



JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE

JAIPUR ENGINEERING COLLEGE AND RESEARCH CENTRE
Approved by AICTE & Affiliated by RTU, Kota

3rd International Conference
on

Recent Innovations & Technological Development
in Mechanical Engineering

ICRITDME-2020

27th-28th Aug, 2020



Souvenir



Springer

IFO



IJSER
IN RESEARCH & PUBLICATION

Organised by:

Department of Mechanical Engineering
Jaipur Engineering College & Research Centre
Shri Ram ki Nangal, Via. Sitapura RIICO, Opp. EPIP Gate
Tonk Road, Jaipur-302022

3rd International Conference

On

Recent Innovations & Technological Development in Mechanical Engineering

(ICRITDME-2020)

[August 27-28, 2020]



JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE

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Dr. Fauzia Siddiqui**

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Mr. Lalit Kumar Sharma**

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**Department of Mechanical Engineering
Jaipur Engineering College and Research Centre,
Shri Ram Ki Nangal, Via Sitapura RIICO,
Opp. EPIP Gate, Tonk Road, Jaipur-302022, Rajasthan, India**

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JAIPUR ENGINEERING COLLEGE
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Shri O.P. Agrawal
(Chairman)

I am happy to note that the Department of Mechanical Engineering of JECRC, Jaipur is organizing a two-day International Conference on “Recent Innovations & Technological Development in Mechanical Engineering” RITDME-2020. . The conference would be another milestone in the academic trajectory of JECRC.

Our future and sustained growth depends on the innovations of scientists and engineers. The contributions and innovative ideas to be presented in the conference will certainly benefit the participants.

Jaipur is known for its rich cultural heritage which I am sure will be an ideal venue for such an intellectual interaction.

I wish to extend my good wishes for the success of the conference.

O.P. Agrawal



JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE



Shri Amit Agrawal
(Director)

It gives me great pleasure to welcome you all to the International Conference being organized by the Department of Mechanical Engineering of JECRC, Jaipur in association with the ISST, India & Indian Foundry Organization. The vision of JECRC is to foster research and technological innovations which lays the foundation of Industrial growth of the country in a globally competitive environment.

We reaffirm our commitment of providing well informed professionals ready to assume their responsibilities in society. Such interactions expedite technological innovations. The drastic changes in engineering sciences have accelerated the need for skilled human resource development in all fields especially technology.

I sincerely thank the keynote speakers, the participants and the core team members who have worked hard to make this event a success.

Amit Agrawal



JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE



Shri Arpit Agrawal
(Director)

Welcome to all the participants of RITDME. The overwhelming response to the conference received from participants of various institutions of higher learning across the different parts of the country motivates us to improve ourselves.

We are currently in the era of engineering revolution, spearheaded by recent developments in engineering sciences, providing sustainable solutions to various issues in different areas. The deliberations in different tracks of the conference will highlight the current developments in the field of Mechanical Engineering that shall create awareness about the dynamics of the Engineering Sciences.

I extend my best wishes for the success of the conference and I am confident that the interaction will be a source of inspiration to upcoming educationists, technocrats, academia who shoulder the responsibility of bringing in the desired innovations in their fields leading to the advancement of the country.

Arpit Agrawal



JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE



Prof. V.K. Chandna
(Principal)

It is gratifying to note that the Department of Mechanical Engineering of JECRC are hosting a two-day International Conference on “Recent Innovations & Technological Development in Mechanical Engineering” RITDME-2020.

Nowadays, organizing such technical conference provides a platform where the researchers can expose their ideas of their research concern. They may also be able to listen and get aware of the recent trends in research and education in a particular field of their interest in the education of invited lectures from different subject experts.

I convey my best wishes to Dr. M. P. Singh and Dr. Fauzia Siddiqui, conveners of this conference ‘RITDME-2020’ for putting paramount efforts for the success of the conference.

I am confident that the conference shall benefit all the participants in finding the solutions of their research problems through discussion.

I also convey my best wishes & greetings to all the participating delegates and wish the conference a great success.

Prof. V.K. Chandna



JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE



Dr. M. P. Singh
(HOD-ME)

It is indeed a great pleasure to write a few words on the occasion of this International Conference. This Conference aims to bring together leading academicians, researchers and industry personals on a common platform to exchange and share their experience and research findings in the area of renewable energy.

The theme of the Conference addresses the critical issue of power shortage in India. Though India has made significant progress in renewable energy in the last decade, the share of modern renewable in the energy mix is marginal. This conference will definitely provide the platform to review the status and potential of different renewable in India.

I express my thanks to the Management for their consistent and unending support. I also extend my gratitude to Prof. V.K. Chandna, Principal, Jaipur Engineering College & research centre for his endless mentoring and untiring efforts to motivate to organize the Conference at such a large level.

I am also grateful to invited speakers, sponsors, members of the advisory and organizing committees, all my colleagues in the Mechanical Engineering Department, student volunteers and media persons and all others who have contributed to the successful organization of the Conference.

Dr. M. P. Singh

PREFACE

For a society to develop, it is necessary to have a vision, the ability to see what lies ahead, as well as the knowledge of various impediments in the present and of the means to arrive at a better future. The world around us is dramatically changing. It is becoming more and more interconnected through technology. Changing global conditions demand that we rethink the strategies of growth, and research is a tool to understand reality in order to make it a better living experience. Every walk of life is enriched due to research. It was scientific innovation that brought about the invention of a steam engine at a primitive level, thereby, making life easy at a click in the digital world. Research in its manifold pattern lays its foundation in diverse fields of Mechanical.

This conference will provide a unique opportunity of presenting and discussing recent advancement in renewable energy and sustainable development and make the bridge between academia and industries. The conference consists of scientific session, symposia on specific topics and paper presentation. A Group of experts will have chance to share information and get in touch with other groups. A special attention is also given to Green Manufacturing, Renewable Energy Sources for Sustainable Development, Green & Smart Construction and Future Fuels. Nowadays these aspects are becoming more and more important both in respects of human life and environment.

We gratefully acknowledge the encouragement and support of the Management showing their faith in us to convene this conference. We are also thankful to Prof. V.K. Chandna, Principal for his valuable guidance at every step we needed in organising the Conference. Our sincere thanks go to IFO for their association with the Conference. We are also thankful to Priya Vyas, Associate Editor - Applied Sciences & Engineering, Springer Nature for her continued association with us since the inception of the Conference in August, 2019. Our wholehearted thanks to the reviewers, sponsors and invited speakers, members of the advisory and organising committees, student volunteers and media persons and all others who have contributed in the successful organization of the Conference.

About The Department

Mechanical Engineering

Vision:

The Mechanical Engineering Department strives to be recognized globally for excellent technical knowledge and to produce quality human resource, who can manage the advance technologies and contribute to society through entrepreneurship and leadership.

Mission:

- *To impart highest quality technical knowledge to the learners to make them globally competitive mechanical engineers.*
- *To provide the learners ethical guidelines along with excellent academic environment for a long productive career.*
- *To promote industry-institute linkage.*

Department of Mechanical Engineering is one of the major activities in the engineering profession and its principles are involved in the design, development and construction of nearly all of the physical devices and systems. Continued development has led to better machines and processes, helping the mankind. The Mechanical Engineering department of JECRC has highly qualified faculty members. The department aims at providing basic knowledge in Mechanical Engineering along with in-depth knowledge in the design of mechanical components and practical applications to overcome the challenges of modern day industry and its commitment to produce knowledgeable and responsible Mechanical Engineers. Continuing student development programs and training/ workshops are being organized on a regular basis. Students of the department are actively participating in various extracurricular and extension activities.

CONFERENCE SCHEDULE
(ICRITDME-2020)
August 27th - 28th, 2020

Day 1			Sessions Links (Platform: Google Meet)	
8.15AM – 10:00AM	<i>e - Inaugural Ceremony</i>		https://meet.google.com/yoa-ftzm-vbv	
Break [10:30 AM – 11:00AM]				
Technical Session-I & II [11:00AM – 1:00PM]			Session I / III meet.google.com/mft-vyzz-tho	Session II / IV meet.google.com/ski-xrdo-uoc
11:00AM – 11:30AM	Key Note Address: Dr. Anna Khan (CEO, Suslenace Research) QATAR			
11:30AM – 01:00PM	Session I	Session Chair: Dr. Anuj Prakash (Project Manager, TCS)		
	Session II	Session Chair: Dr. Varun Sharma (NIT-Jalandhar)		
Break [01:00PM – 02:00PM]				
Technical Session III [2:00 PM - 4:00PM]				
02:00PM – 02:30PM	Key Note Address:Mr Anesh Prabhauchund Maharaj (SA)/ Mr. Paul Haufs (FEV , Germany)			
02:30PM – 04:00PM	Session III	Session Chair: Dr. Ankur Pareek (Consultant, TEQIP III)		
	Session IV	Session Chair: Dr. B.K. Sharma (Chairperson of IFO, Rajasthan chapter)		
Day 2			Session V / VI meet.google.com/fdm-opyy-nnb	
Technical Session-V [09:30AM – 11:30AM]				
09:30AM – 10:00AM	Key Note Address: Dr. Abid Haleem, Professor, Jamia Millia Islamia, Delhi/Dr. Anuj Prakash (Project Manager, TCS)			
10:00AM – 11:30AM	Session V	Session Chair: Dr. O. P. Verma (NIT - Jalandhar)		
Break [11:30 AM – 12:00 Noon]				
Technical Session-VI [12:00 Noon - 2:00 PM]				
12:00PM – 12:30PM	Key Note Address: Mr Bhavesh Metha (RIL, Mumbai)			
12:30 PM - 2:00 PM	Session VI	Session Chair: Dr. Jinesh Kumar Jain (MNIT, Jaipur)		

