MANGALORE INSTITUTE OF TECHNOLOGY AND ENGINEERING
(An ISO 9001:2015 Certified Institution)
(Affiliated to Visvesvaraya Technological University Belagavi)
Badaga Mijar, Moodabidri-574225, Karnataka

3.3.3 Number of books and chapters in edited volumes/books published and papers published in national/ international conference proceedings per teacher during last five years

Details of Books, Chapters in edited Volumes / Books published and Conference Proceedings

Sl.No.	Publication	Page No.
1	Books	1
2	Chapters	2
3	Proceedings	3-27

3.3.3 Number of books published per Teacher during last five years

Sl. No.	Name of the Teacher	Title of the book published	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page. No.
1	Uday J	Pattern recognition techniques for kannada script analysis	2020	978-620-2-55300-1	Lambert Academic Publishing	28
2	Ganesh B. Mogaveer	Elements of Civil Engineering and Engineering Mechanics	2015	978-81-203-5001-4	PHI Learning Private Limited, Delhi-110092	29

3.3.3 Number of chapters in edited volumes/books published per Teacher during last five years

Sl. No.	Name of the Teacher	Title of the chapters published	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page. No.
1	Asha Crasta	Recent Developments in Engineering Research Vol. 5/Chapter 10	Recent Assessment and Analysis of Damping Derivatives for Delta Wings in Hypersonic Flow for Curved Leading Edges with Full Sine Wave: Chapter 10	2020	978-81-947979-5-1	B P International	30
2	Nallusamy Tamilselvam	Advances in Human and Machine Navigation Systems	Optimization of NOE Flights Sensors and their Integration	2019	978-1-83880-564-7	Intechopen Limited UK	31

3.3.3 Number of papers published in national/ international conference proceedings per Teacher during last five years (Lecture Note)

Sl. No.	Name of the Teacher	Title of the proceedings of the conference	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page No.
1	Akhila Rupesh	Lecture Notes in Mechanical Engineering book series (LNME)	Comparative Study on Wind Tunnel Calibrating Instruments	2020	2195-4356	Springer	32
2	Padma Prasad, Sathisha, K. Shreya Prabhu	Lecture Notes in Electrical Engineering	Novel Approach in IOT-Based Smart Road with Traffic Decongestion Strategy for Smart Cities	2020	978-981-15-0626-0_16	Springer Nature Singapore	33
3	D'Souza Dony Armstrong, V.N Ganesh	Lecture Notes in Electrical Engineering, Springer book series	Pedal Effects Modelling for Stringed Instruments by Employing Schemes of DSP in Real Time for Vocals and Music	2020	978-981-15-0626-0_9	Springer Nature Singapore	34
4	Rumana Ali, Vinayambika S. Bhat	Lecture Notes in Electrical Engineering, Springer book series	Performance Analysis of Converter Circuit Transfer Function Model Using PID Control Algorithms	2020	978-981-15-0626-0_3	Springer Nature Singapore	35

Sl. No.	Name of the Teacher	Title of the proceedings of the conference	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page No.
5	Nallusamy Tamilselvam	Mechanical Characterization of Glass Fiber-Strengthened Balsa–Depron Composite	Mechanical Characterization of Glass Fiber-Strengthened Balsa–Depron Composite	2019	978-981-13-6374-0_30	Springer	36
6	Sathisha, Ranjith H D, Padma Prtasad, Ajay Priston Pinto	Lecture Notes in Networks and Systems	FPGA Implementation of Parallel Transformative Approach in AES Algorithm	2019	978-981-13-05856-3	Springer Nature Singapore	37
7	Gajanan M Naik	Lecture Notes on Multidisciplinary Industrial Engineering	Influence of Chloride Content and Exposure Time on Corrosion Behaviour of AZ80 Wrought Mg Alloy	2019	978-981-13-9213-9	Springer Nature Singapore	38
8	Gajanan M Naik	Lecture notes in mechanical engineering. Springer, Singapore	The Role of Processing Temperature in Equal Channel Angular Extrusion: Microstructure Mechanical Properties and Corrosion Resistance	2019	978-981-15-3631-1	Springer Nature Singapore	39

3.3.3 Number of papers published in national/ international conference proceedings per Teacher during last five years (Proceedings)

Sl. No.	Name of the Teacher	Title of the proceedings of the conference	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page No.
1	Nayana Acharya, Raghavendra Sagar	Materials Today Proceeding	Influence of Frequency on Dielectric and Electrical Behaviour of ZnMn2O4	2020	2214-7853	Elsevier	40
2	Nayana Acharya, Raghavendra Sagar	IOP Conf. Series: Journal of Physics: Conf. Series	Influence of temperature on frequency dependent electrical behaviour of FeMn2 O4	2020	17426588, 17426596	Institute of Physics	41
3	H. Vijeth	Materials Today Proceedings	Single Crystalline Hierarchical SnO2 Microsphere and Fluoride-Mediated Hollow Structures for Photocatalytic Activity	2020	2214-7853	Elsevier	42
4	H. Vijeth	Materials Today: Proceedings	UV-irradiation induced synthesis of reduced graphene quantum dots	2020	2214-7853	Elsevier	43

Sl. No.	Name of the Teacher	Title of the proceedings of the conference	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page No.
5	Anthoni Praveen Menezes	Materials Today: Proceedings	The Pivotal Role of the Pyridine Ring in Enhancing Second Order Nonlinearity in Methoxy Substituted Chalcones	2020	2214-7853	Elsevier	44
6	Anthoni Praveen Menezes	Materials Today: Proceedings	Synthesis, Growth, Hirshfeld Surface Analysis and Crystal Structure of a Pyridine based Chalcone Single Crystal	2020	2214-7853	Elsevier	45
7	Anthoni Praveen Menezes	Materials Today: Proceedings	Investigation of Physical, Spectral and Thermal Properties of a Dimethoxy Substituted Chalcone for Opto-Electronic Device Applications	2020	2214-7853	Elsevier	46
8	Akhila Rupesh	AIP Conference Proceedings -	Synthesis and Characterisation of Hydrogen Fuel from Bio-Waste Recovery	2020	1551-7616	AIP Conference Proceedings	47-48

Sl. No.	Name of the Teacher	Title of the proceedings of the conference	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page No.
9	Ajith kumar, H R Praneeth	-	Design and Development of a Novel Flying Car for Future Transportation	2020	1551-7616	AIP Conference Proceedings	49
10	Akhila Rupesh	-	Aerodynamic Design, Analysis, Fabrication and Testing of a Claw Yaw Sphere for subsonic flow	2020	1551-7616	AIP Conference Proceedings	50-51
11	Akhila Rupesh	-	Computational Analysis on Hybrid Composite Material	2020	1551-7616	AIP Conference Proceedings	52-53
12	Shivaji Lamani	-	Analysis, Fabrication and Testing of a Sandwich Composite for an UAV wing	2020	1551-7616	AIP Conference Proceedings	54-55
13	K. R. Vishwaretha	-	Numerical Design and Modelling of a Vertical Axis Wind Turbine to extract Wind Energy from Highways to power Electric Vehicle charging stations	2020	1551-7616	AIP Conference Proceedings	56-57
14	Sujesh Kumar	-	Gesture Control of UAV using Radio Frequency	2020	1551-7616	AIP Conference Proceedings	58-59

Sl. No.	Name of the Teacher	Title of the proceedings of the conference	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page No.
15	G. Purushotham	-	Environmental Pollution Control Using Artificial Intelligence Drone	2020	1551-7616	AIP Conference Proceedings	60-61
16	G. Purushotham	Materials Today: Proceedings	A Review on Mechanical and Wear Properties of ASTM A 494 M Grade Nickel-based Alloy Metal Matrix Composites	2020	2214-7853	Elsevier	62
17	Rumana Ali, Vinayambika S Bhat	-	A Novel Technique for Production of Paint from the Diesel Exhaust Soot	2020	0094-243X	AIP Conference Proceedings	63
18	Vinayambika S Bhat	-	Comparative study of PID control Algorithms for an Electric vehicle	2020	978-0-7354-1995-7	AIP Conference Proceedings	64
19	M. Lokesha	Materials Today: Proceedings	Investigating the Impact of Deep Cryogenic Treatment on Surface Roughness and Cutting Force in Turning C45 Steel	2020	2214-7853	International Conference on advances in materials and manufacturing applications	65

Sl. No.	Name of the Teacher	Title of the proceedings of the conference	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page No.
20	Sagar S	International Journal of Advanced Science and Technology	Performance of concrete by partially replacing fine aggregate with GGBS and Cement with Flyash	2019	2005-4238	Science and Engineering Research Support Society	66
21	Sunil Kumar S, Ganesh Aithal, P. Venkataramana Bhat	Advances in Artificial Intelligence and Data Engineering	Design, Calibration and Experimental study of Low cost Resistive based Soil Moisture Sensor for detecting moisture at different depth of soil	2019	978-981-15-3514-7	Springer Nature, Singapore	67
22	Rajesh N. Kamath	International Journal of Engineering Research & Technology	Heart Attack Detection System Using IoT	2019	2278-0181	RTESIT -2019 Conference proceedings	68
23	Lokesha M	APRN Journal of Engineering and Applied Sciences	Investigation Of Machinability Characteristics On C45 Steel Alloy While Turning With Untreated And Cryotreated M2 Hss Cutting Tools	2019	1819-6608	Elsevier Materials Today: Proceedings	69

Sl. No.	Name of the Teacher	Title of the proceedings of the conference	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page No.
24	Aveen K P, Rueben D'souza, Neelakantha V Londe	-	Experimental Analysis on Effect of Various Fillers on Mechanical Properties of Glass Fiber Reinforced Polymer Composites	2019	978-0-7354-1785-4	AIP Conference Proceedings	70
25	Vijaykumar Meti	ICRTT-Conference Proceedings	A Review of Accelerated Bio-Methanation from Food Waste, Animal Waste and Garden Wastes	2019	2278-0181	ICRTT-Conference Proceedings	71
26	Ajith Kumar, Kiran Kumar M V	IOP Conf. Series: Materials Science and Engineering	Study on Two Body Abrasive Wear behaviour of Carboxyl- Graphene Reinforced Epoxy Nano-composites	2018	1757-8981	IOP Publishing	72
27	Ajith Kumar	-	Study on Mechanical Performance of Carboxyl Functionalized Graphene Reinforced Epoxy Nanocomposites	2018	978- 93-5300- 385-2	SET Jain University	73

Sl. No.	Name of the Teacher	Title of the proceedings of the conference	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page No.
28	Ajith Kumar	-	Investigation of Effect of Filler Materials in Hybrid Fibre Composite	2018	978- 93- 5300- 385-2	SET Jain University	74
29	Sujesh kumar, Kiran Kumar M V, Lokesha M, Ajith Kumar	IOP Conf. Series: Materials Science and Engineering	Review on Condition Monitoring of Bearings using Vibration Analysis Techniques.	2018	1757-8981	IOP Publishing	75
30	Sujesh Kumar, Kiran Kumar M V, Lokesha	IOP Conf. Series: Materials Science and Engineering	Vibration based Fault Diagnosis Techniques for Rotating Mechanical Component : Review	2018	1757-8981	IOP Publishing	76

Sl. No.	Name of the Teacher	Title of the proceedings of the conference	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page No.
31	Akshay Krishna	-	Monitoring and predicting the project progress using earned value analysis:A case study on Mangaluru	2018	2394-5125	ICETE	77
32	Ganesh Aithal	-	Enhanced RSA algorithm using fake modulus and fake public key exponent	2018	978-1-5386-5131-5	IEEE	78
33	Ganesh Aithal	-	Survey on Various RSA Attacks	2018	978-1-5386-5130-8	IEEE	79
34	Kokila R	-	Development of cost effective digital ECG data acquisition system for biomedical device	2018	978-1-5386-5130-8	IEEE	80

Sl. No.	Name of the Teacher	Title of the proceedings of the conference	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page No.
35	Ganesh Aithal	-	Flood and Heat Wave Prediction using Weighted Moving Average, Anomaly Detection and K-Nearest Neighbours for the city of Mangalore	2018	978-1-5386-5324-1	IEEE	81
36	T. Shreekumar	-	Face Recognition based on Local Linear Regression and Particle Swam Optimization an Evaluation	2018	978-1-5386-4304-4	IEEE	82
37	Vinayambika S Bhat	-	Controller Design and Implementation for a Pilot Plant Binary Distillation Column	2018	978-1-5386-5323-4	IEEE	83
38	Vinayambika S Bhat	-	Identifying the Stabilizing Regions of PI Controller based on Frequency Specifications for a Lab Scale Distillation Column	2018	978-1-53866-6	IEEE	84

Sl. No.	Name of the Teacher	Title of the proceedings of the conference	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page No.
39	C R Rajashekhar	IOP Conf. Series: Materials Science and Engineering	Experimental Studies on Effect of Nano particle blended Biodiesel Combustion on Performance and Emission of CI Engine	2018	1757-899X	IOP Publishing	85
40	C R Rajashekhar	IOP Conf. Series: Materials Science and Engineering	Impact of Bio-diesel fuel on Durability of CI Engines – A Review	2018	1757-899X	IOP Publishing	86
41	Chandrashekhar T K	IOP Conf. Series: Materials Science and Engineering	Assessment on performance and emission parameter of diesel engine using waste plastic oil used as a fuel	2018	2393-9109	IOP Publishing	87
42	Chandrashekhar T K	IOP Conf. Series: Materials Science and Engineering	Effect of combustion geometry on combustion, performance and emission characteristics of CI engine using simarouba oil methyl ester	2018	1757-899X	IOP Publishing	88

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43	Chandrashekhar T K	IOP Conf. Series: Materials Science and Engineering	Effect of Cooling Water on the Performance of Lithium Bromide–Water (LiBr–H2O) Absorption Based Heat Pump	2018	1757-899X	IOP Publishing	89
44	Chandrashekhar T K	IOP Conf. Series: Materials Science and Engineering	Injection timing effect on the performance of diesel engine fueled with acid oil methyl ester	2018	1757-899X	IOP Publishing	90
45	Chandrashekhar T K	IOP Conf. Series: Materials Science and Engineering	Effect of solutioninzing and Ageing on Hardness of Aluminum LM13-MgO particulate metal matrix composite	2018	1757-899X	IOP Publishing	91
46	Prem KumarNaik, Neelakantha V L	IOP Conf. Series: Materials Science and Engineering	Mode- I Fracture Characterization of Banana Fibre Reinforced Polymer Composite	2018	1757-899X	IOP Publishing	92
47	Sunil Kumar B. V, Neelakantha V. Londe	IOP Conf. Series: Materials Science and Engineering	Study On Mechanical & Cryogenic Properties of Carbon Epoxy Composites	2018	1757-899X, 1757-8981	IOP Publishing	93

Sl. No.	Name of the Teacher	Title of the proceedings of the conference	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page No.
48	Lokesha M	IOP Conf. Series: Materials Science and Engineering	A review: Mechanical Properties of HSS Steel by deep Cryo-Treatment	2018	1757-899X	IOP Publishing	94
49	Satyanarayana, M Lokesha	IOP Conf. Series: Materials Science and Engineering	Design of Effective Hydraulic Braking System for Formula Motorsport Car	2018	1757-899X	IOP Publishing	95
50	Satyanarayana, M Lokesha	IOP Conf. Series: Materials Science and Engineering	Design of efficient powertrain system for a motorsports race car using a bike engine.	2018	1757-899X	IOP Publishing	96
51	Ramesha V, Vignesha Nayak, Neelakantha V L	IOP Conf. Series: Materials Science and Engineering	A Study on Mechanical Properties of Al-17Si Metal Matrix Composites	2018	1757-899X	IOP Publishing	97
52	Mohan Kumar	IOP Conf. Series: Materials Science and Engineering	Study on effect of varying volume fractions on mechanical properties of coconut shell powder reinforced epoxy matrix composites	2018	1757-899X	IOP Publishing	98

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53	Somashekhar T M, Premkumar Naik, Vignesha Nayak, Rahul S	IOP Conf. Series: Materials Science and Engineering	Study of Mechanical Properties of Coconut Shell Powder and Tamarind Shell Power Reinforced with Epoxy Composites	2018	1757-899X	IOP Publishing	99
54	Purandara Naik, Girish L V, Somashekar T M, Bhanuprakash S H, Rahul S	IOP Conf. Series: Materials Science and Engineering	Effect of 1,2,3benzotriazole on the corrosion of aged 18Ni250 grade Maraging steel in Phosphoric acid solution	2018	1757-899X	IOP Publishing	100
55	Sridhar D R	-	Significance Of The Type Of Reinforcement On The Mechanical Behavior Of Thermoplastic Composites	2018	2214-7853	Material Today Proceedings	101
56	Sunil Kumar S, Neelakhanta V L	IOP Conf. Series: Materials Science and Engineering	A Review on Deterioration of Mechanical Behaviour of High Strength Materials under Corrosive Environment	2018	1757-899X	IOP Publishing	102

Sl. No.	Name of the Teacher	Title of the proceedings of the conference	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page No.
57	Shrikant Patil, Sunil Kumar S, Saviraj A S	IOP Conf. Series: Materials Science and Engineering	A Review on Influence of Various Technological Processes on Mechanical Properties of Aluminum Alloys	2018	1757-899X	IOP Publishing	103
58	Yajnesha P Shettigar	IOP Conf. Series: Materials Science and Engineering	Electrical energy amplifying generator	2018	1757-899X	IOP Publishing	104
59	Yajnesha P Shettigar Ruben Obed	IOP Conf. Series: Materials Science and Engineering	Fabrication and testing of Fibre-reinforced Glass-epoxy composite with Seashell as a filler Material	2018	1757-899X	IOP Publishing	105
60	Aveen K P	IOP Conf. Series: Materials Science and Engineering	3D Printing & Mechanical Characteristion of Polylactic Acid and Bronze Filled Polylactic Acid Components	2018	1757-899X	IOP Publishing	106

Sl. No.	Name of the Teacher	Title of the proceedings of the conference	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page No.
61	Vishwas C J, Girish L V, Gajanan M Naik	IOP Conf. Series: Materials Science and Engineering	Effect of Machining Parameters on Surface integrity during Dry Turning of AISI 410 martensitic stainless steel	2018	1757-899X	IOP Publishing	107
62	D N Elton	IOP Conf. Series: Materials Science and Engineering	Twisted Tape Based Heat Transfer Enhancement In ParabolicTrough Concentrator – An Experimental study	2018	1757-899X	IOP Publishing	108
63	Rueben Obed D'Souza	IOP Conf. Series: Materials Science and Engineering	Analysis of Damped Free Vibration on Glass-Epoxy Composites with Aluminium Powder as Filler	2018	1757-899X	IOP Publishing	109
64	Rueben Obed D'Souza	IOP Conf. Series: Materials Science and Engineering	Experimental Analysis on the Mechanical Properties of GlassEpoxy composite with Fly ash as a filler material.	2018	1757-899X	IOP Publishing	110

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65	Karthik M	IOP Conf. Series: Materials Science and Engineering	A Study on Fatigue characteristics of Al-SiC Metal matrix composite processed through Microwave energy	2018	1757-899X	IOP Publishing	111
66	Vishwas	-	Taguchi based optimization of machining parameters for surface roughness in CNC turning of EN19 and EN31 steel	2018	2321-9637	International Journal of Research in Advent Technology	112
67	Ashwini T P	-	A Survey on Image Analysis to determine Strain Distribution in Geosynthetics.	2018	978-4-7281-0173-6	IEEE	113
68	Ganesh B Mogaveer	-	Experimental studies on the structural characteristics of Solid concrete block masonry,Masonry units and mortars	2017	978-93-5267-355-1	Science and Engineering Research Support Society	114

Sl. No.	Name of the Teacher	Title of the proceedings of the conference	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page No.
69	Easwara Prasad G L	-	A Study on Mechanical properties of treated sisal polyester composites	2017	978-3-319-63408-1	Mechanics of Composite and Multi-functional Materials, Volume 6	115
70	Jayaprakash M C	Proceedings volume of international conference of global civil engineering challenges insustainable development and climate change,ICGCSC	Planning and Implementation of Rain Water Harvesting System in MITE, Moodabidri, Karnataka-Geological and Hydrogeological in Puts Typical Analysis	2017	978-93-5267-355-1	MAT Journals	116
71	Kokila R	-	A study and Analysis of Various Techniques to Match Sketches to Mugshot Photos	2017	78-1-5090-5298-1	IEEE	117
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Sl. No.	Name of the Teacher	Title of the proceedings of the conference	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page No.
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75	Narendra U P	-	A study on the Role of Knowledge Management Technologies in the Education	2017	9781538632437	-	121
76	Sunil Kumar S, Neelakantha V Londe, Saviraj A S, Vikranth Kannath	Materials Today: Proceedings	Effect of Accelerated Ageing on Hardness and Flexural Behaviour of Woven fabric Glass/ Carbon Hybrid Epoxy Composites	2017	2214-7853	Elsevier	122

Sl. No.	Name of the Teacher	Title of the proceedings of the conference	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page No.
77	Sunil Kumar S, Neelakantha V Londe, Prem Kumar Naik, Saviraj A S	Materials Today: Proceedings	Effect of Geometric Discontinuity on Stress Concentration Factor of Al6061T6 Alloy under Bending Load	2017	2214-7853	Elsevier	123
78	Malini Suvarna, Glenson Toney	-	Classification of scalding burn using image processing methods	2017	978-1-5090-6107-5	IEEE	124
79	G. Purushotham	IoP Conf. Series: Materials Science and Engineering	Influence of fused silica and chills incorporation on corrosion, thermal and chemical composition of ASTM A 494 M Grade Nickel alloy	2016	1757-8981	IOP Publishing	125
80	Easwara Prasad G L	Conference Proceedings of the Society for Experimental Mechanics Series	A study on Mechanical Properties of raw sisal polyester Composites	2016	978-3-319-41765-3	Springer International Publishing	126

Sl. No.	Name of the Teacher	Title of the proceedings of the conference	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page No.
81	Easwara Prasad G L	Materials Today: Proceedings	Probabilistic study on tensile and flexure properties of untreated jute fiber reinforced polyester composite	2016	2214-7853	Advanced Materials, Manufacturing, Management and Thermal Science	127
82	Easwara Prasad G L	-	Prediction of flexural properties of coir polyester composites by ANN	2016	978-3-319-21762-8	Mechanics of Composite and Multi-functional Materials, Volume 7	128
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Sl. No.	Name of the Teacher	Title of the proceedings of the conference	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page No.
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86	Easwara Prasad G L	Procedia Engineering	Comparative Study on Impact strength characteristics of Treated and untreated sisal polyester composites	2016	1877-7058	Elsevier	132
87	Ganesh B Mogaveer	-	Effective Use of Arches in Construction	2016	2319-8753, 2347-6710	IJIRSET	133
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Sl. No.	Name of the Teacher	Title of the proceedings of the conference	Title of the paper	Year of publication	ISBN/ISSN number of the proceeding	Name of the publisher	Page No.
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95	G. Purushotham	-	Direct and indirect vector control of induction motors using hybrid PID plus Fuzzy controller	2015	2393-2835	International Journal of Advances in Electronics and Computer Science	142
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97	Sathisha	-	High speed IP based Architecture for Telecommand System on Chip (SoC)	2015	978-93-82702-74-0	-	144

Kannada language has about 2000 year's history. Karnataka was ruled by many rulers like Kadambas, Western Ganga Dynasty, Rashtrakuta, Chalukya, Hoysala and Vijayanagara Empire. The inscriptions generally found are on stone or copper plates. The Kannada inscriptions found on historical hero Stone, coin and temple wall, pillar, tablet and rock edict. Analysis of any language with rich heritage and history is very important to understand the life and culture of that period. Stone inscripted literature speaks about the history, language of different regions of the world. Preservation of such document through digitization process is become very important. To stop degradation and missing further, the analysis of the same will through light on historical events of that region. It is necessary to digitize Stone inscriptions by modern technique.

Dr. H S Mohana
Rajithkumar B K
Uday J

Pattern Recognition Techniques for Kannada Script Analysis

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Recent Assessment and Analysis of Damping Derivatives for Delta Wings in Hypersonic Flow for Curved Leading Edges with Full Sine Wave

Renita Sharon Monis[1,2], Asha Crasta[1*] and Sher Afghan Khan[3]

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ABSTRACT

This paper presents the effect of curved leading edges on the damping derivative due to the pitch rate for the various amplitude of the sine wave, flow deflection angle δ, pivot position, and the Mach numbers. Results show that with the increase in the amplitude of the full sine wave (i.e., positive amplitude) there is a progressive increase in the pitch damping derivatives from h = 0, later in the downstream towards the trailing edge it decreases till the location of the center of pressure and vice versa. At the location of the center of pressure, when we consider the stability derivatives in damping for the rate of pitch q, there is an increase in the numerical values of the derivatives. This increase is non-linear in nature and not like for position near the leading edges. The magnitude of the damping derivatives due to the variations in the Mach numbers, flow deflection angle δ, and the amplitude of the sine wave remained in the same range.

Keywords: Damping derivative; delta wing; hypersonic; curved leading edge.

1. INTRODUCTION

This paper deals with the parametric calculations and analysis of high-speed flow for a wing with a leading arched edge. The wing having curved leading edges have got innumerable advantages over the wing having a straightforward foremost edge. In the case of a delta wing with a straight leading edge has a linear distribution of the wing surface area. However, the wings having arched leading edge, as in the present case, where we are replacing a straight leading verge by a full sine wave. When the amplitude of the sine wave is positive, this will lead to the shifting of a considerable area towards the trailing edge, and this shift will depend on the bounty of the sine wave. The change in the space towards the trailing side will result in a considerable difference in the position of the standard force location, resulting in a more massive moment arm or the higher restoring moment. Hence, this arrangement of the arched front verge of the wing enhances damping derivative magnitude in pitch, which marks remarkable improvements in the dynamic stability derivative. This increase in the damping derivative has its importance at the design stage of high-performance fighter planes at high supersonic Mach numbers. Hence, these days, all the fighter planes are using delta wing or cropped delta wing due to its superiority during the dynamic conditions. Therefore in this study for the aircraft at supersonic speeds, wherein numerical computations, by geometrical variations, are explored and compared with the results of the delta wings having the straight leading edge. While a vehicle involvements a modification in both due to pitch rate and direction of attack concurrently, the twinkling derivative due to the rate of pitch proportion and incidence rate have to be estimated discretely to evaluate the whole permanency.

2. ANALYSIS

The pitching moment per unit span about the pivot $x = x_0$ due to the only lower surface is

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Open access peer-reviewed chapter
Optimization of NOE Flights Sensors and Their Integration
By Tamilselvam Nallusamy and Prasanalakshmi Balaji
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Abstract
This chapter unveils an enhancement strategy for nap-of-the-earth. The nap-of-the-earth (NOE) mode is the most energizing, most unsafe, and is generally the slowest. Military aircraft to maintain a strategic distance from opponent detection and assault in a high-thread circumstance use it. NOE used to limit discovery by the ground-based radar, targets and the control system. The radar altimeter (RA) or terrain following radar (TFR), terrain awareness and warning system (TAWS) used to identify the curbs during flying in NOE flights. Here, while the plane is at the nap of the earth activity, the speed and the height must be moderate as effectively decided. The terrain following radar (TFR) keeps up the altitude from the beginning. Therefore, we analyze the issue to expand the performance of the airplane by extending the terrain by a few modes of the TAWS, which given by various aviation authorities1. Further to this, different TAWS modes of action, explanation of mode selection and progression in TAWS clarified in detail. This chapter displays the MATLAB programme for a few patterns of TAWS mission, and simulation of the flight path for the excessive terrain closure rate from mode two operation of the flight.

Keywords

nap-of-the-earth | radar system | MATLAB programming | terrain awareness and warning system

Chapter and author info

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Comparative Study on Wind Tunnel Calibrating Instruments

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Abstract

In the present study, we use wind tunnel model as a medium to calculate and analyze the flow velocity of the air passes through any aerodynamic medium and besides automobile too. An experimental study was carried out on a wind tunnel to evaluate and optimize the performance and results of the model obtained. Experiments were carried out with four different instruments, i.e., Yaw Sphere, Claw Yaw Meter, Pressure Sphere (multi-hole probe), Turbulence Sphere to obtain velocity data. According to the experiments and studies carried out, Pressure Sphere provides us with exact velocity and pressure value when compared to the other three instruments. Using this new kind of instrument, faults can be minimized when compared to the previous instruments.

Keywords

Wind tunnel Measuring methods Flow velocity Pressure measurement

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Novel Approach in IoT-Based Smart Road with Traffic Decongestion Strategy for Smart Cities

Padma Prasada, Sathisha and K. Shreya Prabhu

Abstract Real world needs to connect to its virtual world to enable anything with just a switch. Internet of things (IoT) makes it possible by interaction between people, objects, environment and virtual data involved with them. The increase in a number of vehicles on road, accidents and delay of emergency services calls for an effective solution, i.e., smart roads. To make effective smart roads within smart cities, it is necessary to employ advanced technology to handle the issues related to normal roads by collecting all the data related to it, process and analyze it and find an alternate solution to it within a small fraction of time. Video monitoring and surveillance are widely used but require personnel to monitor the situation and analyze it followed by an appropriate decision which is not recommended for real-time situation. Road traffic density information is an important parameter that can be exploited in avoiding traffic congestion. This paper proposes an alternative solution in real-time world where different sensors from roadside unit (RSU) capture traffic congestion information based on the vehicle crossing over the given span of time, transmit to base station where it is collected and perform big data analytics. This information is made available to the user via custom-designed Android application, keeping the user updated with the present scenario of the road he/she shall take.

Keywords Smart city · Smart road · RSU · Traffic decongestion · Android

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Pedal Effects Modeling for Stringed Instruments by Employing Schemes of DSP in Real Time for Vocals and Music

D'Souza Dony Armstrong, Shastrimath V. Veena Devi and V. N. Ganesh

Abstract In this paper, it is proposed to put forward musical sound effects processing system based on virtual analog modeling and digital signal processing techniques. The effects used most commonly by musicians such as, fuzz, phaser, distortion reverb, echo, flanger tremolo, vibrato, etc., are generated by analog circuits. Here, we propose to generate these effects by using the concept of digital signal processing filters. The proposed system works on wave files and also on the buffered audio which is fed from the microphone input of computer. The proposed system is built around by using the codes in Scilab/Octave and the sequences of effects are sequenced depending on the musicians/artists choice. The various concepts of filtering in digital signal processing are used. The results obtained are compared with the commercially available systems.

Keywords Fuzz · Distortion · Flanger · Vibrato · Reverb

1 Introduction

The use of different audio effects in musical instruments nowadays are becoming more and more popular and at the same time, expensive and are not easily accessible to everyone. The sophisticated music processing boxes seen in the live performances, studio etc., are in much demand. Hence, in order to have the same effects for an amateur musician or artist, the feel of all the processing effects enhance his/her creativity by having the feel and to know the various effects in which context, it can

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Performance Analysis of Converter Circuit Transfer Function Model Using PID Control Algorithms

Rumana Ali and Vinayambika S. Bhat

Abstract Switching power converter circuits are commonly employed in most electronic gadgets for various applications. The effective control of the converter circuit is significantly important in achieving steady-state response. The PID control algorithms, (i) Ziegler–Nichols, (ii) modified Ziegler–Nichols, and (iii) Good Gain are designed for the transfer function model of the boost and bidirectional converter circuits. The closed loop servo and regulatory responses are recorded in the MATLAB/Simulink environment. The time-domain specifications and performance indices are analyzed. The controller effectiveness is also evaluated in the presence of +10% uncertainties in the process parameters.

Keywords Converter circuit · Transfer function · PID controller · Performance indices · Uncertainties

1 Introduction

Power converters mark a new trend in Industrial Revolution because of its proficiency in various fields of application like laptops, LED drives, electric and hybrid vehicle, fuel cell vehicle, renewable energy, and aerospace [1]. The DC–DC converter circuits are used to increase and/or decrease the voltage amplitude of the input voltage to the required amplitude of the voltage suitable for various applications [2]. "The different types of converters are Buck converters, Boost converters, Buck–Boost converters, Cuk converters, Zeta converters, and SEPIC converters [3]." The most important research interest is the application of power converters and its control.

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Abstract

The present day records the greatest usage of unmanned aerial vehicles (UAVs) in civil and military fields. UAVs are experimenting materials with respect to physical and mechanical properties which should have more strength to weight ratio, resistance to buckling, high ultimate tensile strength, less inflammable, low thermal gradient, high resistance to noise, high resistance to vibration, resistant against deteriorative fuels and chemicals, low corrosion, low oxidation, and high fatigue. This paper presents an experimental investigation of mechanical properties of balsawood–glass fiber, depron–balsa wood, and depron–glass fiber–balsa wood composites. Tensile, hardness, flexural, and thermal tests of different samples are conducted as per ASTM standards. Depron–glass fiber–balsa wood showed 6 times greater tensile strength and 66% hardness than plain balsa wood. Depron–glass fiber–balsa wood showed 34% greater flexural strength than plain balsa wood.

