but also interleave a substantive amount of harmonic current into the utility line To improve the power quality, various PFC schemes have been projected. There are harmonic norms such as IEC 1000-3-2 introduced for improving power quality [3]. By the introduction of harmonic norms now power supply manufacturers have to follow these norms strictly for the remedy of signal intervention problem .

The different methods of power factor correction can be classified as:

- (i) Passive power factor correction techniques.
- (ii) Active power factor correction techniques.

In passive power factor correction techniques, an LC filter is incorporate between the AC mains line and the input port of the diode rectifier of AC/DC converter.

This technique is rugged and uncomplicated but it has intense weight and immense size therefore power factor cannot be very high. Hence it is not valid for the recent trends of harmonic norms. Basically it is applicable for power rating of inferior than 25W [4]. For current power rating it will be bulky. In active power factor correction techniques approach, switched mode power supply (SMPS) method is used to shape the input current in phase with the input voltage. Thus, the power factor can reach upto unity. By the establishment of regulation standards IEC 1000-3-2 active power factor correction technique is used now a day. There are diverse topologies for implementing active power factor correction techniques. Fundamentally in this technique power factor correcting cell is used for tracking the input current in phase of input voltage such That input power factor come up to unity [5]. Comparing with the active PFC techniques, passive PFC techniques have many advantages such as abridged harmonics, high power factor, smaller size and light-weight.

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Design and Simulation of Phase-Locked Loop Controller Based Unified Power Quality Conditioner Using Nonlinear Loads

C.Prakash, N.Abner Leo

Abstract— This project presents a power quality improvement of unified power quality conditioner (UPQC) to compensate current and voltage quality problems of sensitive loads. The UPQC consists of the series and shunt converter having a common dc link. The series converter mitigates voltage sag from the supply side and shunt converter eliminates current harmonics from the non linear load side. The developed controllers for series and shunt converters are based on a reference signal generation method (phase-locked loop). The dc link control strategy is based on the fuzzy-logic controllers. The conventional method using dq transformation to show the superiority of the proposed sag detection method. A fast sag detection method is also is presented. The efficiency of the proposed system is tested through simulation studies using the MATLAB/SIMULINK environment.

Index Terms— unified power quality conditioner (UPQC), reference signal generation, active filter, fuzzy-logic controller.

I. INTRODUCTION

Power quality is the set of limits of electrical properties that allows electrical systems to function in their intended manner without significant loss of performance or life. The term is used to describe electric power that drives an electrical load and the load's ability to function properly with that electric power. Without the proper power, an electrical device (or load) may malfunction, fail prematurely or not operate at all. There are many ways in which electric power can be of poor quality and many more causes of such poor quality power. With the increasing applications of nonlinear and electronically switched devices in distribution systems and industries, Power quality (PQ) problems, such as harmonics, flicker, and imbalance have become serious concerns. In addition Lighting strikes on transmission lines, switching of capacitor banks, and various network faults can also cause PQ problems, such as transients, voltage sag and interruption [1].

Voltage-source converter (VSC)- based custom power (CP) devices are increasingly being used in custom power applications to mitigate these PQ problems in power distribution systems. A shunt converter (also known as the shunt active filter) can compensate for distortion and unbalance in a load so that a balanced sinusoidal current flows through the feeder. A series converter (also known as the dynamic voltage) can compensate for voltage sag and distortion in the supply side voltage so that the voltage across

a sensitive load is perfectly regulated. Control techniques play a vital role in the overall performance of the power conditioner. Instantaneous power theory is generally preferred to generate reference signals for the shunt converter [3]. An extended method based on instantaneous reactive power theory in a rotating reference frame is used to suppress the harmonics and to correct the power factor in [4]. Fuzzy logic is utilized to control the compensation currents of the shunt converter in [5].

There has also been interest in the circuit topologies of UPQC. UPQC is generally designed as a three-phase three-wire (3P3W) systems. The three- phase four- wire system is also realized from the system where the neutral of series transformer used in series part UPQC is considered as the fourth wire for the 3P3W system. There are also single phase UPQC system. Various topologies, such as H- bridge converters, and single-phase UPQC with three legs are examined for the UPQC applications.

This paper presents novel contributions for UPQC control and has the following functions:

- The new control approach based on enhanced phase-locked loop and a nonlinear adaptive filter for reference signals generation is derived for series and shunt converters analyzed.
- A fuzzy logic controller (FLC) in MATLAB to control dc- link voltage without any interfacing of other simulation programs.
- FLC of dc-link voltage is proposed which improves the current total harmonic distortion (THD) over the conventional PI controller.
- A fast algorithm for sag detection is also presented.

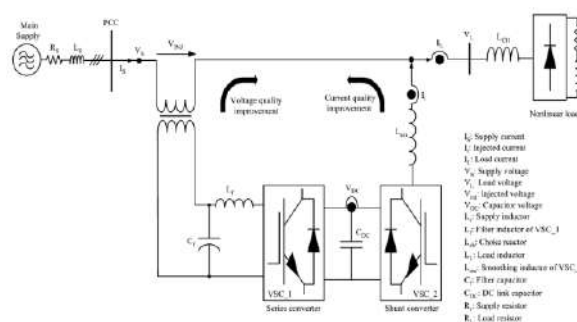


Fig. 1. Schematic diagram of UPQC.

The remainder of this paper is organized as follows. Section II of this paper presents a power circuit configuration of UPQC. Section III and IV, the controller algorithms of series and shunt converters are presented. In section V effectiveness of the proposed UPQC is tested.

Optimal generation scheduling of thermal units with considering startup and shutdown ramp limits

Publisher: IEEE

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3 Paper Citations 110 Full Text Views



Abstract

- Document Sections
- I. Introduction
 - II. Problem Formulation
 - III. Shuffled Frog Leaping Algorithm
 - IV. Result and Discussion
 - V. Conclusion

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This paper presents a generation scheduling of thermal units considering startup and shutdown ramp limits by using Shuffled Frog Leaping Algorithm. The Startup and shutdown ramp limits are does not consider in the conventional method of unit commitment (UC). Without considering the ramp limits in generation scheduling problem, solution for large power system does not give practical value. The objective of proposed work is to determine the optimal committed of thermal generating units at minimum operating cost while considering load demand, spinning reserve and other equality and inequality constraints at each hour time interval. The solution obtained from the proposed Shuffled Frog Leaping Algorithm (SFLA) for four unit system is compared with other conventional methods.

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pp.23757-23762

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pp.23763-23767

S.Aravindhkumar, C.Arulkumar, C.Sakthivel

SPEED CONTROL OF FOUR QUADRANT OPERATION OF BLDC MOTOR USING Z SOURCE INVERTER

pp.23768-23770

BHUVANESWARI M, MURALIBABU B

HYBRID MICROGRID WITH MULTI BIDIRECTIONAL CONVERTER FOR REDUCED MULTIPLE CONVERSIONS

pp.23771-23777

K.Suresh, A.Rathinam, T.Karthikeyan

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pp.23778-23783

P.Revathi, R.Murali, V.Vidhya

COORDINATE CONTROL OF REACTIVE POWER IN DISTRIBUTION NETWORK WITH RENEWABLE ENERGY USING STATCOM

pp.23784-23789

Wind Turbine Based Generation in Hybrid Remote Area Power Supply System

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Abstract—The application of variable speed wind turbine in hybrid remote area power supply (RAPS) systems provides opportunities for improved voltage and frequency control. The study presented in this paper covers doubly fed induction generator (DFIG) as wind turbine technologies together with battery storage and a dump load. The battery storage system and dump load are able to assist in maintaining the active power balance during over and under generation conditions as well as sudden load changes. Through simulation studies, it has been demonstrated that the RAPS systems are able to regulate the load side voltage and frequency within the acceptable limits while extracting the maximum power from wind, which is an inherent capability of variable speed generators. The RAPS system and their associated control strategies have been developed and their performance is investigated using MATLAB.

Index Terms— Doubly Fed Induction Generator (DFIG), Maximum Power Point Tracking (MPPT), Remote Area Power Supply (RAPS) systems.

1. INTRODUCTION

Remote Area Power Supply (RAPS) schemes are now becoming popular in remote areas including islands. However, the design and operation of such a power system are challenging due to the absence of a main grid supply system. Also, these power supply schemes are usually characterized by networks having low X/R ratios, low damping, and lack of reactive power support which may cause unexpected voltage and frequency excursions outside the allowable limits [1]. When designing and implementing RAPS systems, voltage and frequency control are the most important aspects to be controlled.

In addition, coordination between different system components, maximum power extraction from the renewable energy sources, power

quality (e.g., harmonics, voltage unbalance, flicker, etc.), and cost optimization of system operation and components are the other major issues of interest [2]. The selection of the suitable generation mix of a RAPS system is entirely dependent on the availability of resources [3]. Diesel-based power generation is a well-established option to supply power to rural communities. However, increased attention given to environmental concerns and the operating costs associated with diesel power supply schemes make this option less favourable [4]. There has been a recent trend for such diesel-fed isolated power systems to be replaced with renewable energy-based power supply schemes. Among several renewable energy options available, wind is identified as the fastest growing energy industry in the electricity market. However, intermittency associated with wind profiles together with variability of load demand make Operation of wind power systems challenging especially when they operate in a standalone environment. The integration of energy storage into such a power system can be seen to provide improved security and performance [6]–[9]. In this regard, energy storage systems can be operated as a source or a load depending the demand–generation mismatch [10] and [11]. Among several energy storage technologies (e.g., super capacitors, flywheels, etc.), battery storage can be identified as one of the best options for wind power applications due to its high energy density levels [12]. The selection of a specific wind turbine generator technology is also an important design factor in a wind-based power system. In general, variable speed wind turbine generator technologies are preferred in a standalone power system as they provide better voltage and frequency regulation compared to constant speed generators such as induction generators [13]. In this regard, doubly fed induction generators (DFIGs). Typically, DFIG-based wind turbine generator systems are preferred for high-power applications.