Technical Schedule for Parallel Session– I			
Day and Date: Thursday , 27/08/2020		Timings: 11:00AM – 1:00PM	
11:00AM to 11:30AM		Key Note Address: Dr. Anna Khan (CEO, Suslenace Reseach) QATAR	
11:30AM – 01:00PM		Session Chair: Dr. Anuj Prakash (Project Manager, TCS)	
S. No.	Author Name	Title of paper	Paper Id
1	1. Rahul Jain 2. K. B. Rana 3. M. L. Meena	Musculoskeletal risk assessment in small-scale furniture wooden workshops	ICRITDME-2020_PAPER_62
2	1. Sonali Panda	A Systemic Review : Porous Titanium alloys and its applications	ICRITDME-2020_PAPER_35
3	1. Quazi Taquiuddin 2. Pratik Zaware 3. Karan Patil 4. Omkar Rane 5. Vivek Rathod	Analysis of Piezoelectric Material for Automotive Application	ICRITDME-2020_PAPER_68
4	1. Maitreya Limkar 2. Nimitya Phalke 3. Kanishk Sharma	A Numerical Study on Free Vibration Behavior of Shear Deformable Functionally Graded Beam	ICRITDME-2020_PAPER_73
5	1. Manish P. Philip 2. Ashish Panwar 3. Kanishk Sharma	Thermo-Mechanical Analysis of Functionally Graded Turbine Blades Using Finite Element Method	ICRITDME-2020_PAPER_74
6	1. Aditi Saxena 2. Jitendra Kumar	Efficient Control of Two-Link Rigid Robotic Manipulator System Using Self-Tuned Fuzzy PID Controller	ICRITDME-2020_PAPER_76
7	1. Perna Singh 2. Dr. Rajesh Singla 3. Anshika Kesari	An EEG Based Approach for the Detection of Mental Stress Level: An Application of BCI	ICRITDME-2020_PAPER_80
8	1. Saurav Kumar 2. Drishti Yadav 3. Himanshu Gupta 4. Om Prakash Verma	Smart Classroom surveillance system using YOLOv3 algorithm	ICRITDME-2020_PAPER_81
9	1. Paramjit Thakur 2. D.N Raut 3. Dr. Fauzia Siddiqui	Modeling and Simulation in Waterjet Technology	ICRITDME-2020_PAPER_111
10	1. Paramjit Thakur 2. D.N Raut 3. Fauzia Siddiqui	Recent Applications, Developments and Challenges in Waterjet Technology	ICRITDME-2020_PAPER_110
11	1. Ashish Bandewar 2. Dr. Vijay Bhambere 3. Anuj Dongaonkar	Evaporative Refrigeration Using Various Porous Material	ICRITDME-2020_PAPER_1

Technical Schedule for Parallel Session–II			
Day and Date: Thursday, 27/08/2020		Timings: 11:00AM – 1:00PM	
11:00AM to 11:30AM		Key Note Address: <i>Dr. Anna Khan (CEO, Suslenace Reseach) QATAR</i>	
11:30AM – 01:00PM		Session Chair: <i>Dr. Varun Sharma (NIT- Jalandhar)</i>	
S. No.	Author Name	Title of paper	Paper Id
1	1. Satyendra Kumar 2. Tejbahadur Singh	Computational Study of Distribution of Mechanical Stress in Artificially Replaced Hip Joint Implants Using Mathematical Model	ICRITDME-2020_PAPER_5
2	1. Yogesh Dubey 2. Dr. Pankaj Sharma 3. Dr. M. P. Singh	Analysis of Developments on Mechanical Properties of 7xxx Series Aluminum Alloys: A Review	ICRITDME-2020_PAPER_93
3	Hemant Bansal	Comparison of Thermoacoustic Refrigeration System with VCRS	ICRITDME-2020_PAPER_94
4	1. Tej Bahadur Singh 2. Ravi Yadav 3. Satyendra Kumar	Coconut Fiber as a Reinforced Composite: A review	ICRITDME-2020_PAPER_97
5	Akhilesh Paliwal	Integrating Lean Six Sigma and Supply Chain Approach for Quality and Business Performance	ICRITDME-2020_PAPER_99
6	1. Ravi Yadav 2. Dayal Singh Rathore	Green Manufacturing Technologies	ICRITDME-2020_PAPER_55
7	1. Pratham Tailor 2. Akhil Vijay	design and analysis of hydraulic brakes caliper	ICRITDME-2020_PAPER_64
8	Dr. Manish Shrivastava	Mobile Human Air Bag System	ICRITDME-2020_PAPER_2

Technical Schedule for Parallel Session–III			
Day and Date: Thursday , 27/08/2020		Timings: 02:00 PM-04:00 PM	
02:00 Noon – 02:30 PM		Key Note Address: Mr Anesh Prabhauchund Maharaj (SA)/ Mr. Paul Haufs (FEV , Germany)	
02:30 PM - 04:00 PM		Session Chair: Dr. Ankur Pareek (Consultant, TEQIP III)	
S. No	Author Name	Title of paper	Paper Id
1	1. Drishti Yadav 2. Saurav Kumar 3. Varun Sharma 4. Om Prakash Verma	Cuckoo Search Algorithm based Energy Optimization of Multiple Stage Evaporator System	ICRITDME-2020_PAPER_82
2	1. Anshika Kesari 2. Dr. Rajesh Singla 3. Perna Singh	EEG Based Study of Pictorial Advertisement Impact on Costumers' Market Preferences	ICRITDME-2020_PAPER_83
3	1.Daaman Sharma 2.Nimeesh Rathi 3.Dr. Kanishk Sharma	Elastic-Plastic Stability Analysis of Perforated FGM Plate	ICRITDME-2020_PAPER_112
4	1. Rahul Singh 2. Ashish Khinchi 3. Pankaj Sharma	Modal Analysis of Isotropic Spherical cap and Functionally Graded Spherical Panel using COMSOL	ICRITDME-2020_PAPER_86
5	1. Shiv Kumar 2. Ratnesh Sharma 3. Chandramani Goswami 4. Ajay Singh	Enhancement of Mechanical Properties of Fly Ash reinforced Epoxy Composite	ICRITDME-2020_PAPER_87
6	1. Sarla 2. Dilbag Singh	Performance analysis of Wavelet Filters for Heart Rate Variability Analysis	ICRITDME-2020_PAPER_88
7	1. Bhupendra Patil 2. Dr. Rajesh Iyer 3.Jatin Parmar	Parametric Optimization of Single Cylinder Diesel Engine Water Diesel Emulsion Fuel for the improvement of Brake Thermal Efficiency Using Taguchi Method	ICRITDME-2020_PAPER_90
8	1 Siddhesh N. Lad Aakash A. Gharat	Process Parameters Optimization and Analysis of the TIG Welding for Mild Steel	ICRITDME-2020_PAPER_91
9	1. Shailendra Kasera 2. Rajlakshmi 3. Nayak Shishir 4. Chandra Bhadur	Energy Performance Evaluation of Variable Speed Milk Refrigerator using R290	ICRITDME-2020_PAPER_127
10	1. Aditi Saxena 2 Jitendra Kumar 3. Vinay Kumar Deolia	Optimized Controller for Manipulator System Using Genetic Algorithm	ICRITDME-2020_PAPER_129
11	Shivagond Teli	Design of Wheel Chair using Rocker Bogie Mechanism	ICRITDME-2020_PAPER_65

Technical Schedule for Parallel Session–IV			
Day and Date: Thursday , 27/08/2020		Timings: 02:00 PM-04:00 PM	
02:00 Noon – 02:30 PM		Key Note Address: Mr Anesh Prabhauchund Maharaj (SA)/ Mr. Paul Haufs (FEV , Germany)	
02:30 PM - 04:00 PM		Session Chair: Dr. B.K. Sharma (Chairperson of IFO, Rajasthan chapter)	
S. No.	Author Name	Title of paper	Paper Id
1	Lalit Kumar Sharma	A Comprehensive Review on Automatization of Drainage Cleaning System in India	ICRITDME-2020_PAPER_101
2	Rohit Goyal	Hybrid and Composite Biomaterials in Tissue Engineering	ICRITDME-2020_PAPER_104
3	1. Aashish Nagpal 2. Nitin Chhabra 3. Bhuvnesh Bhardwaj	Investigation of the sliding wear behaviour of aluminium oxide filled glass fiber reinforced composites	ICRITDME-2020_PAPER_120
4	1. Shrikant Bansal 2. Shyam Mishra	Evaluating and Comparing Forecasting Models	ICRITDME-2020_PAPER_122
5	1. Jitendra Kumar Gupta 2. Bhuvnesh Bhardwaj 3. Varun Sharma	Friction welding process of AA7075 aluminium alloy to mild steel	ICRITDME-2020_PAPER_123
6	1. Dilip Kumar Prajapati 2. Rahul Sharma	Sugarcane Bagasse Future Composite Material- A Review	ICRITDME-2020_PAPER_125
7	1. Hukam Chand 2. Sumit Saini	An Experimental view on Flammability Behaviour of Al ₂ O ₃ and SiC Filled Woven E- Glass Fiber Reinforcement Epoxy Composites	ICRITDME-2020_PAPER_100
8	1. Nitin Chhabra 2. Varun Sharma 3. Bhuvnesh Bhardwaj 4. Om Prakash Verma	Effect of percentage weight of Al ₂ O ₃ on the physical properties of glass fiber reinforced composites	ICRITDME-2020_PAPER_118

Technical Schedule for Session– V			
Day and Date: Friday , 28/08/2020		Timings: 09:30AM – 11:30AM	
09:30AM – 10:00AM		Key Note Address: Dr. Abid Haleem, Professor, Jamia Millia Islamia, Delhi/Dr. Anuj Prakash (Project Manager, TCS)	
10:00AM – 11:30AM		Session Chair: Dr. O.P. Verma (NIT - Jalandhar)	
S. No.	Author Name	Title of paper	Paper Id
1	1. Sumit Sharma 2. Manish Dadhich 3.Devendra Kumar Vishwakarma 4. Dr. Kamal Kishore Khatri 5.Marek Jaszczur	Heat Transfer Enhancement of Parallel and Counter Flow Heat Exchangers with Varying Size and Fins Number	ICRITDME-2020_PAPER_115
2	1. Nikita Jatia 2. Dr Karan Veer Singh	Techniques for extraction of Phonocardiogram signals and its application	ICRITDME-2020_PAPER_84
3	1. Nikhil Khatekar 2.Rishi Pareek 3.Shivkumar Gaikwad	Correlation of Acoustic Emission Parameters with Surface Roughness in End Milling of AISI 4140 Steel	ICRITDME-2020_PAPER_60
4	1. Dr Rahul Jain 2. Vibhor Verma 3. K. B. Rana 4. M. L. Meena	Multi criteria decision making approaches for ergonomic solutions: A literature review	ICRITDME-2020_PAPER_117
5	1. Farheen Bano 2. Zulquernain Mallick 3. Abid Ali Khan 4. Nabila Elnahas	Effect of stroke rotation on discomfort for assembly tasks	ICRITDME-2020_PAPER_92
6	Priyanka Phatak	Validation of Drivers of Sustainable Manufacturing: A Structural Model	ICRITDME-2020_PAPER_95
7	1. Shraddha Arya 2. Manish Bhargava 3. Mahendra Pratap Singh	Development of Improving Model for the Surface Finish of Ball Bearing (Deep Groove) by Optimizing Cutting Parameter	ICRITDME-2020_PAPER_96
8	1. Shyam Babu 2. Devendra Kumar Vishwakarma 3. Sumit Sharma	Optimization of Heat Transfer Rate, Efficiency and Effectiveness for Thermal Performances of Stepped Rectangular Fin	ICRITDME-2020_PAPER_114
9	1. Gaurav Kumar 2. Varun Sharma 3. Rakesh Kumar 4. Ankit Thakur 5. Navdeep Minhas 6. Om Prakash Verma	Effect of Tool Tilt Angle on the Mechanical and Metallurgical Properties of Aluminium Alloy 6061-T6 Welded by Friction Stir Welding Process	ICRITDME-2020_PAPER_126
10	1. Vivek Singh Sisodiya 2. Rohit Agrawal	A Comprehensive Study of Image Segmentation Techniques	ICRITDME-2020_PAPER_132