Keywords

Balsawood Depron Glass fiber Composite Stiffness Hardness

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FPGA Implementation of Parallel Transformative Approach in AES Algorithm

Padma Prasada, Sathisha, Ajay Prinston Pinto and H. D. Ranjith

Abstract In recent years, network security is the most critical component in information security. In this research, a new simple yet powerful and fast algorithm for AES is proposed. To have a secured data communication on network usage of an iterative symmetric key block, cipher-based AES is proposed widely. AES is implemented by adopting keys of 128, 192, or 256 bits for encryption/decryption of data in block of 128 bits. These include four transformations in AES: substitute bytes, shift rows, mix columns, and add round key. Here in this approach, parallel transformative method in these transformations mainly in mix columns is proposed. This research mainly focused on the designing of AES according to 192-bit key length in the Verilog language and implementation of it in Virtex6 ML605 FPGA evaluation platform using Xilinx ISE 14.4. To enhance the speed of operation of the algorithm, we followed parallel transformative approach, which achieved throughput of 5565.2173 Mbps with maximum frequency 564.972 MHz in latency of about 13 clock cycles.

AQ1

Keywords Advanced encryption standard · Virtex6 · Xilinx ISE
Mix columns · Key expansion · Data security

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Chapter 6
Influence of Chloride Content and Exposure Time on Corrosion Behavior of AZ80 Wrought Mg Alloy

Gopal D. Gote, Gajanan M. Naik and S. Narendranath

Abstract This study aims to investigate the corrosion behavior of wrought AZ80 magnesium alloys in different chloride ion concentrations and exposure time. During the study, the effect of exposure time and chloride content on the corrosion resistance of AZ80 wrought Mg alloy has been studied with 2, 3.5, and 5 wt% NaCl aqueous solution for 12 h and 24 h exposure time. Charge transfer resistance for each sample was established using the Nyquist plot and corrosion rate obtained from polarization curve by adopting Tafel extrapolation method. Corrosion morphology was examined using scanning electron microscopy and XRD. The study revealed that corrosion product layer formed at initial stage was observed unstable after short exposure time which results in decrease in corrosion resistance at initial stage. An increase of chloride content in aqueous environment reduces the corrosion resistance of AZ80 wrought Mg alloy.

Keywords AZ80 · Corrosion · Nyquist plot · Polarization curve

6.1 Introduction

Applications of magnesium alloys are increasing day by day because of its low density, high specific strength, and good machinability [1]. Mg alloys have great potential to replace aluminum and steel due to its lightweight. Also, the use of magnesium in automobile and aerospace can reduce the fuel consumption and harmful gases

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The Role of Processing Temperature in Equal Channel Angular Extrusion: Microstructure Mechanical Properties and Corrosion Resistance

Gajanan M. Naik, S. Narendranath, and S. S. Satheesh Kumar

Abstract Equal channel angular extrusion, patented in Russia by V. M. Segal in 1977, has become a promising technique to enhance tensile strength and corrosion resistance of Mg alloys. It is believed that the processing temperature ensures the production of ECAE-processed billet without surface defects. Indeed, ECAE processing temperature affects microstructure, tensile behavior, and corrosion resistance of the material. Therefore, this chapter investigates the impact of ECAE pressing temperature on microstructure, mechanical behavior, and corrosion resistance of AZ80 Mg alloys. The processing temperature of 533 and 663 K was selected based on the recrystallization temperature of Mg alloys. As a result, the processing temperature has a substantial impact on material properties. The axial tensile strength and hardness decrease by 25.45% and 6.56%, respectively, due to thermal softening of materials. The corrosion resistance increases by 84% due to grain size reduction and distribution of secondary phases, when the ECAP-4P processing temperature is increased from 533 K to 663 K.

Keywords AZ80 · ECAE · Polarization · Micro-hardness · Corrosion

1 Introduction

Wrought magnesium alloys are lightest engineering material, and it has quite special properties which lead to particular applications. In specific, their highest strength to

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Influence of frequency on dielectric and electrical behavior of $ZnMn_2O_4$

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ABSTRACT

In this paper we report the influence of frequency on dielectric and electrical properties of $ZnMn_2O_4$ spinel from 323 K to 773 K temperature. The $ZnMn_2O_4$ spinel was prepared by a wet chemical co-precipitation technique and calcined at 773 K. The real part of permittivity ε' is found to decrease with increase in frequency whereas, dielectric loss increases with increasing temperature. The Ac conductivity increases with increase in temperature and impedance Z' is found to decrease with increasing temperature.

Selection and Peer-review under responsibility of the scientific committee of the First International Conference on Recent Advances in Materials and Manufacturing 2019.

1. Introduction

Spinels are the class of compound ceramics with stoichiometry formula AB_2X_4, where A &B are cations positioned in the tetrahedral and octahedral site of unit cell. The transition-metal oxide based spinels find wide range of applications in gas sensors, supercapacitors, anode material for Lithium ion batteries, NTC thermistor, and protective coating materials in solid oxide fuel cells which are environmental friendly energy sources. In spinel $ZnMn_2O_4$ divalent Zn ion is at the tetrahedral A-site and trivalent Mn is at octahedral B-site and X is Oxygen atom. Mn exhibits varying oxidation states and the substitution of different transition element like Cu, Ni, Fe, and Zn to obtain different types of spinels which exhibit interesting electrical properties [1]. Zn exhibits oxidation state of Zn^{2+} and Mn is exhibiting Mn^{3+} and Mn^{4+}, leading the formation of oxygen vacancy in the material with variation in temperature and relaxation process is related to oxygen vacancy. The important electrical parameters can be determined using the following equations.

$$\varepsilon = \frac{C_p d}{\varepsilon_0 A} \tag{1}$$

$$\tan\delta = \frac{\varepsilon''}{\varepsilon'} \tag{2}$$

$$\sigma = \omega \varepsilon_o \varepsilon' \tag{3}$$

$$\varepsilon' = \frac{1}{\omega C_o R_p} \tag{4}$$

$$C_o = \frac{A\varepsilon_o}{d} \tag{5}$$

C_P is capacitance of sample measured directly from impedance analyzer, d is the thickness of the sample, A is cross section area of sample, ε_0 represents permittivity of vacuum 8.854×10^{-12} Fm^{-1}.

2. Experimental

The $ZnMn_2O_4$ powder was prepared by wet chemical process of co-precipitation. $ZnSO_4{\cdot}H_2O$ (Loba Chem, purity, 98.5%) and $MnSO_4{\cdot}H_2O$ (Loba Chem, purity 99.9%) as starting materials in preparation of $ZnMn_2O_4$ spinel. The solutions were prepared in stoichiometric ratio using distilled water, and then added drop wise to NaOH solution maintaining the pH ~ 10 throughout the mixing. The obtained precipitated were dried to remove water content and calcined at 500 °C in air atmosphere to form single phase $ZnMn_2O_4$. The powder was pressed using hydraulic press and frequency dependent electrical measurements were performed in LCR meter (HIOKI IM3536) from 323 K to 773 K for a range of frequency from 50 Hz to 8 MHz, using dry temperature calibrator DPI-1100.

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Influence of temperature on frequency dependent electrical behavior of $FeMn_2O_4$

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Abstract. Here, we report the influence of temperature on frequency dependent electrical properties of $FeMn_2O_4$.The ε' decreases with increasing frequency in all studied temperatures and exhibits phase transition at higher temperature region. The increase in magnitude of tanδ with increasing temperature indicates the increasing electrical conductivity of $FeMn_2O_4$The frequency dependent Z' shows systematic decreasing resistance with increasing frequency in between 50°C to 300°C. The frequency dependent σ_{ac} is in contrast to Z' behavior and endorse the increasing electrical conductivity at both higher temperature and frequency. The M' decreased with increase in temperature and sustained same behavior at higher temperatures.

1. Introduction

In recent times, the study of Mn_3O_4 based spinel (AB_2O_4) oxides transport properties has gained immense attention due to their better thermal stability and superior electrical properties. These properties impart Mn_3O_4 based oxides for potential use in various electrical applications [1]. Nevertheless, these oxides offer high resistance in lower temperatures and exhibit better conductivity in higher temperatures. Due to better conductivity in high temperatures these oxides are extensively probed for high temperature applications such as protective coating on SOFC interconnects and NTC thermistor. However, the presence of Manganese (Mn) in both A and B site of spinel with different cationic valences limits their use in many potential applications like electrochemical supercapacitors and catalysts [2].

Impurity substitution is one among the easy way to tune the electrical properties of Mn_3O_4 based spinels. The properties such as electrical conductivity can be increased or decreased by substituting suitable substituent's either fully or partially to tune for the desired applications. Many substituent's like Copper, Cobalt. Nickel and Zinc has been previously reported and found to improve the electrical behavior with their own limitations [3-4]. Many of such limitation include the formation of secondary phase and solubility limit which greatly influence the electrical behaviour of Mn_3O_4 based spinel oxides. Thus, we report the frequency dependent electrical behaviour of $FeMn_2O_4$ prepared by co-precipitation technique and the influence of temperature on frequency dependent electrical behavior.

2. Experimental

The $FeMn_2O_4$ powders were prepared by a well-known wet chemical approach using co-precipitation technique. The starting materials used in preparations were iron and manganese sulfates with high purity. The distilled water was used as a solvent and mixed thoroughly maintaining the pH ~10 throughout the mixing. The obtained precipitated were dried to remove water content and calcined at 450°C to form single phase $FeMn_2O_4$. The powder was pressed using hydraulic press to get a pellet and silver coated for better electrical measurements. LCR meter (HIOKI IM3536) was used to measure the frequency dependent measurements from 50°C to 500°C using dry temperature calibrator DPI-1100.

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Single crystalline hierarchical SnO_2 microsphere and fluoride-mediated hollow structures for photocatalytic activity

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ABSTRACT

The present research study deals with the preparation of tin oxide (SnO_2) nanostructures hierarchical hollow microspheres and composed of oriented aligned cone-like SnO_2 nanoparticles are prepared by a hydrothermal route using either NH4F as morphology controlling agents. The samples were morphology characterized by FE-SEM with diameter of about 2 μm to 50 nm and XRD showed a homogeneous distribution of quite small grains over scanned area. The FT-IR result shows the stretching vibration of the hierarchical SnO_2 solid or hollow microspheres nanoparticles due to its chemical interaction. The optical properties were studied using UV absorption and its optical band gap value is 3.9 eV. The electrochemical performance of SnO_2 tested to determine the oxidation/reduction processes by cyclic and linear sweep voltammetry.

Selection and Peer-review under responsibility of the scientific committee of the 2nd International Conference on Nanoscience and Nanotechnology.

1. Introduction

The important semiconductor SnO_2 is an environmentally friendly and a wide band-gap n-type semiconductor of 3.6 eV at room temperature promising multifunctional material with remarkable chemical and has been extensively used in many fields, since the past few years various SnO_2 nanostructures such as 0D nanoparticles, 1D nanorods, Nano belts, nanowires and nanotubes, 2D Nano sheets, and 3D hierarchical architectures with hollow or mesoporous structures have been prepared via a variety of methods, Specifically the hierarchical micro and nano-structures assembled from low dimensional nano-building blocks have attracted tremendous attention in many fields due to their great significance for scientific and practical applications, as a result of their high surface area, large pore volume and robust stability, At the same time, the design of hierarchical and hollow SnO_2 architectures with an oriented alignment of nano-building blocks and well-defined structures remains a great challenge, In this paper we introduce a purely water-based template-free hydrothermal synthesis leading to hierarchical SnO_2 microspheres of either solid or hollow structure by using NH_4F and NaF as a morphology controlling agent respectively .

2. Materials and characterization

All chemical reagents are of analytical grade, Tin chloride pentahydrate (SnCl4·5H2O), sodium hydroxide (Naoh) and ammonium fluoride (NH_4F) and absolute ethanol were Purchased from sigma Aldrich Chemical Reagent Co, LTD without further purification.

UV–Visible spectra were obtained by using Perkin Elmer lambda 350 UV/Visible spectrometer, Fourier transform infrared (FT-IR) spectra were recorded on Bruker alpha ATR FT-IR spectrometer, Field –Emission Scanning Electron Microscopy (FESEM) was conducted by using sigma Zeiss FE-SEM, XRD, Electrochemical Performance carried out CHI 660E electrochemical workstation.

2.1. Synthesis of SnO_2 microsphere

The hierarchical SnO_2 solid or hollow microspheres were prepared in water via a simple hydrothermal method, using tin (IV) chloride pentahydrate as the tin source and NH_4F or NaF as morphology controlling agent, In a typical experiment, 1.4 g $SnCl_4{\cdot}5H_2O$ and 0.8 g NH_4F (0.6 g NaF) were added into 70 mL of H_2O, After magnetic stirring for 30 min a transparent and clear solution was

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UV-irradiation induced synthesis of reduced graphene quantum dots

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ABSTRACT

The synthesis of reduced graphene quantum dots (rGQDs) by using 365 nm UV-source irradiated glucose through hydrothermal method and glucose as a precursor. Characterization of rGQDs was studied by various techniques such as surface morphology using Field Emission Scanning Electron Microscopy (FESEM). Optical property was studied UV–visible spectroscopy and the absorption band observed at 244, 252, 364, and 428 nm. Electrochemical behavior was examined using linear sweep voltammetry (LSV). The fabrication of rGQDs electrode by coating on stainless steel electrode using doctor blade method and studied the electrochemical properties. The results revealed that the rGQDs can be used as an active electrode materials application.

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1. Introduction

Graphene quantum dots (GQDs), carbon nano dots (CNDs), reduced graphene, have attracted intensive interest because of their excellent luminescence performance. Generally, GQDs are produced from graphene-based materials (such as graphite, glucose, carbon fibres natural raw materials) and possess graphene lattices inside the dots, which can impart better opt electrical properties. The photoluminescence quantum yield (QY) of the CNDs has been enhanced, the GQDs still suffer from low QY. Much work has been carried out to improve the QY of GQDs, including surface passivation, doping and reduction. Chemical reduction is a facile and effective approach to enhance the fluorescence of carbon nano material [1–3]. Reduced graphene quantum dots (rGQDs) is one of the most significant zero dimensional material because of their electronic, optical and electrochemical properties induced by quantum confinement and edge effect. Hollow micro-structures with controllable shape, size and composition have received significant attention owing to their structure-dependent properties and potential application in a broad range of fields, such as biomedicine, photonic devices, catalysis, and energy storage conversion. Metal nanoparticles (NPs) have been frequently investigated by the researchers for their multi-dimensional applications after their synthesis in 1959 by Richard Feynman, with a size ranging from 1 nm to 100 nm. Particles exhibited a new behavior of efficiency at even very low concentration. The recent trend of nanotechnology research has been diverted to antimicrobial food packaging, delivery of nano-medicines/drugs, gene delivery vectors, nano-imaging and Biosensors for cancer diagnosis, and polymeric nano-composite wound dressing.

Various chemical and physical techniques have been reported for the synthesis of glucose particles. The chemical techniques have certain limitations including strict reaction protocols, toxic reagents, time consumption and unstable particles A new and relatively safer concept. As the "UV-irradiation induced synthesis" of glucose. The synthesis of particles, with reduced size and better shape, through direct physical techniques, is another irradiation and promising sector. These physical techniques mainly include synthesis by sun rays, microwave radiation, gamma radiation or ultraviolet (UV) irradiations. For the physical methods, the toxicity, economy and benign biological nature of the compounds should not be ignored. The organic biopolymers are economical, environment friendly and exhibit no or very low toxic nature for the physical synthesis of glucose particles. The rGQDs performance can be increased by simply controlling the size and many unique properties including high surface area [4–8]. Then, the thermal reduction was used to remove the oxygen containing group on the GQDs,

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The pivotal role of the pyridine ring in enhancing second order nonlinearity in methoxy substituted chalcones

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ABSTRACT

In the present article, the linear and nonlinear optical properties of an organic chalcone derivative, 3-(3,4-dimethoxyphenyl)-1-(pyridin-2-yl) prop-2-en-1-one (DMPP) are examined and relationship between the crystal structure and the material property has been analyzed and the results are presented. The crystal has the ability to transmit wider range of EM radiation. The optical band gap evaluated by plotting Tauc's graph is 3.08 eV. Third order nonlinear response of the material is studied by the open aperture z scan experiment. The second harmonic generation efficiency obtained by Kurtz experiment is 7.4 times that of urea. The material's NLO response is analyzed with the help of the literature, and it can be concluded that the optimal arrangements of planar molecules in the crystal structure combined by the hydrogen bond interactions result in an increase in SHG efficiency. Further, the role of pyridine ring at the benzoyl arm on the NLO property of methoxy substituted chalcones is also discussed. Due to the wider transparency window and large SH conversion capability, DMPP can be used for various opto electronic applications.

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1. Introduction

Nonlinear optical (NLO) materials are a fascinating class of materials used by scientists and device engineers in designing and fabricating opto electronic devices such as optical limiters, optical data processing devices, harmonic generators, eye and sensor protectors etc [1–3]. Molecules with large second order or third order nonlinearities are required in order to realize the many of the above mentioned applications. Among the various materials explored for NLO properties, chalcones are an important type of organic chromophores satisfying the requisites such as high NLO coefficients, better physical-chemical properties, wider transparency window extending in to the IR region etc [4]. These are a very flexible type of molecules in the sense that their photophysical properties can be easily tuned by an appropriate electron donor/acceptor substitution at either ends of a conjugated —CH=CH— bond. This kind of substitution will make the second order nonlinearity viz, second harmonic generation (SHG) extremely intense due to the enhanced molecular hyperpolarizability (β). In molecular compounds, the SHG is the result of different favourable parameters both at the molecular (high conjugation with intramolecular charge transfer) and crystalline (suitable alignment of molecular dipoles forming enantiomorphic structures) states. Among the various types, pyridine based chalcone molecules displayed particularly noticeable nonlinear and other properties [3,5–11]. In an attempt to obtain a more suitable NLO material, we modified the structure of 3-(4-methoxyphenyl)-1-(pyridin-2-yl) prop-2-en-1-one (MPP) considering the fact that an additional methoxy group substituted at the meta position compared to that in MPP decreases the charge transfer energy and thus an increase in the degree of charge transfer across the molecule [12]. This strategy resulted in a chromophore crystallizing in non-centrosymmetric system with very good conversion efficiency. Here we report the linear and nonlinear optical studies and structure-property relationship analysis of pyridine based chal-

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Synthesis, growth, Hirshfeld surface analysis and crystal structure of a pyridine based chalcone single crystal

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ABSTRACT

In this article we present the growth and structural details of a pyridine based chalcone single crystal grown using the method, slow evaporation of solvent. The crystal structure was studied by X-ray diffraction method. The solid belongs to orthorhombic crystal system with a non-centrosymmetric space group $Pna2_1$. Weak C–H–O intermolecular hydrogen bond interactions stabilize the crystal structure, which is further confirmed by surface analysis by Hirshfeld. As the material crystalizes in enantiomorphic crystal structure, it may be a potential candidate for various photonic applications.

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1. Introduction

Nonlinear optical (NLO) materials have noteworthy applications in the field of optoelectronics. In the recent past, extensive research has been carried out with organic materials due to the advantages such as ultrafast response, ability to withstand large laser power, better optical nonlinearity, the ease with which the structure of these materials can be altered, wider optical transparency etc [1,2]. The NLO effect in these materials results from the strong donor–acceptor inter-molecular interaction and delocalized π-electron system. Chalcones are a notable class of organic materials possessing striking second and third-order NLO properties suitable for optoelectronic and photonic applications such as optical data storage, optical sensing, optical limiting, high-speed information processing, integrated photonics, optical switching and so on [3,4]. A conjugation bridge binds the two phenyl rings in a chalcone molecule. It is well known that if the appropriate electron donor and acceptor groups are substituted at the ends of this conjugated structure, the asymmetric electronic distribution will be increased leading to higher optical nonlinearity [2,5]. In the recent past, researchers showed that replacement of benzene ring in these class of molecules at the benzoyl arm by thiophene or pyridine significantly alters the NLO response [6–8]. A derivative of chalcone based on pyridine viz, 3-(4-Methoxyphenyl)-1-(pyridin-2-yl) prop-2-en-1-one (MPP) reported by our group showed an SHG efficiency of 4.7 times that of urea [9]. In the MPP molecule, the para position of the phenylene moiety is substituted by an electron donor. Further, for improved NLO response, the chromophores should possess larger molecular hyperpolarizabilities (β) values, which requires the optimized charge transfer through the molecule. It is reported by Cho et al that an electron donating methoxy group substituted at the meta position along with one at para position increases the degree of charge transfer and thus enhances the NLO activity [10]. Considering this aspect, the structure of MPP is slightly modified by substituting an additional methoxy group at the meta position. In this report, we describe the synthesis, crystal growth and crystal structure of 3-(3,4-dimethoxyphenyl)-1-(pyridin-2-yl)prop-2-en-1-one (DMPP).

2. Experimental procedure

The compound under study is prepared by the method reported earlier [2]. As starting materials, 3, 4-dimethoxy benzaldehyde (0.01 mol) and 2-acetyl pyridine (0.01 mol) were used. Fig. 1 is the synthetic scheme for the title compound.

The solubility of DMPP is studied in ethanol and acetone in order to select a suitable solvent to obtain single crystals. The solubility curves are presented in Fig. 2(a). Based on this study, acetone is selected as the solvent to grow singe crystals by adopting

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Investigation of physical, spectral and thermal properties of a dimethoxy substituted chalcone for opto-electronic device applications

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ABSTRACT

We report herewith the experimental results of various analytical techniques performed on a chalcone material 3-(3,4-dimethoxyphenyl)-1-(pyridin-2-yl) prop-2-en-1-one (DMPP). The Scanning electron microscope images disclosed a layered 2D growth pattern. Existing functional groups were identified using FT-IR and FT-Raman spectra while the hydrogen atoms in the molecule were confirmed by ^{1}H NMR spectrum. The title crystal is tested for thermal stability. DMPP melts at118 °C and chemically stable up to 200 °C. This feature makes the material a useful candidate for high temperature optical device applications.

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1. Introduction

Organic materials with nonlinear optical (NLO) property are widely used in the field of second and third harmonic generation, optical limiters, data storage devices, photonic integrated circuits etc. Chalcones are an imperative form of organic compounds found in a variety of plant spices, fruits, vegetables etc. The chalcone molecule consists of two phenyl rings interconnected by two α, β unsaturated carbons and a C = O group [1]. The structure of these molecules can be tuned very easily by substituting the aromatic rings with suitable electron withdrawing /donating functional groups such as Cl, Br, CH_3O, CH_3 etc. This sort of substitution would escalate the charge distribution across the molecule and lead to a crystal structure which results in improved photo physical properties such as optical nonlinearity (NLO). Materials with large optical nonlinearity, fast response and ability to withstand high temperature are required for aforesaid photonic device applications [2,3]. The search for new materials possessing the desired photo physical properties never ceased. In recent years there has been a huge amount of research on these class of materials with the aim of optimizing various properties at the molecular level as well as at the bulk level [4–8]. Recently our research group has reported few heterocyclic chalcone derivatives consisting of a pyridine ring in place of phenyl moiety at the benzoyl arm displaying substantial NLO response [9–12]]. In our efforts to obtain materials with enhanced NLO property, we have designed another pyridine based chalcone using the design criterion reported in the literature and quality single crystals were grown [13,14]. In this article, the experimental results on spectroscopic study, surface morphology and thermal stability of a methoxy substituted chalcone 3-(3,4-di methoxyphenyl)-1-(pyridin-2-yl) prop-2-en-1-one (DMPP) are described in detail.

2. Experimental procedure

Pyridine based chalcone, DMPP is synthesized using the procedure reported in the literature and adopting slow evaporation of solvent (acetone) tiny single crystals were grown [15]. Good quality singe crystals grown in acetone were used for further investigation. The crystal belongs to noncentrosymmetric domain with $Pna2_1$ space group. The lattice parameters are a = 11.8095(6) Å; b = 27.926(1) Å; c = 3.9329(2) Å and α = β = γ = 90° [15]. The crystal surface is coated with gold by sputtering technique and a JOEL JSM-6380LA analytical scanning electron microscope (SEM) operating at 20 kV was employed to record the surface images of the

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Synthesis and characterisation of hydrogen fuel from bio-waste recovery

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ABSTRACT

Due to the extensive use of fossil fuel, there is an accelerating and alarming impact on the environment as well as utilization on fossil fuel energy, Scientist are in search for the fuel fuels which is more renewable and is environmentally less hazardous as well as compatible. To contrast the fuel entrants, criteria have been developed, which make it possible to assign according to quality and grade. Amid all the fuels contemplated, hydrogen protrudes as the best. The following paper will focus on production and compares hydrogen with other conventional and unconventional fuels and comes to the conclusion that in every count hydrogen has the best attribute with many distinctive unique and beneficial properties. H_2 is famed for its distinctive characteristics devising it as the most feasible substitute fuel and propellant and plentiful and is being used in a great many applications industrially but

Design and Development of a Novel Flying Car for Future Transportation

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Abstract. Modern day traffic has led to more pollution causing harm to the environment, thus more emphasis is given on electric vertical take-off and landing aerial vehicle which will have dual mode of transportation both in terrain and air, commonly known as flying cars. Previous concepts of flying cars are taking up lots of space to take off and land. This paper presents a detailed design, fabrication and testing of a prototype of a flying car completely based on green fuel and compact in size. Newly developed flying car will have vertical takeoff and landing capabilities with optimized aerodynamic design for minimum drag at cruise condition. The flying car is incorporated with retractable rotor arms. The aerodynamic optimization and the endurance test of the proposed flying car is carried out under varying cruise velocities in both ground and air. This novel flying car expected to be a potential future technology for green transportation.

INTROUDUCTION

Ever since the invention of car, man has dreamt of taking it to the skies. This led to the invention of airplanes. Nowadays growing population, land space limitations, and high infrastructure development cost present a challenge for future of ground-based transportation. Combination of road vehicle with abilities to fly efficiently looks like an ideal solution for modern day traffic. Recent developments in this area are very closer in making flying cars a reality. Flying cars have got all the attention and imaginations of innovators and drivers since the pioneering age of motoring. A flying car is a hybrid vehicle that combines fixed wing and rotary wing aircraft capabilities. It is a type of personal air vehicle or road able aircraft that provides air and ground transportation. The classic idea of flying car was a car that could somehow fly. It is one of the holy grails of the futuristic, utopian society, where everyone gets to zip around the air and land easily, quietly, and safely wherever he or she wants. The flying car concept itself is expanding, from an aircraft which flies from airport to airport to a passenger carrying drone that can land and lift off anywhere.

LITERATURE REVIEW

In the design of a Flying Hover Car running on a single 4- stroke Piston Engine, works as a shifting mechanism which shifts from car to hover mode just by a joystick with just a single engine shift. Instead of having huge wings or propeller it works on the principle of Coanda effect and thus vertical takeoff and landing (VTOL) capability. The power output from the engine is around 124 HP for 475kg of weight and takes around 6500rpm of shaft speed for takeoff. This flying hover car thus has no wings or propellers and is convenient to take off and land safely without runways or the struts. It is also used for military and video recording applications [1]. Design of flying Car model was done using Auto CAD software. The model has two guarded propellers at front and rear end, and is coupled with a Wankel engine to power the main rotor and tail rotor blades which helps in cruise. The material for guarded propellers is Boron alloy steel and car material is nano-steel [2]. A flying car with 3 propulsion units and actuator

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Aerodynamic design, analysis, fabrication and testing of a claw yaw sphere for subsonic flow

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ABSTRACT

Modern day aerodynamics has applications in various domains ranging from design of ballistic shells to ground vehicles exceeding sonic speeds. The conceptual design and analysis of such extreme applications require test beds of the same calibre which are able to comply with the complexity of the working mechanism. Wind tunnel is one such apparatus where scale models of the prototypes can be tested. Alike all apparatus even wind tunnels has to be calibrated on a regular basis which ensures that the readings obtained from the instrument are acceptable and the error margin are within the limitations. Thus there is a need for instruments which can accurately measure the various properties of the wind tunnel, namely the flow angularity, velocity distribution, speed setting etc. Taking into account the various requirements a claw yaw is designed, simulated and tested in a wind tunnel and the results are

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Computational analysis on hybrid composite material

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ABSTRACT

Present work describes an attempt to develop hybrid bio-composite material using Bombyx Silk & glass fiber reinforced in epoxy resin as matrix varying the orientation of silk fiber to the glass fiber at an angle of 90.˚ In medical industry weight is an important parameter that is considered widely in manufacturing of artificial limbs for physical disabled. Usually to support the person the structure needs enough strength to carry the weight of the person. The limb needs to be light in weight, so it should not affect the daily routine of the person. The structural member undergoes continuous cycles of compression and tension when the user is performing day to day activity. The procured

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Analysis, fabrication and testing of a sandwich composite for an UAV wing

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ABSTRACT

This paper includes the study on analysis, fabrication and testing of a lightweight sandwich composite made by balsa wood core and fiber-glass/polyester resin for an UAV wing. The analysis for von mises stress distribution is done using COMSOL software. The materials play an important role in the design of any engineering process and therefore must have the ideal properties required for a particular function. It is more important for the airframe designers as weight is a major criterion in aircraft design. The sandwich structure exhibits high flexural strength which is the primary necessity of a wing to counter bending loads. The balsa wood core structure exhibits better structural strength properties than that of polyurethane foam-based cores. The sandwich composite developed exhibits satisfactory mechanical properties for the required application.

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Numerical design and modelling of a vertical axis wind turbine to extract wind energy from highways to power electric vehicle charging stations

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ABSTRACT

The conventional sources of energy are exhausting. Considering this fact, the Government is firmly set on making India a primarily electric car driven nation by 2030 to reduce the petroleum import bills and the running costs of vehicles. Thus, the automobile sector is going to be dependent on the power grids and on the power transmission firms. The sudden increase in electricity requirement would put extra load on the power supply chain which completely depend on the depleting natural resources such as coal and nuclear power plants. Thus, there is a need of an alternative electricity generation technique for the Electric Vehicle charging infrastructure in the country. Our approach of solving this problem is by installing an array of vertical axis wind turbines [VAWT] in the existing infrastructure of the cities such as bridges, flyovers, highways etc. For the implementation of the wind turbines in cities on a large scale VAWTs have considerable advantages over the conventional wind turbines (horizontal axis), as these cover a less rotational area and being easy to install and maintain. Also,

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Gesture control of UAV using radio frequency

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ABSTRACT

With the ever-increasing reliance on electronic gadgets and equipment, the technology has reached its peak but with the increase in features and functions of the gadgets, the complexity of the user interface also increases. As such are the problems faced by drones that have almost unlimited untapped potential but due to the complex interfacing between conventional controls and the use of a lot of the drones are still limited. This paper puts light on the steps to create an aerial vehicle capable of being controlled by easy gestures, to reduce complications in controls, more instantaneous and instinctive control of the aerial vehicle. This technology can be currently used in flying drones and can further be applied to military, rescue, and relief operations in times of distress.

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Environmental pollution control using artificial intelligence drone

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ABSTRACT

Pollution is an increasing factor nowadays; it is also getting worse day by day at an exaggerated rate so there is a strong need to control it. There are many non-technical ways to do it but it takes a certain amount of time to achieve the desired rate. So, the idea is to remove the dominant part of the pollutants present in the atmosphere. In this paper there is an idea to control the presence of pollutants in the atmosphere with the help of an artificial intelligence drone. A programmed drone has been designed in a way to sense the presence of pollutants and absorb it. The drone will work according to the input program given to it for absorbing the pollutants, activated carbon sheets are used these sheets absorb Particulate matter and majorly carbon monoxide. The carbon sheet is rigged up to a set of sensors and apparatus which senses the pollutants and the activated carbon sheets play a role of absorbingit.

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A review on mechanical and wear properties of ASTM a 494 M grade nickel-based alloy metal matrix composites

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ABSTRACT

The paper explains the mechanical lead and wears the properties of composites made from the cross-section of Nickel composite metal using the common shape. Nickel and nickel-containing base composites are used as critical and important materials in a broad variety of current applications due to their wonderful properties, such as exceptional mechanical strength, advanced mix safety, and complex process control. As a result, these materials had a steadily increasing enthusiasm for exhibiting predominance in different applications in their mechanical and tribological properties. Improving these more exceptional materials with improved workmanship for mechanical and tribological applications has led experts to develop new and innovative materials from the hypothetical processes to be developed. Product lattices composites have an advantage over the end, because they are particularly suitable for applications requiring outstanding stability at high temperatures, unrivaled basics, dimensional protection and light weight. This composite material, in the same way, offers a mix of impenetrable disintegration, heat exhaustion, heat staggering, quality, robustness, metallurgical quality, workability, weldability and, in addition to its ability to withstand a wide range of conditions of Extraordinary work, including high temperatures, is of similar concern to creeping material. Several professionals have shown that strengths such as silicone oxides, graphene, aluminum particles; silicon carbide, tungsten, graphite, etc. particles, without a very noticeable stretch, are joined together in a nickel mixture organized for the progression of the compounds. Nickel and nickel blends of world class use are widely used in steel, marine, avionics, watches, cars, improvements, PCs, etc.

Selection and peer-review under responsibility of the scientific committee of the International Conference on Newer Trends and Innovation in Mechanical Engineering: Materials Science.