Short Term Generation Scheduling of Thermal Units with Emission Limitation in Deregulation Environment

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Abstract -This paper presents a generation scheduling of thermal units considering startup and shutdown ramp limits by using Shuffled Frog Leaping Algorithm. The Startup and shutdown ramp limits are does not consider in the conventional method of unit commitment (UC). Without considering the ramp limits in generation scheduling problem, solution for large power system does not give practical value. The objective of proposed work is to determine the optimal committed of thermal generating units at minimum operating cost while considering load demand, spinning reserve and other equality and inequality constraints at each hour time interval. The solution obtained from the proposed Shuffled Frog Leaping Algorithm (SFLA) for four unit system is compared with other conventional methods.

Keywords -Unit Commitment, Shuffled Frog Leaping Algorithm (SFLA), Startup Ramp limit and Shutdown Ramp limit.

I. INTRODUCTION

The planning and operation of generation scheduling of thermal units in electric power system is based on the total load demand on the system. The daily load demand of the system varies time to time and hour to hour. So the commitment of thermal units gets important to ON/OFF the thermal generating units [1]. The committed units optimally distribute the forecasted load. Unit commitment is a mixed integer nonlinear optimization problem used to schedule the thermal generating units in order to satisfying the load demand and reserve requirements of minimum cost [2]. The thermal unit commitment problem is solved by various optimization methods [3]. The methods are like Priority list (PL), Forward Dynamic programming(FDP), Lagrangian Relaxation (LR), Genetic algorithm(GA),

Simulated Annealing (SA), Particle Swarm optimization (PSO) and Ant colony Optimization (ACO).

The priority list method comparatively gives high production cost and high computational time. The dynamic programming method has more mathematical complexity compare to other methods for solving unit commitment problem [4]. The inherence sub optimality is the main drawback in the Lagrangian relaxation based unit commitment problems [5]. In genetic algorithm convergence does not guaranty to produced optimal solution compare to other methods [6]. The simulated annealing also has some mathematical complexity to implement the scheduling problem [7]. Particle swarm Optimization is based on birds flocking behavior which produces the efficient output [8],[9]. In ant colony Optimization, the colony of individuals is adopting by decision making policy [10].

In this paper we propose a integer coded Shuffled Frog Leaping Algorithm (SFLA) for solving the short term thermal generation scheduling problems. The four thermal generating units with eight hour load demand is consider as a case study for our proposed work. The organization of paper is follows. Section I describes the introduction of unit commitment; section II a detailed mathematical formulation of problem with considering the various constraints. The proposed integer coded SFLA with flow chart is explained in section III. Section IV and V gives the result and discussion and conclusion of our proposed work."

II. PROBLEM FORMULATION

The Unit commitment problem can be mathematically formulated by the following equation.

$$OC_T = \sum_{t=1}^T \sum_{i=1}^N PC_i(P_{i,t}).U_{i,t} + SC_i \quad (1)$$

$$PC_i(P_{i,t}) = A_i + B_i P_{i,t} + C_i P_{i,t}^2 \quad (2)$$

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Keywords -Unit Commitment, Shuffled Frog Leaping Algorithm (SFLA), Startup Ramp limit and Shutdown Ramp limit.

I. INTRODUCTION

The planning and operation of generation scheduling of thermal units in electric power system is based on the total load demand on the system. The daily load demand of the system varies time to time and hour to hour. So the commitment of thermal units gets important to ON/OFF the thermal generating units [1]. The committed units optimally distribute the forecasted load. Unit commitment is a mixed integer nonlinear optimization problem used to schedule the thermal generating units in order to satisfying the load demand and reserve requirements of minimum cost [2]. The thermal unit commitment problem is solved by various optimization methods [3]. The methods are like Priority list (PL), Forward Dynamic programming(FDP), Lagrangian Relaxation (LR), Genetic algorithm(GA),

Simulated Annealing (SA), Particle Swarm optimization (PSO) and Ant colony Optimization (ACO).

The priority list method comparatively gives high production cost and high computational time. The dynamic programming method has more mathematical complexity compare to other methods for solving unit commitment problem [4]. The inherence sub optimality is the main drawback in the Lagrangian relaxation based unit commitment problems [5]. In genetic algorithm convergence does not guaranty to produced optimal solution compare to other methods [6]. The simulated annealing also has some mathematical complexity to implement the scheduling problem [7]. Particle swarm Optimization is based on birds flocking behavior which produces the efficient output [8],[9]. In ant colony Optimization, the colony of individuals is adopting by decision making policy [10].

In this paper we propose a integer coded Shuffled Frog Leaping Algorithm (SFLA) for solving the short term thermal generation scheduling problems. The four thermal generating units with eight hour load demand is consider as a case study for our proposed work. The organization of paper is follows. Section I describes the introduction of unit commitment; section II a detailed mathematical formulation of problem with considering the various constraints. The proposed integer coded SFLA with flow chart is explained in section III. Section IV and V gives the result and discussion and conclusion of our proposed work."

II. PROBLEM FORMULATION

The Unit commitment problem can be mathematically formulated by the following equation.

$$OC_T = \sum_{t=1}^T \sum_{i=1}^N PC_i(P_{i,t}).U_{i,t} + SC_i \quad (1)$$

$$PC_i(P_{i,t}) = A_i + B_i P_{i,t} + C_i P_{i,t}^2 \quad (2)$$

Wind Turbine Based Generation in Hybrid Remote Area Power Supply System

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Abstract—The application of variable speed wind turbine in hybrid remote area power supply (RAPS) systems provides opportunities for improved voltage and frequency control. The study presented in this paper covers doubly fed induction generator (DFIG) as wind turbine technologies together with battery storage and a dump load. The battery storage system and dump load are able to assist in maintaining the active power balance during over and under generation conditions as well as sudden load changes. Through simulation studies, it has been demonstrated that the RAPS systems are able to regulate the load side voltage and frequency within the acceptable limits while extracting the maximum power from wind, which is an inherent capability of variable speed generators. The RAPS system and their associated control strategies have been developed and their performance is investigated using MATLAB.

Index Terms— Doubly Fed Induction Generator (DFIG), Maximum Power Point Tracking (MPPT), Remote Area Power Supply (RAPS) systems.

1. INTRODUCTION

Remote Area Power Supply (RAPS) schemes are now becoming popular in remote areas including islands. However, the design and operation of such a power system are challenging due to the absence of a main grid supply system. Also, these power supply schemes are usually characterized by networks having low X/R ratios, low damping, and lack of reactive power support which may cause unexpected voltage and frequency excursions outside the allowable limits [1]. When designing and implementing RAPS systems, voltage and frequency control are the most important aspects to be controlled.

In addition, coordination between different system components, maximum power extraction from the renewable energy sources, power

quality (e.g., harmonics, voltage unbalance, flicker, etc.), and cost optimization of system operation and components are the other major issues of interest [2]. The selection of the suitable generation mix of a RAPS system is entirely dependent on the availability of resources [3]. Diesel-based power generation is a well-established option to supply power to rural communities. However, increased attention given to environmental concerns and the operating costs associated with diesel power supply schemes make this option less favourable [4]. There has been a recent trend for such diesel-fed isolated power systems to be replaced with renewable energy-based power supply schemes. Among several renewable energy options available, wind is identified as the fastest growing energy industry in the electricity market. However, intermittency associated with wind profiles together with variability of load demand make Operation of wind power systems challenging especially when they operate in a standalone environment. The integration of energy storage into such a power system can be seen to provide improved security and performance [6]–[9]. In this regard, energy storage systems can be operated as a source or a load depending the demand–generation mismatch [10] and [11]. Among several energy storage technologies (e.g., super capacitors, flywheels, etc.), battery storage can be identified as one of the best options for wind power applications due to its high energy density levels [12]. The selection of a specific wind turbine generator technology is also an important design factor in a wind-based power system. In general, variable speed wind turbine generator technologies are preferred in a standalone power system as they provide better voltage and frequency regulation compared to constant speed generators such as induction generators [13]. In this regard, doubly fed induction generators (DFIGs). Typically, DFIG-based wind turbine generator systems are preferred for high-power applications.

Design and Simulation of Phase-Locked Loop Controller Based Unified Power Quality Conditioner Using Nonlinear Loads

C.Prakash, N.Abner Leo

Abstract— This project presents a power quality improvement of unified power quality conditioner (UPQC) to compensate current and voltage quality problems of sensitive loads. The UPQC consists of the series and shunt converter having a common dc link. The series converter mitigates voltage sag from the supply side and shunt converter eliminates current harmonics from the non linear load side. The developed controllers for series and shunt converters are based on a reference signal generation method (phase-locked loop). The dc link control strategy is based on the fuzzy-logic controllers. The conventional method using dq transformation to show the superiority of the proposed sag detection method. A fast sag detection method is also is presented. The efficiency of the proposed system is tested through simulation studies using the MATLAB/SIMULINK environment.

Index Terms— unified power quality conditioner (UPQC), reference signal generation, active filter, fuzzy-logic controller.