Technical Schedule for Session– VI			
Day and Date: Friday , 28/08/2020 Timings: 12:00 Noon - 2:00 PM			
12:00 Noon – 12:30PM		Key Note Address: <i>Mr Bhavesh Metha (RIL, Mumbai)</i>	
12:30AM – 02:00PM		Session Chair: Dr. Jinesh Kumar Jain (MNIT, Jaipur)	
S. No.	Author Name	Title of paper	Paper Id
1	1.Mahendra Pratap Singh 2. Manish Jain	Optimization of process parameter by using CNC Wire Electrical Discharge Machine through Taguchi Approach	ICRITDME-2020_PAPER_3
2	1. Lakshy Zaveri 2. Dr. M. P. Singh	Enhancing Performance of Burner - A Review	ICRITDME-2020_PAPER_12
3	1. Himanshu Jain 2.Dr. Fauzia Siddiqui	A rivew on electric paper shredder machine	ICRITDME-2020_PAPER_33
4	1. Bhuvnesh Bhardwaj 2. Nitin Chhabra 3. Om Prakash Verma 4. Varun Sharma	Investigation of the effect of percentage weight of Al ₂ O ₃ on the mechanical properties of glass fiber reinforced composites	ICRITDME-2020_PAPER_121
5	1. Navneet Gupta 2. Aashish Nagpal 3. Kuldeep Sharma	Design analysis and development of low cost ATV	ICRITDME-2020_PAPER_26
6	1. Usama Sherwani 2. Dr. Rishi Pareek	Portable Air Conditioner Using Peltier Effect	ICRITDME-2020_PAPER_16
7	1. Rai Yadav 2 Bhuvnesh Bhardwaj 3 Varun sharma	Effect of EDM parameters on metal removal rate during the machining of Hastelloy C-276	ICRITDME-2020_PAPER_119
8	1. Ajay Sharma 2. Abhisekh Kumar	Flywheel Based Bicycle Generator: A Review	ICRITDME-2020_PAPER_10
9	1. Navendu Shekhar Pandey 2. Man Mohan Siddh	Six Sigma in Food Industry: A literature review	ICRITDME-2020_PAPER_65

Experimental Investigation for Evaporative Refrigeration Using Various Porous Materials

¹Ashish Gangadhar Bandewar, ²Dr. Vijay L. Bhambere, ³Anuj V. Dongaonkar

^{1,3}Assistant Professor, Mechanical Engineering Department

²Associate Professor, Mechanical Engineering Department

Jagdambha College of Engineering and Technology, Yavatmal (M.S.)

Abstract. Effect of evaporative cooling has been explored by many researchers by using various porous materials. This paper aims at investigating the refrigerating effect, finding saturation efficiency of the system by using various porous materials which includes Cotton, Soil and Pulverized wood. Comparison of saturation efficiency and performance of these materials is done in this paper. This eco fridge works on principle of evaporative cooling by consuming simply water as a medium in these porous materials. Wet filler material in this setup is heated by sunlight and hot air due to ambient temperature evaporates water from the filler material. Latent heat for the vaporization is taken by the inner cylinder as the filler material is placed between inner and outer cylinder of this set-up due to this, the inner cylinder becomes cooler and makes it perfect for the storage of perishables. The results suggested in this paper focused towards using these low cost porous materials for refrigeration. Cotton has shown maximum saturation efficiency of 86%, followed by Soil with 83% and pulverized wood gives a saturation efficiency of 76%.

Keywords: Solar powered eco-fridge, Evaporative cooling, Latent heat of vaporisation, porous materials, hot and humid, Saturation/Adiabatic Efficiency

Mobile Human Air Bag System

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Abstract. This paper introduces a mobile human airbag system designed for fall protection for the elderly. Safety unit consists of three dimensional MEMS accelerometers, gyroscopes, a Bluetooth module and a Micro Controller Unit (MCU). It records human motion information, and, through the analysis of falls using a high-speed camera, a lateral fall can be determined by gyro threshold. A human motion database that includes falls and other normal motions (walking, running, etc.) is set up. Using a support vector machine (SVM) training process, we can classify falls and other normal motions successfully with a SVM filter. Based on the SVM filter, an embedded digital signal processing (DSP) system is developed for real-time fall detection. In addition, a smart mechanical airbag deployment system is finalized. The response time for the mechanical trigger is 0.133 s, which allows enough time for compressed air to be released before a person falls to the ground. The integrated system is tested and the feasibility of the airbag system for real-time fall protection is demonstrated.

Keywords: Airbag, Motion sensor, gyroscope.

Optimization of process parameter by using CNC Wire Electrical Discharge Machine through Taguchi Approach

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Abstract. Wire electrical discharge machining (WEDM) is used to manufacture components of conductive hard metal with complicated shape, larger tolerance and precision. A review of the literature exposes that most of the research work has been intended for towards the optimization of Wire electrical discharge machining operation and modeling of the process. Conventional wire electrode has been developed to a brass wire from a copper wire and finally to zinc coated wire on the brass, steel or copper wire core, by which more advanced WEDM, is realized in terms of better machining speed and accuracy. To examine the effect of process parameters such as peak current, pulse ON time, pulse OFF time etc. by the optimization of WEDM operation and modeling of the process during micro slit machining. Analyzed the results and optimize the process parameter conditions for maximum MRR (g/min), and surface roughness based on Taguchi's Methodology. The ANOVA analysis indicates the significant factors for maximization of MRR, improvement of Surface Roughness and regression analysis. By the research work, it has been concluded that the MRR reduces with raise in pulse off time and spark gap set voltage. Material removal rate increases with increase in pulse on time and peak current.

Keywords: WEDM, MRR, ANOVA, DOE, EDM

Computational Study of Distribution of Mechanical Stress in Artificially Replaced Hip Joint Implants Using Mathematical Model

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Abstract. Problems of the Total hip joint replacements leads the distribution of mechanical stresses over the implant-joint and bone. During different investigations it was found that using different combinations of load, bonds, and implants failure can be avoid. Several times performing an experiment is expensive and consumes a lot of time. Whereas mathematical molding is essential and cheap tool. In this study a weak form generated from sets of governing differential. Integration method and interpolation functions are used to analyze the stress pattern in hip arthroplasty.

Keywords: Mathematical molding, FEM, Total Hip Replacement, Artificial implants.

Recent Development in Renewable Energy of India

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Abstract. India have a huge supply of Renewable resources, it is the only country who have an exclusive ministry for Renewable energy, the Ministry of Non-conventional Energy Sources (MNES). In year 2006 MNES was renamed by Ministry of New and Renewable Energy (MNRE). India have four renewable Sources which are available in India Hydro Power, Solar Power, Wind Power and Biomass Power. The Government of India and it state Government had released many Policy for Promotion and development of Renewable energy.

Keywords:

Automatic Sewage Cleaning System: A Study

Abstract. This paper is about replacing the manual work in drainage cleaning by automated system. Now days, automation plays a vital role in all industrial applications. Yet, the proper disposal of sewage from industries is still a challenging task. Drainage pipes are been used for the disposal and unfortunately sometimes there may be loss of human life while cleaning the blockage in the drainage pipes. In order to overcome the problems in manual drain cleaning, we are implementing “AUTOMATIC SEWAGE CLEANING SYSTEM”, to clean and control the drainage level.

Keywords:

Design and Development of Flywheel Powered Bicycle: A Review

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Abstract. A flywheel is an inertial energy-storage device. By using kinetic energy recovery devices like flywheel, kinetic energy can be improved from bicycles, mopeds, bikes. In this project a flywheel is designed and advanced and mounted on a bicycle. This flywheel is attached to bicycle by means of chain system. When pedals are operated bicycle moves forward as well as extra energy is stored in flywheel in the form of kinetic energy. As we know that while braking, energy is vanished in form of heat, so this lost energy is used in flywheel while braking. The rider can use stowed energy of flywheel during descending hill areas or traffic lights and up to 10 out of a hundred of energy can be saved during pedaling. The main emphasis is kept on design of flywheel and frame possessions to enhance the efficiency of bicycle. Thus, the loss in kinetic energy is converted into increase in kinetic energy by using regenerative braking.

Keywords: Flywheel, Kinetic energy recovery, Regenerative braking, Bicycle.

Design of Human Operated Flywheel to Generate Electricity: A Review

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Abstract. In the age of fossil fuels, human power was neglected but the hazardous environment pollution caused by fossil fuel again brought the human power resources in the stream of renewable power resources. So in recent past, vast research has been taking place to harness human power for energizing various process units. This review paper is based on one of that renewable power resources which is human power. Human has applied energy through the use of arms, hands and back, with the invention of bicycle and pedaling, legs also began to be considered as a means to develop power from human muscles. A person can generate four times more power by pedaling than by hand-cranking. The power levels that a human being can produce through pedaling depend on how strong the pedaling person is and on how long he or she needs to pedal. If the task to be powered will continue for hours of time, 75 watt mechanical power is generally considered the limit for a larger healthy non-athlete. A healthy athletic person of the same build might produce up the twice the amount. Therefore human power may be used for a process if the power enables a person to drive device at same rate as that achieved by hand-cranking but with far less effort and fatigue.

Flywheel Based Bicycle Generator: A Review

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Abstract. Invention of bicycle had an enormous effect on society, in terms of culture and of advancing modern industrial method. But now-a-days there is decrease in use of bicycle. More efforts are needed while travelling on a gradient and energy used by the bicycle is more. For minimizing this problem, we are using kinetic energy recovery system by designing the flywheel for recovering the moving bicycle energy under breaking and also to convert the usual loss in kinetic energy into gain in kinetic energy. When riding a bicycle, a great amount of kinetic energy is lost while breaking. To use this energy, we are using a flywheel to store the energy which is normally lost during breaking and reuse it to help propel the rider when starting. By the help of flywheel we can store the energy and with the help of that the efforts of the rider can be reduce. The rider can charge the flywheel during downward motion on hilly road and boost the bicycle when accelerating. This project preliminary deal with one of the method for recovering the kinetic energy from the Flywheel, which is implemented in a bicycle. In this we are concentrating on the mass of the flywheel and redesigning it.