1. Introduction

Some of our cutting-edge developments need materials with odd mixtures of properties that cannot be met with metal, ceramic, and polymeric material combinations. This applies in particular to the materials required for aviation, submerged, and transport applications. There is a pattern of expansion towards utilization to achieve better execution in material design. The sought-after expansion, with minimal effort, of lightweight, high-quality, solid, high-quality, and solid materials has led to the improvement of composites, which have different focal points over solid materials and traditional amalgams. Composite materials are characterized as perceptible mixtures at the level of non-solvent components with at least two unmistakable parts [1–5]. One of the materials that guarantees the association is known as the network and the other that confers obstruction is known as the support. For the most part, fortification is presented as particles, short strands, or long strands. By consolidating different materials, it is conceivable to build a different material with unmatched properties. The mixture of the constituent materials is determined by the specific application proposed and the relative relevance for a number of factors, such as protection against erosion, uncompromising nature, weight, exhaustion, and warm expansion. An examination work package is currently underway at the international outreach of Metal Lattice Composite (MMC) to improve security against

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A Novel Technique for Production of Paint from the Diesel Exhaust Soot

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Abstract-Air Pollution is the most crucial problem worldwide causing health issues, global warming and even extinction to wildlife Species. PM2.5 particles are tinnier than the red blood cells, behave almost like a gas and sweep into lungs, get accumulated causing serious lung disorders. Only a very few industries follow legitimate process to eradicate the captured waste leading to pollution. The article presents a way to get best out of the waste, harvest from the air pollution and make world a pollution free place to live in. The idea is to constrain and bind the captured pollution into high grade products which is useful to the livelihood. The article presents the design and fabrication of the soot collector, to collect soot from four stroke diesel internal combustion engine, the soot was tested using Energy Dispersive X-Ray Spectroscopy method to find the percentage of the carbon content present in the soot. The soot collected is converted into ink and paint using chemicals like rubbing alcohol, with a co-surfactant, cocamidopropyl betaine in water and then made into a carbon compound.

INTRODUCTION

Exhaust gases are discharged as an outcome of the combustion of fuels such as natural gas, gasoline, petrol, biodiesel blends, diesel fuel, fuel oil, or coal [1]. Rendering the type of engine, the exhaust gases are liquidated into the atmospheric air over an exhaust pipe, smoke stack or impelling nozzle. The exhaust gases are often diffused in a downwind configuration termed as exhaust plume [1, 2].Soot is kind of contaminated carbon particles produced from the partial combustion of hydrocarbons [3]. Diesel soot, one of the major environmental pollutants, is the finer particle produced during the extreme temperature combustion of diesel fuel [4, 5]. Particulate matter emissions from diesel engines are considerably higher (six to ten times) than from gasoline engines [6].The diesel engine is an auto-ignition engine in which fuel and air are mixed inside the engine. The air required for combustion is highly compressed inside the combustion chamber. This generates high temperatures which are sufficient for the diesel fuel to ignite spontaneously when it is injected into the cylinder. Thus, the diesel engine uses heat to release the chemical energy contained in the diesel fuel and to convert it into mechanical force [6, 7]. The finer particles present in ambient air are formed during combustion, are accountable for increased respiratory infirmities [5]. With emission control systems, pollutants from the exhaust can be eliminated after it leaves the engine, just before it is emitted into the air [7]. The discharge of particulate matter in the atmosphere has undesirable effects on the environment and the wellbeing. Researchers have discussed the emission from the diesel engine have led to diseases like chronic lung disease, lung cancer, influenza, asthma thereby increasing the rate of mortality. These emissions are not only

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Comparative Study of PID Control Algorithms for an Electric Vehicle

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Abstract: Electric vehicles have emerging as prominent alternative for sustainable, clean and cleaner energy emissions in transportation. Modelling and controlling of electric vehicles have attracted increasing attention from researchers. Proportional Integral derivative (PID) controllers are most extensively used in the control of any system because of their simplicity, robustness, and successful practical application. A comparative study of the different control algorithms used in the PID controller of an electric vehicle is carried out in the present work, including the control of the electric vehicle for the Transfer Function model by applying three control algorithms, i.e., the Ziegler-Nichols (ZN) algorithm, Modified ZN (MZN) algorithm, and the Internal Model Control (IMC) algorithm for the second order transfer function model and the equivalent first-order with delay time (FOPDT) model of an electric vehicle. It also includes control of the electric vehicle using the state space model by applying two control algorithms, i.e., the Linear Quadratic Regulator (LQR) algorithm and the Pole Placement (PP) algorithm. The gain values of the PID controller K_p, K_i, and K_d are calculated by considering Transfer function case and the State space model case. The performance of these approaches is evaluated by using the Integral-Square-Error (ISE), Integral-Absolute-Error (IAE), Integral-Time-Absolute-Error (ITAE), and the Integral-Time-Square-Error (ITSE). The comparison is carried out based on domain specifications and performance indices, in order to identify the superiority of the control techniques.

Keywords: Electric Vehicle; PID Control Algorithms; Performance Indices.

INTRODUCTION

Energy saving is one of the major difficulties faced by the modern world. The growing number of vehicles resulting in environmental pollution is a major reason for the greenhouse effect [1]. The world is witnessing a steady development and transformation of gasoline-powered vehicles to electric vehicles (EVs). An EV has less moving components than conventional Internal Combustion (IC)engine vehicle [2]. Moreover, EVs can avoid the problems associated with oil changesand Liquid fuels. In addition,EVs ensure notransmission failures or belt timing failures. In fact, maximum of the maintenance expenditures related with an IC engine is eradicated.Even if the vehicle remained to be fueled completely by electrical energy generated by coal, EVs partake a better emission profile than IC engine vehicles. They not only have lower emission content, but also the location and timing of the emission are better. In the peak driving hours, the gasoline-powered vehicle emits pollutionacross the city, whereas the emission from an EVs generally occurs during off-peak driving hours at power plants in far-flung locations [2].

Proportional Integral Derivative (PID) controllers are commonly used for ideal solution. Finest solution gives improved efficiency. The PID controller is a robust and simple system that can deliver excellent control performance, regardless of the varied dynamic features of the process plants. When the real output matches the set output, better efficiency is achieved. For this purpose, there is the need of a controller. The trouble in using a

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Investigating the Impact of Deep Cryogenic Treatment on Surface Roughness and Cutting Force in Turning C45 Steel

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Abstract

In this work, aimed to predict an optimized combination of machining parameters to produce minimum cutting force and surface roughness while turning of C45 steel, with deep cryo-treated M2 HSS tool under dry condition. Methods: Design of Experiments (DOE) with Taguchi's L9 orthogonal array (OA) is used to predict the optimum combinations of machining parameters to produce minimum cutting force and surface roughness. S/N Ratio and ANOVA analysis were conducted to show the control of three cutting parameters on the cutting force and surface roughness. Findings: The machining parameters are the most significant factors in the turning operation. The confirmatory test includes the optimized combination parameters. From the analysis of ANOVA results, the cutting speed was the most significant factor effects both untreated and cryotreated surface roughness by Vc=52.87%, f=7.59%, ap=2.77% and Vc =37.93%, f=29.20%, and ap=0.11% respectively, of the machined surface. Cutting force untreated tool, depth of cut was the most influencing factor ap=86.75% followed by feed rate=8.80% and cutting speed=3.37%. While in the treated tool feed rate is the dominating factor on f=56.76% followed by ap=19.73% and Vc=10.10%. Taguchi technique is the efficient and effective method to optimize machining parameters for low cutting force and surface roughness.

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"Performance Of Concrete By Partially Replacing Fine Aggregate With Gbs And Cement With Fly Ash"

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Abstract

Concrete is most indisputable material being used in infrastructure growth all over the world. It is globally known building material in all type of civil engineering structure. Due to development there is huge demand for concrete in turn increases environmental issues. So there is need for alternative measures for concrete. Cement, sand which are the prime material used for concrete plays an important role in mix design. Construction industry is a largest user of material resources which has led to reduction of good quality of sand. This situation led to discover new alternative material. Therefore the aim of this research is replacing sand with granulated blast furnace slag to reduce the consumption of sand. And addition to this there is environmental pollution in construction industry due overuse of cement which produces carbon dioxide in large amount led to global warming. As a solution for this cement is partially replaced by fly ash. In this investigation, natural sand by replacement of GBS in various % (5, 10,15,20,25,30,35,40,45,50) with water cement ratios 0.45 and cement by partial replacement of fly ash in constant 20
%. Different tests were conducted for fine aggregate and GBS sample. Different mix proportions for varying percentage replacement of fine aggregate have to be obtained for M30 grade concrete. The compressive strength and split tensile tests conducted for the concrete with various percentage of GBS and fly ash. This aims at the comparison of strength between the normal concrete with the convectional concrete.

Key words –Concrete, GBS, fly ash, Fresh properties , Hardened Properties.

1. Introduction

Concrete is commonly viewed as the most generally utilized material on Earth. It is a blend of element of concrete, fine total, coarse total and water. It tends to be formed into any shape in flexible stage. The overall amount of fixing controls the property on concrete in wet stage just as in solidified stage. Aggregate is a general class of coarse particulate material utilized in development including sand, rock, and squashed stone. Aggregate serves as reinforcement that provides strength to the composite material. With the increasing urban development and population, demand of sustainable structures increased. The Concrete Industry is exceptionally enormous buyer of normal assets like sand, rock, squashed stone, and so forth as building material. Natural limitations of sand extraction from stream beds have brought about quest for elective wellsprings of fine total, especially close to the bigger metropolitan zones. Due to high demand of sustainable structures, demand of river sand increased which is one of the ingredient required for preparation of concrete. Due to erosion of rivers and other environmental problems there is a lack of river sand. The demand for sand is increasing that will increase the price of sand and leads to lack of sand. Due to unavailability of river sand, it is

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Design, Calibration, and Experimental Study of Low-Cost Resistivity-Based Soil Moisture Sensor for Detecting Moisture at Different Depths of a Soil

S. Sunil Kumar, Ganesh Aithal, and P. Venkatramana Bhat

Abstract Soil moisture is one of the important abiotic factors for the proper growth of plant and scheduled irrigation in agriculture. Soil moisture stress would lead to the improper growth of crop and reduction in yield. Nowadays, most of the scheduled irrigation systems are depending on the compact soil moisture sensor to detect the soil moisture level and actuate the irrigation accordingly. Even though many soil moisture sensors are already available, the limitation of the existing soil moisture sensor poses further challenges for improvement in soil moisture sensor. In this work, one of the limitations of existing soil moisture sensor is unable to detect the soil moisture level at different granularities of soil considered and proposed an improvement. In the proposed work, the multiple parallel probes at different depths of soil are used to detect the soil moisture at different vertical profiles of soil using the basic soil properties of variation in soil resistivity due to soil moisture. The empirical study of proposed work showcases the behavioral characteristics of variation in soil resistivity due to moisture and relationship between change in soil resistivity of upper and lower probes and its possible use to detect the presence of soil moisture at different depths of soil.

Keywords Soil moisture · Resistivity · Vertical profile · NI WSN 3202

1 Introduction

Agriculture has been a backbone for any nation and primary source of food, which is at high risk due to the shortage of water for irrigation [1–3]. The shortage of freshwater for agriculture crops leads to the emergence of smart technologies on scheduled irrigation. In scheduled irrigation, crop will be provided with the required amount of water only when needed, hence avoids the excess supply of water to crop and

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Heart Attack Detection System using IoT

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***Abstract*— These days various people are misplacing their life inferable from heart assault and deficiency of restorative thoughtfulness regarding persistent at right stage. Subsequently, in this venture we are actualizing pulse observing and heart assault acknowledgment framework utilizing IoT. The patient will convey equipment having sensors with android application. The heartbeat sensor will permit checking heart beat readings and transmit them over the web. Thought depends on the checking of the patient that is finished by the specialist persistently without really visiting the patient. In this paper, IoT is turning into a noteworthy stage for some administrations and applications. The pulse of the patient can be checked by the specialist or by the gatekeeper without really visiting the patient. The framework is executed utilizing Arduino MCU8266, Temperature sensor, Electrocardiography ECG sensor.**

Keywords*— *IoT, Arduino MCU8266, Temperature sensor, ECG sensor.

I. INTRODUCTION

In the new time of correspondence and innovation, the hazardous development of electronic gadgets, advanced cells and tablets which can be imparted physically or remotely has turned into the crucial device of everyday life. The up and coming age of associated world is Internet of Things (IoT) which interfaces gadgets, sensors, apparatuses, vehicles and other "things". The things or items may incorporate the tag, cell phones, sensors, actuators and substantially more. With the assistance of IoT, we associate anything, access from anyplace and whenever, productively get to any administration and data about any article[1].

The point of IoT is to expand the advantages of Internet with remote control capacity, information sharing, steady availability, etc. Utilizing an inserted sensor which is dependably on and gathering information, every one of the gadgets would be attached to neighborhood and worldwide systems. Presently a-days medical issues like cardiovascular disappointment, lung disappointments and heart related infections are emerging step by step at a high rate. Because of these issues time to time wellbeing checking is exceptionally fundamental[1]. A cutting edge idea is wellbeing observing of a patient remotely. It is a noteworthy advancement in restorative field. Wellbeing experts have built up a splendid and cheap wellbeing checking framework or giving progressively open to living to the general population experiencing different ailments utilizing driving innovations like remote interchanges, wearable and compact remote wellbeing observing gadget. As visits of specialists to the patients continually are diminished as the data with respect to patient's wellbeing legitimately reaches to specialist's screen from anyplace the patient lives. Likewise, in light of this specialists can spare numerous lives by conferring them a speedy and profitable [2][3].

A. The Arduino Node MCU

Arduino is an open-source gadgets stage dependent on simple to utilize equipment and programming. Arduino sheets can peruse contributions from various sensors and divert the yield to the referenced yield pins. The Arduino Uno is a microcontroller board dependent on the EPS8266(data sheet). It has 14 advanced Input Output pins(of which 6 can be utilized as PWM yields) , 6analog data sources, a 16 MHz artistic resonator, a USB association, a power jack, an ICSP header and a reset catch. It contains everything expected to help the microcontroller; essentially associated it to a PC with a USB link or power it with an AC to DC connector or battery to begin. Its an open source physical stage dependent on a straightforward microcontroller board, and a improvement condition for composing programming for the board.

B. Electrocardiography ECG sensor

An electrocardiogram records the electrical signal in the heart. It's a common test used to detect heart problem and monitor heart's status in many situation. ECG is an indication of the patient's heart health by recording the electrical activity to be read by specialized doctors which able to extract vital signs from it. Hence, HR can be calculated from ECG.

C. Blynk App

Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, visualize it and do many other cool things. There are three major components in the platform:

Blynk App - allows to you create amazing interfaces for your projects using various widgets we provide.

Blynk Server -responsible for all the communications between the Smartphone and hardware. You can use our Blynk Cloud or run your private Blynk server locally. It's open-source, could easily handle thousands of devices and can even be launched on a Raspberry Pi.

Blynk Libraries - for all the popular hardware platforms - enable communication with the server and process all the incoming and outcoming commands.

II. LITERATURE REVIEW

A literature survey shows the various analysis and research made in the field of interest and results already published, taking into account the various parameters of the project and the extend of the project. It includes researches made by the various analysts -their methodology and the conclusion they have arrived at. As the amount of elderly people and chronic diseases patients grow rapidly, drawbacks of traditional healthcare service are increasingly prominent. The Internet of

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INVESTIGATION OF MACHINABILITY CHARACTERISTICS ON C45 STEEL ALLOY WHILE TURNING WITH UNTREATED AND CRYOTREATED M2 HSS CUTTING TOOLS

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ABSTRACT

The present paper compares some of the vital cut qualities of C45 alloy steel while turning operation. The effect of cryogenic treatment and machining parameters on cutting force and temperature were investigated in the dry turning of C45 steel with treated and untreated M2 HSS tool with the radial nose of 0.4mm, are optimized by using the statistical method. The selected work material was machined with untreated and deep cryogenically treated M2 HSS tools and the results were compared in order to exhibit the feasibility of DCT tools. Series of experiments were performed by adopting Taguchi's L_{27} orthogonal array. Cutting speed, feed rate, and depth of cut were taken as three process variables whereas cutting force (F_c), machining temperature (T_m) were selected as the machining characteristics to be compared. The cutting tool materials were initially characterized to examine the effects of deep cryogenic treatment. The characterization was done with the help of a hardness test and scanning electron microscopy (SEM) test coupled with energy dispersive spectroscopy (EDS). The result shows that the depth of cut is the most significant factor for both treated and untreated tool on cutting force, temperature followed by cutting speed and feed rate has less significance, from statistical method to obtain considerably reduced the cutting force of HSS tool by 9.11% and temperature by 11.5%, while depth of cut was the dominating factor for both.

Keywords: M2 HSS tool, cutting force, temperature, machining, deep cryogenic treatment

1. INTRODUCTION

In the concept of dry machining, there is no scope for contamination, disposal, and filtration due to cutting fluids (2004); but operate at lower cutting speeds resulting in slow production rate. The possibility of overheating the tool and lack of chip removal mechanisms pose a significant challenge on the scope of dry machining (1993). In the metal cutting process, cutting tool overcomes the shear strength of work piece and cuts the metal. Advanced manufacturing has produced materials with good strength whose machining demands a paradigm shift in the cutting tools. These cutting tools need to apply more force to cut while compromising their tool life. High temperature generated during cutting impacts in multiple ways on tool life by causing thermal distortion and dimensional changes thereby affecting accuracy (1992). The force components that come into play, impacting on the cutting tool during machining process are termed as cutting forces (2000). They indicate the work done by the tool in removing metal; there by giving an account of tool life, the machined work piece's dimensional accuracy and quality of finished product. High- speed steels first produced in the 1900s are the best choice for cutting tools owing to its high toughness and excellent wear resistance characteristics (1998). Its peculiar behaviour of maintaining hardness at elevated temperatures makes it suitable for drilling, cutting, and various machining processes. Molybdenum type HSS are most favoured due to their cost- effectiveness and high abrasion resistance as compared to Tungsten type (2005).

They indicate the work done by the tool in removing metal; there by giving an account of tool life, the machined work piece's dimensional accuracy and quality of finished product. High- speed steels first produced in the 1900s are the best choice for cutting tools owing to its high toughness and excellent wear resistance characteristics (1963). Its peculiar behaviour of maintaining hardness at elevated temperatures makes it suitable for drilling, cutting, and various machining processes. Molybdenum type HSS are most favoured due to their cost- effectiveness and high abrasion resistance as compared to Tungsten type (2000). A typical interaction between cutting tool with the work piece in machining process is pictured in Figure-1. The tool dynamometer measures the cutting forces F_x, F_y, and F_z; and the obtained values can be stored in the computer by Data Acquisition system. F_x describes feed force acting in horizontal plane parallel to the workpiece axis. It is also known as thrust force and is responsible for dimensional inaccuracy and vibration. F_y is the primary component (power component) representing cutting force acting in the vertical plane and is tangential to work surface. F_z represents radial feed force acting in the horizontal plane but along the radius of the work piece. F_y and F_z are most and least influential forces respectively. These cutting forces are susceptible even to a small change in the cutting process.

Experimental Analysis on Effect of Various Fillers on Mechanical Properties of Glass Fiber Reinforced Polymer Composites

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Abstract: Filler materials are the inert materials which are used in glass fiber reinforced polymer (GFRP) composites for modifying the chemical and physical properties of the matrix polymers to reduce material costs, to improve processability, to improve product performance or to simply act as extenders or matrix diluents. Effect of fillers on mechanical properties like tensile strength, flexural strength, tensile modulus, impact strength, hardness was tested by various methods experimentally. The present work focused on fabrication of Glass Epoxy composite with Mother of pearl, fly ash and aluminum powder used as filler material. The Filler material was varied in % composition by 3%, 6% and 9% in the total volume. This study was carried in order to determine the mechanical properties of fabricated composite by conducting Tensile and Flexural tests. The tests showed the composite with aluminum filler material exhibits better tensile property and composite with fly ash filler exhibits better flexural property.

INTRODUCTION

Filler materials are generally the inert materials which are used in composite materials to reduce material costs, to improve mechanical properties to some extent [1].In some cases, to improve process ability and to improve product performance two or more different materials with differentproperties are combined together they will form a composite material. Fibers when embedded with weaker matrix materials comprise of strong load carrying capacity. The fibers in the composite materials will improve the mechanical properties viz., tensile strength, flexural strength, impact strength and stiffness. The essential features of composite materials are their high quality and firmness. In composite,thereinforcing phase constituted either of fibers, particles or flakes.Matrixphaseis continuous in nature. Generally, Composites are known to be Heterogeneous although have advantages over conventional metals. Sengupta el al. studied the effect of fly ash on tensile properties of polyurea composites and found that tensile strength reduced due to fly ash addition [2].The composite like PMC's have some disadvantages because of their anisotropic properties. It leads to a significant challenge for the designer when usingcomposite materials in structures which have multi directional forces. Ban Bakir et. Al [3], studied the effect of fiberorientation on fiberglass composite material [3].They studied the effect of orientation of these fibers on Mechanical properties. The study showed thefibers oriented at 45° gave better results and this was achieved when volume of fibers exceeded30% in total volume. The experiment was carried out for 45° orientation of fibers for Continuousand Discontinuous fibers. Sandeep M. B et. Al [4], carried out a work on Glass/Epoxy composite to study the effectof Orientation of fibers and how it effects the flexural strength of the material. In this study theyused glass fiber as reinforcement and epoxy was used as resin.Composite was fabricated by handlayup process. This study showed that the flexural strength in -45+45 orientation fibers is more thanthat of 0,90 oriented ones.Michael Ipkiofem et. Al [5], carried out a work on composites composed of permissible shelland cashew nut shell liquid (CNSL) resin, to study the mechanical properties and how filler materialaffects it. The study was carried out for different sizes of filler materials like (400, 600 and 800microns) and the volume% for the composition was also carried from (10-40%). The material wasmanufactured by compression mould technique. The results showed good mechanical properties forincrease in %volume of filler material. The optimum results were found for 400microns filler size and30%

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A Review of Accelerated Bio-Methanation From Food Waste, Animal Waste and Garden Wastes

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***Abstract*:- Here we reviewing the acceleration of biomethanation from food waste, animal waste and garden waste. As the effect of urbanization the usage of fossil fuels is going on increasing and the organic solid waste also increasing. By producing biogas, we can overcome this crisis. By using aerobic and anaerobic two-phase digestion method we can enhance the biomethanation process and through this method, we can use food, garden and vegetable wastes effectively to produce gas. This method even helps to increase the concentration of volatile fatty acid and helps to reduce the volatile solids. By maintaining chemical oxygen demand, temperature and PH at the proper value we can even enhance the biogas production. By design and constructing efficient and compact high rate gas generation digester, we can save space, time and it will be economical. The biogas can be used as alternative fuel in IC engines, and Cooking fuel. By Using biogas, we can save fossil fuels fossil fuels (petroleum products) which are costly and exhausting soon.**

Keywords:- Aerobic digestion, Anaerobic digestion, Biogas, Food waste, Kitchen waste, Garden waste, dairy waste, VFA, Volatile Solids, COD

1. INTRODUCTION

Decades of rapid industrialization primarily dependent on diminishing fossil fuel reserves have brought about an alarming energy crisis of global proportions. Efforts in energy research now focus towards production from sustainable, affordable, and environmentally being sources. Biomass from kitchen waste, garden waste and agricultural products have been found promising substitutes for crude oil. However, the competition between biomass and high-value crops production remains a major drawback of large-scale utilization of biomass energy. Production of biofuels from biomass can be achieved through gasification, pyrolysis, Torrefaction and incineration from biomass.

Biogas is a gaseous fuel obtained from biomass by the process of anaerobic digestion (Fermentation). The infeed to the biogas plant Includes-Urban waste(garbage), Urban Refuse (Human excreta), Rural, agricultural waste, cow dung, animal waste from Butchery, etc. Biogas is a cheap secondary renewable energy. Close to 40% of methane emission takes is from the wetland ecosystem and 60% of the methane comes from human energy. Here, the infeed is mixed with water to assist anaerobic fermentation process. The biogas plant delivers methane-rich gas which has methane (CH_4), Carbon-dioxide (CO_2) and other impurities. Food waste if utilized can be a boon in producing many useful products such as renewable energy (RE), cooking gas and good manure.

By using above mentioned waste the accelerated Bio-methanation by the rapid anaerobic reaction can be attained with effective utilization of biogas produced from kitchen waste (food & vegetable), garden waste, agricultural waste and dairy waste, etc. This produced gas is used in I.C engine and heating application in the kitchen.

This particular study as lots of scopes as follows biogas production is a clean low carbon technology for efficient management and conversion of fermentable organic waste into clean and cheap and versatile fuel. This fuel is used in various category: Such as Fuel for cooking (Biogas chulha), driving IC engines for pumps and residue from biogas plants is used as manure.

Waste is simply being wasted and thrown into garbage than to landfill, which in turn act as open sources of anaerobic digestion causing the emission of greenhouse gases which has an impact on global warming. Hence, every individual's right to know about the consequences which each one is ignorant about the impacts. Thus it's an essential step for everyone, to go for reducing the global warming threats. Green technology and the concepts have to be understood and practised by every person to reduce the threats. Non-Conventional resources such as a bio-waste, solar, water harvesting, wind etc. are the source for renewable energy (RE) production. And the combination of all these sources which are available on premises would produce a sustainable energy.

Learn about methanogens Understand the chemistry behind the production of methane from food

Study on Two Body Abrasive Wear behaviour of Carboxyl-Graphene Reinforced Epoxy Nano-composites

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Abstract. The focus of this study was to investigate the effect of carboxylic acid (COOH) functionalized graphene (CGr) content on abrasive wear behavior of epoxy nanocomposites. CGr-reinforced epoxy (CGr//Ep) nanocomposites were fabricated using probe sonicator for dispersion and vacuum oven for curing. The percentage of CGr in the developed composites was varied from 0.2 to 1 wt. % with an increament of 0.2 wt. %. The abrasive wear tests were conducted on the developed CGr/Ep composites on SiC abrasive paper with two grit sizes at constant velocity and constant load for varying abrading distance. The worn surfaces were analyzed using Scanning Electron Microscope and the images reveals that the developes nanocomposites exhibits good tribolofical performance at low filler loading (≤0.6 wt. %). Neat epoxy showed the highest specific wear rate as well as high wear volume. On the other hand, epoxy with 0.6 wt. % of CGr exhibited the least friction coefficient and superior wear resistance for 320 grit SiC abrasive paper. It is predicted that the good interfacial adhesion between CGr and epoxy matrix and also tribo-chemical reactions between CGr layer and epoxy matrix for reducing wear rate of the composite materials.

1. Introduction

The understanding of wear process in case of polymers and its composites are difficult. Because of interacting of materials in the crack formation prompting the creation of wear particles [1]. A few scientists have given major importance in the study of wear performance of composite materials because of their good tribo-mechanical properties [2]. Nevertheless, there are some tribological limitations in polymer composite due to its low thermal and hardness property which reduces the wear behavior of composites at high loads and high temperatures [3]. In order to overcome from this limitations, polymers should be reinforced with fibers/fillers especially carbon based materials which improves the wear properties of the material.

The nano-filler reinforced polymer composites play an important role in order to improve the wear behavior of the material because of large surface area which leads to high strength to weight ratio of the material [4]. Generally the optimum filler content ranges between 1 – 4 vol. %, if the filler content increases, there might be a chances of improper dispersion causes agglomeration, ultimately which leads to reduce the properties of the material [5]. Hence the proper dispersion of nanoparticles in the

Study on Mechanical Performance of Carboxyl Functionalized Graphene Reinforced Epoxy Nanocomposites

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***Abstract*— Herein, we report the formulation of new series of carboxyl functionalized graphene (CGr) (0.2, 0.4, 0.6, 0.8 and 1 wt. %) reinforced epoxy composites by hand layup technique. The CGr induced changes in the mechanical performance of epoxy composites were valued through tensile, and three point bending measurements as per ASTM standards. The characterizations divulge 0.4-0.6 wt. % as optimal reinforcement content (percolation threshold) that brings about improved material performance. The worn surfaces were analyzed using Scanning Electron Microscope and the images reveals that the developed nanocomposites exhibits good mechanical performance at low filler loading (≤0.6 wt. %). Even with a very small loading of 0.4 wt. %, CGr was able to increase the tensile strength and flexural modulus. This increased mechanical performance also depicts excellent filler/matrix compatibility and mechanical interlocking of functionalized graphene with epoxy matrix. The results obtained support the utilization of surface functionalized graphene towards enhancing the mechanical performance of epoxy based polymeric systems for structural applications.**

Keywords: **Carboxyl functionalized graphene, Mechanical behaviors, Polymer composite**

I. INTRODUCTION

Ever since the discovery, graphene reinforced polymer composites have been increasingly investigated for advanced mechanical, thermal and electrical applications [1]. The increased material performance of such composite systems was attributed to excellent material behaviors of graphene alongside increased processability of polymers [2]. In recent decades, graphene sheets reinforced polymeric systems especially epoxy matrices have been studied for various functional applications [3-5]. However, formulation of graphene reinforced epoxy based advanced multifunctional systems demand improved filler dispersions and excellent interfacial adhesion. Nevertheless, the entanglement of graphene checks its dispersion and exfoliation particularly in polymeric systems [6-7]. The poor dispersion and exfoliation will not only lower their efficiency as reinforcements but also causes graphene to slip by each other, thereby limiting their intent to mechanical performance [8].

An evaluation of the previous work done on mechanical characterization of carbon fillers in epoxy composites is given here. Asma et al. [9] studied the mechanical properties of carbon reinforced epoxy composites. They exhibited that adding filler material like carbon had a much better performance in terms of modulus of elasticity and durability. They conjointly showed that homogenized dispersion of carbon platelets had a much better surface adhesion to the epoxy. Wen et al. [10] studied the impact of dispersing MWCNT in epoxy composites. Two different techniques were used to prepare the composites (sonication and planetary mixing) followed by solidification. They revealed that the sonication technique might be higher approach to supply epoxy nanocomposites with better dispersion of MWCNTs, which after improves mechanical properties like flexural strength and modulus of the composites. Mohammad et al. [11] characterized the mechanical behaviour of fullerene/epoxy nanocomposites at completely different weight fractions of fullerene additives within the epoxy matrix. They showed that properties of the epoxy chemical compound were appreciably improved by the fullerene additives at relatively very little nanofiller loading (0.1 to 0.5 wt. %) fraction. Steurer et al. [12] according that graphene is a excellent carbon nano-filler compared to carbon nanotubes and carbon nanofiber for rising mechanical behaviors of composites. Shen et al. [13] investigated that graphene has the best extent per unit mass, and it's even better to CNTs and fullerenes. Kuilla et al. [14] showed graphene stuffed chemical compound reinforced nanocomposites show better-quality and flame retardant properties compared to other different nanocomposites. They conjointly showed graphene's rough and wrinkled surface improves the interlocking with the encompassing matrix enhancing load transfer.

Investigation of the Effect of Filler Material in Hybrid Fiber Composites

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***Abstract*-The present experimental study aims at studying the mechanical behaviour of hybrid fiber composites. Here Composite materials are formed by reinforcing two or more materials of varying percentage. Samples of cotton-nylon reinforced composite and cotton-polyester reinforced composite with and without filler material were fabricated using wet hand layup method. The weight fraction of fibre was kept at 2%, 4%, 6% respectively and filler content was kept at 5%. Based on the physical and mechanical properties of the selected materials the required resins, catalysts and other accelerators are chosen and fabricated accordingly. Specimens were cut from the fabricated laminate according to the ASTM standards for different experiment. After that the experiment is performed under Universal testing machine (UTM) Tensile strength were observed and compared to base values of epoxy polymer to perceive the change in strength. It was found that in the presence of fly ash as a filler material there was sustainable improvement in the mechanical properties. The various tests are performed on composite material with and without filler material and their mechanical are compared.**

Keywords—Polymer composites, Hybrid fibers, Epoxy Resin, Composites.

I. INTRODUCTION

In an advanced society like ours we all depend on composite materials in some aspect of our lives. Composite materials are heterogeneous mixtures of two or more homogeneous phases, which have been bonded together. In composites, properties or set of properties can be attained which could not have been obtained separately. In the last century, the use of composites has been extended after appearance of pneumatic tyres for vehicles and reinforcedconcrete. The next step was the development of glass fiber reinforced plastics during the Second World War. The different materials work together to give the composite unique properties, but within the composite. Hybridization is a process of incorporating synthetic fibers with that of natural fibers in order to yield better strength, stiffness, high strength to weight ratio, mechanical properties. Hybrid composites are more advanced composites as compared to conventional FRP composites. They have better flexibility as compared to other fiber reinforced composites. Polymer nano-composites represent a new class of materials alternative to conventionalfilled polymers. Filler materials are generally the inert materials which are used in composite materials to reduce material costs, to improve mechanical properties to some extent and in some cases to improve processability. Fly ash depending upon the source of coal, contain different proportions of silica, alumina, oxides of iron, calcium,magnesium etc along with elements like carbon, Ti, Mg etc.