I. INTRODUCTION

Power quality is the set of limits of electrical properties that allows electrical systems to function in their intended manner without significant loss of performance or life. The term is used to describe electric power that drives an electrical load and the load's ability to function properly with that electric power. Without the proper power, an electrical device (or load) may malfunction, fail prematurely or not operate at all. There are many ways in which electric power can be of poor quality and many more causes of such poor quality power. With the increasing applications of nonlinear and electronically switched devices in distribution systems and industries, Power quality (PQ) problems, such as harmonics, flicker, and imbalance have become serious concerns. In addition Lighting strikes on transmission lines, switching of capacitor banks, and various network faults can also cause PQ problems, such as transients, voltage sag and interruption [1].

Voltage-source converter (VSC)- based custom power (CP) devices are increasingly being used in custom power applications to mitigate these PQ problems in power distribution systems. A shunt converter (also known as the shunt active filter) can compensate for distortion and unbalance in a load so that a balanced sinusoidal current flows through the feeder. A series converter (also known as the dynamic voltage) can compensate for voltage sag and distortion in the supply side voltage so that the voltage across

a sensitive load is perfectly regulated. Control techniques play a vital role in the overall performance of the power conditioner. Instantaneous power theory is generally preferred to generate reference signals for the shunt converter [3]. An extended method based on instantaneous reactive power theory in a rotating reference frame is used to suppress the harmonics and to correct the power factor in [4]. Fuzzy logic is utilized to control the compensation currents of the shunt converter in [5].

There has also been interest in the circuit topologies of UPQC. UPQC is generally designed as a three-phase three-wire (3P3W) systems. The three- phase four- wire system is also realized from the system where the neutral of series transformer used in series part UPQC is considered as the fourth wire for the 3P3W system. There are also single phase UPQC system. Various topologies, such as H- bridge converters, and single-phase UPQC with three legs are examined for the UPQC applications.

This paper presents novel contributions for UPQC control and has the following functions:

- The new control approach based on enhanced phase-locked loop and a nonlinear adaptive filter for reference signals generation is derived for series and shunt converters analyzed.
- A fuzzy logic controller (FLC) in MATLAB to control dc- link voltage without any interfacing of other simulation programs.
- FLC of dc-link voltage is proposed which improves the current total harmonic distortion (THD) over the conventional PI controller.
- A fast algorithm for sag detection is also presented.

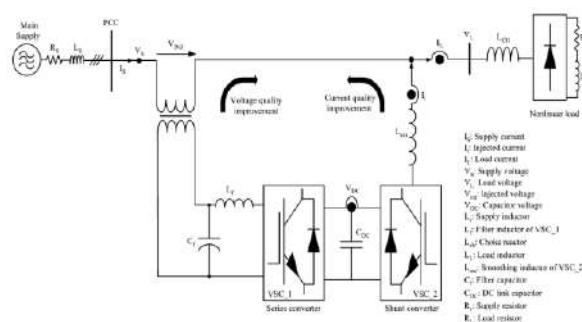


Fig. 1. Schematic diagram of UPQC.

The remainder of this paper is organized as follows. Section II of this paper presents a power circuit configuration of UPQC. Section III and IV, the controller algorithms of series and shunt converters are presented. In section V effectiveness of the proposed UPQC is tested.

Wind Turbine Based Generation in Hybrid Remote Area Power Supply System

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1. INTRODUCTION

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CFD ANALYSIS FOR HOMOGENOUS EFFECT OF BIOGAS AND AIR IN THE INTAKE MANIFOLD OF DUAL FUEL CI ENGINE

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ABSTRACT

In this laboratory research, biogas was produced by the anaerobic digestion of solid phase system using kitchen food solid waste. The biogas was carried out in a single cylinder diesel engine with supercharger under dual fuel mode. The experimental study was conducted by inducting biogas with air in the intake manifold, at four different pressures. The gas injector is mounted beyond the critical point; the injected gas fuel is not reaching completely into the engine cylinder during suction stroke, that may result to power drop and high chance of backfiring due to the gas accumulation [1]. The computational fluid dynamics (CFD) software is used to investigate the optimum distance and angle for better mixing of biogas with air at intake manifold. The results indicated that the biogas introduced at 2 bar pressure at 45° injector angle and a distance of 336 mm from the axis of the inlet valve was found to a better mixture. Based on the experimental results, it was observed that the 50% of blended biogas with a supercharged system produces an improved mechanical efficiency of 25% than the natural aspiration system. Further, the result shows a low value of CO emission for a supercharged system when compared to natural aspiration system.

KEYWORDS: Biogas, Computational fluid dynamics, Diesel Engine, Gas injector orientation, Supercharger India

1. INTRODUCTION

Diesel is a fossil fuel with high calorific value, nowadays which we are using for power generation, transportations and also for various applications cause many economical and ecological problems. In most urban centers around the world, the exhaust emissions from the diesel engine are major source which cause heavy pollutions with hazardous emissions such as NO_x (oxides of nitrogen), CO (Carbon monoxide), HC (Hydro Carbons) and PM (Particulate Matter) [1]. The primary reason for this pollution is due to the heterogeneous mixture of air and diesel in the combustion chamber and this fuel will be exhausted soon because they meet excessive usages and also they are of non-renewable type. They are the one in demand. The most critical issue concerning in the present is the replacement of fossil fuels with renewable sources. In this case, an alternate resource is required to meet the requirements of the current environment to reduce hazardous emissions. Thus, biogas is found to be the better fuel to meet the above crisis. India produces about 50 tones of wastes which can be used by waste treatment technology to minimize green house gas emission [2]. There are vast biomass resources that have good potential for biogas production such as animal waste, food waste, plant waste etc [3,4]. It can be also being produced from de-oiled cakes which further minimize the addition of greenhouse gases into the environment [5]. It has high self-ignition temperature enabling them to operate with lean mixtures and high compression ratios results in higher efficiencies and lower emissions [6]. Biogas generally has a high self-ignition temperature hence; it cannot be directly used in a CI engine. So it is useful in dual fuel engines. So far there have been assorted researches under combustion, performance and emission characteristics are completed in a dual fuel engine [7-10].

The dual fuel engine is a modified diesel engine in which usually a gaseous fuel called the primary fuel is inducted with air in the intake manifold. This fuel and

air mixture does not auto ignite due to high octane number. A small amount of diesel, usually called pilot fuel is injected for promoting combustion. This dual fuel engine can be operated either in only diesel fuel or in dual fuel mode. The primary fuel in dual fuelling system is homogeneously mixed with air that leads to very low level of smoke. Dual fuel engine can use a wide variety of primary and pilot fuels. The pilot fuels are generally of high cetane fuel. Biogas can also be used in dual fuel mode with vegetable oils as pilot fuels in diesel engines [11]. The performance of engine depends on the amount of biogas and the pilot fuel used. The ignition delay of the pilot fuel generally increases with the introduction of biogas and this will lead to advance the injection timing. Thus a fuel with low self-ignition temperature could be used along with biogas to help its ignition.

The advanced levels of computerized tools in CFD (Computational Fluid Dynamics) have led to the improvisation of attaining more precise results. They rested often on the volumes finished method by the use of CFD computer codes like FLUENT, Start-CD and FloWorks [12]. The geometric modification in the intake manifold of a CI engine for LPG (Liquefied Petroleum Gas) was studied by Jemni et al., on in-cylinder flow by numerical simulation which resulted in the improvement of brake power, brake torque and brake thermal efficiency [13].

From this, the objective of this paper is to conduct a study work on CFD in a CI engine by inducting biogas with air in the intake manifold at four different pressures with nine different orientations (location and angle) along with air. These outcomes were deliberated under supercharged condition and the experimented results were equated and examined using CFD software to scrutinize the optimum point on which the biogas atomizes effectively with air. Thus, the optimization of injector position with different injector distance with different injection angles at different injection pressures was done.

Finite Element Analysis and Simulation of Al 7075 Alloy Joints Produced by Friction Stir Welding
p.1116

Fatigue Analysis of Forward Fuselage under Dynamic Conditions
p.1121

Determination of Fracture Behavior under Biaxial Loading of Kevlar 149
p.1127

Computational Investigation of High Velocity Ballistic Impact Test on Kevlar 149
p.1133

Acoustical Failure Diagnosis of Bush in a Domestic Mixer
p.1141

The Consequence of Target Surface Curvature in the Jet Impingement Cooling
p.1148

Performance Combustion and Emission Characteristics of DI Diesel Engine with Use of Alternate Mechanism
p.1153

Productivity Improvement in CED Paint Plant by Jig Modification
p.1159

Acoustical Failure Diagnosis of Bush in a Domestic Mixer

692 12



Abstract:

Many of the machines and systems having rotating components are designed for operation at high speeds, and hence, it is obvious that only these elements are damaged initially and becomes the root cause of a defect in any machine. Using on line, continuous monitoring techniques, any defect in a rotating part can be detected at its initial stage itself and the user could be alerted before it leads to a catastrophic failure. In this experimental work of the acoustical failure diagnosis, three domestic mixers, the first one in healthy condition, the next mixer about to fail and the last with completely damaged bush were analyzed, with a Type-1 and Delta ohm HD2010 Model sound level meter (SLM). The acoustical readings of the three

mixers were measured and tabulated in decibel, using Delta Ohm Noise Studio software. Graphs were drawn for different sets of readings and by analyzing the graphs of the three mixers, the threshold value of the initiation of the defect was found to be 80 decibel, at which failure starts.