Keywords: Flywheel, KERS.

Enhancing the performance of a burner by changing design: A review

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Abstract. The most important issue in the present scenario of the world is the availability and use of energy. In developing countries the energy used for cooking is a major proportion of the total energy consumption. India with a consumption of 22.5 million tonnes is the world's second largest consumer of LPG. About 89.9% households in India uses LPG that is 25.95 crore registered customers out of which 25.68 crore are domestic customers. 21.86 crore customers are active domestic customers as on January 2018. The Ministry of Petroleum and Natural Gas reported that a growth of 34% is expected in the LPG consumption, leading to 30.3 million tonnes by 2025. In the present work, various works dealt with research in increasing thermal and conversional efficiency of stoves using different material burners of different shapes and different burner heads are studied. Various parameters affecting thermal and conversional efficiency of a burner are determined.

Keywords: Conversional efficiency, thermal efficiency, covering, sealed burners, swirling effect, premixed air burners.

Enhancing the performance of photovoltaic panels by water cooling

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Abstract. To minimize the amount of water and electrical energy needed for cooling of the solar panels, especially in hot arid regions, e.g., desert areas. A cooling system has been developed based on water spraying of PV panels. A cooling model has been developed to determine how long it takes to cool down the PV panels to its normal operating temperature i.e., 35 degree C based on the proposed cooling system. the development of a cooling apparatus using water in a commercial photovoltaic panel in order to analyze the increased efficiency through decreased operating temperature. This paper highlights different cooling techniques to reduce the operating temperature of the PV cells. It was identified that the water spray cooling system has a proper impact on the PV panel performance. So the water cooling is one way to enhance the electrical efficiency of the PV panel.

Keywords: Efficiency increase, increasing of the electrical performance, photovoltaic panel, water cooling.

Portable Air Conditioner

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Abstract. Heat has always been a problem in every country. Doing work in a hot summer day can be tiring and are prone to more fatigue. A proper air conditioner would be good item to have during these times. Air conditioning is defined as the simultaneous control of temperature, humidity, cleanliness and air motion. The portable Air conditioner system should satisfy the need of user at the most economical cost. The selection of system depends upon many factors. It could be only a relief in temperature or complete control of environment. It could be lowest first cost or lowest running cost. The portable air conditioner is based on air water system, in this system the room unit is supplied with both processed air and chilled water life. Conventional Air conditioners satisfies that need but they are not affordable to everybody. The solution on this problem is portable air conditioner which is having very low manufacturing and maintenance cost. Its cooling power is comparable to wall air conditioner. It provides transportability, can be move anywhere easily. It is small in size; hence it would sit nicely in our bedroom, drawing room and kitchen.

Keywords: Human comfort, Refrigerants, Air conditioner, Condenser, Low cost.

KERS in bicycle using flywheel

Abstract. Kinetic Energy Recovery System (KERS) is an innovation utilized in formula 1 cars for recouping the vitality lost in braking of the vehicle and along these lines giving lift to the vehicle movement. Same idea for example regenerative braking can be applied in bike which utilizes a flywheel which will be mounted between the casings of the bike, the flywheel can store the braking vitality by turning and this vitality can be offered back to the framework which will diminish the accelerating power required to drive the bike. This Flywheel Energy Storage (FES) framework utilizes flywheel with suitable clutch component alongside sprocket and chains. Further this undertaking finishes up about productivity and accelerating power in flywheel bike.

Keywords: Kinetic Energy Recovery System, Vitality, Regenerative Braking, Flywheel.

Portable Air Conditioner Using Peltier Effect: A Review

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Abstract. This paper is focused on the review of recent research on portable air conditioner using peltier effect and also for better study and understanding of peltier effect. For doing this a structured review methodology with 5-steps approach for selection of research papers have been used which consists of 1) Database Selection 2) Keyword Selection. 3) Research Papers Collection 4) Tabulated Literature Review of Research Papers. 5) Conclusion. Rising temperature has always been a problem in every country during summer season temperature reaches upto 50°C and also work in a hot summer day can be tiring and are prone to more fatigue for human being. A proper air conditioner would be good to have during hot climate season. Air conditioning using peltier effect can be choice for proper cooling.

Keywords: Thermoelectric; Air conditioner; Peltier module; Peltier effect.

A Review on Energy Conservation using Insulating Materials in Buildings

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Abstract. The rapidly growing world energy use has already raised concerns over supply difficulties, exhaustion of energy resources and heavy environmental impacts (ozone layer depletion, global warming, climate change, etc.). Energy consumption for heating and cooling for buildings is rising day by day. In particular, there is an increase in the demand of electricity for cooling in the summer season. Thermal insulation on the sides of the buildings with insulating materials is a very usual strategy to reduce energy consumption, but the aim of this paper is to prepare an overview of the research done on various insulating materials such as mineral wool, glass wool, expanded polystyrene, extruded polystyrene, polyurethane, vacuum insulation panels, gas insulation panels, Shape-stabilized phase change material (PCM), insulation materials of beyond tomorrow like Nano insulation materials and material like glass wool which can be mixed with cement mortar to make a better insulating mixture for construction of buildings. Every insulating material has its advantage and usage according to conditions but using insulation materials can reduce consumption of energy by 30%.

Keywords: Insulating materials.

Design of Solar Dryer For Drying Agricultural Products

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Abstract. This paper consists and presents the designing and construction of a solar dryer for drying a agriculture product. The dryer consists of a solar collector (air heater) with drying racks in the solar drying chamber combined and assimilated together and a solar drying chamber with baffles. It consists of utilizing of solar energy for heating of the air and drying the any food with the help of it. Due to this reason it is a beneficial setup and it also helps in preservation of agricultural products thereby reducing wastage of material to be dried. These reasons are contribute in easy transportation of the food materials to the people easily and also promotes for their health and welfare.

The basic process involves heating up of air in the solar collector chamber that entered the system through the air inlet which is then transferred and channelled for drying the agricultural products in the drying chamber by removing and reducing the moisture content from it. Materials that can be used for the construction are glass, wood, aluminium metal sheet and net for all the trays Drying is cheapest and most common method of storing and preservation of agricultural products.

Keywords: Solar drying, design, efficiency.

Wheel chair for mentally and physically disables

Abstract. This paper is automatic wheelchair for physically disabled person. A dependent and ultrasonic and infrared sensor system has been integrated in this wheelchair. In this way we have obtained a automatic wheelchair which can be driven and with the possibility of avoiding obstacles by using infrared sensors and down stairs or hole detection by using ultrasonic sensors. This wheelchair works on accelerometer movement and which will helpful for the person whose limbs are not working. Accelerometer can be attached to any movable part of body like hands, head etc. It has also provision of joystick for disabled people who can easily move his/her hand. Electronic system configuration, a sensor system, a mechanical model, accelerometer control and joystick control are considered. It enables a disabled person to move around independently, which is interfaced with motors. The model of the wheelchair is made using a micro-controller, chose for its low cost, in addition to its versatility and performance in mathematical operations and communication with other devices.

Android control smart wheelchair for disabilities

Abstract. Our project is specifically related to the Smart Android phone handling the wheel chair system using application. The wheelchair System is recommended to control a wheel chair by using the android application in the mobile device and system. The system is designed to control a wheelchair by using an android device. The objective of this project is to facilitate the movement of disable people or handicapped and also the senior people who are not able to move well. The result of this design will allow the special people to live a life with less dependence on others. Android technology is a key which may provide a new approach of human interaction with machines or tools. Thus, their problem can be solved by using android technology to control the movement of a wheelchair. Which leads to mental and social isolation, and many mental problems. The needs of disable people can be satisfied by manual or self-automated wheelchairs, a segment of the disabled community finds it difficult or impossible to use wheelchairs independently. The disabled population includes people with low vision, visual field reduction, spasticity, tremors, or cognitive deficits. For accommodating this population, many researchers have used technologies to developed power wheelchairs.

A Review of Design of Automatic Drain and Gutter Cleaner

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Abstract.

Purpose – The purpose of this paper is to review the work in the field of drainage and sewage cleaning through the articles that are published in the period of January 1980 to December 2019.

Methodology/approach – A structured review methodology with 5-steps approach for selection of articles have been used consists of 1) Database Selection 2) Keyword Selection 3) Article Collection 4) Inclusion/Exclusion Criteria 5) Reviewing Selected articles.

Findings and concluding remarks – Most of the work is found to be similar type. Therefore, there is a need of more automation in this field.

Utility of the paper – A lot of things have been discussed in this paper regarding segregation of floating waste from the sewage. This can help in aspiring future researchers to lead those researches to next level.

Keywords: Automatic Drain Cleaner, Sewage Cleaner, Floating Waste

A Review Paper on Fabrication of Compact Paper Recycling Machine

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Abstract.

Aim - A manually operated paper-recycling machine was designed and fabricated initially to enable waste paper conversion into useful product. Due to lack of proper paper waste collection channels, practically we lose a major portion to landfills and cannot utilize the waste paper properly. In institutes like offices, schools, colleges and industries the paper recycling machine can be used to reduce the paper waste and cost saving. The main aim of recycling is a double decrease of the environmental load. So automatically operated compact paper recycling machine is to simplify the process of paper recycling , reduce the cost of production of paper and the recycling time

Review methodology- during the review paper four step process is accepted the steps are given below 1) selection of topic and keywords 2) collection of related articles 3) inclusion or exclusion of criteria 4) reviewing the selected articles

Findings and concluding remark-the most of the work is found so experimental and practical based. There is a lot of possibilities of research in the this field

Research implications-this paper is helpful for the engineers who want to devolve compact paper recycling machine and also for future researchers who are willing to do research in the paper recycling

Keywords: compact recycling machine, Fabrication, waste.

Case Study of Artificial Intelligence Inventory Management in Industry

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Abstract.

Purpose of the article – This paper reports the findings of an applied research on AI inventory management in Industry. It specifically examined the relationship between inventory management and company's performance. Interviews with the company management were conducted to identify the inventory management issues and system used by the company. The relationship between the inventory management and company performance was determined based on inventory days and return on asset (ROA) analysis.

Methodology/methods – The methodology used is unstructured interviews, on-site study, and annual report analysis. Inventory management is an important area of manufacturing industry. If company fails to manage inventory, they will face failure. It is a challenge for the company to maintain fair inventory. There are various inventory management techniques available for maintaining fair inventory level in the company.