II. MATERIALS ANDMETHODS

A. Natural Fiber

The interest in natural fiber-reinforced composites is growing rapidly due to their high performance in terms of mechanical properties, low cost, low density, processing advantages, easy availability and recyclability. In this present study utilizes cotton fiber as a natural fiber. Physically the individual cotton fibres consist of a single long tubular cell. Its length is about 1200-1500 times than its breadth. Length of cotton fibre varies from 16mm to 52 mm depending upon the type of cotton. The Properties of Cotton Fibres includes Good Strength,Good Color Retention, fibre can be the best soft hand feeling fibre amongst the others, Cotton fiber has large amorphous portion and this is why the air can be in and out through cotton fiber. So, the fabric made by cotton fiber is quite comfortable to use.

B. Sythetic Fibers

Present study utilizes nylon and polyester as a synthetic fiber. Characteristics of Nylon - High specific strength, Variation of luster, Durability, High elongation, Excellent abrasion resistance, Highly resilient, Melts instead of burning.

Polyester is a category of polymers that contain the ester functional group in their main chain. Polyesters include naturally occurring chemicals, such as in the cutin of plant cuticles, as well as synthetics through step-growth polymerization such polybutyrate.Depending on the chemical structure, polyester can be a thermoplastic or thermoset, there are also polyester resins cured by hardeners. However,the most common polyesters arethermoplastics. Natural polyesters and a

Review on Condition Monitoring of Bearings using vibration analysis techniques.

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ABSTRACT – A Bearing is one of the important components in the Rotary machines and has been widely used in various industries in many of the applications such as shaft mountings, to reduce friction as well as facilitate relative motion between the two components etc. It is therefore very essential to determine the early faults conditions from bearings. There are various methods to detect faults in the bearings, such as vibration monitoring, wear debris monitoring, temperature monitoring, soap techniques, non destructive test etc. Vibration signal analysis may be one of the commonly used techniques for checking the condition and finding faults in bearings. Vibration analysis has been used as a predictive maintenance procedure in the machine maintenance. By adopting appropriate signal processing techniques, changes in vibration signals due to faults can be detected to aid in maintaining the bearings health condition. By detecting and analyzing the machine vibration, it is possible to determine and predict the machine failure. Early fault detection of the bearings is possible by analyzing the vibration signal using different techniques. This paper give a relative of various techniques used for finding the fault in the bearings based on vibration analysis method.

KEYWORDS: Bearings, Vibration Techniques, Fault diagnosis, Vibration Signature.

1.Introduction

Machine are made up of so many parts in which relative motion is transferred from one moving part to another moving part due to which generates lot of sound and vibration. According to principles of mechanisms each moving part in the machine have individual vibration signal. The signal changes along with the change in state of machine parts, due to change in the vibration signal there will be indication of fault in the machine incipient stage it can be detected and repaired before failure. This is the main application of condition monitoring. Condition monitoring is the process of systematic data collection and evaluation to identify changes in performance. The main advantage of Condition monitoring is to detect the condition of machine components by utilizing the selected measurement to identify the changes in operating Condition as depicted below.

- Condition Monitoring gives warnings before final failure.
- Condition Monitoring gives the nature of failure and information.
- Condition monitoring manages the machine life potential.
- Condition evaluates corrective action.
- Condition monitoring maintenance efficiency and risk can be avoided and hence save money

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Vibration based Fault Diagnosis Techniques for Rotating Mechanical Components: Review Paper

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Abstract: A rotating mechanical components in machineries like bearings, gears, pulleys, belt drives etc. are major components in any rotating machinery. The failure of these components leads to downtime of machines and reduction in production. Significant economic losses will be caused due to an unexpected failure of these components. Belt drives are widely employed in various industrial equipment. Finding the early fault symptoms in the belt drive is very important. This can be achieved by various methods. For detecting faults and monitoring the condition of a belt drive, the vibration signal can be used as one of the parameter. Thus, vibration signal can be used as a procedure for predictive maintenance and it is used for machinery maintenance decisions. The changes in vibration signals due to fault can be detected by employing signal processing methods. It can be used to evaluate the health status of the machinery. The nature and severity of the problem can be determined by analysing the vibration signal and hence the failure can be predicted. Signature of the fault in the machine is carried by the vibration signal. It is possible to have early fault detection by analysing these vibration signals. Different signal processing techniques are used for processing these signals. The various techniques used for fault diagnosis based on vibration analysis method are discussed in this paper. The application of the artificial intelligence techniques such as Artificial Neural Network (ANN), fuzzy sets and other emerging technologies are discussed.
Keywords: Fault Diagnosis, Vibration signature, Fast Fourier transform, Continuous wavelet transform, Vibration Measuring Techniques, Envelope power spectrum, Wavelet.

1. Introduction

The machines are made up of moving parts, which generates sound and vibration. According to the state and construction of the machine, each part will have a specific vibration signal. The vibration signal changes along with the change in state of the machine part. This change in the vibration signature indicates the incipient defect and hence it can be detected and corrected before failure. This is the main advantage of condition monitoring. The maintenance efficiency and risk of serious accidents can be reduced by using condition monitoring and hence it can save money. This vibration analysis is a fundamental tool for condition monitoring. The machine supervision has been completely automated by the use of electronic equipment, transducers, computers and software. A review of variety of diagnosis techniques for rotating mechanical components has been presented in this paper. The two main purpose of the vibration technique as follows. First is to separate the machine related signal from other components and minimize the noise in the early stage. Second is to identify the status of the machine and indicate the defective components. The various techniques are Spectral Analysis, Order Analysis, Time Synchronous Average, Time – Frequency analysis, Waveform analysis, Fast Fourier Transform(FFT) and Probability Density Moments. Due to their ease of measurement, these vibration based diagnosis techniques are widely used. Formally, the vibration analysis was being used for determining fault and critical operation conditions.

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MONITORING AND PREDICTING THE PROJECT PROGRESS USING EARNED VALUE ANALYSIS: A CASE STUDY IN MANGALURU

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ABSTRACT: Considering the various challenges existing in construction activities, the earned value tool has a lot of theoretical and practical significance. The entrepreneurs, project managers and experts can apply this technique to minimize the problems arising in the construction field. This paper focuses on monitoring and predicting the project progress using earned value technique. In order to prepare schedule and estimation easily, Primavera P6 software is used.

KEYWORDS: Earned value, Scheduling, Primavera, Planned cost, Tracking, Actual cost.

I. INTRODUCTION

Construction Industry holds a fundamental job in financial development of the nation and it is one of the main segments in India All construction activities need systematic initial planning, proper aligned path of progress so as to gain effective output or product .In spite of proper monitoring and control during the stages of ongoing works, there may be deviations from scheduled pre-planned dates. It may occur due to non- availability of skilled labourers for respective works at the right time, unexpected issues such as damage to equipment's due to unawareness of handling procedures and technical aspects by labourers which in turn affects the financial issues. For any ongoing project the main input is the proper planning of cash inflow and outflows. It is achieved by proper pre-planning of future work. A long term duration project requires high monetary inputs as to proceed without any occurrence of major hindrance during course of project. A small variation in cost factor input may lead to a huge change at the time of completion of Project. In order to avoid variation of costs various bench marks or target destinations are to be set in the scheduled activity list of the project. Once a set of activities are completed it has to be cross checked with the pre-existing estimated cost in terms of amount of money spent for the respective works and also the duration of time taken by each activity in order to finish it.

It is easy to handle small projects since the duration required and budget spent is less when compared to mass construction projects. It is true that costs of raw materials are spectacularly increasing day by day for which costs are to be properly planned and controlled. Hence to handle mass construction projects earned value management is indeed helpful for proper progress of work and also to analyse futuristic variations in terms of both money and time

II.LITERATURE REVIEW

Chiranjeevi (2017) et.al [1**]** has carried out project in a residential building to examine cost spent over the resources that had been used. He also compared the actual cost incurred, amount of work physically completed over the planned data. The project performance was evaluated with help of earned value method using primavera P6 software .The author elaborated the detailed procedure of how to prepare a complete schedule from Enterprise project structure to creation of reports related to project. A case study was conducted at Vajram Elina which is estimated to be completed on September 2017. The project was tracked at 3 stages of duration as to check the performance of the project. At the third stage of track it was found to be 0.98 for schedule performance index and 0.88 for cost performance index. These values indicated that the project was running behind the schedule and also actual cost incurred were more than estimated cost .They also calculated the cost required for remaining successive activities which was found to be 1.28 crores. Finally they concluded that the project has to be performed at the speed rate of 1.02% as to cope up with planned scheduled time.

Sandhaya (2015) et.al [2] has conducted analysis based upon the performance of a real time project for a hospital building at Kerala using Microsoft Project so as to monitor and control the budget .The main objective of the project was to detect and suggest remedial measures at high probable risky areas so that the project would run smoothly with minimum hurdles during progress. Initially cost and scheduled data's of the ongoing project were collected further progress of work was monitored by tracking various activities .Later the earned value analysis was performed at various intervals after the adding actual cost incurred for finished work. It was found

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Enhanced RSA Algorithm using Fake Modulus and Fake Public Key Exponent

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***Abstract*— In cryptography Public key cryptography plays an important role in the field of data communication. Public key uses two different keys where keys are associated in such a way that, the public key can use to encrypt the data and private key is used to decrypt. RSA is considered as one of the efficient algorithm in public key cryptography. Efficiency of RSA Algorithm mainly depends on how effectively public key components is shared i.e. modulus *n* and public key exponent *e*. If these components compromised using mathematical attack, obtaining private key becomes easier job for the intruder. In this paper an enhanced RSA algorithm is proposed to increase the factoring complexity of the public keys, we use fake public key exponent *f* instead of *e* and modulus *X* instead of '*n*'. Results of our scheme overcome the limitations of Integer factorization attack. Paper also gives comparative analysis of the proposed work using standard metrics.**

Keywords*— Public key cryptography, Fermat factorization, Euler's function, wieners attack

I. INTRODUCTION

In Communication era protection of data plays an important role in our day today life. So, securing information from eavesdroppers is major task. A cipher is a method of hiding information by replacing original letters with other letters, numbers and symbols through some kind of mathematical tricks. A cryptography uses pair of techniques called encryption and decryption. A Function which is used to convert the plain text to cipher text using a key is called Encryption. Obtaining Plaintext back from cipher text by applying another mathematical function is called Decryption[1].

There are different approaches are used in cryptography depends on the keys what they are adopting in encryption and decryption.

A. Symmetric Key Cryptography

If encryption side(Sender) and decryption side(Receiver) makes use of the same function or keys for encrypting the data and decryption of the data, it is referred as Symmetric Key Cryptography.

Limitations: Security of this algorithm mainly depends on key generation algorithm and the space used to represent the key used. If user uses weak key (size of the key is small) then it leads to less amount of time to obtain the key.

Proposed work focus on public key cryptography by presenting improvement of the limitations of attacks on private keys of RSA.

B. Asymmetric Key Cryptography

Asymmetric key also referred as public key encryption. In this algorithm pair of related keys are used which can be received from a certified authority, key used for encryption function called Public key and another key used for decryption called private key. Any user wants to send any information initially he must use recipient's public key information from public directory encrypt the message. It is hard to decrypt the encrypted message by anyone who knows the public key, only the legitimate user having the secret key can decrypt original information.

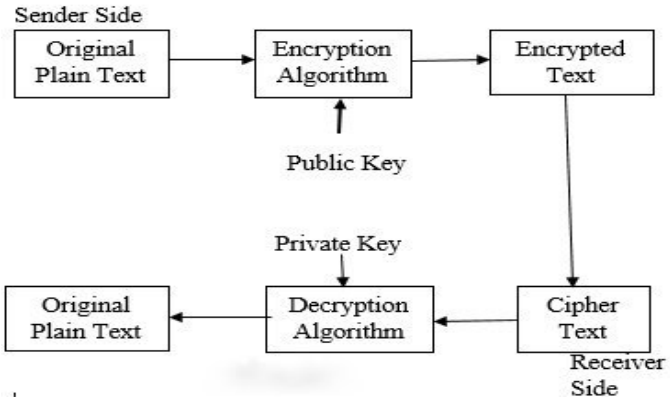

Fig. 1. Asymmetric Key Cryptography Process [16]

An asymmetric-key cryptography technique provides cryptography services like confidentiality, integrity, and authentication of message. Figure 1 explains asymmetric key cryptography

Public key algorithms are developed based on some number theoretic concept which involves arithmetic operations. Longer the keys and operands more secure the algorithms is. RSA is considered as more secured, efficient

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SURVEY ON VARIOUS RSA ATTACKS

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***Abstract*---Public key cryptography is one of the most significant techniques in securing multimedia data. Along with its benefits this technique brings with it, its own share of vulnerabilities. This paper aims at giving an outlook on the attacks that can have disastrous effects on the most used public key cryptography technique, RSA. The primary focus of the paper lies in differentiating between the types of attacks, their effects and their counter measures to provide insight in order to develop a variant.**

***Keywords*—Cryptography, public and private key exponents, RSA attacks, counter measures.**

I. INTRODUCTION

The most vital aspect of computer networks is the concept of data communication. This brings with it, the issues dealing with protection of data. Data must be protected from attacks at all costs. A system that assists in data communication is called a "Cryptosystem". Cryptosystems deal with the complexities of data encryption and data decryption. While encryption works on plain text to produce cipher text, decryption works on the produced cipher text to get back the original data. This is done based on keys – public keys, private keys.

If both keys used, are the same, then it is termed as "Symmetric Cryptography". Such systems are relatively easy to break into. To overcome this, Public key cryptography has been implemented; this makes use of related key pairs. One for encryption, called "Public key" and another for decryption called "Private Key". The former is disclosed while the latter is kept hidden. This ensures secure communication as only the receiver who knows the secret Private Key can decrypt the cipher text and obtain original data.

This paper throws light on RSA and its functionality and continues to specify the different attacks that it is liable to, thus forming a foundation for a future to develop a new variant that can overcome the limitations of RSA but is just as secure.

II. RSA CRYPTOSYSTEM AND ITS PROPERTIES

This system is named after its 3 inventors – Ron Rivest, Adi Shamir and Len Adleman. Developed as the first public key cryptosystem, it is relevant even today and most public key cryptosystems are variations of the same. It has properties that deal with using easy large numbers that are prime and the complexity of factorization their product as well as computation of modular powers and inverting their exponentiation. The whole working of RSA can be summarized as follows.

1. Two prime numbers p and q, relative large are selected such that they are not equal.
2. $n = pq$ is computed and $Z(n) = lcm\ (p-1, q-1)$ is found.
3. Integer d which is relatively prime to $Z(n)$ is picked such that $d \neq Z(n)$.
4. e is computed as the multiplicative inverse of d mod $Z(n)$, keeping in mind that $ed \equiv 1 \bmod Z(n)$. Usually, Euclidean algorithm is extended to carry out this procedure.
5. Public key = (e, n) is published.
6. Private key= (d, n) is kept secret.

III. RSA ATTACKS

Attacks on the RSA Cryptosystem are divided into two classes: While the former class that primarily aim at manipulating the core mathematical function, the latter deals with attacks that target the faults in RSA implementation.

A. Mathematical attacks

Mathematical attacks on the RSA cryptosystem focuses on attacking the underlying form of the mathematical function. The elementary step is to compute the value of N using factorizing method; using which the message can be easily obtained which in turn reveals the private key d. Ultimately, the original message can be decrypted using d.

a. Low public exponent Attack[1]:

Using a small public key exponent (e) helps in reducing the signature-verification time. The most common choice for e is 3. But when the value 2^16+1 is used, the encryption requires only 17 multiplications, while when a random e $O(N)$ is used, approximately 1000 multiplications are required.

Assume each employee has the following information:

a) value of n

b) e - personal public encryption key of the employee

c) d - employee's personal private decryption key

It is usually observed that the encryption key is small after the RSA implementations. For instance: In PGP (Pretty Good Privacy), e obtained through a system software is of sizeable majority i.e., 17 and in SSH (Secure Shell) e obtained through a system software is of sizeable majority i.e., 37. Assume that in this case also the public key e is small. Using the value of private key d, value of public key e, the attacker can factorize n using $e*d \equiv 1 \bmod \phi(n)$. Now $\phi(n)$ value is known for a random number $i < min\{e,d\}$ such that $e*d - 1 = i*\phi(n)$. Hence, the value of $\phi(n)$ is not known to the employees. Therefore, integer $i < min\{e,d\}$ exists such that $\phi(n) = (e*d - 1)/i$. This

Development of Cost Effective Digital ECG Data Acquisition System for Biomedical Device

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***Abstract*—Today, the standard of health of the patients is improved by the health information technology. Increase in telemedicine solutions design and development provides the patients various medical services. The advancements in technology in the field of wireless communication and integrated circuits led to the construction and production of the small sized, low cost and less power consumption smart data acquisition devices. An electrocardiogram (ECG) is the surface measurement of the electrical voltage produced by electrical activity in cardiac tissue over a period of time. The aim of the study is to design and construct a portable, wearable, small and cost effective digital ECG Data Acquisition System (DAQ). The system transmits the ECG data wirelessly from the device to the smartphone. The acquired data is plotted using MATLAB.**

***Keywords*—Data Acquisition, ECG, ESP8266, Bluetooth Module, ADS129X**

I. INTRODUCTION

Food, clothing and shelter are the basic needs of human beings wherein healthcare can also be added as a basic need in these days. The improvement in the technology has made new innovations in the field of various health care devices. The innovation of such handy portable devices which make use of technologies like wireless communications has made people to use them anywhere and monitor their health continuously.

ECG signals plays a major role in identification especially for detection of diseases and disorders concerned to heart. ECG refers to measuring the bioelectrical signals generated by cardiac cells involved in heart activity. The ECG is identified by electrodes attached to the body. ECG signals are recorded by a device external to the body. The contraction and relaxation mechanisms of the heartproduce an electrical potential difference on various point of the heart. The electrical signals produced will propagate to all neighbouring soft tissues and lets the physician to measure the differences between these potentials using particularhardware. The rhythmicity of the heart can be evaluated precisely using the ECG and the morphology of ECG waveform providesessential information about the functioning of the cardiac muscle. ECG signal acts a significant part in the early diagnosis, prognosis and survival analysis of heart diseases (Bin Yu, LishengXu&Yongxu Li, 2012). An ECG of a heartbeat is shown in "Fig. 1".

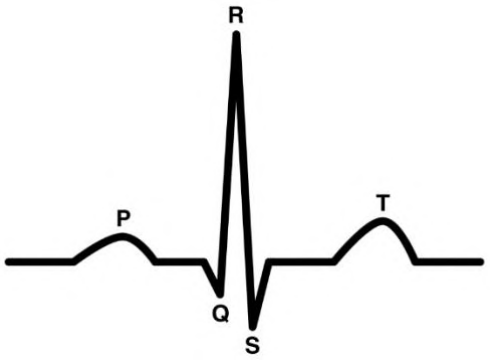

Fig 1: The ECG waveform

P wave is the outcome of contraction of heart muscles which will represent the atrial depolarization. Q wave is the representation of any downward deflection after P wave. R wave indicates the big upward deflection also called as R peak which comes after the P wave. The downward wave after R wave is the S wave. T wave denotes ventricular repolarization. The QRS complex symbolizes ventricular depolarization. The ECG signal that is acquired from the human body has a very low potential and it is tough to evaluatethe signal. The amplitude of the ECG signal is comparatively low of about 10uV~5mV with a frequency spectrum comprising of frequency components ranging between 0.05Hz to 100Hz of frequency. The amplification of the acquired ECG signals is necessary to get any information about the abnormalities of heart.

The aim of the project is to acquire data from the patient wirelessly through Bluetooth using a smart phone and plot it in MATLAB to get the ECG waveform. The system involves Analog Front End (AFE) chip from TI (ADS129x) which is specially designed to obtain biomedical samples upto8 electrodes to obtain the raw ECG data with 24 bit Analog to Digital Converters (ADC) with variable gain amplifier and an

Flood and Heat Wave Prediction using Weighted Moving Average, Anomaly Detection and K-Nearest Neighbours for the City Of Mangalore

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Abstract—Natural calamity is a naturally occurring event in nature that usually is out of the control of human beings. Little to nothing can be done to avoid it. Natural disasters cause damage to living beings and other structures and property. Floods and heat waves are relatively common natural calamities that affect lives. Flood is an abnormal overflow of water and heat wave is an abnormal increase in temperature.

Flood and heat wave are natural calamities that claim many lives every year in India. This paper describes a method to forecast the occurrence of flood and heat wave using weather data for the city of Mangalore. In this method, a combination of weighted moving average and K-Nearest Neighbours is used on the weather data to predict floods and anomaly detection is used to detect heat wave. The prediction of flood is based on temperature, humidity and pressure parameters obtained from weather stations. The combination of K-Nearest Neighbours and weighted moving algorithms is used to forecast rain and then infer the prediction of flood. Heat wave is detected by finding anomalous temperature behaviour in the weather readings considering the temperature readings for an extended period of time.

Keywords—flood prediction; heat wave prediction; Mangalore; prediction technique; weather

I. INTRODUCTION

Flooding is a serious issue in developing cities. Due to the rapid growth in urbanization, excess water from heavy rains fail to seep into the earth soon enough. Increase in the usage of concrete results in greater difficulty for excess water to find soft or porous material to pass through into the ground. The urbanization begs for improved water seeping facilities and appropriate planning needs to be done to facilitate timely drainage of rain water. It is due to these issues that there is a need to study the trends of rainfall and floods in order to take precautions prior to devastation. According to a United Nations report, between 1995 and 2015, flood disasters have affected 2.3 billion people worldwide [1].

Mangalore being a developing city is seeing rapid growth with numerous concrete structures being erected at a fast pace. It is part of Dakshina Kannada district with receives an annual average rainfall of above 2500mm [2]. This study was conducted to analyse the weather over this city and to devise a method to detect prolonged rainfall and floods. The study of rainfall and floods for the country will help in determing the appropriate proceedings in the natural calamity response systems of the country and also for increased preparedness to face such situations.

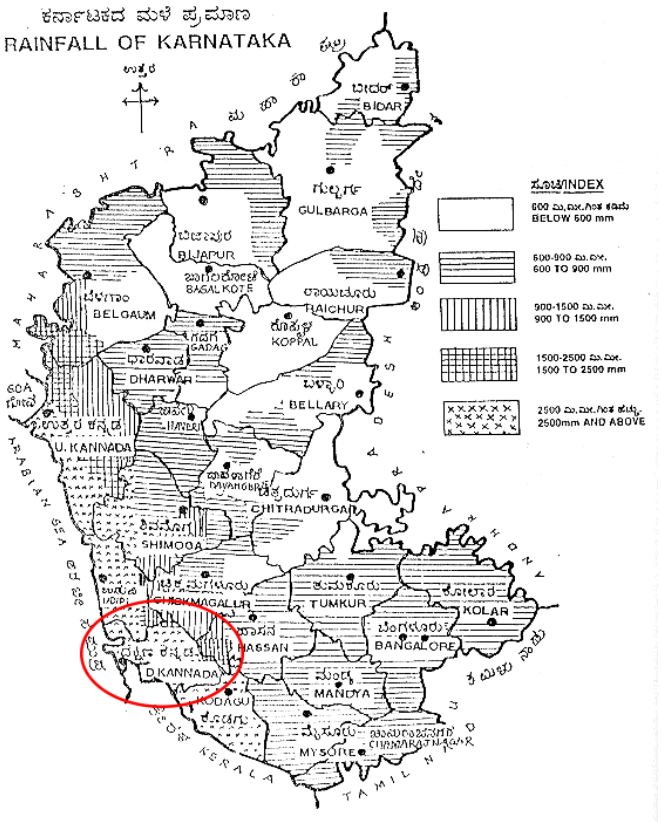

Fig. 1 Rainfall Map of Karnataka State [3].

Face Recognition based on Local Linear Regression and Particle Swam Optimization: An Evaluation

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Abstract ***The advancement of face recognition systems is still restricted by the conditions achieved by several real applications even though current face recognition systems have attained a moderate level of maturity. In this paper we compare our previous two approaches i. Face normalization and recognition using local linear regression and neural network ii. Recognition system based on particle swarm optimization with the Support Vector Machine. The results of both the approaches are compared with the Active Appearance Model based and the standard support Vector Machine based face recognition algorithms.***

Keywords—Principal component analysis, Fisher's linear discriminant analysis, Face Recognition, Particle Swam Optimization, Support Vector Machine, Active Appearance Model, Adaptive Mean Filter, Local Linear regression,Particle Swam Optimization.

I. Introduction

Human identification using Face biometric can be a method of confirming one or more individuals particularly from still or video images using a stored database [1] [2] [3]. It finds a number of applications in surveillance, human-computer interactions, authentication and security [4]. It is broadly classified into two categories, feature-based methods and appearance-based methods [5]. The Human facial parts are considered as very significant geometrical constraints and are acceptably used in feature-based methods. For example, elastic bunch graph matching is a well-known face recognition method comes under feature based method [6] while active appearance model [7], based on appearance-based method. In appearance based methods the intensity or intensity-derived parameters are utilized for recognition [1] [8].

The primary two stages of a face recognition technique are face detection and face identification [4]. Initially in the face detection phase, the presence of face image(s) in a given input image/video is located. Then it is used to recognize the person from the database of the registered individuals, shows the reasonable significance of having both face detection and face recognition methods[9]. The important characteristics in face recognition are the variations in illumination, pose, identity [10], facial expression, aging, hair style, make-up, scale etc. The variation in pose and illumination are real challenging problems because the same person may appear extremely different in two different images with these abnormalities [11].

As a solution, to overcome the problem and to manage pose variations in face recognition view-based method is principally used. In this method, the images are captured from diverse view angles to recognize the face images of the persons [12] [13]. Using the images of the same view an Eigen space model is constructed for each view. By using the view-specific Eigen model, a person in a different pose can be recognized effectively [14].

Video based algorithms that consistently use both spatial and temporal information for face recognition has began recently but still requires more maturity to improve still-image-based recognition [15]. A typical face recognition system identifies the face regions automatically from video frame/ still image and extracts the distinguishing facial identities, which is often a difficult task [16].

The organization of paper is as follows: Section I provides the brief introduction of the proposed system. Section II gives the state-of-the art work done in the field of human face recognition from the video. Section III describes the integrated approach using DCT and LLR for recognizing the face. Section IV provides the algorithm to recognize the face using support vector machine and particle swam optimization. In Section V the result of performance evaluation is presented. Section VI discusses the conclusions and issues related to the proposed system.

II. Literature Survey

A few research works that are related video face recognition system are reviewed in the following section.

S.Venkatesan and S.Srinivasa Rao Madane [17] have proposed a method for face detection then recognition using Genetic and Ant colony Optimization algorithms. This

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Controller Design and Implementation for a Pilot Plant Binary Distillation Column

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***Abstract*—The binary distillation column is a highly nonlinear and higher order system, where the control of temperatures plays a very vital role in maintaining the purity of the end products. The article deals with the Proportional Integral Derivative (PID) controller design in both centralized and decentralized control strategy. The decentralized controller is designed with an additional controller called as the decoupler. The centralized controller that is designed is with decoupling process with an additional integral for better control with limited control interactions. The closed loop servo response is recorded. Also, both the control algorithm are validated by implementing it on a pilot plant binary distillation column.**

Keywords—Centralized, Decentralized, Distillation column, Decoupler.

I. INTRODUCTION

Several control techniques have been reported in the academic literature for effective control of the Multi-Input Multi-Output (MIMO) system. Among these, the interactive MIMO system mostly handled by either centralized or decentralized control algorithm [1-2]. In the centralized control technique, every input has a significant effect on all controller outputs. However, in case of a decentralized controller, it will have diagonal or off-diagonal control structure. This structure is based on Input/ output pairing to identify which output should be controlled by which input to achieve the reduced interaction effect.

A decentralized plus decoupler gives the effective control over a process. The decoupler eliminates the interaction effect in several control loops [1]. In this article, a Two Input Two Output (TITO) system is considered for the design and implementation of the controller. The decentralized controller will have two controllers which take the control over the process variables. The decouplers are the additional controllers which generally reduces the process interactions, which leads to the reduction in interaction effects of control loops. The decouplers are the diagonal controllers which will have the effect on the specified control variables for the desired setpoint changes [2, 3]. The decouplers can formulated using the process models (process transfer functions). The centralized structure is having a separate controller to look after the control of required control variable. As the number of controllers are more the number of control loops are also more. As each process block will have a separate controller the control through centralized will be more sophisticated [4].

The article is organized as follows: Section II describes the binary distillation column setup considered for the design and implementation of the control algorithm. The decentralized control strategy based on decoupler is presented in section III. Also, the centralized control technique is discussed in section IV. Finally, both the simulation and real-time results are given in section V, followed by section VI conclusion.

II. DISTILLATION COLUMN

The "Distillation" is the process of separating the substances from a given liquid mixture through continuous evaporation and condensation [3, 5]. The liquid mixture of 30% Isopropyl Alcohol (IPA) and 70% water is taken as feed to the distillation column.

Fig. 1 Binary distillation column setup

Once the feed is given to the column, it is heated to the required temperature. The final top product is IPA, and the boiling point of IPA is 82.60 ^{o}C. The distillation column used in Fig. 1 is having 5 trays. Tray 1 is the bottom tray and is controlled by controlling the heater current of the column; Tray 5 is the top tray which is controlled by the amount of reflux that is dispensed back into the column. The objective is to control the temperatures of Tray 5 (T_5) and Tray 1 (T_1), to control the temperatures of the two trays. The Manipulated

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Identifying the Stabilizing Regions of PI Controller based on Frequency Specifications for a Lab Scale Distillation Column

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***Abstract*—In this article the authors have made an attempt to design and validate the PI controller based on the frequency based specifications on a lab scale distillation column. In general, the literature reveals the controller design based a specific formula, which leads to a static controller. In lab/Industrial scale most of the processes are dynamic in nature, hence the static controller concepts fail to prove its effectiveness in the presence of dynamic behaviors of the plant. In this article, wide range of stable K_p and K_i values are plotted with fixed $K_d$for specific gain and phase margin. The design engineers are permitted to select any K_p and K_i values based on the closed loop specifications required. The presented algorithm is simulated for the closed loop response of the lab scale binary distillation column model identified by Vinaya and Arasu [6,7,8]. The closed loop simulation with 30% uncertainty in all process parameters are also analyzed presented in this article. The Performance measure calculations for servo and regulatory responses are also reported. The experimental validation of the given control algorithm on a lab scale pilot plant distillation column is also found satisfactory to prove the control algorithm effectiveness.**

***Index Terms*—Boundary Locus, Decentralized Controller, Gain Margin, Phase Margin,MIMO process.**

I. Introduction

In industry most of the processes are multiinput and multi-output (MIMO) systems. Control of MIMO system is quite complex compared to SISO systems because of the interactions in control loops. The controller for MIMO systems can be either centralized or decentralized structure. The decentralized PI controller with decoupler is a better method, where a decoupler is designed to deal with the interactions and then a set of (Kp and Ki) values are designed using stability boundary locus. The main reasons for this popularity are that PI controllers are often effective and are easy to implement. Decentralized PI control is one of the most common control schemes for interacting multiple-input multiple-output MIMO plants in the chemical and process industries. Gain and phase margins have served as important measures of robustness and also serve as a performance measure. For multi-input multi-output (MIMO) systems, the notation of gain and phase margin can be generalized using singular values of the loop transfer function matrix. In the current research, an ideal decoupler plus decentralized PI controller based on the frequency specificationis simulated and implementedon a pilot plant binary distillation column.

Distillation columns are very widely used in the chemical and petroleum industries to separate chemical components into more or less pure product streams. This separation is based on differences in volatilities among various chemical components. In a distillation column, the more volatile, or lighter, components are removed from the top of the column, and the less volatile, or heavier, components are removed from the lower part of the column. In the present research, a mixture of Isopropyl alcohol and water in the ratio of 30% and 70% are considered for the distillation. The reflux flow rate (L) is measured as LPH and reboiler power rate (Q) is measured in KW are the manipulated variable (MV), whereas the temperature of tray 5 (T5) and tray 1 (T1) in Deg. Cel. is the controlled variable (PV).Thearticle presents the simulation of control algorithm with and without load disturbance using MATLAB/Simulink software. Further the control algorithm is validated on the experimental setup at PC based Instrumentation Lab, Dept. of ICE, MIT, Manipal. All the four performance indices such as Integral Square Error (ISE), Integral Absolute Error (IAE), Integral Time Absolute Error (ITAE) and Integral Square Time Error (ISTE) are analyzed for both servo and regulatory response.