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KINETICS STUDIES ON CLEOME VISCOSA USING NANO MgO
CATALYST FOR BIODIESEL PRODUCTION

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ABSTRACT

Biodiesel from Cleome Viscosa L seed oil was produced using nano MgO as catalyst. Synthesised nano MgO catalyst characterizations were done using SEM, XRD and TGA analyses. The transesterification in the presence of the catalyst proceeded with a maximum yield of 95.36% under optimized conditions [0.5% (w/w) MgO, methanol/oil molar ratio 6/1, reaction time 45 min, reaction temperature 60 °C, and stirring rate 250 rpm]. Thus, MgO is an effective catalyst for transesterification of cleome viscosa seed oil. The results indicated that both esterification and transesterification reaction are of first order rate reaction.

Keywords: *Cleome Viscosa L*, transesterification, biodiesel, MgO nanoparticles, kinetics

INTRODUCTION

The need of energy is rising continuously, because of increase in industry as well as human population. The major sources of energy are petroleum, natural gas, coal, hydro and nuclear (Kulkarni, M.G., *et al.*, 2006). The disadvantage of using petroleum based fuel is atmospheric contamination. Petroleum diesel combustion is a most important source of greenhouse gases (GHG). Other than these emissions, petroleum diesel combustion is also main cause of other air contaminants including NO_x, SO_x, CO, particulate matter and volatile organic compounds (Klass, L.D., 1998), that adversely affects the environment and causing air pollution. These environmental related problems can be eliminated by replacing the petroleum based fuel with an efficient renewable and sustainable biofuel. Edible oil seed crops, like oilseed, sunflower, soyabean and *Carthamus tinctorius* and non-edible seed oil plantation crops genus *Jatropha* and genus *Pongamia* have proved to be globally viable industrial supply of vegetable oils for the production of biodiesel. Considering the deficiency of edible oils and unsustainability of plantation of genus *Jatropha* and genus *Pongamia* in countries like India, the prospects of seed oil producing cleome viscosa, a yearly wild short period plant species of the Indogangetic plains, were used as a supply for biodiesel. The oil was determined to be similar in carboxylic acid composition to the non-edible oils of rubber, genus *Jatropha* and genus *Pongamia* plantation crops and soybean, sunflower, safflower, flaxseed and rapeseed edible oil plants in richness of unsaturated fatty acids. The chemical process efficiency of base catalysts is on top of that of acid catalysts; but, because of the actual undeniable fact that crude oils and fats contain little or no amounts of free fatty acids (FFAs) or water, use of homogeneous basic catalysts can end in the formation of soap and a decrease in biodiesel yield (Ma and Hanna, 1999; Kawashima *et al.*, 2008). The standard draw back might be a copiousness of the waste water that is because of the purification to clean the homogeneous catalyst off the crude biodiesel with water. And besides, emulsification of biodiesel happens throughout the purifying operation, that causes not solely obstruction of the strategy operation however conjointly loss of biodiesel. Moreover, removal of those homogeneous catalysts when reactions is difficult. Compared with homogeneous basic catalysts, heterogeneous catalysts can avoid saponification of FFAs, and are merely separated from product mixtures. Examples include Mg-Al hydrotalcites (Deng *et al.*, 2011), K₂CO₃/γ-Al₂O₃ (Liu *et al.*, 2010), TiO₂-MgO (Wen *et al.*, 2010), Zr-La oxides (Sun *et al.*, 2010). Though variety of these catalysts could also be used for an improved biodiesel yields, they're going to operate only at high temperatures, need long reaction times, sensitive to wetness and high in cost.

MATERIALS AND METHODS

Magnesium nitrate, oxalic acid, dehydrated methanol, acetic acid (99.5%), and acrylic acid (98%) were purchased from Merck. A mechanical oil expeller was used for oil extraction. The extracted oil was filtered and left undisturbed for three-four days for settling of any suspended particles. Glycerol (99.9%) was obtained from Sigma-Aldrich (Shanghai, China). Deionized water was used in all experiments.

HYDRODYNAMICS STUDIES ON SEMI-FLUIDIZED BED REACTOR USING INTERNALS

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ABSTRACT: Mixing is an important unit operation encountered in chemical and allied industries. It can be achieved by many ways. One such way is fluidization. The efficiency of conventional fluidized bed is enhanced by semi-fluidized bed reactor. It is a novel type of fluid-solid contacting device. The semi fluidized bed is characterized by a fluidized bed and a fixed bed in series with single contacting vessel. Any improvements that made in the fluidized section of semi fluidized bed will increase overall efficiency of semi fluidized bed. This can be achieved by employing mixing elements in fluidized section of semi- fluidized bed reactor. For this purpose, Experiments have been conducted in a 50 mm ID, 1m-height vertical glass column using water as liquid phase and glass beads, sand, quartz used as solid phase. kenics elements of different L/D ratios are used. It is found that pressure drop increases with increase in particle size and static bed height. The minimum liquid semi-fluidization velocity increases with particle size but is a weak function of static bed height. The height of top packed bed increases with liquid and but decreases with particle size and static bed height. Results are presented graphically.

Keywords: Semi-fluidized bed, Mixing, static elements, pressure drop, Minimum and Maximum Semi-fluidization velocity, packed bed formation

1. INTRODUCTION

A Semi-fluidized bed can be viewed as the combination of a batch fluidized bed at the bottom and a fixed bed at the top within a single vessel. A Semi-fluidization bed has the advantages of both the packed and the fluidized beds. It is a new and unique type of fluid-solid contacting technique which has been reported recently. In most of the chemical plants we come across situations where a solid phase has to be kept in contact with a fluid phase — for example diffusional operations like drying, adsorption, reaction kinetics, solid catalysed reactions, heat transfer, etc. In all these cases fluid-solid contacting is very essential and developments to increase the efficiency of contact and mixing are always welcome. Static elements incorporated in the fluidizing section helps to increase the mixing efficiency. The development and advantages of the semi-fluidized bed relating to studies on hydrodynamics, mass transfer, reaction kinetics and filtration ^[4]. Fixed bed or packed bed, batch and continuous fluidization and semi-fluidization all are two phase phenomena. In case of batch fluidization if the free expansion of the bed is restricted by the introduction of porous disc or sieve and the fluid velocity is increased the particles are fluidized and the expansion starts with further increase in velocity of fluid—the particles will be carried and the formation of a fixed bed results at the top. So by the introduction of restraint some of the particles

STUDIES ON HYDRODYNAMICS, MIXING TIME AND RESIDENCE TIME DISTRIBUTION BEHAVIOUR OF EXTERNAL LOOP AIRLIFT REACTOR

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ABSTRACT: Mixing is one of the important unit operations in chemical and allied industries. Airlift reactors are known to be efficient contactors for processes involving gases, liquids and solids. Airlift reactors are mostly used in biological processes, aerobic waste water treatment, fermentation processes. In the present work focused on investigation of hydrodynamics and mixing index behavior (i.e., gas holdup, residence time distribution) in an external-loop airlift reactor and a stimulus-response tracer technique were used in the measurements. The geometry of External loop airlift reactor of column diameter 100mm and height 1000mm. Pressure drop, Gas hold-up, Mixing time, Residence time distribution have been measured for various electrolytes and solvents with various concentrations have been studied. In addition, the effects of superficial gas velocities on the gas holdup and RTD were also investigated. Comparisons made on both electrolytes and solvents by graphically.

Keywords: external loop airlift reactor, electrolytes, solvents, gas holdup, pressure drop, mixing time, residence time distribution

INTRODUCTION

The airlift reactor (ALR) is a multiphase reactor which is used in gas-liquid or gas-liquid-solid pneumatic contacting devices that are characterized by fluid circulation. It is also defined as a cyclic pattern through channels built specifically for this purpose.. Recent literature reveals that 80% of losses in process is due to improper mixing. Mixing can be achieved in two ways one with moving parts and another without moving parts. Batch and flow reactors come under the first category. The second category includes bubble column, fluidized bed and air lift reactor. The main difference between ALRs and bubble columns (which are also pneumatically agitated) lies in the type of fluid flow, which depends on the geometry of the system. This class of reactor is very attractive for use in the chemical process industry and biotechnology due to their design flexibility, low power requirement, and less pressure drop with further advantages of good mass and heat transfer. The rate of liquid circulation depends on gas flow rate. Two basic classes of the gas lift are distinguished: (i) the internal-loop gas lift reactor (IL-ALR) and (ii) the external-loop gas lift reactor (EL-ALR). The External loop airlift reactor has greater flexibility (Weiland and Onken, 1981) and its performance could be manipulated better by controlling parameters for the individual sections. EL-ALR is selected in this study. Gas holdup is an important hydrodynamic parameter in the reactor. It affects to mass and heat transfer in the system. Gas holdup measurements usually provide overall average information, i.e.



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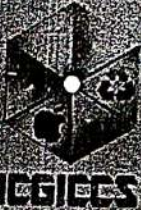

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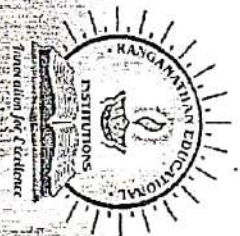
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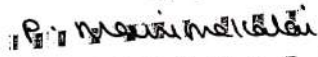
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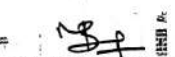
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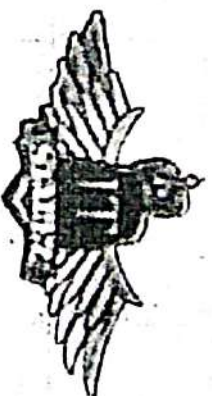
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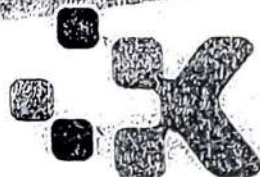
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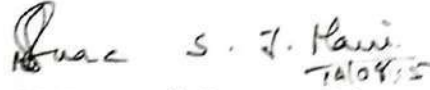
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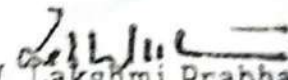
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STRUCTURAL ANALYZING IN GEAR BOX COVER USING NX-NASTRAN

Nithyanandhan.T^{1*}, Kannakumar.R² Suresh Kumar.P³

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Keywords: Displacement, Path length, Stress, Max shear and deflection.