Scientific aim – The effort is directed at finding whether the method of prediction using artificial neural networks is suitable as a tool for enhancing the ordering system of an enterprise. The research also focuses on finding what architecture of the artificial neural networks model is the most suitable for subsequent prediction.

Design analysis and development of low cost ATV

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Abstract.

Purpose – The purpose of this paper is to design the ATV in low cost and project emphasizes on the practical and engineering applications of the subjects Vehicle Dynamics and Automotive Technology.

Methodology/approach – A structured review of 2 ATV car design to analysis cost using CATIA V5 R20 CAD.

Managerial implications – Future research of this paper is to help us to improve any type of fault and design related problem or cost problem who can work on this project.

Keywords: All terrain vehicle, vehicle dynamics, automotive technology, automotive course evaluation.

Loudspeaker Driven Thermo Acoustic Refrigeration

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Abstract. CFC-contained refrigeration systems has caused many environmental hazards so many researchers have been looking for alternatives since 1980. Researchers have found that Loud Speaker driven thermoacoustic technology is a very good alternative for conventional vapour compression cooling system in particular for special uses. This environmental friendly technology has the potential to replace conventional refrigerator once the improvements in design and technology are realized. It is not only an environmental friendly technology but also a non vapour compression cooling technology. No lubrication system, low electricity consumption, and without the use of any chemical refrigerants so that the constructions, it will be more simplified and cheaper. In this paper, theoretical, numerical and experimental studies were completed to identify optimum operating conditions for the design, fabrication, and operation of a Loud Speaker driven thermoacoustic refrigerator. The system uses no refrigerant or compressor, and the only mechanical moving part is the loudspeaker connected to a signal generator that produces the acoustics.

Keywords: CFC, CHFC, Acoustics, Sound Wave, Refrigeration, Thermo acoustic, Loud Speaker.

Case study on artificial intelligence in industry to improve quality and maintenance

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Abstract. In the upcoming future, artificial intelligence will replace intelligent machines and enhance human capabilities in many areas. It is the intelligence which is exhibited by machines or software. Artificial Intelligence is becoming a popular in many fields such as manufacturing, inventory control, quality and maintenance. Artificial intelligence is playing a unique role in evolving technology. Artificial Intelligence is creating impact on various fields of life and help to solve complex problems in areas like science, engineering, business, medicine, forecasting. With this evolve in technology of artificial intelligence there is exponentially increase in the quality and efficiency. This paper gives an overview of current use of artificial intelligence technologies in quality improvement of product and use of artificial intelligence in maintenance of machines. This paper will also explore the current use of Artificial Intelligence technologies in the design of quality control and improvement in quality by artificial intelligence and less wastage of material so as to improve customer experience .In this research paper we also focus on predictive maintenance using artificial intelligence so as to avoid breakdown of machines so as to decrease the corrective maintenance which lead to high maintenance cost.

Keywords: Artificial intelligence, neural networks (computers), quality, maintenance.

A Review on Electric Paper Shredder Machine

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Abstract. The purpose of this paper is for the better study and understanding of electric paper shredder machine.

In carrying out this work the study of more than 25 different papers has been studied and according to them conclusion have been made.

A structured review methodology with 4-steps approach for selection of articles has been used consists of 1) Collection of papers 2) Keyword Selection 3) Paper selection 4) Reviewing selected papers.

The machine shred papers for the purpose of destroying secret information and preparing waste papers for recycling. The machine is easy to operate and maintain.

Keywords:

A Systemic Review Porous Titanium alloys and its Applications

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Abstract. The high strength, low weight, outstanding corrosion resistance rigidity, fracture toughness and their reliable mechanical performance possessed by titanium and its alloys have led to a wide and varied range of successful applications. The use of additive manufacturing technologies, some capable of producing composite or multi-material components is an enabler for light-weighting, as features formally associated with one principal function can be designed to fulfil multiple functionalities. Additive manufacturing technologies have the ability to produce complex porous titanium structures with strictly controlled architecture, while providing freedom of design. The current applications of titanium alloys include aerospace industry, biomedical applications, automotive, chemical plant, power generation, oil and gas extraction. Porous titanium has applications in biomedical implants, electrodes, filters and lightweight sandwich panels. Extensive literature review has been undertaken which focuses on applications of porous titanium alloys in various fields & future scope of porous titanium alloys

Keywords: Fracture toughness, Porous titanium, Additive manufacturing technologies.

Review On Wind Turbine Blade Design

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Abstract. In current time the population is increasing and the demand for conventional source of energy is also increasing. Sources are very limited, so we have to make some advancement and modifications in design and other factors to increase the output and make it to utilize the input properly. The performance of the aerodynamic system of wind turbine plays critical role to generate maximum torque from wind power, which is most important to generate power. While the size of the wind turbine is also increasing, it is important to create best blade designs to produce high output, and deliver maximum torque output to the generator. In order to generate best lift on blades, we need to study some main factors such as: speed and density of the wind, surface area of the blade, lift coefficient.

Keywords: design, optimization, blade, wind turbine.

Wind Power Generation using Multi-Generator

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Abstract. Renewable energy sources and technologies have potential to provide solutions to the long-standing energy problems being faced by the emerging countries. World population is increasing and demand for conventional source of energy is also increasing. Sources are very limited, so we have to make some enhancements and alterations in design and additional factors to increase the output. In this paper two electromagnetic induction generators are chosen to share the single shaft through straight bevel gears to exploit 100% mechanical energy from the rotor of the wind turbine. The output current is further used for appliances through converter and step up transformer.

Keywords: Wind Power, Wind turbine, Wind energy conversion system, Multiple AC generators, Bevel Gear.

A Review on Solar Cooling Technologies

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Abstract. Solar energy is a renewable and efficacious source of energy which is most fundamentally used in recent and evolving technologies. Solar Cooling is one such technology which uses the energy produced from the solar photo-voltaic cell to generate cooling which further can be utilized for refrigeration and air conditioning applications. Developments in the field of solar-powered cooling systems have increased the scope of future research and global usage. This paper provides a review and analysis of different solar cooling technologies that can be implemented to generate a cooling effect in various applications. In this paper, Solar Thermal and Electrical technologies are discussed with different attributes which can be utilized for comparison, reflecting the advantages and correct usage for each technology.

Keywords: Solar cooling, solar thermal cooling, solar electrical cooling, photovoltaic cell, cooling technologies.

Six Sigma in Food Industry: A literature review

Abstract. In the current era of globalization, customer is supreme and purchase products from anywhere, hence focus should be enchantment of the customer rather than satisfaction. To respond to these needs a new paradigm in this area of manufacturing strategies is six sigma methodology which works on principles of customer converging, process oriented, process data driven and breakthrough improvement strategy. It has been increasingly adopted world-wide in the manufacturing sector in order to enhance productivity and quality performance and to make the process robust to quality variations. From the researches and surveys published so far, it appears that six sigma is not being explored by the Indian industries to its full potential. On global scenario also much is available regarding techniques of six sigma and its success stories at various multinationals, but very less is reported regarding step-by-step implementation of six sigma in food industry industries.

Keywords: Six Sigma, DMAIC, Food Industry.

A Review on Solar Energy in India: Present and Future

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Abstract. The purpose of this paper is for the better study and understanding of solar energy in India. In carrying out this work the study of more than 14 different papers has been studied and according to them conclusion have been made. A structured review methodology with 4-steps approach for selection of articles have been used consists of 1) Collection of papers 2) Keyword Selection 3) paper selection 4) Reviewing Selected papers. The machine shred papers for the purpose of destroying secret information and preparing waste papers for recycling. The machine is easy to operate and maintain.

Keywords:

Renewable Energy in India: Current Status and Future Potential

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Abstract. India is the second largest populous country in the world as well as a fastest growing economy. To sustain India's economic momentum it will require 3 to 4 time more than today, as well as face threat like climate change, emission of carbon and green house gases etc. Renewable energy is a sustainable and clean source of energy derived from nature that can provide solutions to the energy crisis facing developing nation like India. Renewable energy sources such as wind energy, solar energy, tidal energy, biomass energy and fuel cells can be used to overcome India's energy shortage. Today, renewable energy is about 35% of India's primary energy use. India is taking appropriate steps to deal with carbon emissions, clean air and global warming. India is only country in the world to have a ministry for renewable energy development, the Ministry of Non-Conventional Energy Sources (MNES). In this paper, efforts have been made to summarize the availability of, current, major achievements of future potentials of renewable energy option in India.

Keywords: Renewable energy, current status, future potentials.

An Investigation of Generation of Electricity Using Foot Steps

Abstract. In this project we are generating electrical energy by means of a non-conventional method just by walking on the footsteps. Non conventional systems for energies are very much required at this time. Energy generation using footsteps requires no any fuel input to generate electricity. The generation of electricity from footstep is eco-friendly, requires no fuel and utilizes energy that would have wasted from human locomotion. It is a fantastic development and a seeming uncharted territory in non-conventional energy sources. In this project we are generating electricity just with the help of rack and pinion arrangement along with alternator and chain drive mechanism. For its proper functioning such that it converts Force into electrical energy, the mechanism consists of rack & pinion, chain drives, alternator and battery. We have discussed its various alternate applications with extension also.

Keywords:

Review on Working Principle of Shredder Machine

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Abstract. The purpose of this paper is for the better study and understanding of working principle of shredder machine. In carrying out this work the study of more than 25 different papers has been studied and according to them conclusion have been made. A structured review methodology with 4-steps approach for selection of articles has been used consists of 1) Collection of papers 2) Keyword Selection 3) paper selection 4) Reviewing Selected papers. After that we have discussed about the literature review of working principle of shredding machine. The machine shred papers for the purpose of destroying secret information and preparing waste papers for recycling. The machine is easy to operate and maintain.

Keywords:

Recent Advances and Challenges of Abrasive Jet Machining

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Abstract. A large number of modifications on the abrasive jet machining with output parameters as material removal rate (MRR) and surface finish have been carried out to maximize the effectiveness of the machines. The growth of high performance material such as composites and advanced ceramics has a variability of manufacturing challenges. It is known that many of these materials cannot be meritoriously machined by conventional machining methods. This paper scrutinizes the optimal machining parameters to machine holes on soda lime glass for several performance characteristics. Grey Relational Analysis (GRA) is used for enhancing the process parameters for the material removal rate (MRR) and radial overcut (ROC).

Keywords: Abrasive jet machining, Edge radius, GRA , MRR, Micro-hole, Erosion Rate ,Jet velocity.