Section II gives a brief summary on decoupler design method; Section III describes the design of stabilizing PI controller using boundary locus method. The simulation and implementation results of PI controller based on stability boundary locus are presented. The closed loop performance has been analysed and compared for various PI controller

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Experimental Studies on Effect of Nano particle blended Biodiesel Combustion on Performance and Emission of CI Engine

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Abstract. This article is concerned with the study of effect of addition of Carbon Nano Tube (CNT) on the physiochemical properties of Biodiesel and to investigate its effect on the performance and emission of a single cylinder direct injection CI engine. The fuel selected for the present study were Diesel, Biodiesel blends (B20), and CNT blended –biodiesel. The Biodiesel used is Honge Oil Methyl Ester (HOME). Biodiesel Blends were prepared by adding 80% Diesel and 20% Biodiesel by volume with the help of mechanical homogenizer. CNT blended Biodiesel contains 50 ppm of CNT in one liter of biodiesel blends. The experimental studies were carried out in a single cylinder 4 stroke direct injection CI engine connected to an eddy current dynamometer with computerized test rig facility to measure the performance and emission. The experimentations were carried at a constant speed of 1500 rpm and varying the load on the engine. The results shows that increase in the Brake thermal efficiency with the inclusion of CNT to Biodiesel. The brake thermal efficiency of CNT added Biodiesel fuels were 2.24% better as compared to that of Biodiesel without the addition of nano particle at full load calculation. Also the reformulated fuel (Inclusion of CNT's in the Biodiesel blends) shows considerable reduction in the pollutant emission.

Keywords: Carbon Nano Tube, Honge oil Methyl Ester.

1 Introduction

The growing demand for the primary source such as petroleum is increasing day by day due to the population growth and effective utilization of energy particularly in automobile segment. A lot of research is going in the field of alternate fuels to fulfil the growing demands. The main reason in searching of renewable alternate sources of fuel is the fear of depletion of petroleum fuels and stringent emission rules. Biodiesel is one of the promising alternate fuel in the CI engine as it can successfully replaces the Diesel .The advantage of Biodiesel is it minimizes the dependency on the foreign oil also with the biodiesel it contains more amount of oxygen resulting in better fuel combustion. Now a day's more and more focus is giving to take care of emission rather than performance. Different methods have

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Impact of Bio-diesel fuel on Durability of CI Engines – A Review

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Abstract. Bio-diesel is a sustainable, renewable and alternate fuel for CI Engines. The use of bio-diesel produces various durability issues on key components of CI engines. For durability studies, the aspects considered are injector coking, carbon deposition on piston, lubricity of engine oil, wear and tear of piston and cylinder walls and corrosion of engine parts they come in contact with fuel. In this work, reports about the durability aspects, published by highly rated journals in scientific indexes, have been cited. From these reports, the effect of bio-diesel on engine durability are surveyed and analysed. The use of bio-diesel leads to injector coking, increased carbon deposition on piston, decreased viscosity of the lubricating oil and fuel dilution, increased engine wear and increased corrosion.

1. Introduction

The depletion of fossil fuel has made to look for alternative fuels. Among alternative fuels, biodiesel is more convenient to use for IC engines as it does not require any major engine modification. Its contribution towards global warming is lesser than that of diesel. The emission of unburned hydrocarbon (HC) and carbon monoxide are less in case of biodiesel because of complete combustion. But NOx emissions are more because of higher combustion temperature. The power produced is less due to the loss of heating value of biodiesel as compared to diesel.

Durability is the ability of an entity to perform until limiting value is reached under conditions of use and maintenance. The various aspects considered in studying the durability of engine are injector coking, carbon deposits on piston and cylinder head, wear and tear of engine components, corrosion of engine parts that come in contact with biodiesel.

Biodiesel causes injector coking as it deposits more carbon on injector tip and injector nozzle. The deterioration of lubricating oil of biodiesel fuelled engine is more compared to diesel fuelled engine. The wear of engine components is more in biodiesel fuelled engine. The amount of carbon deposition on piston and cylinder head is also more in biodiesel fuelled engine. Very less research has been done on durability of engine as it is more time consuming. This paper reviews the works already made in the above aspects for biodiesel fuelled engines.

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Assessment on performance and emission parameter of diesel engine using waste plastic oil used as a fuel

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Abstract: The two important parameters to be considered in the diesel engine are performance characteristics of the engine and emission characteristics. At the present energy scenario of fossil fuels can be depleted any time and in order preserve these fuels for the longer time alternate fuels such as biodiesel, plastic oils have gain prominent importance. In this paper, studies focused on study of diesel engine using waste plastic fuel. The use of alternate fuel produces HC, CO and oxides of nitrogen as products of emission. The parameters such as brake thermal efficiency; heat release rate of engine can be improved by plastic oil as energy source. Another important point is the fuel is extracted using plastic which is not degradable and not environmental friendly.

1. Introduction

One of real source of natural contamination is diesel engines. The strict emission standards are imposed to decrease the level of air pollution. In order to do so the performance of engines need to be improved. A critical investigation has been carried out to improve the fuel economy.

The various studies have been carried out by researchers to find out potential alternate source to the fossil fuels. In view of this waste plastic oil has gained important fuel which can be used and also as we are aware of the problem of waste plastic disposal. The plastic oil is used in the pure form and can also be blended with diesel. The researchers have discovered that the properties of plastic oil are nearer to diesel expect the viscosity. Most of the plastic material used for packing materials are not recycled and create environment problem. The amount of consumption of plastic had increased due to economic development and urbanization. The great consumption would leads to environmental problems.

Diesel engines are most favoured power plants in vehicle because of their outstanding drive capacity and higher efficiency. The 100% waste plastic oil can be utilized as fuel for diesel engines. It is found out that engine could work with 100% waste plastic oil and can be utilized as a fuel in diesel engine. It additionally shows higher thermal efficiency. It is additionally figured out that oxides of nitrogen,

Effect of combustion geometry on combustion, performance and emission characteristics of CI engine using simarouba oil methyl ester

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Abstract. Present study investigates the effect hemispherical (HCC), cylindrical (CCC), toroidal (TCC) and toroidal re-entrant (TrCC) type combustion chamber (CC) geometry on the characteristics of combustion, performance and exhaust emissions from the engine using simarouba oil methyl ester (SuOME) and to compare with base engine operated with diesel fuel. Simarouba oil biodiesel is prepared by 2 stage transesterification using methanol and KoH. 4-stroke naturally aspirated single-cylinder water-cooled direct-injection diesel engine with different optimized injection parameters ofinjection pressure to 240 bar, injection timing to 27^0bTDC, 6 hole injector of 0.2 mm diameter, and loading condition at rated speed of 1500 rpm were used for testing. Ignition delay (ID), combustion duration (CD), peak pressure (PP), brake thermal efficiency (BTE), exhaust gas temperature (EGT) and exhaust emissions (HC, CO, smoke opacity and NO_x) were measured to estimate the behaviour of the diesel engine running on SuOME with different combustion geometry. Results were indicated that, use of SuOME reduces the engine performance with increased emissions compared to fossil diesel conventional fuel. However use of toroidal re-entrant CC gave the better combustion and performance with reduced emission except NO_x comparing with other combustion chamber design.

1. Introduction

In order to warrant the successful combustion and reduced emission from CI engines, a thorough study and optimization of injection parameters like nozzle structure and spray characteristics is crucial since it has control on the fuel atomization, mixing process, evaporation, combustion mechanism and the rate of heat release[1-6]. To meet the stringent forth coming emission guidelines, along with study of injection characteristics, clean combustion concept together with best alternative for commercially available diesel fuel will play an increasingly significant role [7]. Various studies shown that the deviation in performance and emissions rates based on the injection parameters, combustion chamber shapes and types biodiesel used. Suryawanshi *et al*. [8] reported that by retarding the injection timing

Effect of Cooling Water on the Performance of Lithium Bromide–Water (LiBr–H_2O) Absorption Based Heat Pump

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Abstract: The need for extracting high heat from the industries has encouraged the development of Lithium Bromide-Water (LiBr-H_2O) absorption based heat pump. This paper presents a simulation study of single-stage LiBr–H_2O vapor absorption heat pump. The detailed thermodynamic analysis of the single-stage LiBr–H_2O vapor absorption heat pump was carried out in this study. The validation of this model is performed by considering the values from the literature.The effect of cooling water on flow rates, COP (Coefficient of performance) and conductance are examined.

1. Introduction

Absorption heat pumps systems have been used to produce cold since 1850. They are gaining more attraction because of eco-friendly. There are operated by using low-grade energies like geological, solar and waste heat liberated from process industries. The device uses working fluids which have no effect on ozone. The LiBr -H_2O is announcing the best working fluid pair because its properties such has a high enthalpy of vaporization, not toxic and does not require a rectification step.

Numbers of researchers like Ghaddar et al., (1997) have studied LiBr-H_2O absorption system for space cooling. The simulation was developed and performance of the system was carried for all possible climatic condition at Beirut. Yoon et al., (2003) have conducted an experimental investigation on double-effect LiBr–H_2O absorption cycle. The performance of absorption chiller system was carried by using exhaust gases to preheat the weak absorbent solution coming from the absorber to the low-temperature generator. Park et al., (2004) have studied the performance of absorption refrigeration. The study showed that performance of the absorption system greatly depends upon the inlet temperature and flow rate of the water.

Asdrubali et al., (2005) have studied the performances of single stage LiBr–H_2O absorption machine by developing mathematical model. Vega et al., (2006) have performed experimental study on the performance of absorption chiller. The result showed cooling capacity and energy supplied to the absorption chiller had uncertainty margin was around 18-20%. Castro et al., (2007) have developed prototype of an air-cooled absorption chiller of cooling capacity of 2kW

Injection timing effect on the performance of diesel engine fueled with acid oil methyl ester

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Abstract: Acid oil which is extracted from vegetable oil refinery operation where acid oil is cheap and readily available in enormous quantities. Acid oil consists of less amount of mineral acids (2-3%) along with long chain free fatty acid mixture, phospholipids and free moisture (4-9%) thus makes the acid oil to dark brown in colour. In this paper, the main concentration is on emission, performance and combustion characteristics using diesel and acid oil methyl ester as fuel for single cylinder diesel engine. To estimate brake thermal efficiency, HC and CO emission and combustion duration, test was conducted at different injection timings of 19^0,23^0,27^0 and 31^0 BTDC, keeping constant injection pressure at 205 bar and rated speed of 1500 rev/min. For each and every load, fuel flow rate, air flow rate, exhaust gas temperature, CO_2, CO, HC, NO_X and smoke emissions were recorded. Based on the readings with the specified condition, optimum injection timing was recorded for each of the fuel tested.

Key Word: Acid oil methyl ester (ACOME); Injection strategies; Performance; Emission characteristics.

1. Introduction

Various methods of using biodiesel in CI engine could be seen in literature [1-6]. The variation in brake thermal efficiency of compression ignition engine was reported by varying the injection timing. The relationship between the process parameters and the varied input characteristics was provided by the developed mathematical model.

When engine was fueled with biofuel, combustion parameters and emissions were recorded. It was reported that fuel burning starts early and showed shorter ID [2]. The properties of Acid oil methyl ester were well within the recommended biodiesel standard ASTM D6751 and it can be an alternate source for biodiesel production. Raw materials for the production of biodiesel were more than 360 oil bearing crops around the globe [4]. Degummed jatropha of 20% with diesel yielded better results at high loads when IT was at 45˚ BTDC. Shorter ID and high cylinder pressure were recorded with JOME and its emulsions with WPO. Smoke opacity decrease was also reported when emulsions with WPO was increased by comparing it with diesel at full load [5]. A review work on the research in last decade was highlighted in the literature to get clean and efficient combustion in CI engines [6]. It was concluded that the biodiesel types have no impact on peak cylinder pressure and BSFC.

Effect of solutioninzing and Ageing on Hardness of Aluminum LM13-MgO particulate metal matrix composite

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Abstract. Ceramic reinforced aluminum matrix composite materials are increasing wide acknowledgment in the designing application. Incorporation of MgO as reinforcement in aluminum LM13 Composite enhances its hardness. In the present examination aluminum LM13/MgO composites were produced by vortex strategy by shifting the weight level of MgO particulates from 0wt% to 10wt% in the means of 2wt%. The As-cast and its composites have been subjected to solutioninzing treatment at a temperature of 530° C for 2 hours, trailed by extinguishing in various media, for example, air, water and ice. The extinguished hardness examples were subjected to artificial aging at 164° C. Microstructural behavior were completed to comprehend nature of structure. The hardness test was led on both aluminum LM13 and aluminum LM13/MgO particulate composite, when warm treatment. Aluminum LM13/MgO particulate composites displayed critical change in hardness when contrasted and aluminum LM13.
Key Words: LM13, MgO, solutioninzing, Artificial Ageing, Hardness

1. Introduction

MMC's are increasing wide prominence in a few segments because of its enhanced mechanical properties. When contrasted with metals, especially when weight is considered as major factor. Aluminum composites are used in different applications few of them are Pistons, brake plate and cylinder and so on [1]. Aluminum composite increases the particulate reinforcement increases the strength by following traditional methods [2, 3]. SiC is most normal molecule utilized in aluminum alloy composites [4, 5] for light weight applications by addition of clay particles in the matrix the strength of the composite increases [6] Al6061 combination is warm treatable and subsequently additionally increment in quality can be normal [7], heat treatment process improves the strength and fit to design the material for industries [8]. Aluminum LM13 compound have various advantages like formability weldability, consumption protection and ease. For generation of Aluminum particulate strengthened composite blend throwing technique gives off an impression of being promising strategy among different regular handling strategies. Warmth Treatment procedure to alter the microstructure of aluminum compound composites with aluminum is the last generation phases of composite [9]. A large portion of the scientists have explored aluminum composites utilizing SiC, Al2O3, MgO, Zircon and so forth., and these composites are industrially accessible in various basic structures [10]. In the present work the maturing conduct of LM13/MgO composites containing MgO particulates is contrasted and warm treated LM13 combination were contemplated.

Mode I Fracture Characterization of Banana Fibre Reinforced Polymer Composite

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Abstract: In this paper, fracture behavior and Mechanical properties of short banana fiber reinforced polymer composites is investigated. Fibers are extracted from banana plant,Further compositelaminates were prepared with randomly distributed fiberswith different weight fraction of banana ranging from 30%, 35% and 40%. Composites are prepared using hand layup technique.Tests were performed to determine fracture toughness(Mode I) and mechanical properties of these laminates.The tests were performed to examine the effect of weight fraction of fiber on the fracture toughness of the composite.As epoxy is a brittle material, stress intensity factor is utilized to evaluate the fracture toughness of the composites.From the experimental results were carried out on different weight fractions of banana. It is observed that the 40 % of banana fiber shows maximum fracture toughness,Composite plate of 30% shows the maximum tensile strength.

Keywords—Bannana fiber, Polymer Matrix Composites (PMCs*)*

1. INTRODUCTION

In recent decades, natural fibre composites are getting much attention in structural applications. However, due to a flaw-free material is extremely difficult to be produced and cracks may be introduced during service, understanding the crack resistance ability is thus essential. Good toughness and crack stopping capability are particularly important. It has been mentioned that toughness of a brittle thermosetting polymer such as polyester and epoxy can be improved through natural fibre reinforcement [1]. Fracture behavior characterization of polymers and composites are still at infant stage [2].

In principle, composites can be constructed of any combination of two or more materials, whether metallic, organic or inorganic. Advanced composites are a blend of two or more components, one of which is made up of stiff long fibers and the other, for polymeric composites, a resinous binder or matrix that holds the fibers in place. High performance fiber reinforced composite materials are comprised of high strength and modulus fibers, embedded in, or bonded to a matrix, with a distinct interface between them. In a composite, the fiber, as well as the matrix, retain their physical and chemical identities, but still provide a combination of properties that cannot be achieved with either of the constituents alone. In general the fibers play the role of load bearer. The matrix, while keeping the fibers in the desired location and orientation, act as a load transfer agent and protects the fibers from external conditions such as chemicals, heat and moisture [3]. Manmade fibers using glass, carbon,

Study On Mechanical & Cryogenic Properties of Carbon Epoxy Composites

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Abstract. Carbon-fiber-reinforced polymers are composite materials. In this case the composite consists of two parts: a matrix and reinforcement. In CFRP the reinforcement is carbon fiber which provides the strength. The matrix is usually a polymer resin such as epoxy to bind the reinforcements together. The material properties depend on these two elements. The reinforcement will give the CFRP its strength and rigidity measured by stress and elastic modulus respectively. Unlike isotropic materials like steel and aluminium CFRP has directional strength properties. The properties of CFRP depend on the layouts of the carbon fiber and the proportion of the carbon fibers relative to the polymer. This paper deals with the studies done on cryogenic treatment (Liquid Nitrogen) of composites having different fiber and matrix composition. In this work studies are done to find the effects caused by the liquid nitrogen on composites mechanical properties and change in properties due to different fiber and matrix composition in composites. It was observed that due to cryogenic treatment there was changes in the physical properties of the specimens. The specimens had deformed in their shape. The more deformation was seen in 60:40 specimen which was treated for 48 hrs and tensile strength of the composites at cryogenic temperature had higher values than that normal temperature for 70:30 specimen which was treated for 24hrs. The flexure strength of the composites at cryogenic temperature had higher values than the normal temperature for all the specimens. The flexure strength is more for 70:30 specimen which was treated for 48hrs.

1. Introduction

In the current quest for improved performance which may be specified by numerous criteria comprising less weight, more strength and lower cost currently used materials frequently reach the limit of their utility. Thus material researchers, engineers and scientists are always determined to produce either improved traditional materials or completely novel materials [12]. Composites have already proven their worth as weight-saving materials; the current challenge is to make them cost effective. The hard work to produce economically attractive composite components has resulted in several innovative manufacturing techniques currently being used in the composites industry. The composites industry has begun to recognize that the commercial applications of composites promise to offer much larger business opportunities than the aerospace sector due to the sheer size of transportation industry [13]. The biggest

A review: Mechanical Properties of HSS Steel by deep Cryo-Treatment

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Abstract. Cryogenic treatment deals with heating and cooling tool piece in extreme condition so that the complete stress is relieved as to achieve zero entropy at absolute zero temperature. Exploration of the benefit of cryo-treatment for achieving improvement in wear resistance of tool steel is a topic of current research interest. This work discusses the various cryogenic treatments used so far in a manufacturing process. The optimization technique such as Taguchi method is reviewed. The present work explores the effect of cryogenic treatment done on a single point cutting tool (HSS) which helps in machining different tool materials with a better surface finish and increased tool life. Further, we propose the use of regression model and fuzzy logic based approaches for efficient optimization of process parameters. This work will act as a primer for the researchers/Industrialists and students who enter into the world of cryogenic treatment.

1. Introduction

A. Cryogenic treatment

"Cryogenic" word is taken from the two Greek words- cryo means freezing and genic means to produce. Technically, the meaning says the study of materials at very lowtemperature. Deep cryogenic treatment (-190^{0}c) of steel is a deep stress relieving technology [1]. The deep cryo-treatment process makes many changes of the treated materials and it alsoeffects on the bases of chemical composition. Involved in thematerial, it comprises three things; Retained austenite (FCC) turned to martensite(BCT), carbide structure precipitatesandresidualstress is relieved [2]. Cryo-treated materials generally improve the mechanical properties like hardness, dimensional stability, toughness, corrosion resistance and minimize the frictional behavior[3].

Many survey authors indicate that the purification of sec- ondary carbides in metals is very advantageous over a wear resistance by cryogenic treatment. Few of themdiscussed on cutting tools by cryogenicbut no clear idea about HSS tool by cryogenic treatment [4]. Cryogenic treatment transmits nearly 110% development of tool life. Cryo-treated tools consume less power as compared to untreated tools [5]. Under certain conditions,deepcryotreatmentwillnoteffectoncarbidetools, at that time reprocessed carbides

Design of Effective Hydraulic Braking System for Formula Motorsport Car

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Abstract. The design of an effective braking system plays a major role in high performance formula cars since the stopping distance and speed control during cornering are the important part of any race. Everyone wants their car to go fast, but the braking system should be capable to stop immediately and safely. Any car with highly effective braking system fills confidence in the driver. It also increases driving pleasure.

1. Introduction

Braking system is the device which brings the moving vehicle into rest by converting kinetic energy of the vehicle to frictional energy interns heat energy which is dissipated to atmosphere [7]. Brakes helps to slow down or stop the vehicle in the shortest possible time as per the driver requisite and also at the time of driving down the hill and to obtain a better traction control in different terrains [2].

There are various types of braking systems available such as drum brakes and disc brakes based on the components involved [6] and also hydraulic and wire actuated brakes and these brake actuation systems converts drivers force into frictional force at the rubbing surface [4].

Usually drum brakes are used in heavy weight transportation vehicles since the friction area is more which intern helps to control larger momentum easier and this entire system is completely closed, brake operation will not be affected by any other foreign particles like dust, mud and sand [1] when driver applies force *on* the brake pedal due to hydraulic actuation or wire actuation driver's force will be transmitted to the actuating member inside the drum which intern pushes the brake shoes against the internal surface of the drum resulting reduction of velocity of the vehicle [5].

Disc brakes are commonly used in high speed racing cars because of no time operations [8]. In this type when driver applies force on the brake pedal either by the use of hydraulic actuation or wire actuation driver force will be transferred to the calliper which intern rubs the ceramic brake pads against the rotating disc resulting the vehicle deceleration [3]. Disc brakes are simple in construction since number of sub components are less compared to the drum brakes.

Design of efficient powertrain system for a motorsports race car using a bike engine.

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Abstract. The design of the transmission system for a formula styled racecar using a stock bike engine is one of the best choice for all the engineering students who design the motorsport vehicles for all the student race car build competitions. As there are many rules and restrictions on engine usage such as capacity, Maximum power allowed, type of fuel usage permitted and many more. In addition, this report emphasize on the suitable type of transmission system, differential and drivetrain assembly. The present report shows the various considerations, calculations, analysis and various parametric data's of stock KTM 390 Engine and the drivetrain of the car.

1. Introduction

As this report is produced as a post design and analysis report of a student racing car designed for a motorsports competition organized by Fraternity of Mechanical and Automotive Engineers[1], the report shows the various components and their specifications and also the various analysis they gone through.

Whenever a race car is to be built, there are many department and sub departments works relative to each other in order to make the car better by increasing its performance, increasing its stability, increasing its controls, increasing the safety, decreasing the loses[5]. In order to make sure the vehicle is perfect many tests and analysis are conducted in each individual sections [2].

To design the components, sub-assemblies and assembly the design software's NX CAD and SOLID WORKS are used, and to analyses the components against mechanical forces[7] ANSYS software is used, and the vehicle performance analysis[4] software OPTIMUM G is used to analyze the vehicle behavior at different gears[3] , at different road conditions and against different race tracks.

The proper evolution of virtual design [9] to actual model, results in a successful car build with the parameters matching the requisites, the issues that are showed up during the development phase are addressed properly with proper analysis. The assumptions and the natural parameters, which are considered during the analysis, are too precise in order to make sure the analysis results are proper and matches with reality.

A Study on Mechanical Properties of Al-17Si Metal Matrix Composites

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Abstract. Aluminum metal matrix composites (MMC) are finding applications in aerospace, automobile and general engineering industries owing to their favourable microstructure and improved mechanical behaviour. Aluminium alloy Al-17Si and Zirconium Silicate (ZrSiO4) composites were obtained by stir casting technique. Four different weight percentages (3,6,9 & 12) of ZrSiO4 particles were added to the base alloy. The specimens were prepared as per ASTM standards and tested. Hardnessproperties of the composite showed an improvement as compared to the alloy without ZrSiO4 additions. From the experiment result it is found that tensile strength of the composite will increase with addition of ZrSiO4 till 3% and thereafter decreases.The present paper highlights the salient features of casting technique and characterization of aluminum alloy Al-17Si and ZrSiO4 metal matrix composite.

1. Introduction

Metal matrix composites are materials with metals as the base and distinct, typically ceramic phases added as reinforcements to improve the properties. The reinforcements can be in the form of fibers, whiskers and particulates. Properties of the metal matrix composites can be tailored by varying the nature of constituents and their volume fraction. They offer superior combination of properties in such a manner that today no existing monolithic material can reveal and hence are increasingly being used in the aerospace and automobile industries. The principal advantage MMCs enjoy over other materials lies in the improved strength and hardness on a unit weight basis [1].

Al-Si alloys have the potential to be used in the tribological applications such as internal combustion engines, plain bearing, compressor and refrigerator/1/. [2]It was concluded that a slight increase in the ultimate tensile strength is noticed with the increase of silicon content from 3% to 8% and that the elongation % reaches a maximum value at 12% Si from 8% to 15% Silicon. [2]

When compared with the metal matrix alloys, the Micro hardness and Tensile strength will be higher in hybrid composites. And an enhancement in strength is noticed with the increased content of reinforcement followed by heat treatment.[3]

Study on the effect of varying volume fraction on mechanical properties of coconut shell powder reinforced epoxy matrix composites

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Abstract. Coconut shell powder reinforced epoxy matrix composite is made of coconut shell powder, epoxy resin, and hardener. The tensile and compression tests of composites conducted at three different volume fractions of coconut shell particulates. The experimental results reveal that tensile strength of the composites increased with the decrease of the coconut shell particulate content, whereas compressive strength increases with the increase of the coconut shell powder.

Keywords:Coconut shell particulate, Epoxy resin, Hardener, UTM, Tensile strength, Compression strength

1. Introduction

Composite materials are materials made from two or more constituent materials with significantly different physical or chemical properties, that when combined, produce a material with characteristics different from the individual components. For example, concrete consists of crushed stones or limestone, cement, sand, and water. The composition occurs on a microscopic scale; new material is then called an alloy for metals or a polymer for plastics. A composite material is composed of reinforcement (fibres, particles, flakes, and/or fillers) embedded in a matrix (polymers, metals, or ceramics). This reinforcement is very tough and different shapes can be obtained. They are much preferred because they are less expensive, stronger, and lighter [1]. Nowadays, naturally obtained particles reinforced composites have considerable potential to replace conventional materials like metals, plastics, and wood in structural and non-structural applications.

Ramesh M and Nijanthan S investigated the mechanical properties such as tensile, flexural and impact strengths of these composites of kenaf and glass fibres with two different fibre orientations of 0◦ and 90◦. From the experiment, it was observed that the composites with the 0◦ fibre orientation can withstand the maximum tensile strength of 49.27 MPa, flexural strength of 164.35 MPa, and impact strength of 6 J. Whereas, the composites with the 90◦ fibre orientation hold the maximum tensile strength of 69.86 MPa, flexural strength of 162.566 MPa and impact strength of 6.66 J [2].

Study of Mechanical Properties of Coconut Shell Powder and Tamarind Shell Powder Reinforced with Epoxy Composites

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Abstract. Coconut shell is non-food part which is one of the hard agro wastes. Coconut shell is high potential material due to its high strength and modulus properties. Coconut shell powder exhibits admirable properties compared to other materials such as low cost, renewable, high specific strength to weight ratio, low density less abrasion to machine and environmental friendly. Mixing coconut shell powder with epoxy resin enhances its properties and creates a wide range of applications. Tamarind shell is also a non-food part which is an agro waste. After the tamarind fruit is extracted these shells are disposed as waste. As these shells are hard they provide better strength when used in composite materials as an additive. The components are made by mixing coconut shell powder, tamarind shell powder and epoxy resin at definite ratios and is tested for mechanical properties. The present study deals with preparation and experimentally testing the mechanical properties of Coconut Shell Powder and Tamarind shell powder reinforced epoxy resin composites. 3 different percentages of coconut shell powder and epoxy resins are made to form composite material and then results are analysed for those 3 composite materials. From the results it has been found that tamarind shell powder with coconut shell powder, increases the tensile properties by around 50%. The best result and increase in mechanical properties is obtained when the composition of the material is 50% of Coconut shell powder and 5% of Tamarind shell powder along with 45% of epoxy resin.

1. Introduction

In the latest years, composites fulfil optimal requirement criteria for several designers' materials.In the last 50 years, there have been major developments in the design and fabrication of light-weight, high strength materials, primarily due to the increase of polymer composite materials1. Several researchers have aimed at their work towards defining abundant combinations of biodegradable matrix/natural fillers in order to promote new classes of biodegradable composites with enhanced mechanical properties, as well as to attain products with lower cost. Among several investigated natural fibers in this area, different fillers have the significant importance[1].The Natural Fillers (NF) reinforced materials offer several environmental advantages, such as decrease dependence on non-renewable material sources, lower pollution and green house emission. Natural lignocelluloses fillers (flax, jute, hemp, etc.) represent an environmentally friendly alternative to conventional reinforcing fibers (glass, carbon). The Advantages of natural fillers over traditional ones are their low cost, high toughness, corrosion resistance, low density, good specific strength properties and reduced tool wear2. However, there are several disadvantages in natural fillers, like low tensile strength, low melting point, not suitable for high temperature application, poor surface adhesion to hydrophobic polymers, non-

Effect of 1,2,3benzotriazole on the corrosion of aged 18Ni250 grade Maraging steel in Phosphoric acid solution

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Abstract: The 18 Ni 250 grade maraging steel is a potential high strength steel for advanced technologies such as aerospace, nuclear, and sporting goods. Phosphoric acid and Nitric acid solutions are used in pickling of delicate and precision items where re-rusting after pickling has to be avoided. The present work addresses the study of corrosion behaviour and inhibition using 1,2,3 benzotriazole of aged 18 Ni 250 grade maraging steel in phosphoric acid medium at higher concentration by Potentiodynamic Polarization Technique. The corrosion rates were determined in 1M, 1.5M and 2M by Tafel extrapolation technique in the temperature range 30^0C-50^0C with different concentrations of inhibitor. The results indicate that the corrosion rate increases with increase in acid concentration and temperature.Inhibition efficiency of 1,2,3benzotriazolewas found to increase with the increase in 1,2,3 benzotriazole concentration and decrease with the increase in temperature.The activation energy E_a and other thermodynamic parameters (ΔG°, $\Delta H^\#$ and $\Delta S^\#$) have been evaluated and discussed. The standard free energy of adsorption ΔG°_{ads} values indicates that the adsorption is of mixed type. Scanning electron microscopy (SEM) study confirmed the formation of an adsorbed protective film on the metal surface.

Keywords: Maraging Steel, Acid solutions, Organic inhibitor, Polarisation, adsorption.

1. Introduction

Corrosion of structural elements is a major issue for any industry because of the chemical environment of the chemical processing. The significant technical challenges and the high cost directly related to corrosion provide strong incentives for engineers and other technical personnel to develop a firm grasp on the fundamental bases of corrosion. Understanding the fundamentals of corrosion is necessary not only for identifying corrosion mechanisms (a significant achievement by itself), but also for preventing corrosion by appropriate corrosion protection means and for predicting the corrosion behaviour of metallic materials in service conditions. Understanding the mechanisms of corrosion is the key to the development of a knowledge-based design of corrosion resistant alloys and to the prediction of the long-term behaviour of metallic materials in corrosive environments.

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Significance Of The Type Of Reinforcement On The Mechanical Behavior Of Thermoplastic Composites

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Abstract

In mechanical engineering applications, composite materials are subjected to a variety of loads such as tensile, bending, compression, impact etc. For the effective use of composites in engineering applications, an insight into mechanical properties is essential. The aim of this study was to investigate the significance of the type of reinforcement on the mechanical behaviour of polypropylene reinforced by glass fiber and carbon fiber. The composite specimens were prepared in accordance with ASTM standards using injection moulding technique varying the fiber weight percentage (10%, 20% and 30% by weight of reinforcement). Mechanical properties were measured according to ASTM. The study suggested that there was a significant role of type of reinforcement and weight fractions on the mechanical behaviour.

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*Keywords: Keywords:*Polypropylene; Short glass fiber; Short carbon fiber;Type of reinforcement;

1. Introduction

Polymers have proved them as a prominent category of engineering materials for mechanical components. Polymer composites reinforced with short fibers exhibit better mechanical and wear properties and are easily processed by extrusion and injection moulding techniques at low cost [1-5]. The matrix, the reinforcement and the interface are the most important parameters which decide the end properties of the composites. There are other variables which must be carefully controlled to get the desired properties of composites such as type of matrix, reinforcement and their amount, reinforcement geometry etc. The matrix and reinforcement constitute a composite; the reinforcement part plays a prominent role in forming a composite material [6-27].

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A Review on Deterioration of Mechanical Behaviour of High Strength Materials under Corrosive Environment

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Abstract. Surface corrosion has a major influence on ageing of high strength materials that leads to degradation in mechanical properties. Therefore,design of a component frequently implores the engineer to minimize the possibility of failure particularly by environmental deterioration. Effect of corrosive environment on high strength materials of Aluminum alloys and steels is studied. The influence of corrosion on material loss and deprivation of mechanical behaviour such as ultimate strength, yield strength and fatigue resistance arereviewed and presented.Salt spray test as per ASTM B117 and immersion in natural sea water are the usual practices followed to induce corrosion. It is evident from the literatures that corrosion has a significant effect on deterioration of mechanical behaviour of the materials.

Keywords: Corrosion, High strength materials, Mechanical behaviour.

1. Introduction

Engineering materials during their service life are exposed to mechanical failure due to major causes such as fracture, fatigue, creep, wear and corrosion. Materials do not reach their theoretical strength when tested practically. Therefore, the performance of the material in service is not same as expected. Hence, the design of a component frequently implores the engineer to minimize the possibility of failure particularly by environmental deterioration such as corrosion. It could be found that the concentration of chloride is more in offshore or marine environment that leads to chloride induced corrosion, a key cause of deterioration of structural materials such as steel. The effect of corrosion on structural materials in service life leads to mechanical failure [1, 2, 3].The structural Steel bars in reinforced concrete must possess high tensile strength because theyare usually subjected to tensile loads. Therefore, the corrosion of the reinforcing steel bars in concrete is primary cause for failure of concrete structures [4, 5]. The present days standards have led the structural steels to have load carrying capacity with respect to fatigue load that varies with time. However, a little work has been done on effect of corrosion on low cycle fatigue of structural steels.