Abstract

At first we used prototype model to analyze the component performance under varying load condition. Before manufacturing we found the capacity of component with the help of prototype. But it had some demerits like as more lead-time and redesign cost. Due to this we introduce new analyzing tools Nx-Nastran and Ansys. Here we selected Nx-Nastran to analyze the gear box cover. NX Nastran is a powerful, general purpose Finite Element Analysis (FEA) tool with an integrated graphical user interface and model, which is used to analyze linear and nonlinear stress, dynamics, and heat transfer characteristics of structures and mechanical components. It represents the latest in FEA technology with some of the fastest solvers on the market along with accurate solutions that have been trusted for over 20 years by companies in all industries. NX Nastran is available on a wide variety of platforms including 32-bit and 64-bit Windows and Linux operating systems.

NX Nastran (NASA Structural analysis) is a series of commercial software products originally developed under a NASA contract in the late 1960s by MSC Software Corporation using FORTRAN programming language. It uses the Finite Element Method which discretizes geometry into small elements and solves large sparse matrices using linear algebra to find quantities like displacement and stress in order to design structures. It became the industry standard program in part due to MSC buying competitors and in incorporating their advances into their products. After an antitrust settlement with the FTC in 2002, their source code was released to various organizations. Alternative Nastran versions were soon created including NEi-Nastran and NX Nastran.

Introduction

Nx-Nastran is Siemens product lifecycle management software inc. Parts of the UG/knowledge fusion software has been provided by Heidi Corporation. This product includes the international components for Unicode software, provided by international business machine co operation and others .We used Nx-Nastran to check the performance of engine cover under varying load condition in two stages.

Stage-1

In this stage we checked the performance of gear box cover under varying load condition without ribs. GBC's performance was graphed under varying load condition. X - Axis represents path length and Y - Axis explains displacement of gear box cover under varying load conditions. We attached the simulation results of gearbox cover with graph.

Gbc without rib's



AUGMENTATION OF YIELD ON DOUBLE SLOPE SINGLE BASIN SOLAR STILL BY WICK MATERIALS

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Abstract- Life on the earth depends on the availability of water and nowadays this vital resource is drying out rapidly. Solar distillation is one of the green technology in which hard (waste) water can be used to obtain potable water. Usage of wick material can increase the evaporation rate and thus materials like sponge, jute and cotton have effect on the still productivity. In this technical paper, the productivity of still with sponge, jute, cotton are experimentally measured and compared with simple still. It is observed that productivity increased by 11% on sponge, 15% on cotton and 19% on jute when compared with that of simple still.

Index Terms- Still Productivity, Sponge, Jute, Cotton.

I. INTRODUCTION

Quality and quantity of the natural resources which are essential for the life on earth is depleting rapidly [1]. Also pollution is a major issue which is very difficult to control. These things are serious even to cause an unbalance in the globe which may results in eradication of life from the earth. In case of water, effluents from households, agriculture and industry after various processes are dumping into water bodies like ponds, rivers, lakes and our oceans. Consequence of harmful entry of pollutants is the poor quality of the naturally available water. Also the annual rainfalls are getting low so that our underground water levels are lowering at an alarming rate. This also makes water too hard which cannot be used for domestic purposes. In short, both water quantity and qualities are becoming poor. Thus, efficient water treatment is necessary for this century to relief the thirst of our globe. Also we have to modify our technologies which are capable of producing potable water from waste (hard water). Solar distillation is a better alternative which is reliable on current world scenario [2]. Generally water can be treated by various techniques like Reverse osmosis, distillation, Ultra filtration etc...Each method needs a positive work and heat to run the system to get potable water. In distillation, latent heat is absorbed by the water to be treated from the heat source and thus water gets evaporated. Evaporated water release latent heat and thus, the condensate obtained will be pure water[3]. Amount of heat determines the rate of evaporation and thus to obtain higher evaporation rate, higher supply of heat is required. So, normal distillation requires adequate amount of conventional fuels to give required thermal energy to the distillation system. If we can replace the conventional heat source by renewable sources, then it will be a great boon for our world which suffers critical energy issues. Hence, solar distillation is an important

alternative as a green technology in which the potable water can be obtained without giving any external heat and work source. In solar distillation, solar heat is trapped in an arrangement called solar still which have absorber plate, insulation and transparent glass. Absorber is a sheet material of Aluminium which coated with black paint in order to increase the heat absorbing rate. Insulation is provided to minimize the heat loss from the still. Transparent glass will allow the passage of solar radiation inside the still. Due to this heat addition, the water in the still gets evaporated and this water vapour will be condensed and collected to get pure water. Various factors can influence the evaporation and condensation rate which changes still productivity. Water depth, inlet water temperature, wick materials etc., can increase the condensate production. Also the availability and intensity of the sun will influence the entire performance of the solar still. Usage of wick materials can influence the still productivity [4]. These materials are highly porous and when it is dipped in water, it moves inside through tiny pores of the wick material by capillary action. Jute, Cotton and sponge are selected as wick material for this work. The completely wetted wick thus increases the effective surface area of the still water thus increases the condensate production. The sponge, jute and cotton are arranged inside the still in a similar fashion for each case [5]. The solar intensity, glass temperature, vapour temperature, still water temperature, absorber temperature and still productivity is measured. Still productivity for each case is experimentally measured and compared with that of simple still.

II. EXPERIMENTAL PROCEDURE AND SETUP

A. Double Slope Solar Still

Solar still is a setup consists of absorber, insulator and

INVESTIGATION ON DOUBLE SLOPE SOLAR STILL UNDER VARIOUS WATER DEPTHS

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Abstract- Water scarcity and polluted water bodies are one of the severe problems faced by the globe and green technologies to obtain pure water is very necessary in the current world scenario. In the conceived project, the solar radiation is made trapped in a still by which the wastewater (hard water) gets evaporated and then condensed to get potable water. In this technical paper, an attempt was made to analyze simple solar still for various water depths viz. 0.5 cm, 1 cm, 1.5 cm and 2 cm. Water depth in a solar still is predominantly influenced the rate of evaporation and thereby the amount of condensate production. It was observed that yield increased by 19 % for 1.5 cm, 32 % for 1 cm and 51 % for 0.5 cm when compared to that of 2 cm water depth.

Keywords- Solar Still, Water Depth, Evaporation, Condensate.

I. INTRODUCTION

Around two third of earth surface is covered with water and still the entire population is facing serious water scarcity. Nowadays many of our water bodies are destroyed and remaining is highly polluted, hence life is becoming unsustainable on the earth. Underground water is also reducing at an alarming rate and it is becoming much harder so that it cannot be used for the basic needs of the living organism. We, the human beings, have to take necessary step to restore the health of the water bodies and to make it safer for the society.

Generally water can be treated by various techniques like Reverse osmosis, distillation, Ultra filtration etc...Each method needs a positive work and heat to run the system to get potable water. In distillation, latent heat is absorbed by the water to be treated from the heat source and thus water gets evaporated. Evaporated water release latent heat and thus, the condensate obtained will be pure water. Amount of heat determines the rate of evaporation and thus to obtain higher evaporation rate, higher supply of heat is required. So, normal distillation requires adequate amount of conventional fuels to give required thermal energy to the distillation system. If we can replace the conventional heat source by renewable sources, then it will be a great boon for our world which suffers critical energy issues. Hence, solar distillation is an important alternative as a green technology in which the potable water can be obtained without giving any external heat and work source.

In Solar distillation, the solar radiation is made trapped in a Solar Still where the water to be treated is stored. There is no need of the external heating source as the necessary heat can be obtained from the solar radiation itself. Solar still is a fabricated arrangement

similar to greenhouse which is used to harvest the incoming solar radiation in order to increase the heat energy inside the setup. It has an absorber metal sheet (normally sheet metal of Aluminum or Copper) coated with black paint in order to increase the heat absorbing capacity. It is covered with suitable insulating materials like wood, thermocol etc., to minimize heat loss from the system. Heat flux inside the still can increase the effective temperature of still water which in turn induces the higher evaporation rates. Double sided transparent glass is used to cover the top side of the solar still so that the sunlight can be easily transmitted into the system. Glass is provided with a right slope enables smooth flow of the condensate and thus it can be easily collected. Solar radiation can provide higher amount of heat flux (around 1200 W/m² at peak times) which is sufficient for the distillation process. Therefore, due to the solar thermal flux, the evaporation of still water gets enhanced and the potable water can be produced in a significant amount which is highly beneficial for remote and arid places.

Hossein Taghvaei and Hamed Taghvaei[1] studied various water depth influence on the still productivity. Ali. F.Muftah and M.A.Alghoul[2] reviewed that water depth is an important design factor in the distillation process. T. Rajaseenivasan a and K. Kalidasa Murugavel[3] worked on single and double basin solar still and showed that productivity is affected by different water masses. Jianyin Xiong and Guo Xie[4] stated that still can produce yield not only in a day ,but also in the night time. M.T Chaibi[5] reviewed solar desalination performance in irrigation for rural arid areas.T. Rajaseenivasan and K.Kalidasa Murugavel[6] reviewed different methods to improve the productivity in multi-effect solar still.