Portable Air Conditioner Using Seebeck Effect

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Abstract. Heat has always been a problem in every country. Doing work in a hot summer day can be tiring and are prone to more fatigue. A proper air conditioner would be good item to have during these times. Air-conditioning is the process of controlling temperature, humidity, motion and purity of the atmospheric air in confined space. Present Air Conditioning System Produces Cooling Effect By Refrigerant Like Freon, Ammonia, Etc. Using This Refrigerents Can Get Maximum Output But One Of The Major Disadvantages Is Harmful Gases Emission And Global Warming. These Problem Can Be Solve By Using seebeck Module (seebeck Effect) Air-Conditioner The appearance of this thermoelectric type of air conditioner is same as conventional window air conditioner.

Keywords: Thermoelectric; Air conditioner; seebeck module.

Review on Recent Developments in Solar Refrigeration Technology

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Abstract. Energy is backbone of technology. Now ‘energy’ is the fourth factor of production in men, machines and money. At present a major problem facing by the world is lack of electricity. It urgent to find new resources to make energy in a more efficient way. Solar energy is the alternative resource to reduce problem of energy.

A review is related to advances development in solar refrigeration technology. Recants work on photo-voltaic and solar thermal systems is reviewed. Evaporator, compressor, condenser, and expansion are the four main component of vapour refrigeration system. The Li-Br and H₂O are the best pair as refrigerant for absorption refrigeration. This solar refrigerator is eco-friendly because refrigerant (H₂O) has zero depletion and low global warming potential.

Keywords: Solar energy, vapour-absorption, refrigeration systems, solar heating.

GPS Based Object Location and Route Tracking

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Abstract. Location primarily based offerings has permit humans to find and track the vicinity of other humans, gadgets, device, automobiles and sources, from the comfort of their domestic so long as they have the specified machine which include clever cellphone, PDA’s, and others (Adusei, et al, 2004). Requesting area touchy records is generally initiated through a person known as the consumer or network Company. Most application these days use Global Positioning System (GPS) offer location statistics; for instance social network website like Facebook allow users to percentage their vicinity with buddies and own family, any other not unusual example are utility that allow customers retrieve climate forecast information primarily based on their contemporary vicinity.

With the numerous advantages emanating from the usage of region-based provider, there may be but issues that bothers at the privateness of consumer; for this reason there is need for correct Authorities rules.

The cause of this venture to develop a tracking / monitoring Android application (cell) using object GPS gadgets to check its current location, and previous region at distinct intervals, this machine in contrast to previous tracking system will supply consumer the capability to create International Journal of Information System and Engineering .

This paintings is certified beneath Creative Commons Attribution 4.0 International License. Bookmark of present day location and ability to direction again to that region from anywhere the use of Google Maps API’s in case they can’t keep in mind the expenses vicinity.

Keywords: Global Positioning System, Location Based Service, Tracking, Privacy, Android tool.

Review on Automatic Scissor Jack Using Car Battery

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Abstract. An automotive jack is a device used to raise all or part of a vehicle into the air in order to facilitate repairs. Improvement in automotive car jack is really needed to make the tool more efficient, user friendly, practical to use, changes in industry direction and most importantly high safety feature. An Automatic car jack works on a torque motor which drives by electrical supply from the car battery itself making it easy to operate. Operator only needs to press the button from the controller without working in a bent or squatting position for a long period of time to change the tire. In order to fulfil the needs of present car jack, some improvement must be made.

Keyword: Facilitate repairs, more efficiency, high safety features, work on torque.

Development of multipurpose agriculture cutter

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Abstract: After 20 years of neglect by international donors, agriculture is now again in the headlines because higher food prices are increasing food insecurity and poverty. In the coming years it will be essential to increase food productivity and production in developing countries, especially in Sub-Saharan Africa and with smallholders. This however requires finding viable solutions to a number of complex technical, institutional and policy issues including land markets, research on seeds and inputs; agricultural extension; credit; rural infrastructure; storage; connection to markets; rural nonfarm employment and food price stabilization. This paper reviews what the economic literature has to say on these topics. It discusses in turn the role played by agriculture in the development process and the interactions between agriculture and other economic sectors; the determinants of the Green Revolution and discuss the foundations of agricultural growth; issues of income diversification by farmers; approaches to rural development; and finally issues of international trade policy and food security which are at the root of the crisis in agricultural commodity volatility in the past few years.

Keywords:

Hybrid Power Generation using Wind and Solar Energy: A Review

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Abstract. This paper explains the hybrid system of power generation which provides efficient and continuous power supply with overall cost very low with compared to other sources of energy.

While studying about the following system for power generation using renewable sources of energy, a study of over 20 research papers was done.

Now for the above study to be conducted the following methodology is being followed:

- Collection of Papers
- Selection of Keywords
- Selection of Research Papers
- Understanding and Reviewing of the study of selected research papers

A Hybrid System of power generation using renewable sources of energy such as solar energy, wind energy etc is the coupling of two process of individual mechanisms. Therefore a process of producing electricity from solar energy using solar panels and wind energy using wind turbines is being combined into a whole new process overcoming the fluctuations caused due to individual processes being used.

Also the construction of this whole hybrid system combining solar and wind energy is being explained in this paper.

Keywords: Wind Turbine, Solar Panels, Microcontroller, Battery.

Correlation of Acoustic Emission Parameters with Surface Roughness in End Milling of AISI 4140 Steel

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Abstract. This paper reports correlation of response variables and their effects on machining parameters in end milling of AISI 4140 Steel. In any recent development of precision machining, controlling and monitoring of metal cutting processes is an essential requirement. The recent advancement in intelligent machining industries deals with the effective utilization of cutting tools and different strategies employed to monitor tool condition. During machining, condition monitoring of tool plays an important role to achieve high degree of surface finish. This improves product quality and also helps to minimize machining costs. In this paper, an experimental study is exhibited to examine methodically the acoustic emission (AE) signals for observing and determining the behaviour of end milling operation. The logical and scientific results of AE parameters are compared with the roughness parameter R_a . A surface roughness R_a value of $0.517 \mu\text{m}$ is obtained using PVD coated TiAlN carbide insert by end milling of AISI 4140 steel.

Keywords: AE signals, AISI 4140 Steel, PVD, Taguchi Orthogonal Array, R_a

Study of Vertical Axis Wind Turbine for Energy Harvester in a Fishing Boat

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Abstract. Increased concern for environment has led to the search for more environment friendly sources of energy. Wind energy can be a viable option in this regard. Vertical axis wind turbines offer promising solution for areas away from the integrated grid systems. This paper reviews various configurations of VAWT along with their merits and demerits. Moreover, design techniques employed for VAWT design have also been reviewed along with their results. It was learned that coefficient of power (CP) for various configurations is different and can be optimized with reference to Tip Speed Ratio. This paper presents an unsteady two-dimensional computational study in order to observe the effect of overlap ratios on static torque characteristics of a vertical axis wind turbine (VAWT). In this work, the near and far wakes of a low-solidity two-straight-bladed vertical axis wind turbine (VAWT) were, for the first time, investigated with two- and three-dimensional computational fluid dynamics (CFD) simulations.

Keywords: Renewable energy; Wind turbine; VAWT; HAWT; Wind tunnel; Straight-bladed; Darrieus.

Musculoskeletal risk assessment in small-scale furniture wooden workshops

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Abstract. In lower middle income countries, wooden furniture making is primarily done in small-scale workshops in which most activities are performed manually. The current research is conducted among workers of wooden furniture workshops to verify the prevalence of musculoskeletal disorders (MSDs) and to assess operating conditions to determine significant risk factors related to MSDs. In the current research, 70 randomly selected workers from 20 different wooden furniture workshops in Kota participated. The data was collected using a Standard Nordic questionnaire and ergonomic checkpoints consisting of seven sections. The data were further analyzed for finding the statistical difference among all sections. The highest prevalence of MSDs was reported in the shoulders (75.14%) and knees (54.28%). It was found that material handling and storage, low lighting, poor workstation design, and awkward working postures were associated with the MSDs in one or more body parts. Different action categories indicate the priority of corrective measures, and ergonomic modifications are required for improving the working conditions.

Keywords: Musculoskeletal disorders; repetitive activities; risk assessment; small scale; unorganized sectors.

An Application on Machine Learning for Networking: A Review

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Abstract. The purpose of this paper is to review of the applications on machine learning for networking. This includes review on the research papers of machine learning applied for networking and their applications in current scenario. A structured review of factors that influences or enhanced networking sectors through machine learning. Future research of this paper is to help us to enhance the network by using machine learning approach and betterment of whole networking field.

Keywords: Deep learning, Autoscaling of Servers, Cybersecurity, Network trafficking, Traffic pattern handling optimization, Request routing, Regression, Classification.

Design of Wheelchair Using Rocker Bogie Mechanism

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Abstract. In this study, we propose a step climbing wheelchair with a Rocker Bogie mechanism which allows successful obstacle surpassing like curbs, ramps, staircases, terrain while maintaining passenger's comfort. Rocker Bogie mechanism is known for its obstacle climbing potentiality and vehicle constancy. The high grade of mobility suspension approach is provided to wheeled rover which has the ability of driving over rough terrain. The Rocker Bogie mechanism provides a simple drive and is mainly operated by two motors. The motors are held inside where thermal deviation is kept lowest and that motors increases its efficiency and reliability. To overcome the obstacle the wheels are guided concurrently. By implementing this mechanism, the vehicle can roll over any obstacle it faces during the travel.

Keywords: Rocker-Bogie, DC-motor, Stair-Climbing, Wheelchair.

Energy, exergy analysis of an oxy-hydrogen gas in diesel engine under dual fuel mode

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Abstract. In this study, diesel engine performance is analyzed by applying the first and second laws of thermodynamics. For experimentation, the non-road modified diesel engine (variable compression ratio) was used. Oxy-hydrogen gas (HHO) was supplied along with diesel to the engine under dual fuel mode, which was generated from HHO dry cell hydrogen generator. An optimum flow rate of HHO (0.75 LPM) was selected to run the engine at all engine load conditions (0, 2.5, 5, 7.5, 12.5 kg). A significant improvement in performance parameters was found in brake thermal efficiency and brake specific energy consumption as ~6.5% and ~6%, respectively under the DF mode (at 80% load). Moreover, a slight increment in exhaust energy and exergy was found by ~8.55% and ~5.7%, respectively due to rapid oxidation of combustible mixture, which results in higher cylinder pressure and temperature. Overall it could be concluded that HHO can be considered as a prominent alternative fuel for the diesel engine.

Keywords: Diesel engine; Dual-fuel engine; Oxy-hydrogen gas; Energy analysis; Exergy analysis; Combustion.