The fatigue load on the structures causes sudden cracks on the surface which breaks the oxide layer and thus enhancing faster corrosion rate when compared with static loads [6-15]. Rain, fog and condensation due to temperature change are the causes for the formation of electrolytic layer on the

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A Review on Influence of Various Technological Processes on Mechanical Properties of Aluminum Alloys

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Abstract: Aluminum alloys are alloys in which aluminium (Al) is the predominant metal. The typical alloying elements are copper, magnesium, manganese, silicon, tin and zinc.Aluminum alloys are widely used in engineering structures and components where light weight or corrosion resistance is required. Selecting the right alloy for a given application entails considerations of its tensile strength, yield strength, fatigue strength,ductility, microhardness, weldability and corrosion resistance .The processes such as shot peening, age hardening, hydrostatic extrusion, friction stir welding, tungsten inert gas welding, quenching,sand casting,gas metal arc welding effect the various above mentioned mechanical properties of alloys. This paper gives a brief review on various processes used for improvising the mechanical properties of Aluminium alloys.
Keywords:Aluminum, microhardness, shot peening.

1. Introduction

Aluminum is the world's most abundant metal and is the third most common element, comprising 8% of the earth's crust. The versatility of aluminum makes it the most widely used metal after steel. Pure aluminum is soft, ductile, corrosion resistant and has a high electrical conductivity. It is widely used for foil and conductor cables, but alloying with other elements is necessary to provide the higher strengths needed for other applications. Aluminum is one of the lightest engineering metals, having a strength to weight ratio superior to steel.It has a density around one third that of steel and is used advantageously in applications where high strength and low weight are required. When the surface of Aluminum metal is exposed to air, a protective oxide coating forms almost instantaneously. This oxide layer is corrosion resistant and can be further enhanced with surface treatments such as anodising.The best alternatives to copper are Aluminum alloys in the 1000 or 6000 series. These can be used for all electrical conduction applications including domestic wiring.The effect of fatigue strength improvement achieved by imparting of hardness and repairing of casting defects by peening impact.Age hardening, also known as precipitation hardening is a low temperature heat treating

Electrical energy amplifying generator

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Abstract: In electric power generation, there is always compromise in terms of efficiency. Now a days, modern turbo-generators have efficiencies greater than 98%. Although this amount of efficiency is not obtained from all kinds of generator. The efficiency and the cost will always be one of the major parameters for customer choice. Electrical Energy Amplifying Generator (EEA generator) consists of permanent magnet rotor having high polarity and running at low speed to amplify the electrical energy obtained from solar panels using the newly designed coil and magnet arrangement. In the special design of the coil of EEA generator is completely utilizes the magnetic flux of the rotating magnetic rotor. The cost of this generator is less than the commercial generators available in the market. This setup describes the construction of state of art of permanent magnet generators. Design aspects of permanent magnet generators are presented. The prototype of the generator is fabricated and tested and the output variations at different inputs of the generators is discussed.

Keywords: EEA.

1 Introduction:

A generator is a device that converts any available energy into electrical energy. Source of available energy includes steam turbine, wind turbine, hand crank, diesel engine, water turbines, and other mechanical sources. Even the chemical and light energy source can be used to produce electricity, such devices are also called generators.

Now we are concentrating on the generators that converts mechanical energy into electrical energy. It is important to understand that a generator doesn't actually create electrical energy. Instead, it uses the mechanical energy supplied to it to force the movement of electric charges present in the wire of its windings through an external electric circuit.

The modern day generator works on the principle of electromagnetic induction discovered by Michael Faraday in 1831-32. Faraday discovered that the flow of electric charges could be induced by moving an electrical conductor, such as a wire that contains electric charges, in a magnetic field. The movement creates a voltage difference between the two ends of the wire or electrical conductor, which in turn causes the charges to flow, thus generating electric current. Generators are useful appliances that supply electrical power during a power outage and prevent discontinuity of daily activities or disruption of business operations. Generators are available

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Fabrication and testing of Fibre-reinforced Glass-epoxy composite with Seashell as a filler Material

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Abstract: In this study mechanical properties of a Polymer Matrix Composite i.e. mixing E-glass fibre (synthetic fibre) with seashell as filler material and using Lapox L-12 as the epoxy resin with K-6 hardener are tested. The constituents used in this composite are cheaper when compared to other composites and it showcases properties like higher strength, higher stiffness, chemically resistant, good insulation to electricity and light weight too. Three components are fabricated with ratio of sea shell powder varying from 5% to 15% in a total amount of 70:30 (Volume Fraction) fibre to resin ratio. Properties of different ratios of the composite material are determined using various tests like Tensile strength, Three-point bending & Natural frequency is found by FFT analyser. As this composite is light weight and durable, it is can be used in helmets, karts, and auto body parts.

1. Introduction

In recent years, Composite materials have expanded more hugeness in various fields. The extension being utilized of composite materials can be cleared up by better and more data of the essential properties of composites and their long organization life. This has achieved the extension of Composite materials starting late.

A Composite material can be characterized as a mix of two or more materials that results in preferable properties over those of the individual parts utilized alone. As opposed to metallic compounds, every material holds different physical, chemical and mechanical properties. The Reinforcement and Matrix are the two constituents of Composites. The essential central purposes of composite materials are their high quality and firmness, combined with low thickness when contrasted and mass materials, considering a weight diminish in the finished part. The Reinforcing phase is said to be made either of fibres, particles, or flakes and the Matrix phase in Composite is said to be continuous. Generally, Composites are known to be Heterogeneous.

The part of reinforcement in composite materials is fundamentally to add mechanical properties to the material, for example, strength and stiffness. The reinforcement in composite material assumes an imperative part and it influences the mechanical properties of the composite. By and large, the reinforcement is harder, more grounded, and stiffer than the matrix. The reinforcement is normally a fibre or a particulate. The reinforcement serves as spine of the composite.

The matrix phase in a composite also holds the important role and its main function is to keep or bind the reinforcement together and position it correctly with respect to cross sectional area in order to use mechanical properties of the material optimally. Matrix phase in a composite is known as continuous

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3D Printing & Mechanical Characteristion of Polylactic Acid and Bronze Filled Polylactic Acid Components

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Abstract: Rapid prototyping (RP) technologies have emerged as fabrication methods to obtain engineering components within a short span of time. Desktop 3D printing, also referred as Additive Manufacturing (AM) technology is a powerful method of rapid prototyping technique that can fabricate three-dimensional engineering components. Poly Lactic acid (PLA) is a green alternative to petrochemical commodity plastics, used in packaging, agricultural products, disposable materials, textiles, and automotive composites, 3-D printing technology enables fabrication of PLA and bronze filled PLA, which has less tensile and flexural modulus. In order for 3D printed parts to be useful for engineering applications, the mechanical properties of the material will play an important role in the functioning of the components. In the present study, commercial grade PLA & bronze filled PLA has been considered as material for preparation of samples using desktop 3D printer. The samples were tested for their mechanical characteristics like Tensile and flexural strength properties. The test Samples were fabricated using 3D printing with different layer height and with different layer build-up speed. Comparison between the PLA & bronze filled PLA based on the experimental results are discussed and found PLA has superior tensile and flexural property when compared to Bronze filled PLA.
Keywords: 3D printing, PLA, Bronze filled PLA.

1. Introduction

Thermoplastic polymers reinforced with natural fibres are increasingly studied as they provide an interesting range of specific mechanical properties in combination with a controlled environmental footprint [1]. 3D Printing is the process by which a 3D digital design is converted into a component by depositing material using additive processing. As a process, components are made layer-by-layer from a range of materials which are available in; liquid resin, filament and fine powder form. As a result, a range of different metals, plastics and composite materials can be used to make 3D printable objects [2]. Fused deposition modeling (FDM) is one of the popular additive manufacturing technique, after stereo-lithography [5]. It is a process of depositing material layer-by-layer through heated nozzle, whose position is controlled in two axes, on a platform which descends to add third dimension to the part [6]. In FDM printing, usually diverse thermoplastic polymers are used, such as PLA, Acrylonitrile butadiene styrene (ABS), polyamide 6.6 (PA 6.6), polycarbonate, etc. [4]. Additionally, several special filaments exist, combining polymers with different other materials, such

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Effect of Machining Parameters on Surface integrity during Dry Turning of AISI 410 martensitic stainless steel

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Abstract: The primary method of material removal from a cylindrical workpiece is conceivable by using turning process.This paper presents a comprehensive analysis of surface integrity in dry machining of AISI 410 martensitic stainless steel which is widely used material for automotive and aerospace applications. In the present work, the effects of turning process parameters such as cutting velocity, feed and depth of cut in dry turning of martensiticstainless steel has been investigated. Taguchi orthogonal array has been implemented to investigate the effect of process parameters on surface roughness and tool-workpiece interface temperature. A detailed study about the chip morphology and machined surface has been carried out using scanning electron microscope. It was noticed that golden color thick long ribbon type chip was produced at dry condition and side flow has been observed in chip.
Key words: Dry Turning, Surface roughness, martensitic stainless steel, SEM.

1. Introduction

In practice, Martensitic stainless steel finds greater importance in many industrial applications like automotive and aerospace industry due to its special noticeable mechanical properties which helps in smooth functioning of the component. By nature itself it has complex microstructure good corrosion resistance property and even harder than austenitic stainless steel. It was found that surface integrity greatly affected by cutting tool geometry [1].Though different machining processes are used in numerous applications, basically Turing process finds itself one of primary machining process to produce desire shaped components to suit the point of applications. The overall performance and life span of machined component mainly rely on nature of surface attained during the machining process. It is well-known that surface integrity of a machined surface is influenced by numerous factors such as cutting speed, feed, and depth of cut and even it has a direct effect on functional performance of the component. M.Y. Noordin et al. [2] have studied the Dry turning of tempered martensitic stainless tool steel using coated cermet and coated carbide tools. Study revealed at low feed rate, snarled cock screw chips are produced regardless of the cutting speed and cutting speed at 0.16 mm/rev, long, cock screwchips are obtained. G. Krolczyket al. [3] investigated the microhardness analyses in dry and wet machining of duplex stainless steel. The microhardness of surface integrity for various cutting speeds were compared. It has been shown that wet cutting speed leads to the decreased surface integrity hardening depth. V. GarcíaNavas et al. [4] have discussed the surface integrity of AISI 4150 (50CrMo4) steel turned with different types of cooling-lubrication. Study proved that cryogenic machining is the best solution since it reduces machining problems of heating, leading to tool life

Twisted Tape Based Heat Transfer Enhancement In Parabolic Trough Concentrator – An Experimental study

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Abstract. The heat transfer augmentation in parabolic trough concentrator is gaining importance now a days as it makes the system compact and efficient. Out of various techniques, use of twisted tape inserts is popular due to easy implementation as well as substantial enhancement in system performance. Most of the studies in this field pertaining to experimental/computational analysis with respect to both outdoor and indoor set ups. The rise in convective coefficient of heat transfer fluid due to insert has been studied by many researchers. But such studies are based on uniform heat flux or out-field non-uniform based which is under uncontrollable environment. Hence in the present study, Nusselt number correlations for plain absorber and absorber with twisted tape (y=3.48, 5.42 and 7.36) are developed under the realistic condition of solar concentration with controlled environment. The parity plot shows the maximum deviation of 20% which in turn indicates better quality of fit.

1. Introduction

Solar energy has been used by both nature and human kind throughout time in many ways. It is used to heat and cool buildings (both actively and passively), heat water for domestic and industrial uses, heat swimming pools, power refrigerators, operate engines and pumps, desalinate water for drinking purposes, generate electricity, for chemistry applications, and many more operations. Because of the desirable environmental and safety aspects it is widely believed that solar energy should be utilized instead of other conventional energy forms. Out of different applications of solar energy, the power generation by focusing type of collectors is gaining popularity now a days.

Parabolic trough power plants consist of large field of parabolic trough collectors (PTC), a heat transfer fluid/steam generation system, a Rankine steam turbine/generator cycle, and optional thermal storage and/or fossil-fired backup systems. The performance of PTC is based on optical and thermo-hydraulic configuration. Due to advanced optics technology presently in use, researchers have focused on performance enhancement of receivers taking into account various geometrical treatments.

2. Literature review

In this section, various heat transfer augmentation techniques applicable to PTC absorber have been highlighted.

An innovative flat aluminium absorber in small PTC for process heat and direct steam generation has been investigated by Bortolato et al. [1]. The absorber has got bar and plate technology

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Analysis of Damped Free Vibration on Glass-Epoxy Composites with Aluminium Powder as Filler

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Abstract: Glass-Epoxy Composites are having a wide range of applications due to its light weight and low cost. This paper deals with the fabrication of Glass-Epoxy composites having a composition of 70-30% with Aluminium powder as a filler material. The percentage of aluminium is varied by 2%, 4% and 6% by volume. Aluminium due to its high strength to weight ratio finds its application in many areas. The composite plates are fabricated as per ASTM standards and Tensile test and 3-point bending tests are carried out to determine the mechanical properties of the composite. Modal Analysis is done using Fast Fourier Transform and the analytical results are obtained from Nastran. The experimental and Analytical results are compared with each other.

1. Introduction

Composites are one of the most advanced and versatile engineering materials known to men. Evolution in the field of material science has given birth to these wonderful fascinating materials. Composites are heterogeneous in nature and formed by the assembly of two or more materials with reinforcing fibres or fillers and a compactable matrix. The matrix may be ceramic, metallic or polymeric in origin. This gives the composite its shape, environmental tolerance, surface appearance and overall durability while most of the structural loads are carried by the fibrous reinforcement thus providing macroscopic stiffness and desired strength. A composite material provides superior and unique physical and mechanical properties as it combines the most enticing properties of its constituents while repressing their least desirable properties. At present composites play a very important role in automobile industry, aerospace industry and various other engineering applications since they exhibit outstanding weight and strength to weight ratio. High performance intransigent composites made from graphite, glass, boron, silicon carbide fibres or Kevlar in polymeric matrices have been studied broadly because of their application in space vehicle technology and aerospace.

The composites are classified based on the matrix material which creates the continuous phase. They are categorised as Metal Matrix Composites (MMC's), Ceramic Matrix Composites (CMC's) and Polymer Matrix Composites (PMC's). Of these the polymer matrix composites are much simpler to fabricate than Metal Matrix Composites and Ceramic Matrix Composites since they have a relatively low processing temperature for fabricating.

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Experimental Analysis on the Mechanical Properties of Glass-Epoxy composite with Fly ash as a filler material.

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Abstract: Pulverised fuel ash also known as fly ash is a very popular material as it is cheaply available and has good properties such as workability and provides a smooth surface finish. This paper deals with the fabrication of Glass-Epoxy composites having a composition of 60-40% with fly ash as filler. Fly ash is varied by 3%, 6% and 9% in volume. Since Fly ash is cheaply available this is an attempt to study the properties of the composite with the addition of fly ash. Tensile test, Bending Test and compression tests are conducted to find the mechanical properties of the material. The properties of the Glass-Epoxy composites are compared by varying the percentage of fly ash filler.

1. Introduction

Composites are one of the most advanced and versatile engineering materials known to men. Evolution in the field of material science has given birth to these wonderful fascinating materials. Composites are heterogeneous in nature and formed by the assembly of two or more materials with reinforcing fibres or fillers and a compactable matrix. The matrix may be ceramic, metallic or polymeric in origin. This gives the composite its shape, environmental tolerance, surface appearance and overall durability while most of the structural loads are carried by the fibrous reinforcement thus providing macroscopic stiffness and desired strength. The Reinforcement and Matrix are the two constituents of Composites. The essential central purposes of composite materials are their high quality and firmness, combined with low thickness when contrasted and mass materials, considering a weight diminish in the finished part. The Reinforcing phase is said to be made either of fibres, particles, or flakes and the Matrix phase in Composite is said to be continuous. Generally, Composites are known to be Heterogeneous.

Although composite materials have advantages over conventional metals, they also have some disadvantages. PMC's and other composites tend to be anisotropic; i.e. properties like stiffness, strength etc. are different in different directions. This poses a significant challenge for the designer when using composite materials in structures which have multi directional forces.

2. Literature Review

V. Manohar [1] et. Al (2014), carried out a work on Sea Shell Jute Fabric composite and studied the Tensile properties of it. In this study the sea shell powder was used as filler material. The weight% of

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A Study on Fatigue Characteristics of Al-SiC Metal Matrix Composites Processed Through Microwave Energy

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Abstract. Aluminium based Metal Matrix Composites are the very promising light materials with enhanced mechanical properties. Aluminium Metal Matrix composites (AMC) are identified as one of the very good materials for aerospace and automobile applications because of their lightweight, cost effectiveness and high stiffness. Metal Matrix Composites can be produced by various methods such as liquid infiltration, stir casting, spray deposition and powder metallurgy technique. Microwave processing of metals is a rapid developing technology which will offer significant time saving and can be cost effective. It is a volumetric process and very efficient to obtain high heating rates due to the interaction of microwave with the material in molecular level. The present work is an attempt made to study the fatigue characteristics of microwave processed Al-SiC_P metal matrix composite. Sintering of the compacted Aluminium powder with 4% SiC is carried out using microwave energy. The sintered metal matrix composite is subjected to secondary processing of Extrusion. The fatigue characteristics and micro hardness properties are investigated.
Key words: AMC, Microwave, Sintering, Extrusion, Fatigue strength.

1. Introduction

Aluminium Metal Matrix composites (AMC) are known as one of the very promising light materials with enhanced mechanical properties which are used in various industries for their lightweight, cost effective and high stiffness [1]. It can be used as a replacement in automotive and aerospace applications by reinforcing with Al_2O_3 and SiC which will reduce the weight and thereby increase the engine efficiency, reducing the fuel consumption [2]. Replacing cast iron engine components with lightweight aluminium alloys requires overcoming of the poor adhesion and seizure resistance of Al. This can be achieved by dispersing Al_2O_3, SiC or graphite particles in Al. Considerable reduction of wear and friction characteristics can be achieved by the using these particulates. Moreover, cylinder pressures can be increased because AMCs can withstand high thermal and mechanical loads and reduce the loss of heat by permitting closer fit that can be achieved because of the lower thermal expansion coefficient of AMCs [3].. Metal Matrix Composites can be produced by different methods such as liquid infiltration, stir casting, spray deposition and powder metallurgy technique. Among

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Taguchi based optimization of machining parameters for surface roughness in CNC turning of EN19 and EN31 steel

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Abstract-In this work, the machining parameters are optimized in turning based on Taguchi method. The experiments have been carried out in dry condition using L9 orthogonal array. The machining parameters are selected for operations are spindle speed, feed rate and depth of cut with each three levels in CNC turning of EN19 and EN31 steel. As a result Feed rate was found to be dominantly affecting the surface roughness for both materials. This paper also estimates the contribution and significance of process parameters through analysis of variance (ANOVA) technique. The optimal setting parameters of surface roughness for EN-19 and EN-31 is A3-B1-C3 (1200rpm, 0.25mm/rev-0.6mm) and A2-B1-C2 (800rpm, 0.25mm/rev-0.4mm) respectively.

Keywords-Ra, CNC Turning, ANOVA, EN-19, EN-31.

1. INTRODUCTION

Metal cutting is one of the vital processes and widely used manufacturing processes in engineering industries. Highly competitive market requires high quality products at minimum cost. Products are manufactured by the transformation of raw materials [1]. Industries in which the cost of raw material is a big percentage of the cost of finished goods, higher productivity can be achieved through proper selection and use of the materials. To improve productivity with good quality of the machined parts is the main challenges of metal industry; there has been more concern about monitoring all aspects of the machining process. Surface finish is an important parameter in manufacturing engineering and it can influence the performance of mechanical parts and the production costs [2]. The ratio of costs and quality of products in each production phase has to be monitored and quick corrective actions have to be taken in case of deviation from desired output. Surface properties such as roughness are critical to the functional ability of machine components. Increased understanding of the surface generation mechanisms can be used to optimize machining process and to improve functional ability of the component. D. ManivelR. Gandhinathan [3] have studied the Optimization of surface roughness and tool wear in hard turning of austempered ductile iron using Taguchi method the study revealed that the main contributing factors affecting the surface roughness and tool wear were cutting speed with a contribution of 49.1% and 50.2% respectively.Patole P. B.a , Kulkarni V. V. [4] worked on Optimization of Process Parameters based on Surface Roughness and Cutting Force in MQL Turning of AISI 4340 using Nano Fluid which resulted optimal parameters are as lowest feed rate, cutting speed and depth of cut. Diptikanta Das et al. [6] have investigated Optimization of machining parameters and development of surface roughness models during turning Al-based metal matrix composite. The analysis resulted Rz and Ra reduced with increase in lathe spindle speed, but increased with increasing either feed or depth of cut. Numerous investigators have been conducted to determine the effect of parameters such as feed rate, tool nose radius, cutting speed and depth of cut on surface roughness in hard turning operation. The surface roughness decreases with increasing nose radius. Large nose radius tools have produced better surface finish than small nose radius tools. Based on the literature review it was found that the factors that highly influence the process efficiency and output characteristics are spindle speed, feed

A survey on Image Analysis to determine Strain Distribution

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***Abstract*— Determining the deformation response of a specimen under load is important to understand the behavior of the material. In many engineering problems, knowledge of strain distribution in the material is an important issue. There exists many strain measurement methods like electrical resistance strain gauge, extensometer, Geometric Moire, etc. Each method has its own advantages and drawbacks. Major nonconventional and contact-free methods to measure displacement and strain in mechanical test specimen are included in this paper. This paper attempts to provide a comprehensive survey of the recent technical achievements in strain measurement using image processing method. The survey focuses on different algorithm used for the analysis of movements of patterns made on the specimen. Finally, based on the existing technology and demand from real world application, a few future research directions are also suggested.**

Keywords—Image analysis; Strain measurement; Digital Image Correaltion.

INTRODUCTION

The knowledge of strain measurement is vital to the engineers as it plays an important role in the most of the engineering designs and experimental work. The designs and structures are getting more and more complex than before so an accurate strain measurement method is always desirable as a misleading result might cause a catastrophic incident and also put human lives in danger [1]. To overcome this different strain measurement methods are invented and used.

There exists many conventional strain measurement tools like strain gauge, extensometer, optical strain measurement method, brittle coating method etc, but each has its own advantages and drawbacks. Most of these methods can only measure deformation at few points [2]. They are very difficult to use to find strain in small specimens. The contact points of tool create unwanted stress concentration to the specimens, and conventional methods are also dependent on external environmental factors like humidity, temperature [3]. Also their high price tag and handling difficulty make them an imperfect strain measurement method.

To improve the strain measurement method, A vision system known as Digital Image Processing had been introduced. Human brain divides the vision signal in to many channels that stream different kinds of information to brain. Our brain has an attention system that identifies important part of the image while suppressing the other parts [2].But for computer; image is just a grid of numbers which is represented in nxm matrix, where each element represent some specific information of image. Using image processing algorithm computer finds the content of image.

Table 1 summarizes some of the image processing terminologies.

TABLE 1
Image processing terminologies

Image processing term	Meaning
Image acquisition	Process of retrieving a digital image from a physical source captured.
Grey scale conversion	Process of converting color image to a single intensity value
Image background extraction	Separation of image background and retrieving foreground images.
Image enhancement	Improvement in perception of image for human and machine analysis
Image histogram	Pixel intensity vs frequency analysis
Binary image segmentation	Foreground object separation from background
Image filtering	Process of distorting image in desired way
Feature extraction	Defining a image characteristics that meaningfully represent the information for analysis
Image object analysis	Extracting the reliable and meaningful information from image

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Experimental Studies on the Structural Characteristics of Solid Concrete Block Masonry, Masonry Units and Mortars

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Abstract: *An attempt is made to investigate the performance of different materials used for the construction of solid concrete block to check their suitability in the construction. Solid concrete blocks from a unit have been collected and after conducting various tests like rate of moisture absorption, compressive strength in dry as well as wet state, prism compressive strength test, shear bond strength test, etc., suitability of using the same in construction has been verified. Cement Mortars of different mix proportions like 1:4 and 1:6 have been tested for flow value and compressive strength to know about the workability of mortars and also strength. Stack bonded masonry prisms of suitable dimensions have been constructed to study the masonry compressive strength. Shear bond strength is tested using three solid blocks with suitable mortar proportions.*

Keywords: *Solid Concrete Blocks, Shear Bond, Prism Strength.*

1. Introduction

Brick is the oldest manufactured building material. The earliest brick, made from mud (sometimes with added straw), was invented almost 10,000 years ago. Clay brick started to appear about 5,000 years ago, when builders borrowed pottery manufacturing techniques to improve its strength and durability. From some of the oldest known structures to modern buildings, clay brick has a history of providing shelter that is durable, comfortable, safe, and attractive.

Concrete blocks were first used in the United States as a substitute for stone or wood in the building of homes. The earliest known example of a house built in this country entirely of concrete block was in 1837 on Staten Island, New York. The homes built of concrete blocks showed a creative use of common inexpensive materials made to look like the more expensive and traditional wood-framed stone masonry building. This new type of construction became a popular form of house building in the early 1900s through the 1920s. House styles, often referred to as "modern" at the time, ranged from Tudor to Foursquare, Colonial Revival to Bungalow. While many houses used the concrete blocks as the structure as well as the outer wall surface, other houses used stucco or other coatings over the block structure. Hundreds of thousands of these houses were built especially in the Midwestern states, probably because the raw materials needed to make concrete blocks were in abundant supply in sand banks and gravel pits throughout this region. The concrete blocks were made with face designs to simulate stone textures: rock-faced, granite-faced, or rusticated. At first considered an experimental material, houses built of concrete blocks were advertised in many Portland cement manufacturers' catalogs as "fireproof, vermin proof and weatherproof" and as an inexpensive replacement for the ever-scarcer supply of wood. Many other types of buildings such as garages, silos, and post offices were built and continue to be built today using this construction method because of these qualities.

Concrete brick has more benefits than its striking visual qualities. They deaden exterior noise, providing a buffer from traffic noise, airplanes flying overhead and other various disruptions. Fire protection is another benefit as is reduced maintenance. Finally, concrete brick walls can improve the thermal mass qualities of exterior walls, thus reducing energy bills.

A Study on Mechanical Properties of Treated Sisal Polyester Composites

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Abstract

In the present study an attempt is made to determine the mechanical properties of sisal fiber reinforced polyester composites. Sisal fibers are the natural fibers obtained by processing the leaves of the sisal plants grown in nature. Sisal plant offers hard and strong strands of sisal fibers. The soft tissue of the sisal leaves is removed either physically or by using equipments. The fibers obtained are dried and brushed to remove the dirt left over to get the sisal fibers. In the present study, randomly oriented sisal fiber reinforced polyester matrix composite specimens of thicknesses 2 mm, 3 mm, 4 mm, 5 mm and 6 mm were fabricated by using hot compression moulding technique. 5 % NaOH treated sisal fibers of length 10 mm is used as reinforcement for casting the composite specimens. A mixture of polyester resin, methyl ethyl ketone peroxide and cobalt naphthenate of ratio 50:1:1 is used as matrix for the fabrication of composite panels. Composite panels of fiber volume fraction 10 %, 15 %, 20 %, 25 % and 30 % were casted and the test specimens were cut from the panels and tested for its tensile strength and flexural strength as per ASTM D-3039 and ASTM D-7264 respectively. From the experimental results it is observed that strength of tested specimens was found to show peak values at a fiber volume fraction of 20% to 25%.

Key words: sisal, mechanical properties, polyester, natural fibers, chemical treatment.

1. Introduction

Continuous studies were reported by researchers in pursuit of new materials which has brought about a large group of new materials and innovations. The need for materials that are stronger, lightweight, corrosion and chemical resistant and permeable to electromagnetic radiations have lead to the use of composites. During the recent thirty years, composite materials, plastics and ceramics have emerged as dominating innovative materials with wide advantages and applications [1]. The constituent material of composites that has higher strength is reinforcement. It can be fiber, fabric particles, particulates or whiskers. In many parts of the world, artificial fibers like steel, carbon or polymeric strands (fibers) are used as reinforcement. Attempts have been made to use naturally available strands obtained from plants and so on as reinforcements in composite materials. A unique aspect of these strands is the low vitality required for their extraction. A noteworthy issue in the utilization of these strands with matrix is that they develop rough surface in the alkaline environment and thus sturdiness of the composite involves concern. Sisal plant offers ascend to hard and strong fibers. The composition of sisal fiber is basically of cellulose, lignin and hemicelluloses. The failure strength and the modulus of elasticity, depend on the amount of cellulose and the orientation of the micro-fibers [2]. As a natural product, these properties have a variation from one plant to another plant. The Sisal fibers are commercially available in different formats viz., fabric, cords, strips, wire and rolls. The

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Planning and Implementation of Rain Water Harvesting System in MITE, Moodabidri, Karnataka-Geological and Hydrogeological in Puts Typical Analysis

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Abstract

Water harvesting techniques had been evolved and developed centuries ago. Ground water resources occur in dynamic state and hence subjected to periodic changes. The development of ground water resource leads to changes in its regime and water quality, therefore planning for further development of the resource. The ground water resource development is urgent need by management planning and further validation using rain water harvesting technology to fulfill the present scarcity of safe and hygienic drinking water in both urban and rural areas. The average rainfall in and around MITE, Dakshina Kannada is 3789 mm. Average rainy days are 126.In spite of copious rainfall, during summer season many parts of the district including MITE face acute scarcity of water. Detailed geological, hydrogeological, structural studies were carried out in and around Mangalore Institute of Technology Engineering, Dakshina Kannada to locate suitable site for rain water harvesting technique. Site specific case study revealed rainwater harvesting using artificial recharge structure resulted for storage of sub surface water and caters requirements of the MITE Campus.

Keywords: *Rainwater harvesting, geological, hydrogeological, screen filter, MITE.*

INTRODUCTION

Naturally seasonal rainfall will get the ground water resource recharged through percolation. But due to anthropogenic activities and unsustainable development and rapid urbanization, leads soil disturbances drastically with resultant reduction in percolation of rainwater, thereby depleting ground water resource. The process of ground water augmentation by rainwater harvesting is the natural filtration of rainwater in to the underground formation by some artificial methods.

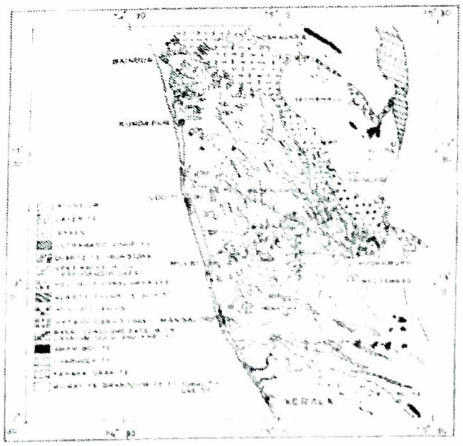

Fig1. *Geological map of Dakshina Kannada and UdupiDistrcicts(Source: D Venkat Reddy 2002)*

The average rainfall of the Dakshina Kannada is 3789 mm. Average rainy days are 126. The average groundwater development is nearly 66%. Even though receiving 3789 mm of rainfall, during summer season many parts of the coastal

A Study and Analysis of Various Techniques to Match Sketches to Mugshot Photos

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***Abstract*—Identification and apprehension of criminals by matching facial sketches with photographic faces is one of the major law enforcement applications of the modern world. Majority of the crime occur where there will not be any information available regarding the suspect. In such situation, forensic sketch artist who usually deals with the eyewitness of the crime or victim in order to draw the sketch that resembles criminal face according to the verbal description given by the eyewitness. These sketches are termed as 'forensic sketches' and can be matched manually against gallery of criminal mug shot photos. By developing an automatic system for matching these sketches to the criminal database would reduce many person-hours. A lot of research is done in this regard. This research paper provides an overview of different forensic sketch matching technique and their analysis.**

Keywords— Forensic sketch, Composite sketch, Mugshot, Feature descriptor.

I. INTRODUCTION

Advances in biometric technology have made criminal investigation agencies to use efficient tools for identification of criminals in a faster way. But unfortunately most of the crime happens without any clues (like DNA, fingerprint samples or crime scene evidence) regarding the culprit. Thus advanced biometric technology becomes impractical in determining the identity of criminals. In such circumstances if any eyewitness who had seen the crime will be used for detecting the culprit. Skilled forensic artists are used to draw the sketches of the suspect with verbal description provided by the eyewitness. These sketches play a very important role in investigation process. Prepared sketches are sent to investigation agency to further carry out the investigation and to catch the criminal. There are mainly four kinds of facial sketches used in the sketch matching research. (1) Viewed sketches: By directly looking at the person or his/her photo sketches will be created. Viewed sketch quality will be higher when compared to other sketches [1]. (2) Semi forensic sketches: These kinds of sketches are drawn by sketch artist based on his/her recollection from photo image of a person [2]. (3) Forensic sketches: which are drawn by obtaining eyewitness's description about the suspect [2]. (4) Composite sketches: which are generated with a help of some face composite software. This software provides a predefined set of human facial components. Based on witness description of the suspect individual face components are selected and merged together to form a facial image [3][4]. Some of the most popular software used for composite sketch generation are Photo-Fit, Mac-a-Mug, EvoFIT [5], FACES [6] and Identikit [7].