Various factors can influence the rate of production of the solar still. Experiment was done with a double

Grid Connected Hybrid System with Battery Energy Storage for Critical Load

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¹JCT college of engg and Technology, Coimbatore

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Abstract— In the grid connected network, it is especially difficult to support the critical load without uninterrupted power supply. The proposed Wind-Hydro hybrid system with battery energy storage is used to maintain the voltage profile and support the real and reactive power in the grid. The proposed system employing one squirrel cage induction generator driven by variable speed wind turbine. And another squirrel cage induction generator driven by constant power hydro turbine feeding to the grid. The scheme can also be operated as stand-alone system in case of grid failure. The system is simulated in MATLAB/SIMULINK and results are presented for various types of linear, nonlinear, and dynamic loads and under varying wind speed conditions.

Keywords- Wind Energy Conversion System (WECS), small hydro, Battery Energy storage system (BESS), Squirrel cage induction generator(SCIG)

I. INTRODUCTION

WITH HIGH population growth and economic development in the world, there is a very high demand for energy. Traditional fossil sources such as oil, coal are costly and have a serious pollution to the environment. As a renewable energy, wind energy generation has been focused as a clean and inexhaustible energy providing a feasible solution to energy shortage. The micro wind power generation system with battery energy storage is becoming more prominent with the increasing demand of power generation. It also reduces the environment pollution. However the output power of micro wind generator is fluctuating and will affect the operation in the distribution network. The utility system cannot accept new generation without strict condition of voltage regulation due to real power fluctuation and reactive power generation/ absorption. The industrial and commercial customers often operate the sensitive electronic equipments or critical load that cannot tolerate voltage sags, voltage swells, or loss of power, which moreover cause interruption in life operating equipments or stoppage in industrial production. This requires some measure to

mitigate the output fluctuation so as to keep the power quality in the distributed network. International Electro-Technical Commission IEC-61400-21 describes the norms for power quality of micro-wind generating system. The battery storage is used for critical load applications as it supplies power for a short period of time. The combination of battery energy storage and wind generating system in distributed power system can provide the effective, reliable, and durable power system. The system also provides energy saving and un-interruptible power within distribution network. In Japan, battery energy storage was used for mitigation of variations in wind farm output to stabilize the short fluctuation of output power. The parallel processing of wind energy generating system and battery storage will enhance the power flow in the distributed network. The wind energy generating system is used to charge the battery as and when the wind power is available [1]. The control method for the state of charge of battery unit was proposed in. The battery storage provides a rapid response for either charging/discharging the battery and also acts as a constant voltage source for the critical load in the distributed network. The battery storage system utilizes flooded lead-acid battery cell for energy storage. For electrical energy storage application, a large number of cells are connected in series to produce the required operating voltage. In order to verify the effectiveness of proposed system, the current control mode of voltage source inverter is proposed to interface the battery storage with micro-wind energy generator into the distributed network. The proposed control system with battery storage has the following objectives:

- 1) Unity power factor and power quality at the point of common coupling bus;
- 2) Real and reactive power support from wind generator and batteries to the load;
- 3) Stand-alone operation in case of grid failure.

[Home](#) > [Emerging Materials Research](#) > [List of Issues](#) > [Volume 4, Issue 2](#)

Comparative investigation on performance of various aspiration methods applied in a single cylinder diesel engine

Comparative investigation on performance of various aspiration methods applied in a single cylinder diesel engine

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Abstract

Better fuel economy and higher power with lower maintenance cost has increased the popularity of diesel engine vehicles. This paper investigates the effects of various aspiration methods such as natural aspiration, charge preheating, exhaust gas recirculation and supercharging (SC) on the performance of a diesel engine using neat diesel fuel in terms of brake thermal efficiency, indicated thermal efficiency, mechanical efficiency, specific fuel consumption and total fuel consumption. For this study, a naturally aspirated four-stroke single cylinder diesel engine was modified and tested with diesel fuel under various load conditions. The evaluation of the experimental data showed that SC the engine gives comparative performance than all other aspiration methods considered in this work.

Keywords: [Energy/](#) [Environmental impact/](#) [Transport](#)

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Optimizing The Process Parameters on Tool Wear of Tungsten Carbide Insert When Machining of AISI 304 Stainless Steel Material

Authors

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ABSTRACT

*In order to produce any product with desired quality by machining, proper selection of process parameters is essential. This can be accomplished by **Taguchi's approach**. The aim of the present work is to investigate the effects of process parameters on surface finish and material removal rate (MRR) to obtain the optimal setting of these process parameters. And the analysis of Variance (ANOVA) is also used to analyze the influence of cutting parameters during machining. In this work, **AISI 304 stainless steel** work pieces are turned on **conventional lathe** by using tungsten carbide tool. The results revealed that the feed and nose radius is the most significant process parameters on work piece surface roughness. However, the depth of cut and feed are the significant factors on MRR.*

Tool wear is serious, which leads to lower machining efficiency and it is thus of great importance to choose reasonable cutting parameters to decrease tool wear and increase machining efficiency. In this work, coated carbide tools were used to cut the materials. In light of the tool wear mechanism, tool flank wear model was established. The optimal cutting temperature was obtained using the established wear model. Further cutting parameter optimization was conducted according to the optimal cutting temperature. The optimized Cutting parameters can be considered to increase tool life and machining efficiency.

*In the present study, an attempt has been made to investigate the effect of cutting parameters on cutting forces and tool wear in hard turning of **AISI 304 steel** using coated carbide tools. The machining experiments were performed in accordance to **Taguchi's method** obtained results reveal that, cutting speed and depth of cut have significant effect on feed force whereas feed rate and depth of cut are factors that significantly influences on thrust force. The depth of cut and cutting speed has predominant effect on tool wear. Feed rate have less significant effect on tool wear. But, in case of cutting force modeling, all the three parameters have significant effect. Key parameters and their effects on tool wear and cutting forces have*

Use of Corn Cob as Low Cost Adsorbent for the Removal of Nickel (II) From Aqueous Solution

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ABSTRACT

The present study focuses on the use of Corn cob as an effective and efficient adsorbent for the removal of Ni (II) from aqueous solution. The influence of Physico-chemical parameters such as Adsorbent Dosage, Contact time, pH and Initial concentration has been examined in Batch studies. The initial and residual concentration of Ni (II) was analyzed using UV- Double Beam absorption spectrophotometer at 394 nm by which the percentage removal can be calculated. The equilibrium data onto the adsorption of Ni (II) was measured using Langmuir and Freundlich Isotherm model. The results revealed that Corn cob, a waste material have good potential as an adsorbent for the removal of toxic heavy metal like Ni (II) from Industrial waste waters.

KEYWORDS: Adsorption, Corn cob, Ni (II) Removal and Adsorption Isotherm.

INTRODUCTION

In recent years, Heavy metals are released into the environment due to rapid Industrialization and Urbanization causing a great problem worldwide [1]. The pollutant occurs to waste water is toxic and that contaminates the ground water and aquatic ecosystem [2]. One of the important toxic heavy metal Ni (II) finds its own way of the water bodies of Ni (II) mining and by industries [3, 4]. Due to the uptake of high concentration of Ni (II) from the groundwater that not only affects the aquatic life but also the Human beings causing

Lung Cancer, Nose Cancer, Respiratory Failure, Allergic Reactions and so on [5, 6]. So it is necessary to remove the Ni (II) from the Industrial waste before being discharged into water streams. There are number of processes has been employed for the treatment of waste water such as Reverse Osmosis, Chemical Reduction, Ion- Exchange, Electro dialysis and Activated Carbon adsorption Hazardous and Environmentally unsuitable chemicals [7, 8]. The adsorption using Agro-based plant waste consists of lignocellulosic materials

A BATCH STUDY ON THE REMOVAL OF NICKEL (II) USING LOW COST ADSORBENT FLYASH

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ABSTRACT

The present study is to investigate the removal of Heavy metals Ni (II) from the Industrial effluent using Fly ash emitted from the power plant. Fly ash is used as an adsorbent for the removal of Ni (II), in which various parameters such as Adsorbent Dosage, Contact time, pH and Initial Concentration are studied. The adsorption data using Langmuir and Freundlich Isotherm are analysed that concludes Fly ash is the best adsorbent for the removal of Heavy metals Ni (II).

KEYWORDS: Fly Ash, Batch Adsorption Studies, Ni (II) Removal, Langmuir and Freundlich Isotherm

INTRODUCTION

In recent years, the progressive increase of Industrial and Technological development that causes various types of pollutants to the Environment and Human life (Torab- Morteaei *et al.*, 2010). The Industrial waste water contains toxic pollutants which contaminate the ground water and it contains heavy metals such as Al, Ni, Zn, Pb, Cd, Cu and So on, one among those is Ni (II) a toxic heavy metal have good conductors of Heat and Electricity and high corrosive resistant that are widely used in Silver refineries, Electroplating and Storage battery Industries (House Croft and Sharpe, 2008). During this process, the Ni (II) released onto the effluent which causes Head-ache, Nausea, Chest Tightness, Chest pain, Lung Cancer, Respiratory failure and allergic reactions (Hema Krishna and Avvs Swamy, 2011; Parker, 1980).