Analysis of Piezoelectric Material for Automotive Application

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Abstract. Automobiles are made up of many different reciprocating components subjected to extensive amount of vibration ranging from 40-200 Hz. Also there is generation of heat and shocks during the operating conditions of the vehicle. As per energy conservation rule, we can absorb these vibrational, thermal and external shocks to convert them into a usable entity or energy i.e. in the form of electrical energy which can be further used for other applications in the automobile.

It is a thought of using piezoelectric transducer as a medium to convert the vibrational, thermal and external shocks to generate electrical energy. For this, the PZT composites are to be placed in close/direct contact with the most vibrating, thermal/stress producing automotive components through which energy transfer would take place between component and PZT which will directly trigger the output voltage and current through the circuit and this current would be used in most appropriate manner where it can be used..

Keywords: piezoelectric, vibration, thermal, electric energy, automotive components.

FEM Analysis of Robotized Arc Welded Joint

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Abstract. The welding is one of the most important phenomena as far as the joining of two bodies is concerned. Welding processes are common in fabrication industries. Different types of welding are used in the automobile industries for the manufacturing of their bodies. Other examples of industries where welding plays a crucial role include construction industries, aviation industries, fabrication of pipelines, general repairing of machines, etc. As welding is such a most important factor in almost all industries, therefore it deserves proper attention in order to optimize the whole welding process. On one hand welding process is quite beneficial but on the other hand, it requires very careful attention of the operator, as there were several cases of accident due to welding just because of the carelessness of the operator. Also, it is a repetitive task so the labor or worker is engaged in working without proper use of their brains in some other productive works. Thus a number of manpower is only engaged for welding operation this makes the work boring and this restricts them from showing their true potential. This paper deals with the finite element analysis (FEA) of welded single V joint for obtaining the Shear Elastic Strain, Normal Elastic strain, Strain energy, and Shear stress respectively developed at the welded joint. The temperature of the weld pool taken for analysis is 400°C and the material of the specimen is Mild steel ASTM A 36 for welding and its coordinating filler material AWS A5.1 E 6013 were chosen in this study. The specimen size was 30×150×9mm³ thickness. Welding current was set to 90A with welding speed 27mm/sec.

Keywords: FEM Analysis; Robotics; SMAW; Simulation; Thermal Deformation.

Design and Fabrication of Tree Structure for Micro Photovoltaic Power Plant

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Abstract. Utilization of solar energy is the most promising way of meeting the rising energy demands in an eco-friendly manner. A solar tree powered micro power plant is the most innovative way of satisfying small local power requirement where ground space availability is a problem. Solar tree is an efficient and compact PV unit having a superior design as compared to traditional photo-voltaic systems from the stand-point of floor space requirement and efficiency. Solar tree powered micro power plant can easily provide small power for urban and rural areas and is especially adaptable to the needs of remote and socially backward areas when there is a shortage of electricity. Scarcity of land is the greatest problem in crowded cities and villages in India. Solar Tree is better alternative compared to flat rooftop PV mountings. For domestic lighting and other applications, use of solar tree is more relevant when PV system is to be used. All the calculations are done considering solar radiation data at Mumbai, Maharashtra. The load capacities or sizes of all other components of system are determined. Solar tracking system can be easily incorporated in Solar Tree to further enhance its performance. The overall cost can be reduced using simple and innovative designs of Solar Tree. The power output can be easily increased by increasing the number of PV panels without corresponding increase in ground space.

Keywords: Solar Tree, Silicon-crystalline Photo-Voltaic (SPV), Angle of incidence, Series connection.

Review and Significance of Thermoacoustic Refrigerator

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Abstract. For cooling purpose conventional refrigeration system is being widely used. Various types of refrigerants are used in these systems but the major drawback of using these refrigerants is the emission of gases like ChloroFluoro Carbon (CFC), Hydro ChloroFluoro Carbon (HCFC) which are harmful for our environment. Hence, to find a replacement of the conventional refrigeration system, thermoacoustic refrigeration system is introduced. Thermoacoustic refrigeration system is one of the harmless types of refrigeration system, which offers a wide range of scope for further research. The main advantage of this refrigeration system is that there is no emission of harmful ozone depleting gases as chemical refrigerants are not required. The major disadvantage of the method is lesser Coefficient of Performance. Due to several advantages of this system it is getting the attention of many researchers as it can replace the conventional refrigeration in future. Researchers have found the influence of various parameters of the components, the working fluid, and the geometry of the resonator on the performance of the device. The main objective of this paper is to present a detailed overview on the arrangement and functioning of the refrigeration system using high intensity sound waves. A review on the works done in this area, the advancements made and the future scope are also discussed.

Keywords: Refrigeration, no refrigerants or chemicals, Acoustics, Stack, Sound waves, Cooling, Temperature Difference.

A Numerical Study of Free Vibration Behavior of Shear Deformable Functionally Graded Beam

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Abstract. A numerical study to analyze the vibration characteristics of the shear deformable graded beam is presented in this paper. The material properties of the beam are assumed to be varied in thickness and/or axial direction in accordance with the power law. The governing differential equations for free vibration analysis of FGM beam are derived using Hamilton's Principle. The finite element formulation is then employed to obtain the numerical solution of derived differential equations. A convergence study is conducted to fix the number of elements for discretization of finite element model of FGM beam. The accuracy of model is verified by comparing the present results with that available in the literature. Parametric studies are conducted to investigate the effect of material properties, boundary conditions and geometrical parameters on the free vibration behavior of FGM beam. Vibration characteristics of the FGM beam are presented in the form of natural frequencies and corresponding mode shapes. It is found that the vibration response of FGM beam is significantly affected by the material gradation profile.

Keywords: Vibration, Functionally Graded Materials, Finite Element Method, Shear Deformable, Mori-Tanaka Scheme and Power Law.

Thermo-Mechanical Analysis of Functionally Graded Turbine Blades Using Finite Element Method

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Abstract. The Thermo-Mechanical analysis of turbine blade made of FGM under thermal loading condition is carried out using finite element method. A two noded shear deformable beam element with graded material properties is used for finite element analysis. The material properties are varied across the thickness of FGM beam using Power Law and Voigt Model is adopted to predict the Young's Modulus and thermal expansion coefficient of FGM beam. The accuracy of the present formulation is verified by comparing the obtained results with existing literature. A detailed numerical study is conducted to assess the effects of various material, geometrical and loading conditions on thermo-mechanical response of turbine blade. Results such as stresses and deformations are illustrated in graphical and tabulated form. It is envisioned that the application of graded materials can improve thermal and mechanical strength of for turbine blades considerably.

Keywords: Thermo-Mechanical, Functionally Graded Materials, Finite Element Method, Turbine Bladed, Power Law and Voigt Model.

Controlling of Manipulator for Performing Advance Metal Welding

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Abstract. The regulation of a mechanical manipulator device is a critical step for a simpler and accurate method of welding. In order to ensure accurate metal arc welds the direction and pace of the deceiver should also be monitored using only a measurement control device using welding parameters such as temperature, swelling speed and the friction that happens in the gripper, since the number of connections increases their difficulty. This research is performed with assistance of SIMULINK to monitor two link solid robotic manipulator systems. A mathematical model was developed that serves as an interface and then a FUZZY-PID regulator is attached whose output acts as a reference into the system. The deceiver has a complex behavioral model. The con-trolling machine has been further improved using GENETIC Algorithm. by simulation results it is found that the FUZZY PID does have the lowest error value in comparison to the FUZZY PI, FUZZY PD and PID controllers.

Keywords: Controlling; Robotic Welding; Welding Parameters; FUZZY-PID Controller; Genetic algorithm; Integral absolute error.

Buckling Analysis of Functionally Graded Plate under Non-uniform Compressive Loading Condition

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Abstract. A finite element formulation to analyze the buckling characteristic of Functionally Graded Plate (FGP) under non-uniform compressive loading conditions is presented. The graded material properties across the thickness of the plate are calculated using Mori-Tanaka and Tsai-Hill homogenization schemes. An eight noded Mindlin Plate element with 5 degree of freedom at each node is employed for discretization and finite element formulation. A convergence study is conducted to fix the number of layers across the thickness of FGM plate to provide smooth and continuous variation of material properties of. Present formulation is verified by comparing the buckling load of perforated isotropic and FGM plates with available literature. Various parametric studies are conducted to investigate the influence of material properties, geometrical parameters and boundary conditions under non-uniform loading conditions. It is observed that the buckling response of FGM plate is significantly differs from corresponding isotropic plate. Results are presented in the form of buckling loads and mode shapes.

Keywords: Buckling Load, Functionally Graded Materials, Finite Element Method, Perforated Plate, Mori-Tanaka and Tsai-Hill homogenization schemes.

Design and Development of an Indigenous Drum Dryer for Preheating of Plastic Scrap

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Abstract. Plastic plays an important role in different sectors; the use of plastics varies from general day to day life to complex packing of items. The industries that use plastics are packaging, logistics, manufacturing etc. It is quite evident that plastic is also the main cause of environmental pollution. It is very dangerous to living being and affects the ecological system directly or indirectly. The consumption of plastics has several benefits such as in medical and packaging of surgical items. The quality of plastics is measured in microns, and they should be under 40 microns, as under 40 microns they can be decomposed into the soil after a specified amount of time. Plastics items that are over 40 microns e.g., toys, beverage bottles, etc are very common. Therefore they should be recycled in order to have a safe environment.

In this experiment an indigenous plastic scrap preheating machine has been developed that preheats the plastic scrap very economically and may be used at small scale industries, as such types of industries largely uses sun drying method for heating the plastic scrap. The limitation of such method is that the time taken to heat the scrap is quite large and also there remains porosities inside the plastic scrap, these porosities create voids in these scraps that reduce the strength of the final manufactured plastic item in operations like injection moldings.

Keywords: Pollution, plastic Scrap, Preheating, Drum dryer, Molding.

Experimental and numerical investigation of thermal conductivity of marble dust filled needle punched nonwoven jute –epoxy hybrid composite

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Abstract. In the present research work, the thermal conductivity of unfilled and marble dust filled needle punched nonwoven jute-epoxy composite is investigated. The hybrid composites are prepared using vacuum assistant resin transfer molding (VARTM) process with varying the wt.% of marble dust (filler) from 0 to 24 wt.%. The hot disk TPS thermal constant analyzer is used to measure experimental thermal conductivity. The analytical thermal conductivity is estimated using different theoretical models and Finite element simulation package ANSYS workbench. Three-dimensional model is used to simulate the thermal conductivity of fabricated composite for various filler concentrations. The Temperature and heat flow are considered as the input parameters, while heat flux is output for the finite element simulation. The experimental results indicate that the thermal conductivity increase with increase the filler wt.% in the composite. The result obtained from the theoretical models and ANSYS are found to be in good agreement with the experimental results.