The sketches are matched against existing criminal mug shot database. The facial matching framework accepts input as faces and outputs the recognized faces from the image database.

There are two major challenges in forensic sketch matching,

- Matching across different image domains.
- Sketches are inaccurate depictions of the face i.e. sketch level depends on the witness memory of the suspect. And other challenges include resolution pixel difference, texture difference and distance difference.

Higher level of preprocessing cannot be applied on forensic sketches since eyewitness in the crime spot can remember more of superficial face features than internal features. Superficial features might include color, age, gender etc. Hardly ever distinct internal features are noted.

Fig. 1. Sketches with their corresponding photographs from CUHK Dataset [19]

A Novel approach for Matching Composite Sketches to Mugshot Photos using the Fusion of SIFT and SURF Feature Descriptor

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***Abstract*—Identification and apprehension of criminals by matching facial sketches with photographic faces is one of the major law enforcement applications of the modern world. Majority of the crime occur where there will not be any information available regarding the suspect. In such situation, forensic sketch artist who usually deal with the eyewitness of the crime or victim in order to draw the sketch that resembles criminal face according to the verbal description given by the eyewitness. These sketches are termed as 'forensic sketches' and can be matched manually against gallery of criminal mug shot photos. By developing an automatic system for matching these sketches to the criminal database would reduce many person-hours. The paper presents a novel feature based approach which measures the similarity between sketches and mugshot photos. An efficient preprocessing technique is implemented on sketches and photos. Speed Up Robust Features (SURF) and Scale Invariant Feature Transform (SIFT) features are extracted and the resultant features are matched using nearest neighbor algorithm. Experiment are carried out using 40 composite sketches with 220 photos and it is observed that our two approach with image preprocessing given assuring results with good accuracy.**

Keywords— Forensic sketch, Composite sketch, Mugshot, Feature descriptor, SURF, SIFT.

I. INTRODUCTION

Advances in biometric technology have made criminal investigation agencies to use efficient tools for identification of criminals in a faster way. But unfortunately most of the crime happens without any clues (like DNA, fingerprint samples or crime scene evidence) regarding the culprit. Thus advanced biometric technology becomes impractical in determining the identity of criminals. In such circumstances if any eyewitness who had seen the crime will be used for detecting the culprit. Skilled forensic artists are used to draw the sketches of the suspect with verbal description provided by the eyewitness. These sketches play a very important role in investigation process. Prepared sketches are sent to investigation agency to further carry out the investigation and to catch the criminal. There are mainly four kinds of facial sketches used in the sketch matching research. (1) Viewed sketches: By directly looking at the person or his/her photo, sketches will be created. Viewed sketch quality will be higher when compared to other sketches [1]. (2) Semi forensic sketches: These kinds of sketches are pictured by sketch artist by recollecting his/her memory about the photo of the person [2]. (3) Forensic sketches: which are sketched by obtaining eyewitness's description about the suspect [2]. (4) Composite sketches: which are generated with a help of some face composite software. This software provides a predefined set of human facial components. Based on witness's description of the suspect individual face components are selected and merged together to form a facial image [3][4]. Some of the most popular software used for composite sketch generation are Photo-Fit, Mac-a-Mug, EvoFIT [5], FACES [6] and Identikit [7].

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Higher level of preprocessing cannot be applied on forensic sketches since eyewitness in the crime spot can remember more of superficial face features than internal features. Superficial features might include color, age, gender etc. Hardly ever distinct internal features are noted.

The paper presents feature based sketch matching. The distinct features of the image are extracted using feature

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Key Generation and Security Analysis of Text Cryptography using Cubic Power of Pell's Equation

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***Abstract*—Security is major aspect when information is shared in a communication era. To keep the information secure various algorithm are proposed in public key cryptography. In this paper we are introducing new way of approach which overcomes the drawback of RSA in terms of integer factorization method and Wiener's attack which calculates the decryption key. The key generation process of cubic power of Pell's equation is different from traditional RSA method. The public key "K" is dependent on alpha, prime numbers and variables of Pell's equation. It is difficult to obtain the private key using public key exponent "K". The paper aims to satisfy efficient, secure and reliable comparing with RSA by proving various attacks and histogram analysis.**

Keywords—Pell's equation, Public key Cryptography, Fermat factorization method, Wiener's attack, Standard Deviation

I. INTRODUCTION

In cryptography original information will be in unencrypted form. The information exchange can be in any of the form- text, image or audio. The message is transmitted through communicational channel, thereby sending secure data on an unsecure network. Interchange of sensible information should be confidential and secure. Cryptography is art of writing text or images secretly. The information is protected so that is not accessible or modified by unauthorized person. All data sent through network channel is secure since they are in encrypted form. It includes two process namely encryption and decryption. Encrypting process includes encoding plain text into cipher text on sender side whereas decrypting is a process of converting cipher text back to original message on receiver end. Both encryption and decryption make uses of keys for conversion process. Based on number of keys used or key exchange, cryptography is divided into two types- Symmetric key or private key cryptography and Asymmetric key or public key cryptography. All important messages are secured from alteration or modification by any attackers.

A. Private Key Cryptography

Private Key cryptography is also known as secret or symmetric key method. In this method same secret key is used for both encryption and decryption process. The key here is shared secretly between the sender and receiver. Because of sharing key, symmetric key is used for encryption of our own information as opposed to when sharing encrypted information. Compared to public key method, private key approach takes lesser time for encryption and decryption process. They are usually used in applications that are delay sensitive. Since secret key can be used for very large message can be encrypted and decrypted. Fig. 1 shows the secret key cryptography.

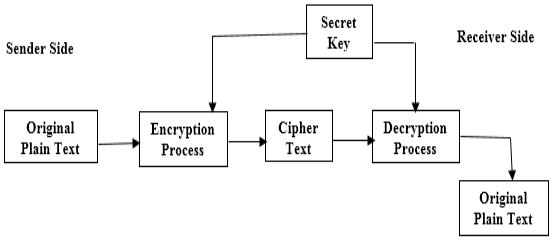

Fig. 1. Symmetric Key Cryptography Process

B. Public Key Cryptography

Key pair consists of two different public key and private key (Pu, P_r). Out of these two keys if one is used for encrypting message then other corresponding key is used for decrypting the message. Receiver sends public key to sender for encryption whereas private key is kept secret. Anyone in the network can access the public key since it is shared between receiver and sender. Asymmetric cryptography is computation intensive. This method is used for short text messages. Key length determines security of algorithm. Fig. 2 shows the encryption and decryption process using two keys.

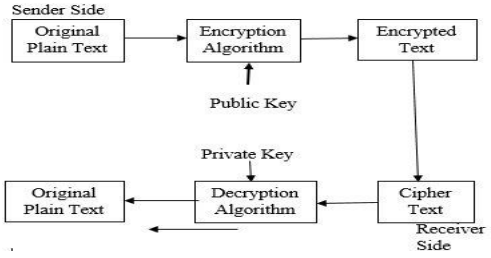

Fig. 2. Asymmetric Key Cryptography Process

C. Security of RSA

In the year 1978, asymmetric method RSA was developed by Rivest, Adi Shamir and Leonard Adleman. Modulus 'n' is

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Externalization of Tacit Knowledge in a Knowledge Management System Using Chat Bots

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***Abstract*—Knowledge is the most valued asset in today's world. Knowledge is an asset that is difficult to be replicated. In the competitive era, every firm would want to have a system wherein they can store and manage the knowledge. Any organizations performance can be assessed by the intellectual assets that they have. Every type of knowledge cannot be acquired and stored. The most important and critical type of knowledge is the tacit knowledge, which is difficult to be articulated. The tacit knowledge is the asset that brings more value to any Knowledge management system. Formal and informal methods, structural representations, mathematical models can be used to store the tacit information, acquired from experts. Retrieval of knowledge stored will not work better with the traditional search methods. Intelligent search techniques will have to be used to retrieve the right information. One of the concepts suggested for sharing the knowledge suggested is by using a query management system An expert can share his/her knowledge only at one place, whereas with the Knowledge management System, a Knowledge expert can be present virtually anywhere. To enable this, Chat bots can be used, thus making location redundant. A Chatbot has no limitation of how many queries it can accept, since a Chatbot allow users to seamlessly interact with multiple users from one location. Use of Chat Bots will make the sharing of Knowledge more effective and efficient**

Keywords*— *Knowledge Management, tacit knowledge, externalization, Chatbots, Bot

I. INTRODUCTION

Knowledge, according to Nonaka [1] is a comprehensive concept with profound meanings, bearing the belief that it increases an organization's ability for effectual action. Knowledge is also defined as "justified true beliefs". Knowledge, according to Davenport [2] and Allee [3] is professional intellect, know-what, know-how, know-why, and self-motivated creativity, or experience, concepts, values, beliefs, and way of working that can be shared and communicated. Knowledge is an asset that is difficult to be replicated. Knowledge Management (KM) is a process of managing knowledge by creating, sustaining, applying, sharing, and renewing knowledge to enhance organizational performance and create values [4]. This involves both human responsibility as well as the role of the information technology (IT). The continuous growing IT is making the task of managing information easier and flexible. The present era is the knowledge period. Knowledge is playing a major role in every field, which has made more attention to be focused on the KM technologies. It has to be adapted in our everyday life. Knowledge exists as some in its raw form, which can be some data, facts, information. This may exist as document, spreadsheet, spreadsheet, pictures or any other form. KM is the process of transforming information and intellectual assets into enduring value [5]. KM should not only manage information and people, but also integrate information processing with innovation of the human beings, for enhancing organizational capacity to adapt to the environment [6]. Knowledge and knowledge workers can be considered as the most valuable asset in this century. Managing this asset is a major issue. KM has now become the fundamental framework of any successful business. It impacts any organization's performance through its efficiency in developing the intellectual assets that are a source of competitive advantage. But as we can see, KM is marred by the absence of proper standardization. This is because most of the organizations are incapable of managing KM process effectively. Any organization should have a definite objective through implementing KM. Organizations that have implemented KM systems possess unique advantage over others with the knowledge bank they have. The ability to learn, unlearn, relearn, adapt to the continuous changes, and are considered as the core competencies in the new knowledge based economy.

The major issue in creating a Knowledge Management System is the process of externalizing the internalized knowledge. The internalized knowledge can be referred to the implicit knowledge that any individual has learnt over a year of experience. Further, the bigger challenge is in sharing the knowledge. One of the concepts that have been explained to implement the sharing of knowledge is by managing a query system and routing the queries to a Knowledge expert [7]. Although, this technique will ensure the learner query will be mapped to the right expert, the bottleneck arises with a limit of queries that can be directed to an expert. This issue can be solved by using the Chatbots, to answer the queries, thus making the existence of an expert at any location. Also, using of Chatbots will ensure that any number of queries can be handled without any limits.

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A study on the role of Knowledge Management Technologies in the Education

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***Abstract*— Knowledge Management is managing of knowledge through the process of creating, sustaining, applying, sharing and renewing knowledge to enhance organizational performance and create value. The process of knowledge Management combines the ability of dealing with the data and information under the information technology with the innovation of people organically. The essence of Knowledge Management lies in innovating and knowledge sharing. It lies in innovate the knowledge to create the new value and making the knowledge to the one who needs the knowledge conveniently. Educational institutions that develop initiatives to share knowledge to achieve business objectives are of tremendous value today Academic culture must change from knowledge hoarding to knowledge sharing. Application of knowledge management in education is an inclusive way to discover, manage and analyze the resource of the education information. Greater collaboration among institutional stakeholders in the area of knowledge management will result in better use of resources and improves services that are easier to access and use.**

Keywords*— *Knowledge Management, tacit knowledge, explicit Knowledge, Education

I. INTRODUCTION

Knowledge, according to Nonaka [1] is a comprehensive concept with profound meanings, bearing the belief that it increases an organization's ability for effectual action. Knowledge is professional intellect, such as know-what, know-how, know-why, and self-motivated creativity, or experience, concepts, values, beliefs and way of working that can be shared and communicated. It is a kind of asset that is more difficult to be duplicated, therefore the knowledge advantage is much more sustainable as defined by Davenport [2] and Allee [3]. Knowledge management can be defined as managing knowledge through the process of creating, sustaining, applying, sharing and renewing knowledge to enhance organizational performance and create value [4].

Knowledge management technologies include the user interface, knowledge map, knowledge base, retrieval, data mining, sharing, online analytical skills and so on. The traditional mode of education was teacher centric, whereas the knowledge management technologies have made students more independent, accordingly teaching mode is becoming increasingly diverse, such as study online, study based on progress, study with collaboration.

The advent of technologies has changed the education system. The characteristic of modern education is based on digital network, aptitude and media. The mode of studying and teaching has become more independent and different from the traditional one. The technologies viz., broadcast television system, planet digital communication system, computer network, antenna television network and wired communication network, the global education resources gets linked and makes the resources global.

The major knowledge management technologies include data mining, case-based reasoning, information retrieval, topic maps, weblogs and e-portfolios. The Data mining helps students to select information from a lot of materials; improving the efficiency of identifying interesting information objects. The case-based reasoning helps students to learn much more from the old cases; doing benefit to students when developing innovative technologies or learning new knowledge. Students can retrieve raw information and make information more explicit through Information retrieval technologies. The Topic maps provides reflective learning to the students; being useful for raising questions and analyzing; helping students to master comprehensive knowledge. The students can learn with peers and make great progress via Weblogs. And the E-portfolios deepen the learning and help students to master comprehensive knowledge.

The mode of traditional education has been changed greatly with information management technologies. The students can learn more independently with the utilization of technologies, which strengthens the reason for implementation of knowledge management in education. Knowledge plays an important role in many areas. It is also an important factor to evaluate the quality of education. With the changing environment, knowledge management plays a key role in the education field. And moreover, the development of the Information Technology provides a better platform to the knowledge management.

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Effect of Accelerated Ageing on Hardness and Flexural Behaviour of Woven fabric Glass/ Carbon Hybrid Epoxy Composites

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Abstract

Carbon fibre reinforced composites finds diverse range of applications in the fields of automobiles, aircrafts, marine structures etc. Even though carbon fibres offer higher flexural strength, expensiveness of these fibres limits their use. This article suggests an alternative in the form of carbon/ glass fibre hybrid composites. The present article throws light on the study of flexural behavior and hardness on the specimens of glass and carbon fibre reinforced hybrid epoxy composites subjected to accelerated ageing. Four sets of laminated composites were prepared by hand layup process by adding graphite filler of 5 %, 10 %, 15 %. Three sets of specimens with different filler content aged by boiling at different temperatures of 40 °C, 60 °C and 80 °C respectively with one set left unaged were subjected to shore D hardness test and flexural test. It was observed that the specimens with 5% graphite filler showed better flexural behaviour in comparison to the specimens with other filler content. Also it was observed that the flexural strength and flexural modulus decreases with increase in filler proportion and boiling temperature. However a little variation was found in the hardness of specimens with varying filler proportion and boiling temperatures.

Selection and Peer-review under responsibility of Advanced Materials, Manufacturing, Management and Thermal Science (AMMMT 2016).

Keywords: Accelerated ageing; Hybrid, shore D; Graphite filler

1. Introduction

Polymer matrix material which is generally called as resin solution is widely used in production of commercial composites. The easy availability, low cost and reinforcement of fibres with better adhesion permits fabrication of Polymer matrix composites (PMCs) [1, 2].

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AMMMT 2016

Effect of Geometric Discontinuity on Stress Concentration Factor of Al6061T6 Alloy under Bending Load

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Abstract

Geometric discontinuity plays a vital role in failure of mechanical members. Grooved or cracked components cannot be replaced immediately, the reason being their high cost and restrictions offered by practical operational features. Such circumstances lead to the requirement of assessing the reliability of grooved or cracked specimen. The objective of present work is to determine relatively safest geometric discontinuity which provides higher reliability under the action of bending loads. Uniform cylindrical specimens of different geometric discontinuities were machined in such a way that all specimens have approximately same cross sectional area at the groove geometry. The specimens were subjected to bending load with a loading rate of 0.5 mm/min on Universal Testing Machine. The maximum stress and stress concentration factor (SCF) for each specimen are calculated and the failure behavior is analyzed. The results show that, the elliptical grooved specimen deform plastically with SCF of 1.4 absorbing a large magnitude of energy whereas the V-groove specimen with SCF of 1.73 failed in a brittle manner with relatively negligible deflection.

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Keywords: *Stress concentration factor; V-Groove; Deflection; Brittle; Stiffness; Reliable.*

1. Introduction

While designing the machine parts, the stress raisers are usually avoided but under inevitable conditions the number of stress raisers is limited to minimum so as to extend the life of the component. The existence of geometric discontinuity in a machine component under service may lead to crack initiation and finally resulting in failure of the component.

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Classification of Scalding Burn Using Image Processing Methods

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***Abstract*— Scalding is one of the major accidents and is often life threatening. The research attempts to find automated solution for classifying scalding (grade 1, grade 2, and grade 3). In India the statistics show that more than 50% children are affected by scalds and thermal burn. The research finds an automated solution for classifying scald burn as superficial, partial thickness and full thickness scald. The development and implementation of the proposed work are of significant importance specifically in rural areas where medical facilities are scarce. A scalding burn image database is formed with images collected from hospitals and other open sources. The pattern analysis or pattern classifier technique namely Support Vector Machine (SVM) and k-Nearest Neighbors algorithm (KNN) is used in this work. SVM is found to give best results in comparison with the KNN classification.**

***Keywords*— SVM, KNN, DCT, RGB, GLCM**

I. INTRODUCTION

With the advancement in Science and technology, automation has crept into every sphere of human lives. Medical Imaging has become an indispensable part of human lives. The progress made in leaps and bounds in medical science in the past century and greater work on image processing, pattern recognition, and machine intelligence has given additional capabilities to medical imaging. Hence, non-invasive diagnosis is now possible.

Implementing an accurate, user-friendly, analysis process helps in theproper treatment and increases the chances of early recovery. Intensive medical amenities are not readily available in rural, semi-rural, and sub-urban areas. Also, modern techniques are more costly which adds on to the woes of the patients immensely. The misery of waiting for the specialists at the rare poly-clinic or arduous travel to the nearest town or clinic can be determinal in critical cases. This research has been taken up with a view to address the needs of such patients, particularly those suffering from scalding.

Skin is a sense organ and the outermost part of our body strategically protects all the underlying organs. Being the one exposed to environment constantly, skin is usually prone to damage. The range of injury may be due to heat, light, radiation, electricity, chemicals. In general, the scald burns affects only the epidermis, which is the outer layer of the skin. But at times deeper tissues of muscles, bones or blood vessels could also be injured if the injury is severe. First aid must be provided to lessen the loss to the skin immediately. Suitable treatment could be even prolonged in places of less access to medical aids if the first aid could be administered on time. Usually, theproper diagnosis is not done due to the lack of specialists or due to the accidents taking place in remote regions. This promoted the need for a study and effective research in classifying the scalding burn images. The research comes in handy to recognize the grade of the scald burn which helps the health center to take theappropriate assessment for the right treatment. Hence helps quick healing with minimum harm to the skin.

A. Classification of Scalding

The major cause for scalds in children is hot drinks that they are usually exposed to. These can cause instant burn in kids and can be determinal many a times. Bubbling water, hot faucet water and hot showers, and also hot sustenance, soups, and sauces are other major reasons for theburn. Boiled water can even burn up to 30 minutes after it has been bubbled.

Children under two years are most at danger of burning from hot fluids in pots, tea kettles, pans, and containers. A new born can tolerate up to 36°C whereas for quite old children the range is 37°C - 38°C. Adults can withstand with no scald up to a temperature range of 41°C and 42°C. [1].

*Superficial Scalding (First Degree burn):*Superficial scalding is the slight burn with aninjury to the epidermal layer of the skin. It appears in light pink color.

Fig 1.A 1st Grade scald

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Influence of fused Silica and chills incorporation on Corrosion, Thermal and Chemical composition of ASTM A 494 M Grade Nickel alloy

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ABSTRACT
A review of a host of relevant literature on the composites leads to some important observations on the gap that prevails for developing the composite with increased strength to weight ratio, improved thermal properties and reduced corrosion rate with the addition of fused SiO_2 dispersoid for the nickel based alloy. In the arena of engineering, metallurgists look for techniques to improve the thermal, corrosion and chemical properties of the materials.
In this connection an investigation has been carried out to fabricate and evaluate the corrosion, chemical and thermal properties of chilled composites consisting of nickel matrix with fused silica particles (size 40–150 μm) in the matrix. The main objective of the present research is to obtain fine grain Ni/SiO_2 chilled sound composite having very good properties. The dispersoid added ranged from 3 to 12 wt. % in steps of 3%. The subsequent composites cast in molds containing metallic and non-metallic chill blocks (MS, SiC & Cu) were tested for their microstructure, chemical, thermal properties and corrosion behavior.
Keywords: Chills, Corrosion, Fused silica, Metal matrix composite, Nickel alloy, SEM & EDX.

1. INTRODUCTION

Many researchers reported the advantages of nickel alloy compared to other materials including the potential for high hardness, good abrasion resistance, improved corrosion resistance and micro creep performance. Furthermore, fabrication of the discontinuously-reinforced nickel composite can be achieved by standard metallurgical methods [1-3]. Nickel alloy based metal matrix composites are the class of advanced materials that are well suited for pumps, valves and automotive industries because of their strength, corrosion resistance and for electric and electronic industry because of their high thermal and electrical conductivities [4-6]. In particular, the particle-reinforced Metal Matrix Composites (MMCs) are attractive since they exhibit near-isotropic properties in comparison with the continuously-reinforced matrices.
With the increment in the interest for quality composites, it has become crucial to create nickel combination composites that are free from hardening imperfections. It is understood that Ni alloys solidify over an extensive variety of temperature and are hard to nourish amid cementing. Nickel composite is inclined to surrender as a small scale shrinkage. The scattered porosity brought about by the pale method of hardening can be successfully diminished through the utilization of chills. Chills concentrate heat up at a speedier level and advance the directional solidification. In this manner chills remain broadly utilized by foundry engineers for the generation of comprehensive and excellence

A Study on Mechanical Properties of Treated Sisal Polyester Composites

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Abstract

In the present study an attempt is made to determine the mechanical properties of sisal fiber reinforced polyester composites. Sisal fibers are the natural fibers obtained by processing the leaves of the sisal plants grown in nature. Sisal plant offers hard and strong strands of sisal fibers. The soft tissue of the sisal leaves is removed either physically or by using equipments. The fibers obtained are dried and brushed to remove the dirt left over to get the sisal fibers. In the present study, randomly oriented sisal fiber reinforced polyester matrix composite specimens of thicknesses 2 mm, 3 mm, 4 mm, 5 mm and 6 mm were fabricated by using hot compression moulding technique. 5 % NaOH treated sisal fibers of length 10 mm is used as reinforcement for casting the composite specimens. A mixture of polyester resin, methyl ethyl ketone peroxide and cobalt naphthenate of ratio 50:1:1 is used as matrix for the fabrication of composite panels. Composite panels of fiber volume fraction 10 %, 15 %, 20 %, 25 % and 30 % were casted and the test specimens were cut from the panels and tested for its tensile strength and flexural strength as per ASTM D-3039 and ASTM D-7264 respectively. From the experimental results it is observed that strength of tested specimens was found to show peak values at a fiber volume fraction of 20% to 25%.

Key words: sisal, mechanical properties, polyester, natural fibers, chemical treatment.

1. Introduction

Continuous studies were reported by researchers in pursuit of new materials which has brought about a large group of new materials and innovations. The need for materials that are stronger, lightweight, corrosion and chemical resistant and permeable to electromagnetic radiations have lead to the use of composites. During the recent thirty years, composite materials, plastics and ceramics have emerged as dominating innovative materials with wide advantages and applications [1]. The constituent material of composites that has higher strength is reinforcement. It can be fiber, fabric particles, particulates or whiskers. In many parts of the world, artificial fibers like steel, carbon or polymeric strands (fibers) are used as reinforcement. Attempts have been made to use naturally available strands obtained from plants and so on as reinforcements in composite materials. A unique aspect of these strands is the low vitality required for their extraction. A noteworthy issue in the utilization of these strands with matrix is that they develop rough surface in the alkaline environment and thus sturdiness of the composite involves concern. Sisal plant offers ascend to hard and strong fibers. The composition of sisal fiber is basically of cellulose, lignin and hemicelluloses. The failure strength and the modulus of elasticity, depend on the amount of cellulose and the orientation of the micro-fibers [2]. As a natural product, these properties have a variation from one plant to another plant. The Sisal fibers are commercially available in different formats viz., fabric, cords, strips, wire and rolls. The

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Probabilistic Study of Tensile and Flexure Properties of Untreated Jute Fiber Reinforced Polyester Composite

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Abstract

A work has carried out to estimate the probable range of tensile and flexure strength of a Jute/Polyester composite. The composite specimens of different thickness and different fiber volume fractions were studied. The composite of 4.1 mm thick 24.39 % fiber volume fraction has shown highest tensile strength and 3.48 mm thick 15.62 % fiber volume fraction has shown highest flexural strength. Both these mechanical properties of Jute/Polyester composite follow normal distribution is also presented. More than 95 % probable range of tensile strength of 4.1 mm thick 24.39 % fiber volume fraction and flexural strength of 3.48 mm thick 15.62 % fiber volume fraction are between 33.5 MPa to 42.0 MPa and 190 MPa to 275 MPa respectively.

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Keywords: Jute Fiber, Polyester Matrix, Tensile Strength, Flexure Strength, Probability, Natural Composite

1. Introduction

Fiber reinforced polyester (FRP) composites are entering into the technical field with their wide range of advantages. They have high lightened themselves with these properties; high strength to weight ratio, corrosion resistance, impermeable to electromagnetic radiation, high stiffness, chemical resistance. The FRP composites with natural fibers as reinforcement are more economical than the artificial FRP composites such as glass, carbon composites. The natural fibers which can be used in natural FRP composites are jute, sisal, kemp, banana, coir. The natural composites have come with the properties like bio-degradability, cost saving, easy availability and cause less

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Prediction of Flexural Properties of Coir Polyester Composites by ANN

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ABSTRACT

In the present study flexural strength of coir fiber reinforced polyester composite is predicted by using Artificial Neural Network. Randomly oriented coir fibers of length 10 mm were used to cast 3 mm, 5 mm and 6 mm thick specimens with fiber volume fraction of 10 %, 15 %, 20 % and 25 % respectively. The flexure tests were conducted as per ASTM D7264. From the experimental results it is observed that the flexural strength increased up to 20 % fiber volume fraction and then it decreased. Further flexural strength is found to increase with increase in the thickness of composite specimens also. Composite specimen of 5 mm thickness with 20 % fiber volume fraction recorded the highest flexural strength of 141.042 MPa. An Artificial Neural Network is adopted with supervised training approach to fix the optimum weighted matrix. Predicted results of flexural strength are also presented. Both the experimental and predicted results of flexural strength depict the similar trend. The error between predicted and experimental results is less than 5.00 %, hence Artificial Neural Network can be effectively adopted to prognosticate the flexural strength of coir fiber reinforced polyester matrix composites; which reduces the expensive manual involvement and its related errors during conduction of experimental programme. Artificial Neural Network results can be obtained quickly than the experimental results.

Key words: coir, flexural strength, ANN, prediction, polyester.

1. Introduction.

In spite of having low density and weight, natural Fiber Reinforced Polymer (FRP) composites are tough and have acceptable specific strength, good thermal properties and reduced dermal and respiratory irritation. Natural FRP composites are also biodegradable, economical, environmental friendly and impermeable to electromagnetic radiations. Compared to the artificial fibers natural fibers are easily (locally) available, requires less chemical treatment, requires lesser expenditure for fabrication setup. Hence in the present study one of non-wood natural fibers like coir is used as reinforcement with polyester resin. Cobalt napthanate

Prognostication of Concrete Mix Proportion using Soft Computing Technique

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ABSRACT: In the present study concrete mix design is achieved by using soft computing techniques, instead of using conventional manual approach. Here an equation driven technique (a process of development of coefficients) and Artificial Neural Network approach is adopted individually to achieve optimum concrete mix design. Achieving optimal concrete mix design by conventional approach is very much tedious job. New (less experienced) designers feel difficult to take decision while deciding the water cement ratio and superplasticizer quantity during concrete mix design. These difficulties lead for failure to achieve optimum concrete mix proportions. Initially optimum concrete mix proportion data set were developed for different input parameters, manually! Further this data set is used in Gauss elimination techniques to develop the coefficients to forecast concrete mix proportion by a less human effort. Likewise optimum weighted matrices are also developed by ANN approach. Hence, less experienced civil engineers can be successfully use the obtained coefficients or developed weighted matrices to prognosticate the concrete mix proportions. Error between all predicted and actual concrete mix proportion values are worked out to be less than 3%. It encourages the usage of soft computing technique to derive optimum concrete mix proportions.

INTRODUCTION

Concrete is a most essential material for all infrastructures. It is a composite material. It composed of sand (fine aggregate), cement (binder), coarse aggregate (crushed or gravel stones), water and (with and without) admixtures. The procedure of deciding the proportions of cement, fine aggregate, coarse aggregate and water is called concrete mix design. IS-10262-2009 is the code suggested by the Bureau of Indian Standard to design concrete mix proportions. Usage of this code requires high knowledge of interpolation, graph reading, because of its complex graphs and tables. To decide the mix proportions, conventional methods consume more time and also more human resource is required (Gowda and Prasad 2011). This is exceptionally monotonous and uneconomic for little and moderate projects. So in our present study we attempted to eliminate those difficulties by adopting soft computing techniques. An equation driven technique and Artificial Neural Network (ANN) is adopted as soft computing technique. Hence, in the present study optimum concrete mix proportion data set are developed for different input parameters manually! In equation driven technique co-efficients are generated by using gauss elimination method to forecast concrete mix proportions.ANN approach is fundamentally data driven approach. ANN basically learns by known examples and results are stored in the form of weighted

Optimum Design of Isolated RCC Footing using Soft Computing Technique

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ABSTRACT: Manual design of isolated RCC footing is a very tedious job. It demands experienced knowledge of reinforced cement concrete behavior under axial load and bending moment. A less experienced (new) engineer feel complex to analyze and design the isolated RCC footing under various types of load. Even though, check for safety against one-way shear, two-way shear, flexure failure, bending stress and development length is another difficult task. To minimize all the above mentioned complexity, soft computing technique like artificial neural network approach is adopted. Initially, optimized results of different set of input parameters are generated manually! Here, column size, axial load, safe bearing capacity of soil, characteristic compressive strength of concrete, yield strength of steel reinforcement are used as a input parameters. And depth, breadth, length, percentage of steel reinforcement is used as output parameters. Feed forward, supervised, single layered Artificial Neural Network is developed to prognosticate the optimized output parameters of isolated RCC footing. Both rectangular and square shaped footings are considered for the analysis and future prediction. All the predicted results showed very well agreement with manual results. Hence, a new or less experienced design engineers can successfully use the developed weighted matrix to forecast optimum design parameters of both square and rectangular shaped isolated footings by a less effort.

INTRODUCTION

Many Engineers are struggled to get the optimum designed value of Isolated RCC footing, due to its complex computation and tedious procedure. So considering the above difficulty facing by the Engineers we choose to adopt Artificial Neural Network (ANN) Technique to get quick and ease optimum design value of footing. Based on Literature Survey ANN Technic is the best tool to privies the intermediate and future value by data driven technique. There are 6 parameters selected as input data and 5 parameters are considered as output data for designing the footing. Here, column size, axial load, safe bearing capacity of soil, characteristic compressive strength of concrete, yield strength of steel reinforcement are used as a input parameters. And depth, breadth, length, percentage of steel reinforcement is used as output parameters. The basic philosophy of ANN is that it learns by known examples and results are stored as experienced knowledge in the form of weighted matrix. This weighted matrix is used for future prediction for unknown examples (Gowda et al., 2013) [1]. This main aim of this paper is to predict the optimum Depth, Length, Breadth, Area of steel reinforcement values. The investigation carried out is arranged in the further sections. A significant number of articles have been published in application of soft computing technique to obtain the optimum design of isolated RCC footing. Chethan et al. (2012) [1] studied the efficient design of counter fort Retaining wall using ANN.

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A Study on Impact Strength Characteristics of Coir Polyester Composites

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Abstract

To study the energy absorption capability of coir polyester composites, experimental studies were conducted as per ASTM D256 norms. Experiments were conducted on specimens with both untreated and treated with 5 % NaOH solutions. The specimens of 2 mm, 3 mm, 4 mm, 5 mm and 6 mm thicknesses with fiber volume fraction of 10 %, 15 %, 20 %, 25 % and 30 % were tested to study the variation of their impact strength with variation in specimen thickness and fiber volume fraction respectively. From the results it is observed that, as the thickness and fiber volume fraction of both treated and untreated coir polyester composite specimens increases, the impact strength also increases. Untreated coir polyester composite of 30 % fiber volume fraction yielded its highest impact strength of 1.570 N-m. Similarly treated composite specimens also yielded its peak impact strength of 1.275 N-m at its 30 % fiber volume fraction.