There are several physical and chemical methods have been employed for the treatment of contaminated wastewater with heavy metals, among these adsorption with the suitable adsorbent would be an effective technique for the removal (Lakshmi Narayanan *et al.*, 2013). The solid wastes generated from various industries can be beneficiary utilized as low cost adsorbent which controls the environmental pollution (Nhapi *et al.*, 2011). Fly ash is an adsorbent contains particulate material produced by the combustion of coal at Thermal power plants which is collected with Cyclones or Electrostatic precipitators (Ahmaruzzaman, 2010; Wang and Wu, 2006). The present study aimed for the removal of Ni (II) using the Industrial Adsorbent Fly ash and to optimize the parameters such as Adsorbent dosage, Contact time, pH and Initial Concentration, then the equilibrium data for adsorption is explained by Langmuir and Freundlich Isotherms.

MATERIALS AND METHODS

Preparation of Fly Ash for Adsorption Studies

Fly ash used in the present study is obtained from Thiru Arooran Sugar Industry, Thanjavur, India. The constituents of Fly ash are SiO₂- 55.04%, Al₂O₃- 24.90%, CaO- 2.3%, Fe₂O₃- 8.18%, Mgo- 0.89%, So₃- 0.75%, Tio₂- 0.72, K₂O- 0.55%, others- 6.69% which are analyzed in Growell Technologies, Chennai, India. The collected adsorbent (Fly ash) is sieved by various size sieve shaker; finally 250 micron size particles are used for further experiments.

Detoxification of Electroplating Sludge by Bioleaching: Process and Kinetic Aspects

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Abstract

The presence of significant amounts of heavy metals in industrial sludge poses a severe threat to the environment and human health. In this study, bioleaching of heavy metals from electroplating industrial sludge was investigated using indigenous *Acidithiobacillus ferrooxidans* as the bacterial agent. The effect of sludge loading on the efficiency of heavy metal removal by bioleaching was studied. The efficiency of bioleaching was assessed based on media acidification, oxidation-reduction potential, and concentration of heavy metals in the aqueous solution. Experimental results showed that the sludge loading had great impact on the bioleaching process. At sludge loading of 1% (w/v), maximum removal of 96.31% and 84.4% was achieved for the heavy metals Zn and Ni, respectively. Bioleaching data were subjected to first-order-based kinetic studies for rate constant and further shrinking core model analysis was applied. It was found that the rate constants for Zn and Ni bioleaching were maximum at the treatment with lower sludge loading. The kinetic analysis using the shrinking core model revealed that chemical reaction step controls the overall rate of the bioleaching process. Such a kinetic study will be helpful in designing the sludge detoxification process by bioleaching.

Keywords: electroplating sludge, *A. ferrooxidans*, bioleaching, rate kinetics, shrinking core model

Introduction

Electroplating is the application of metal coating to a metallic or other conducting surface by an electrochemical process. Articles are electroplated to alter their appearance, provide protective coating, give them specific mechanical properties, and attain special surface properties [1]. The electroplating process generates huge quantities of wet sludge containing heavy metals as pollutants at the wastewater treatment unit [2, 3]. The major heavy metals present in the sludge are cadmium, chromium, lead, copper, zinc, and nickel [4, 5]. Electroplating sludge is categorized as hazardous waste by statutory authorities and is processed for metal recovery by suitable technologies before disposal [6-8]. Improper disposal of industrial sludge may contami-

nate surface water and groundwater with heavy metals and put the surrounding environment under risk and spoil human health [9-11]. Hence, electroplating sludge should be treated for removal of the heavy metals before considering any disposal methodology.

Currently, various chemical and biological methods are available to detoxify industrial sludge, and selection of a suitable process depends on both technical and economic feasibility [12]. Owing to the consumption of a large amount of inorganic acids, the chemical leaching process is often more expensive than the biological process, and thus paves the way for developing the biological leaching (bioleaching) process [13, 14]. In the bioleaching process, the filamentous fungi and lithotrophic bacteria from *Acidithiobacillus* genus are used as biological agents [15, 16]. In comparison, the efficiency of removing heavy metals is found to be less for fungal bioleaching than for bacte-

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Optimization Studies on the Biodegradation of Textile Dye Congo red using Fungal Strains

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Abstract— Dyes are extensively used in the textile industry because of their wide variety of color shades, ease of application and minimal energy consumption. The discharges of dyes into the environment is aesthetically displeasing, impede light penetration, damage the quality of the receiving streams and may be toxic to treatment processes, to food chain organisms and to aquatic life. In this study fungal strain like *Aspergillus flavus* and *Aspergillus niger* were used to degrade Congo red textile dyes. Physico-chemical parameters were optimized for the decolorization process by changing one parameter at a time. For *A.flavus* and *A.niger*, the optimum temperature, pH, carbon source, nitrogen source and inoculum volume were found to be 31°C, pH 8, 1% maltose, 1% yeast extract, and 2% inoculums respectively. Extent of decolorization recorded by *A.niger* under optimal conditions was found to be 93.21%, *A.flavus* was found to be 88.23%. The study has confirmed the potential of the above fungi in the decolorization of Congo red and opened scope for future analysis of their performance in the treatment of textile effluent.

Keywords— Biodegradation, Congo red dye, *Aspergillus flavus*, *Aspergillus niger*, Optimization

I. INTRODUCTION

Textile effluent includes dyes, detergents, grease, oils, sulfates, solvents, heavy metals, other inorganic salts and fibers in amounts depending on the processing regime. Textile dye effluent has a strong color, high pH, high temperature, high COD (Chemical Oxygen Demand) and low biodegradability [1]. Pollution caused by dye effluent is mainly due to the durability of the dyes in the wastewater. Many physical and chemical methods including adsorption, coagulation, flocculation, electrolysis, precipitation, and oxidation have been used for the treatment of dye-contaminated effluents [2], [8]. These methods, nevertheless, may generate a considerable quantity of sludge or may easily cause secondary pollution due to excessive chemical usage. Therefore, it may be economical to develop substitute means of dye decolorization, such as degradation due to its reputation as an environmentally friendly and widely acceptable treatment technology. The various organisms which degrade dyes are fungi, bacteria and actinomycetes. The dyes are completely decolorized by these organisms in 8 to 10 days [3]. Microorganisms can play a really important role in decay and ultimate mineralization of these dyes. Biotreatment offers a cheaper and environmentally friendly alternative for color removal in textile effluent [4], [9]. In order to develop an economic decolorization process, optimizations of process parameters like nutritional sources, pH, and temperature were found [5], [6]. The current work proposes to look into the potential of fungi for decolorization of textile dyes under aerobic conditions and optimize the operation parameters.

II. MATERIALS AND METHODS

A. Textile mill Effluent and Chemicals

The textile mill effluent was collected from a dyeing unit situated in Tirupur region, Tamilnadu, India. The wastewater was stored at 4°C in airtight plastic containers. Congo red dye is used in the present studies. A stock solution of the dye 1000 ppm was prepared by dissolving 100 ml of dye in 100 ml of distilled water and this stock solution was preserved and used for further study. All chemicals used in this study were of AR grade.

B. Micro organism and Growth conditions

The fungal strain *Aspergillus flavus* (MTCC 3783) and *Aspergillus niger* (MTCC 3783) for biodegradation of Congo red obtained from IMTECH, Chandigarh, India. The strains were maintained in Modified Czapek Dox agar media with a composition of sucrose 30 g/l, sodium nitrate 2 g/l, magnesium glycerophosphate 0.50 g/l, potassium chloride 0.50 g/l, dipotassium sulfate 0.35 g/l, ferrous sulfate 0.01 g/l and agar 12 g/l at 30°C for 7 days.

C. Experiment

50 ml of MCDM medium was amended separately with textile dye (200 mg/l) and subsequently inoculated with 3% fungal suspension. The flasks were kept in mechanical shaker and incubated at 30°C for 7 days. Samples were drawn at 2 days

Kinetics of heavy metal biosolubilization from electroplating sludge: effects of sulfur concentration

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Abstract

The removal of heavy metals from industrial sludge through biosolubilization using sulfur-oxidizing bacteria has been shown to be a promising technology, but the process with surplus concentration of sulfur causes re-acidification of the treated residues and creates environmental issues. Thus, the study for investigating the effect of sulfur concentration on the heavy metal biosolubilization system, with an emphasis on optimizing the sulfur concentration, is of immense importance. In this study, the experiments to investigate the effect of sulfur concentration on the performance of biosolubilization were carried out using 2–10 g/L elemental sulfur on heavy metal-laden electroplating sludge (50 g/L). The sludge-acclimatized, sulfur-grown *Acidithiobacillus ferrooxidans* isolate was used as sulfur-oxidizing bacteria. For the type of sludge used in this study, high pH reduction, short lag phase, and high heavy metal solubilization efficiencies were obtained in the treatment with 6 g/L sulfur. The kinetic study showed that the rate constant values of heavy metal solubilization were relatively high while using sulfur concentration of 6 g/L. The analysis using shrinking core model of fluid–particle reaction kinetics explicated that chemical reaction step controls the rate of heavy metal biosolubilization. The study provides an optimized strategy to design an efficient biosolubilization system for anticipated energy source.

OPTIMIZATION OF VARIOUS PARAMETERS ON
BOTRYOCOCCUS BRAUNII FOR BIODIESEL PRODUCTION USING
NANO CaO CATALYST

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ABSTRACT

The aim of the study was to obtain high quality biodiesel from microalgae *Botryococcus braunii* through transesterification process using nano CaO as catalyst. The yield of 81.31% ester was obtained at an optimum catalyst of 0.5 wt %. The reaction temperature was optimum at 55°C and yields 82.33% ester. At an optimum reaction time of 50 min a maximum yield of 84.11% ester was obtained. The stirring speed was varied from 150 to 400 rpm and was optimum at 300 rpm yields maximum of 84.67% ester. The fuel properties of *B.Brunii* Biodiesel was determined as per the ASTM D6571 standard are density 853 kg/m³, viscosity 5.34 mm²/sec, flash point 138°C, acid value 0.46mg/gm, calorific value 39.28 MJ/Kg and sulfur content 15 ppm. The method used in this study may well be novel approach and great potential in the industrial production of biodiesel from microalgae.

Keywords: Botryococcus braunii, Transesterification, Biodiesel, Optimization.

INTRODUCTION

The most basic requirement for human survival and activities is energy. Nowadays petroleum based fuels has been serving the world to meet its need of energy consumption. The dependency of mankind is entirely on the fossil fuels and might leads to shortage in near future (I.M. Atadashi *et al.*,2010 and N. Chand.,2002). Whereas petroleum fuels plays an important role in the development of industrial growth, transportation purpose, agricultural area and also to meet other basic needs. The continuous use of fossil fuel is creating the environmental issues including emission of NO₂, SO₂ and CO₂ gases to atmosphere. Hence, the scientists are in search of an alternative fuels. (Shenbaga *et al.*, 2012). Biodiesel is one of the most important components to reduce greenhouse gas emissions and substitute of fossil fuels. Biodiesel is a non-toxic and biodegradable with less pollutant and presently receiving high attention because of its potential as a sustainable and environmentally friendly substitute to petro-diesel (Vasudevan *et al.*, 2008 and Lam *et al.*, 2012). Biodiesel reduces net carbon-dioxide emissions by 78% on a lifecycle basis when compared to conventional diesel fuel (K. Gunvachai., *et al.*, 2007). Biodiesel produced from oil crops is a potential renewable and carbon neutral substitute to petroleum fuels. But biodiesel from oil crops, waste cooking oil and animal fat cannot satisfy even a small fraction of the present demand for transport fuels (Yusuf Chisti.,2007).

Biodiesel is a mixture of monoalkyl esters of long chain fatty acids resulting from a renewable lipid feed stock (A. Demirbas.,2002). It is composed of 90% - 98% triglycerides, and smaller quantity of mono and diglycerides and free fatty acids, as well as residual amounts of phospholipids, carotenes, tocopherols, sulphur compounds and water (K. Bozbas.,2008). The advantages of biodiesel are portability, readily available, lower sulfur content and aromatic content and high combustion characteristics. Biodiesel is considered as a potential replacement of conventional diesel fuel is normally, composed of fatty acid methyl esters that can be prepared from triglycerides in vegetable oils by transesterification with methanol.(V. Gerpen.,2005)

Microalgae are the most promising alternative supply of lipid for biodiesel production. Microalgae emerge as an only source of renewable biodiesel that has capable of meeting the global demand for transport fuels. Like plants, microalgae utilize sunlight to produce oils but they are highly efficient than crop plants. (Yusuf Chisti.,2007). Microalgae have been well known as a better feedstock for biodiesel production, mainly because of their faster growth rate (100 times than terrestrial plant) and their ability to double their biomass in less than 24 hours under certain culture conditions (Lam *et al.*, 2012; Tredici *et al.*, 2010). Oil content in microalgae may exceed up to 80% by weight of dry biomass (Metting, 1996; Spolaore *et al.*, 2006). Microalgae which have high oil content are preferred for biodiesel production. Depending on the species, microalgae produce different kind of lipids, hydrocarbons and other complex oils (Banerjee *et al.*, 2002; Metzger., *et al* 2005; Guschina., *et al* 2006).

KINETICS STUDIES ON CLEOME VISCOSA USING NANO MgO
CATALYST FOR BIODIESEL PRODUCTION

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ABSTRACT

Biodiesel from Cleome Viscosa L seed oil was produced using nano MgO as catalyst. Synthesised nano MgO catalyst characterizations were done using SEM, XRD and TGA analyses. The transesterification in the presence of the catalyst proceeded with a maximum yield of 95.36% under optimized conditions [0.5% (w/w) MgO, methanol/oil molar ratio 6/1, reaction time 45 min, reaction temperature 60 °C, and stirring rate 250 rpm]. Thus, MgO is an effective catalyst for transesterification of cleome viscosa seed oil. The results indicated that both esterification and transesterification reaction are of first order rate reaction.

Keywords: *Cleome Viscosa L*, transesterification, biodiesel, MgO nanoparticles, kinetics

INTRODUCTION

The need of energy is rising continuously, because of increase in industry as well as human population. The major sources of energy are petroleum, natural gas, coal, hydro and nuclear (Kulkarni, M.G., *et al.*, 2006). The disadvantage of using petroleum based fuel is atmospheric contamination. Petroleum diesel combustion is a most important source of greenhouse gases (GHG). Other than these emissions, petroleum diesel combustion is also main cause of other air contaminants including NO_x, SO_x, CO, particulate matter and volatile organic compounds (Klass, L.D., 1998), that adversely affects the environment and causing air pollution. These environmental related problems can be eliminated by replacing the petroleum based fuel with an efficient renewable and sustainable biofuel. Edible oil seed crops, like oilseed, sunflower, soyabean and *Carthamus tinctorius* and non-edible seed oil plantation crops genus *Jatropha* and genus *Pongamia* have proved to be globally viable industrial supply of vegetable oils for the production of biodiesel. Considering the deficiency of edible oils and unsustainability of plantation of genus *Jatropha* and genus *Pongamia* in countries like India, the prospects of seed oil producing cleome viscosa, a yearly wild short period plant species of the Indogangetic plains, were used as a supply for biodiesel. The oil was determined to be similar in carboxylic acid composition to the non-edible oils of rubber, genus *Jatropha* and genus *Pongamia* plantation crops and soybean, sunflower, safflower, flaxseed and rapeseed edible oil plants in richness of unsaturated fatty acids. The chemical process efficiency of base catalysts is on top of that of acid catalysts; but, because of the actual undeniable fact that crude oils and fats contain little or no amounts of free fatty acids (FFAs) or water, use of homogeneous basic catalysts can end in the formation of soap and a decrease in biodiesel yield (Ma and Hanna, 1999; Kawashima *et al.*, 2008). The standard draw back might be a copiousness of the waste water that is because of the purification to clean the homogeneous catalyst off the crude biodiesel with water. And besides, emulsification of biodiesel happens throughout the purifying operation, that causes not solely obstruction of the strategy operation however conjointly loss of biodiesel. Moreover, removal of those homogeneous catalysts when reactions is difficult. Compared with homogeneous basic catalysts, heterogeneous catalysts can avoid saponification of FFAs, and are merely separated from product mixtures. Examples include Mg-Al hydrotalcites (Deng *et al.*, 2011), K₂CO₃/γ-Al₂O₃ (Liu *et al.*, 2010), TiO₂-MgO (Wen *et al.*, 2010), Zr-La oxides (Sun *et al.*, 2010). Though variety of these catalysts could also be used for an improved biodiesel yields, they're going to operate only at high temperatures, need long reaction times, sensitive to wetness and high in cost.

MATERIALS AND METHODS

Magnesium nitrate, oxalic acid, dehydrated methanol, acetic acid (99.5%), and acrylic acid (98%) were purchased from Merck. A mechanical oil expeller was used for oil extraction. The extracted oil was filtered and left undisturbed for three-four days for settling of any suspended particles. Glycerol (99.9%) was obtained from Sigma-Aldrich (Shanghai, China). Deionized water was used in all experiments.

Kinetics on Biosolubilization of Copper from Electro Plating Sludge: Effect of Agitation Speed

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Abstract: In this present study, typical characteristics and kinetics of biosolubilization of copper from the electro plating industrial sludge using microorganism, *Acidithiobacillus ferrooxidans* was investigated. Since agitation speed is one of the key factor influence the biosolubilization process, hence it is necessary to study the effect of agitation speed on biosolubilization method. The experiments were carried out in 250 mL Erlenmeyer flasks with agitation speed varying from 100 to 300 rpm at temperature 30 °C. The attainment of Cu biosolubilization was inspected for the period of 20 days. It was observed that the high pH reduction, absence of lag phase and improved Cu solubilization were obtained in the experiment with 200 rpm. At this agitation speed, the efficiency of biosolubilization of Cu from the sludge was 56.85 % after 20 days. The pseudo-first order kinetic equation was used to determine the rate-constant of Cu solubilization. The kinetic study indicated that the rate-constant of Cu solubilization was observed to be maximum at the agitation speed of 200 rpm. Using shrinking core model kinetics, it was also observed the rate of solubilization was controlled by the chemical reaction step.

Keywords : Biosolubilization, agitation, pseudo-first order, rate constant, shrinking core model.

Introduction

The hazardous consequences of heavy metals arise from the metal interaction with proteins (enzymes) and metabolic processes getting inhibition in humans, plants and animals. It may cause serious threat to life of plants, aquatic organisms, animals and humans being. The heavy metal concentration in the wastes sludge can be reduced by several pretreatment methods such as alkaline-chlorination-oxidation, electro coagulation, adsorption, membrane process, reverse osmosis, evaporative recovery, ion exchange, and electrochemical treatment¹. The main drawback of these methods are need of chemicals in large amount, high operating cost, difficulties in the working procedure and release of toxic gases in the atmosphere². Hence suitable remediation techniques are required to alter the treatment of wastes for removing heavy metals³.

Biosolubilization is a process, which employs the microorganisms to transform solid insoluble compounds into soluble and extractable elements. Usually, biosolubilization is used to leach the metals from its sulfide ores. Hence, it is called as bioleaching. This process has several advantages for leaching the metals such as less energy requirement, environmentally friendly, and no need of sophisticated control instruments. Even though this process is originally developed for metal extraction from its ore, in last decade, lot of work have

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