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Keywords: composite; coir; impact strength; natural composite; treated coir.

1. Introduction

Coir is one of the most eligible natural fibers to use as reinforcement with polyester matrix. Coconut fiber is extracted from the external shell of a coconut fruit. The standard name, scientific name and plant group of coconut fruit fiber are Coir, Cocas Nucifera and Arecaceae respectively. There are two types of coconut fruit fibers- brown fruit fiber extracted from mature coconut fruits and white fruit fibers extracted from tender coconuts. Brown fruit

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Comparative Study of Impact Strength Characteristics of Treated and Untreated Sisal Polyester Composites

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Abstract

In the present study both treated and untreated sisal polyester composites are tested to study its impact strength characteristics. ASTM D256 norms are followed to conduct the impact test on the specimens of 2 mm, 3 mm, 4 mm, 5 mm and 6 mm thicknesses for fiber volume of 10 %, 15 %, 20 %, 25 % and 30 %. Random orientation of fibers was adopted. Length of fibers used in casting the specimen is as 10 mm. Here all the specimens are fabricated by using manually operated hot compression moulding technique. The results obtained from the present study have shown that impact strength increases with increase in the thickness. Untreated sisal polyester composite yielded its peak impact strength of 3.581 N-m at its 30 % fiber volume fraction. Treated sisal polyester composite has shown highest impact strength of 1.962 N-m at its 30 % fiber volume fraction.

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Keywords: composite; sisal; impact strength; natural composite; treated sisal;

1. Introduction

Since in some parts of the world, manufactured fibers like steel or glass fibers (fibers) are not easily accessible, attempts have been made to combine naturally available fibers isolated from plants in composite materials. A special aspect of these fibers is the easy processing for their extraction. A noteworthy issue in the usage of these fibers with matrix is that, they develop rough surface in the alkaline environment and subsequently durability of the composite

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Effective Use of Arches in Construction

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ABSTRACT: Arches are one of the efficient forms of structural systems. They are widely used in buildings and bridges since ancient times. The behavior of arches depends on the geometric characteristics (i.e. rise, span, thickness and width), materials used for the construction, types of loading and support conditions provided. Arches are constructed normally in masonry. Conventionally masonry arches are constructed using Bricks or Stones in cement mortar. Plain cement arches can also be preferred in constructions. This paper presents the effective use of Arches in construction for various purposes which lead to the increase in strength of structures and reduction in the overall cost of construction. .

KEYWORDS: Arch, foundation, Abutments

I. INTRODUCTION

Arches have been used extensively for the construction of bridges since ancient times. There are several thousand masonry arch road bridges throughout the world, ranging from small span to long multi-span structures. These bridges have given excellent service in terms of strength and durability. In case of buildings arches have also been used to withstand the structural loads above the openings in place of conventional lintels. Now a day's, brick masonry arched panels have been used as roofing elements for low cost buildings to avoid the usage of costly materials like steel and concrete. The use of aches in foundations is very rare even though same has been used extensively for bridges, lintels and roofs. Sarangapani (2002) of Mysore, Nagireddy (2003) of Hyderabad and Pradeep Kumar (2003) of Shimoga have successfully used stone masonry arches in foundations for walls as a replacement to the conventional spread footings. Ganesha Mogaveera and G Sarangapani (2015) have successfully carried out research work on Laterite block masonry arches and Plain cement concrete arches.There is around 40 to 50 percent reduction in cost of foundation if arches are used instead of spread footings. Conventionally spread footings are widely used for wall foundations. This type of constructing foundation in India goes back to great antiquity. The modern spread footing consists of stone masonry in 1:6 cement mortars of 5 to 6 courses. Minimum width of the footing at the bottom being 1m.

Arch can also be defined as a beam, which is curved in the lateral direction. Arches are pre-dominantly subjected to compressive stresses. A typical arch with its components are shown in Figure 1.Arches are more economical than the ordinary beams particularly for large spans because the bending moments and shears acting over the cross section of the arches are considerably smaller to that of beams of same span and carrying the same load. The choice of type of arch depends upon the span, the available rise and the architectural effect desired. The semicircular arch gives minimum reaction on the abutments and is used where light abutments are available. The parabolic arch is suitable for uniform loads and elliptical arch is more suited for loads which increase towards the springing as in case of filled spandrel arch. Information available on the behavior of arches is scanty.

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Earth Sciences Rock Science and Rock Engineering Role in Planning and Development of Civil Engineering Projects With Special Reference to Smart Cities in India

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Abstract: Geological and rock engineering parameters play significant role in planning of civil engineering projects. Rock mechanics and engineering is one of the most important aspects in constructional engineering projects. Rock characters, rock engineering and rock mechanics play significant role during civil engineering design of the engineering projects. India has been traditionally vulnerable to natural disasters on account of its unique geo-climatic conditions. Floods, droughts, cyclones, earthquakes and landslides have been recurrent phenomena. Rock sciences and rock engineering plays significant role in mitigating measures of natural hazards. Government of India has planned to develop selective few cities into smart cities and to provide required facilities to citizens and safe guard from natural and manmade disasters. The importance of the earth sciences and rock engineering is evidenced for most of the basic elements for constructing a smart city planning and development by the Ministry of Urban Development Government of India. The importance of the geology is evidenced for most of the basic elements for constructing a smart city provided by the Ministry of Urban Development, GOI. A smart city, need to find a balance between risks and resources to develop urban planning on the basis of earth sciences and rock engineering.

Keywords: *Earth Sciences, Rock Engineering, Engineering Projects, Smart Cities*

1. Introduction:

All civil engineering projects have to take into consideration one or the other geological aspects during planning. Practicing engineers face several geological challenges in the field almost every day. Engineering geology is a multidisciplinary subject having interrelations with other disciplines. Site selection, design and construction of onshore and off shore structures and all kinds of civil engineering constructions are influenced by the geological factors specific to the site. The sub-surface foundational conditions in engineering projects always require judicious and deserving interpretation of geological features. The civil engineer's responsibility is to define what kind of information he needs concerning the materials and surface and sub-surface conditions .It is an engineering geologist's responsibility to obtain and interpret that information .The burden of geologic interpretation rests with the geologists, the burden of engineering interpretation and application rests with the engineer (Venkat Reddy, 2011).

The geologists must assimilate the data and present conclusions and recommendations to the engineer in concise, practical form (Rogers Rhoades, 1946). Natural Disaster has received substantial attention from the scientific community in recent past. It has also provoked policy makers to think about it. Natural disasters have conquered much of scientific and political debate on global level due to its overall impact. India has been traditionally vulnerable to natural disasters on account of its unique geo-climatic conditions. Floods, droughts, cyclones, earthquakes and landslides have been recurrent phenomena (Ramasamy and Venkat Reddy, 2009). Planning for smart cities requires in detail study of local geological, hydrological, geomorphological, ecological, social, etc. aspects. A comprehensive study on rock sciences 'rock engineering, site specific geological parameters and their role in planning for mega engineering projects and for planning ongoing smart cities in India have discussed.

2. Rock Engineering/Rock Mechanics:

Is the theoretical and applied science which studies the mechanical behavior of rocks. Rock mechanics is that branch of mechanics concerned with the response of rock to the force field of its physical environment. This definition is given by the International Society of Rock Mechanics (ISRM). There are some who believe that rock mechanics is

90nm Node 1T Floating Gate Embedded Flash Memory with Precharge NMOS Transistor

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ABSTRACT
In recent technology advances, Flash Memory has become a powerful and cost – effective solid state storage technology predominantly used in mobile electronics devices. Non-volatile memory like Flash memory developed on two architectures NAND and NOR. The proposed methodology is developed on 1T-Flash NOR cell to reduce area and obtain high performance even at 90nm logic process technology. NOR offers low read latencies features; make it suitable choice for direct code execution. The proposed method design of single poly silicon Flash memory designed and developed 4x4 flash memory architecture and pre-charge transistors to boost the flash cell architecture to operate at low voltage 1.2V to 5V for the program (write), erase and read operation. The advantage of pre-charge is that it gives start up voltage to flash memory. The proposed method is developed using Tanner and Microwind 3.1 version.

Categories and Subject Descriptors
A.0 [**Programming Languages**]: General – Conference proceedings.
B.3.2 [**Memory Structures]** Performance Analysis and Design Aids – Formal Models, Simulation.
B.7.1 **[Integrated Circuits]** Types and Design Styles – Memory technologies, microcomputers, standard cells.
B.7.2 **[Integrated Circuits]** Design Aids – Graphics, Layout, Placement and Routing, Simulation, Verification.
C.5.3 **[Computer System Implementation]** Microcomputers – portable devices, personal digital assistants.

General Terms
Algorithms, Measurement, Documentation, Performance, Design, Reliability, Experimentation, Security, Standardization, Languages, Theory, Verification.

Keywords
Flash memory, Precharge NMOS Transistor, Hot Channel Electron, Floating gate, FN Tunneling, Control gate.

1. INTRODUCTION
Memory performs the most important role in SOC (system on chip) application due to capability of storing data with or without power to the IC [1]. However, only two types are present in memory, such as Volatile memory and Nonvolatile memory. The SOC products requires high performance with low voltage supply (low power consumption) for example, mobile units like where storing information is important [2] [3].

A volatile memory is one type which stores data, but when a power supply is disconnected or lost, the data in memory are no longer used for further tasks. On other hand, data stored in a Nonvolatile memory are permanent that means after power is disconnected or lost to the device, the data will be available [3].

The most promising and widely used memory is Flash Memory which is nonvolatile memory. The flash memory has one extra gate which is called Floating Gate, in between control gate and substrate. There are two types of flash memory, NAND flash and NOR flash. The N-type channel flash memory gives more programming current at low power consumption, which gives high performance compared to P-type channel flash memory. The advantage of N-type channel is that N-type has a high concentration of the electrons as the main charge carrier compared to P-type channel and hence the mobility of N-type is higher than P-type channel. The scaling of flash memory voltages is very important because high voltage for program, erase and read lead to power consumption, larger area and complexity. The reduction of voltage for three operations is achieved by reducing tunnel oxide thickness. The single poly n-type channel flash is mostly used nowadays [4].

The precharge transistor is consists of PMOS and NMOS or sometimes only one either PMOS or NMOS. When it connected to Vdd supply and transistor is ON, it gives constant output to further connect circuits. The output of precharge gives nearly the startup voltage to next CMOS logics. The generated output of the precharge circuit gives enough voltage for the flash memory to do read, write, and erase operation and hence it reduces required voltage [4] [5].

Nowadays, to design a flash memory different logic node technologies are present. These technologies help to increase the performance of flash memory and it will reduce power consumption. The last node technology is introduced by Intel which is 14nm that means the length and width dimension are

Design and Implementation of an Embedded System to Detect Military Fratricide Crisis

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***Abstract*— Friendly fire is the situation where military forces attacks on friendly forces while attempting to attack the enemy. Causative reasons may be either misidentifying the target as hostile or due to errors. Such attacks results in unwanted casualties in the battle field. Utilization of improved technology to assist in identifying friendly forces is an ongoing process to prevent any fratricides. In this proposed paper one such attempt is made to develop an embedded device to identify friendly forces. In this approach encrypted data is sent through laser beam for an authentication. Implementation method gives special consideration to power down strategies, efficient encryption and decryption methodologies and theft security for the module. Software programming algorithm and their implementation is also discussed.**

PIC16F877A from Microchip Corporation is used as heart of this design. It features 256 bytes of EEPROM, self programming, 8 channels of 10 – bit analog to digital converter, UART. Using mickroC PRO IDE, entire software programming done in embedded C language.

***Keywords*— encrypted laser beam, fratricides, friendly fire, pulse detector, PIC microcontroller.**

I. INTRODUCTION

This paper aims in developing an embedded system, which identifies friendly forces to assist in prevention of fratricides at battle field. In the confusion of battle, it is easy to shoot friendly forces, accidently [1]. The effects of friendly fire are not just unwanted casualties, but being hit by their own forces causes a huge negative impact on morale. Forces start doubting the ability of their command, and existence of friendly fire makes commanders more cautious in the battle field. To reduce this effect by military leaders generally starts with identifying the causes of friendly fire and overcoming repetition of such incidents through supplying adequate training, tactics and making use of technology [2] [3].

In this proposed system encrypted laser beam is being transmitted from the initiative unit to the opponent responder unit. The responder unit is expected to decrypt the received encrypted data and sends back a message indicating friendly force is indentified. A soldier equipped with the proposed system has a responder unit on their body armour, and an initiator unit mounted on their rifle. The rifle module transmits an encrypted laser beam. If the rifle points towards a friendly force, phototransistors equipped on the target body armour detects an incident of laser beam. If decryption is successful, the master control unit indentifies which friendly force is currently targeted.

A pulse detector is used to ensure that the system to be deactivated soon after separation from the soldier body; enemy forces cannot recover system from dead soldier and use it to masquerade as friendly force.

The rest of this paper is organized as follows:
section II has discussion on case study of friendly fire crisis in past. Section III exposes system configuration and architecture. Section IV has discussion about hardware design and interface techniques. In section V, Implementation and workflow of the system is portrayed. Section VI, validation and experimental results. Section VII concludes this paper.

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II. FRIENDLY FIRE : CASE STUDY

Most militaries use extended training to ensure troop safety as part of normal coordination and planning, but are not always exposed to possible friendly fire situations to ensure they are aware of the situations. Some tactics make friendly fires are inevitable [6]. History gives many such examples of friendly fire causing death of royalist commanders. Few cases are discussed in this section.

Six Philippine soldiers were killed in one of the bloodiest clashes against al – Qaida – linked militants on July 11, 2014 were hit by friendly fire [9].

In Afghanistan Five American soldiers were killed by friendly fire incident on June 10, 2014. A former football player, American Ranger Pat Tillman were shot and killed by American forces in 2004 [8][9]. In 2009, a British Military Police Officer was shot and killed by British sniper while on patrol.

On October 2012 Indian army witness friendly fire led to death of one soldier and injuries to two. Army spokes person says that ‘these are the realities of combat. Factors like combat stress, the fog of war, affect decision making’. Proper use of advanced technologies may found helpful in solving friendly fire problems. In response to such crisis in this proposed paper an attempt is made to develop an embedded

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Secure Learning in the Mobile Cloud

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***Abstract*— Mobile Cloud Computing is a rapidly growing technology in the modern world, having applications in almost every area including education. Mobile Learning is implementation of learning using mobile devices in the field of education, which can also be considered as complementary approach to implement Knowledge Management in an organization. Mobile Cloud Computing is the best technology to implement Mobile Learning since it does not require much investment. This paper gives an overview of the Mobile cloud computing concepts, the related issues and then discusses a secure implementation of M-Learning using Mobile cloud computing and then analyzes the benefits of using this approach.**

Keywords*— *Cloud Computing; Mobile Cloud Computing; M-Learning; Information Security; Authentication

I. INTRODUCTION

The coming years should be a very exciting time for education sector. Two areas that are expected to show a lot of activity in the coming years are cloud services for education and mobile learning [1]. There are also a lot of chances for these two sectors to join together as cloud computing can be a solution to provide greater capabilities to platforms for mobile information access and communication.

In today's modern world, the existing education system is not suitable for the educational growth and demands of the industry requirements. Hence it is necessary to modify the education system according to the growing needs of the industry and society. Mobile learning is the latest trend in the education sector which is intended to enhance the education system with the latest technology.

Mobile learning is a web based learning system, using mobile devices to support, manage and enhance learning [2]. It is not intended to replace the existing education system; however it aims to improvise it. Mobile learning has a number of advantages like flexibility, scalability, openness and so on; it will definitely become a new system of education in the new century.

Mobile Learning is also considered as a complementary approach to implement Knowledge Management in an organization. Knowledge management is the method of managing, organizing and distributing the knowledge represented by documents, manuals, video and audio by means of effectively managing the people, internet and mobile networks [3]. Thus, Mobile Learning is a part of knowledge management which facilitates learning as a major part of distributing knowledge.

In the existing learning systems using internet, the system construction, infrastructure and maintenance are to be performed within the organization. This requires a lot of investment and results in a lot of maintenance overhead. Hence, the institutions are required to find new techniques which provide better and economical services for learning.

Mobile Cloud Computing has become a hot research topic among companies and researchers, as it offers convenience, ease of use and other advantages [4]. It has changed the view of internet into a new computing paradigm, having a broad development prospectus. The application area of Mobile Cloud Computing has extended in almost any area including education sector.

In contrast, Mobile cloud based learning system offers several advantages. On the one hand, the Mobile cloud developers can use their own technological skills to build a learning system having good performance, many functions, and a large number of features. On the other hand, institutions are free from building and maintaining the learning system; they can focus on using the learning system in a better manner in order to improve the education quality.

This paper starts with discussing Mobile Cloud Computing, its benefits and issues. The section 3 discusses Mobile learning and related issues. Section 4 deals with implementation of Mobile learning using Mobile Cloud.

II. MOBILE CLOUD COMPUTING

Today, the Smart phones are growing at rapid phase which are equipped with a large number of features and applications. They have the facility of moving anywhere and accessing the data any time. With the ability to access the web any time, the Smart phones can be connected to cloud emerging a new computing paradigm called Mobile Cloud Computing.

The Mobile Cloud Computing Forum defines Mobile Cloud as follows [5]: Mobile cloud computing is a system in which both the data processing and data storage are performed outside the mobile equipment. It performs the computations and storage of data in the cloud and out of the mobile, bringing applications to not just sophisticated mobile users but a wide broader range of mobile users.

There are different types of details about the Architecture of Mobile Cloud Computing in the literature. A layered architecture has been explained in [6]. Service oriented architecture has been explained in [7]. In [8], the authors have

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REQUIREMENTS ELICITATION USING DOCUMENT ARCHETYPE

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ABSTRACT

Requirement elicitation is a important process where it discovers the requirements of stakeholders The regular confronts that analysts face during elicitation process are to guarantee effective communication between analyst and the clients. Mostly errors in the systems are due to poor communication between client and analyst. This paper suggests an enhanced approach for requirements elicitation using Document archetype.

KEYWORDS

Requirements engineering, elicitation, document archetype

Growth and Structure of A New Photonic Crystal: Chlorine Substituted Chalcone

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Abstract: A new organic photonic material 3-(2, 4-dichlorophenyl)-1-(2,5-dimethylthiophen-3-yl)propan-1-one(DMTP) has been synthesized and crystallised in acetone solution. The functional groups present in the new material were identified by FTIR spectroscopy. The material is optically transparent in the wavelength range of 400–1100 nm. The crystal structure of DMTP was determined by single crystal X-ray diffraction. The title compound crystallizes in monoclinic system with a centrosymmetric space group $P2_1/c$. The Z-scan study revealed that the optical limiting property exhibited by the DMTP molecule is based on the reverse saturable absorption phenomena.

Keywords: Nonlinear Optical Material, FTIR, UV-Visible, Crystal structure, XRD.
PACS: Replace

INTRODUCTION

Organic nonlinear optical (NLO) materials with high NLO coefficients and ultra-fast response time are required for applications such as frequency conversion, frequency mixing, optical data storage, electro-optic modulation, optical parametric oscillations and photonic integrated circuitry [1,2]. Recently the phenomenon of optical power limiting, a nonlinear optical effect, has attracted much attention due to its application to protection of eyes and sensitive optical devices from high power laser pulses. Since the discovery of optical limiting phenomenon, much work has been done in synthesizing new materials with adequate optical limiting property. The optical limiting property is facilitated by the presence of strong nonlinear absorption. An optical limiter strongly attenuates the laser pulses of high intensity where as it is completely transparent at lower light intensities. Ideally, the laser pulse energy transmitted through the limiter rises linearly with input energy and saturates to a constant value at high energies. The limiting threshold is defined as the input energy at which the transmittance is fifty per cent. Above the threshold, the output energy is clamped to the saturated value which depends on the material [3]. As an interesting type of nonlinear optical material, chalcone and its derivatives have recently received extensively attention due to their high tendency to crystallize in centrosymmetric structure and good optical limiting behaviour with nanosecond laser pulse at 532 nm wavelength [4-6].

EXPERIMENTAL DETAILS

Commercially available 2,4-dichlorobenzaldehyde and 3-acetyl 2,5-dimethylthiophene were used to synthesize the title compound by adopting Claisen-Schmidt condensation reaction method [7]. A mixture of equimolar quantities (0.01 M each) of 2,4-dichlorobenzaldehyde and 3-acetyl 2,5-dimethylthiophene in ethanol (60 ml) were stirred for 2 hrs. Then the contents of flask were poured into ice cold water (250 ml) and left for 12 hrs. The resulting crude solid was collected by filtration, dried and purified by repeated crystallization from acetone. Acetone was found to be the best solvent. The solution of the growth material was prepared in acetone. After filtration by using whatman filter paper, the solution was transferred into a crystal growth vessel. Next, it was kept for crystallization by slow evaporation at room temperature (28^{o}C). Good quality crystals of the new material were harvested within 15 days.

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Effect of position of nitrogen in pyridine ring on structural, optical and thermal properties of chalcone single crystals

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ABSTRACT

Crystals are unacknowledged pillars of the world of contemporary technology. Single crystals of a set of three chalcone derivatives, 1-(pyridin-2-yl)-3-(2,4,6-trimethoxyphenyl) prop-2-en-1-one (C1), 1-(pyridin-3-yl)-3-(2,4,6-trimethoxyphenyl) prop-2-en-1-one (C2) and 1-(pyridin-4-yl)-3-(2,4,6-trimethoxyphenyl) prop-2-en-1-one (C3) were grown by slow evaporation technique. The thermal analysis reveals that the chalcone derivatives possess good thermal and chemical stability. Crystal C1 is nonlinear optically (NLO) active with SHG efficiency of 0.7 times that of KDP. The position of nitrogen in the pyridine ring has a significant effect on thermal, structural and NLO properties of these materials. The UV-Visible spectrum discloses that the crystals have adequate transmission in the entire visible region. Due to good thermal stability, optical transparency and SHG response, crystal C1 is an useful candidate for NLO applications such as frequency doubling down to 433 nm.

DIRECT AND INDIRECT VECTOR CONTROL OF INDUCTION MOTORS USING HYBRID PID PLUS FUZZY CONTROLLER

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Abstract- Speed control is one of the various application imposed constraints for the choice of a motor. For speed control of a direct field-oriented induction motor (DFOIM) and indirect field-oriented induction motor, a Ziegler-Nichols (Z-N) based PID plus fuzzy logic control (FLC) scheme is proposed in this paper. Theparameter values of Z-N PID can be chosen using a simple and useful rule of thumb. The FLC is connected to the PID controller for enhancing robust performance in both dynamic transient and steady-state periods. The FLC is developed based onthe output of the PID controller, and the output of the FLC is thetorque command of the DFCIM. The complete closed-loop speedcontrol scheme is implemented in MATLAB0.14-hpsquirrel-cage induction motor. Simulation results showthat the proposed Z-N PID+FLC scheme can lead to desirablerobust speed tracking performance under load torque disturbances.Induction Motorperformance is checked through the simulation studies inMATLAB/SIMULINK environment.

Keywords- Speed Control, Hybrid PID Plus Fuzzy Controller, Induction Motor, Ziegler-Nichols Method.

I. INTRODUCTION

The implementation of field-oriented induction machine (FOIM) drives [1] is easy with low cost hence they have been increasingly utilized in motion controlapplications. The high servo quality is achieved by decoupling of torque and flux control.However,the decoupling control feature can be adversely affected by loaddisturbances and parametervariations in the motor so that thevariable-speed tracking performance of an IM is degraded. An effectiveand robust speed controller design of PI and PID controllersis needed for making the motor closely follow a reference speed trajectory under torque disturbances.In [2]-[8], fuzzy-logic-based intelligent controllers have beenproposed for speed control of FOIM drives and are associated with adaptive gains due to fuzzyinference and knowledge base.

As a result, they can improvetorque disturbance rejections in comparison with best trial-and-error PI or PID controllers. Thus a hybrid PID+fuzzy controller consistingof a PID controller and a fuzzy logic controller (FLC) arranged serially for speed control of FOIM `drives more specifically,direct field-oriented IM (DFOIM) drives is proposed.Because of simple and systematic design rule of the Ziegler-Nichols (Z-N)) method in [9] it is adopted for designing a PID controller(denoted as "the Z-N PID").

A FLC which carries out fuzzy tuning ofthe output of the Z-N PID controller to issue adequate torquecommands is designed. The simulation results show that the incorporation of the proposed controller into the DFOIM drives can yield superiorand robust variable-speed tracking performance.This paper is organized as follows. The mathematical model and control structure of a DFOIM are given in Sec. II. The proposed controller is given in Sec. III. Simulations are demonstrated in Sec. IV.

II. INDUCTION MOTOR AND CONTROLSTRUCTURE

In this section, we introduce the DFOIM drive shown inFig. 1. The dynamics of an induction motor can be described bysynchronously rotating reference frame direct-quadrature (d-q) equations [10] as

$$\begin{bmatrix} v_{qs}^e \\ v_{ds}^e \\ 0 \\ 0 \end{bmatrix} = \begin{bmatrix} R_s + pL_s & \omega_e L_s & pL_m & \omega_e L_m \\ -\omega_e L_s & R_s + pL_s & -\omega_e L_m & pL_m \\ pL_m & (\omega_e - \omega_r)L_m & R_r + pL_r & (\omega_e - \omega_r)L_r \\ -(\omega_e - \omega_r)L_m & pL_m & (\omega_e - \omega_r)L_r & R_r + pL_r \end{bmatrix} \begin{bmatrix} i_{qs}^e \\ i_{ds}^e \\ i_{qr}^e \\ i_{dr}^e \end{bmatrix} \quad (1)$$

$$J_m p w_{rm} + B_m w_{rm} + T_L = T_e. \quad (2)$$

$$T_e = \frac{3N}{4} L_m (i_{qs}^e \cdot i_{dr}^e - i_{ds}^e \cdot i_{qr}^e). \quad (3)$$

$$w_{rm} = \frac{2}{N} w_r \quad (4)$$

where the notational superscript "e" stands for the synchronousreference frame; v_{ds}^e,v_{qs}^e, i_{ds}^e, i_{qs}^e, i_{dr}^e, and i_{qr}^estand forthe d-axis and the q-axis stator voltages, stator currents androtor currents; R_s, R_r, $L_s$and $L_r$denote the resistances andself-inductances of the stator and the rotor; L_m denotes themutual inductance; $T_e$and T_L represent the electromagnetic and external force load torques, respectively; $J_m$and $B_m$arethe rotor inertia and the coefficient ofviscous damping,respectively; $\omega_r$and ω_{rm}denote the rotor and motormechanical speeds; ω_e stands for electrical angular velocity; N is the number of poles of the motor mechanical speed; pstands for the differential operator (d/dt) . The notationalsuperscript "s" in Fig.

Performance Enhancement of Hadoop MapReduce Framework for Analyzing BigData

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Abstract— **In this BigData era processing and analyzing the data is very important and tedious job. An open source framework called Hadoop, implementation of MapReduce provides efficient platform for BigData analytics. The performance of Hadoop MapReduce mainly depends on its configuration parameters. Tuning the job configuration parameters is an effective way to improve performance so that we can reduce the execution time and the disk utilization. The performance tuning mainly based on CPU usage, disk I/O rate, memory usage, network traffic components. In this paper we are discussing the tuning methods to enhance the performance of MapReduce jobs. From our experiment we can say that performance has improved by 32.97% over the baseline system.**

Keywords— BigData, Hadoop, MapReduce, Performance, Baseline system

I. INTRODUCTION

Apache Hadoop [1] is a popular open source framework used for distributed computing. The major components of Hadoop are Hadoop Distributed File System (HDFS) and the MapReduce [2] which is data-processing component. Hadoop is mainly used for store and analyze huge datasets often referred to as the BigData [3].When Hadoop cluster becomes undersized then improve the cluster by adding new computers or storage devices which are commonly used approach. We found that a high accurate performance model for MapReduce is needed, in order to optimize and dynamically adjust the job parameters (such as number of map tasks Reduce tasks, Buffer size, etc.) to shorten the job execution time.

Hadoop is very efficient when it comes to applying data analytic on BigData with a huge cluster. However, applications are different in terms of usage of resource and bottlenecks. Hadoop tackling the problem of performance from different perspectives like CPU utilization, I/O bounded, memory problem etc. The Hadoop configuration parameters should be modified according to many criteria especially the expected resource consumption of test application. Based on the application user should update at least the most important parameters. Hadoop cluster configurations play a significant role on the performance, i.e. even a small change to one configuration parameter value makes a huge difference to performance, when running the same MapReduce job with the same size of data input. Job configuration of MapReduce model is blackbox kind feature, so it is difficult to find a straightforward mathematical model to the cluster configuration for a specific job. And same type of configuration is not applicable for all kinds of MapReduce jobs. This experiment started by creating a performance baseline for the system. We kept the Hadoop default configuration settings saying it as baseline of the system and compared this result with new methods job configuration. In our experiment we chosen most important parameters of Hadoop such as number of map slots, reduce slots, buffer size and compressing the mappers output. We proposed new methods to optimize these Hadoop parameters, so overall performance has improved by 32.97 %

The rest of this paper is organized as follows. Section II discusses methodology i.e. our tuning methods. Section III we evaluate and analyze the performance improvements seen in our application example and finally in Section IV, we provide concluding remarks and discuss future work in this field.

II. METHODOLOGY

The methodologies described in this paper are based on experience of designing and configuration of Hadoop systems for different parameters. In this section, we provide a brief overview of Hadoop architecture i.e. HDFS and MapReduce and proposed new methods to tune the Hadoop parameters. The methodology presented here is universally applicable to any Hadoop performance optimization operation.

Hadoop Distributed File System (HDFS)

HDFS [4] is the distributed file system used by the Hadoop project, which is popular because of its scalability, reliability and storing capacity of very large

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HIGH SPEED IP BASED ARCHITECTURE FOR TELE COMMAND SYSTEM ON CHIP (SOC)

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Abstract— An IP (intellectual property) core is a block of logic or data that is used for making a field programmable gate array (FPGA) or application-specific integrated circuit (ASIC) for a product. Design reuse IP cores are part of the growing electronic design automation (EDA) industry which allows the repeated use of previously designed components. Using many IP cores a system itself can be designed, System on Chip (SoC) offers this requirement. In the current telecommand communication method, excess number of physical devices is present, which cause a major communication delay. Combining many of the predesigned internal blocks in to a single chip can solve this problem. The paper is concerned with the design of telecommand and telemetry system and its peripheral devices like combined memory and error detection and correction (EDAC) unit.

Keywords— EDAC, Telecommand, SoC

I. INTRODUCTION

The semiconductor industry has continued to make impressive improvements in the Very Large-Scale Integrated (VLSI) circuits. In order to keep pace with the levels of integration available, design engineers have developed new methodologies and techniques to manage the increased complexity occurs in these large chips. One such emerging methodology is system-on-chip (SoC) design, wherein predesigned and pre-verified blocks often called intellectual property (IP) blocks, IP cores, or virtual components obtained from internal sources, or third parties, and combined on a single chip. These reusable IP cores may include embedded processors, memory blocks, interface blocks, analog blocks, and components that handle application specific processing functions. Corresponding software components are also provided in a reusable form and may include real-time operating systems and kernels, library functions, and device drivers.

A System on a Chip or System On Chip (SoC or SOC) is an Integrated Circuit (IC) which integrates all the components of a computer or any other electronic system into a single chip. It is a group of all components and it's subcomponents of a system on to a single chip. SoC design allows high performance, miniaturization, good process technology, cost sensitivities and an efficient battery life time. This innovation in design had been used by many designers .Advantages includes the high performance and low power consumption, cost, and size.

A telecommand is a command sent to control remote system or systems i.e. not directly connected (e.g. via wires) to the place from which the telecommand is sent. The telecommand word is derived from tele = remote (Greek), and command = to entrust/order (Latin). Systems that need remote measurement and reporting of information of interest to the system designer or operator, require the counterpart of telecommand, telemetry. For a telecommand (TC) to be effective, it must be compiled into a pre-arranged format (which may follow a standard structure), modulated onto a carrier wave which is then transmitted with adequate power to the remote system. The remote system will then demodulates the digital signal from the carrier, decode the telecommand, and execute it. Transmission of the carrier wave can be by ultrasound, infra-red or other electromagnetic.

For effective control of the various satellite sub-systems under all conditions, a highly efficient and responsive telecommand (TC) system is absolutely essential. Some of the important operations performed by the telecommand system include energizing various subsystem, tape recorder operations, spin-up of satellite etc. Since remote control through telecommand system is the mainstay for these operations to be reliably performed in the satellite in orbit, the system has to work with a high degree of reliability design wise. Inclusion of many physical devices in the whole communication system always makes communication delays. Combining certain blocks of system can reduce such delays.

II. LITERATURE SURVEY

The work titled "designing of telecommand system using SoC for space craft control application"[5] , describes the importance of checking the integration between components in the whole system and advantage of using pre-defined and pre-verified IP units in space communication like telecommand system. In the paper "FPGA implementation of SoC architecture for space craft application" introduces the UART (Universal