Keywords: Needle punched, Jute, thermal conductivity, Numerical simulation, ANSYS.

An EEG Based Approach for the Detection of Mental Stress Level: An Application of BCI

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Abstract. This paper aims towards detection of pattern in brain waves that are elicited in response to mental stress. For stress level detection, an algorithm based on Electroencephalogram (EEG) has been put forward. To validate the impact of the proposed stress level recognition algorithm, an experimental investigation has been carried out on different subjects. Stroop color-word test, designed on LabVIEW platform and arithmetic puzzle test (that can be solved mentally) are the two effective stressor that have been utilized to produce different levels of mental stress. The induced stress signals are preprocessed using a software in an eegoTMsports ANTNeuro System using 32 electrodes WaveguardTM EEG cap. The Hjorth parameters and various statistical features have been classified using Support Vector Machine (SVM). Additionally, by utilizing the ratio of absolute alpha and beta power along with the other power band features extracted from EEG signals, a mean accuracy of 76.04% is achieved for three-level stress. Moreover, for the analysis of two-levels of stress, an average accuracy of 87.5% and 90.625% are obtained by Stroop color-word test and mental arithmetic test respectively.

Keywords: EEG, Stress recognition, Stressor, SVM.

Smart Classroom surveillance system using YOLOv3 algorithm

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Abstract. One of the major concerns associated with educational institutions is the attendance survey, monitoring and surveillance. Owing to the labor-intensive nature of manual attendance system involving the management of attendance records, the current focus is on the emergence of an efficient and accurate attendance system. This paper presents a maiden attempt to propose a smart classroom attendance and surveillance system using YOLOv3 algorithm, a novel deep-learning approach. An attempt has been made to avoid the unnecessary wastage of time spent during attendance marking and also to avoid fake attendance. Using YOLOv3 algorithm in the Darknet framework, a realistic dataset of images with around 14 students and faculty members has been used to train the test model. The dataset has been formed by acquiring the realistic images from the Department of Instrumentation and Control Engineering, Dr. B. R. Ambedkar National Institute of Technology Jalandhar, India. The test results demonstrate the efficiency of YOLOv3 algorithm in effective face recognition, thereby, endorsing its capability and usage in smart classroom surveillance system. In addition, the performance of YOLOv3 has been compared with YOLOv3-tiny algorithm to validate its robustness and competence in classroom surveillance tasks. The experimental results demonstrate a maximum accuracy of 99% by YOLOv3 algorithm.

Keywords: Attendance system, Classroom Surveillance, Deep learning, YOLOv3 algorithm, YOLOv3-tiny algorithm.

Cuckoo Search Algorithm based Energy Optimization of Multiple Stage Evaporator System

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Abstract. Multiple Stage Evaporator (MSE) system employed in the concentration of black liquor in Kraft Recovery process of Paper mills corroborates to be the utmost and prominent energy intensive unit. Owing to the escalating energy cost, aggravating energy demands and augmenting global warming concerns, Energy optimization of MSE substantiates to be a global concern of astounding and distinguished interest among researchers. This article provides an innovative and effective methodology for energy optimization of MSE via the application of metaheuristic-based strategy. To achieve an enhancement in energy efficiency of the MSE, a hybrid model of various energy saving strategies (ESSs) integrated with MSE has been presented. The non-linear energy models of MSE with and without ESSs consisting of energy and heat balance equations are first transformed to the optimization problem through the formulation of cost function. The optimization task is performed by means of Cuckoo Search (CS) algorithm, an effective metaheuristic approach. The optimum values of various operating parameters comprising steam consumption, vapor temperatures and liquor flow rates are efficiently estimated by CS metaheuristic optimization strategy. Consequently, the optimum steam economy is achieved by exploiting the optimum values of the aforementioned operating parameters. The simulation results are compared with erstwhile research accomplishments to endorse the strength, competence and investigative proficiency of CS in solving a complex system of non-linear algebraic equations. Moreover, the simulation results demonstrate that the amalgamation of various ESSs into the MSE enhances the steam economy of the overall MSE system by 22.79%.

Keywords: Cuckoo Search, Energy Optimization, Multiple Stage Evaporator, Steam Consumption, Steam Economy.

EEG Based Study of Pictorial Advertisement Impact on Customers' Market Preferences

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Abstract. Neuromarketing is a way to detect elicited brain activities while customer is engaged towards various products and brands. This paper presents a study regarding customers' engagement with various products and brands available in the market using Electroencephalography (EEG). A total of 10 test subjects were presented with a collage of still pictures from the TV commercials and their brain activity was recorded. Power Spectral Density (PSD) was obtained from the acquired signals using Fast Fourier Transform (FFT) technique and absolute power was obtained. The results showed that test subjects felt change in elicitation in the theta wave and a pattern can be seen in theta band power. This study implies that the variation in theta band power when compared with the Delighted-Terrible (D-T) scale rating changes which signifies the same outcome. Hence, the present work would help in effective evaluation of the change in market demands of various products and brands with the help of pictorial advertisement.

Keywords: EEG · Neuromarketing · D-T scale · Theta band power

Techniques used in Phonocardiography: A Review

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Abstract. Segmentation of Phonocardiogram (PCG) into its significant sound component is the initial phase in the automated diagnosis of cardiac abnormalities. The greater part of the computerized demonstrative calculation that utilized the PCG as a kind of perspective sign to identify side effects of cardiovascular variations from the norm apply time division as a pre handling venture to separate progressive. In PCG we identify the first and second heart sound on recurrence space characteristics. The principal sound emerges from the mitral and tricuspid valve and the subsequent sound brought about by the closer of aortic and pulmonary valves. For this we are utilizing here a few methods where we can extricate the PCG signal. We can discover the fetal pulse during pregnancy around eighth week of pregnancy. As PCG is a clinical test to survey fetal prosperity during pregnancy, work and conveyance. Wavelet transforms a strategy for procedures, as more suitable technique for preparing the FPCG signal. The wavelet technique incorporates the shifting and scaling of signal. This strategy can be utilized for examination of 1-D as well as 2-D data

Keywords: Fetal PCG, Wigner distribution, Wavelet Transform, Phonocardiography, Auscultation.

Numerical Simulation of Solid particle Erosion for Glass Fibre Reinforced Epoxy Composites

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Abstract. Erosion remains a major problem for the development of composite materials applications. A finite element method model for predicting the erosion behaviour of composites subjected to solid particulate impacts was used. In this FEM model, the Glass Fibre Reinforced epoxy composite (GFRP) plate undergoes multiple particle impacts at different speed varying from 15m/s to 55 m/s at the interval of 10 m/s, with steel balls representing as the eroding particles. Mass loss is examined (i) By changing the impingement angle from 15° to 90° by keeping the velocity constant and (ii) Velocity is varying from 15 to 55 m/s at 45° impingement angle. The eroded cumulated mass predictions obtained from the numerical model favourably compare with the eroded mass results obtained from the literature reported experimental data.

Keywords: Solid particle erosion, ANSYS, Finite Element Method, Composite.

Modal Study on Isotropic Spherical cap and Functionally Graded Spherical Panel using COMSOL

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Abstract. This research article investigates the free vibration behaviour of functionally graded spherical (FGM) panel and isotropic spherical cap. The mechanical parameters are continuously graded along thickness direction according to P-FGM (power law gradation). The natural frequencies and corresponding mode shapes are obtained using FE software COMSOL Multiphysics. The variation of power law indices with natural frequencies under different end support is also reported in detail.

Keywords: Vibration study, FGM - spherical panel, Isotropic spherical cap, Power law, COMSOL

Enhancement of Mechanical Properties of Fly Ash reinforced Epoxy Composite

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Abstract. In order to fulfill the increasing demand of electricity, people are dependent upon coal-based thermal power plants. The amount of fly ash waste is also increasing, which leads to air and water pollution, complex problem and harmful effects on the environment, human health & agriculture. Therefore, researchers are working on utilizing fly ash in various applications such as automobile & aircrafts fields. In this work, four different epoxy composites were fabricated with different fly ash content from 0 wt. % to 15 wt. % and then the tensile strength and hardness of the fabricated composite were evaluated. The finding of results indicated that for particulate filled composites, the tensile strength and hardness were increased with the addition of fly ash content for most of the composition. However, there was a fall in the tensile strength at the fly ash content of 5 wt. %.

Keywords: Fly ash, mechanical properties, epoxy composite, hardness.

Performance analysis of Wavelet Filters for Heart Rate Variability Analysis

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Abstract. Heart rate variability (HRV) analysis yields important insights into the understanding of physiological mechanisms. The HRV analysis is a powerful tool for risk prediction in heart diseases. Most common methods of HRV analysis are fast Fourier transform and autoregressive methods. However, these methods have limitations in the study of long-term non-linear variations and transient analysis of heart rate variability. Wavelet transform-based HRV analysis overcomes these limitations. This paper identifies the characteristics of wavelet transform in heart rate variability analysis. The number of wavelet filters suggested in the literature, but every wavelet filter has a specific category of application. To investigate the wavelet filters for heart rate variability analysis; RR tachogram extracted from five minutes of ECG signal recorded from a healthy volunteer. The appropriate wavelet filter should be adaptive to slow and fast variation in the HRV signal. The different wavelet filter performances assessed and the observations presented in the results revealed that Db-3 (Daubechies) with six-filter length is the most suitable wavelet filter for HRV analysis.

Keywords: Heart rate variability, wavelet transform, filter, RR interval.

Computational Fluid Dynamics Modeling of Erosion at Diverse Impact Angle for Glass Fiber Reinforced Composite

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Abstract. Numerical simulation has been carried to study the erosion pattern and erosion rate of glass fiber reinforced polymer (GFRP) composites filled and validated experimentally. The Discrete phase Model (DPM) is used for numerical simulation in ANSYS Fluent. In the experiment setup, air-jet erosion test-rig is used, in which impact velocity of mixture air and sand particle is to be 25 m/s and different impingement angles of 15, 30, 45, 60, 75 and 90 are taken. The experiment results show that with increasing the marble content in glass fiber reinforced composite decrease in erosion rate and maximum value of erosion rate is found between 30° to 90° impingement angles, which reveals erosion behaviour to be semi ductile. The erosion pattern and erosion rate of numerical simulation are in good agreement with experiments.

Keywords: Computational Fluid Dynamics, Erosion, Composites, Discrete Phase Model.

Parametric Optimization of Single Cylinder Diesel Engine Fuelled with Water-Diesel Emulsion Fuel for the Improvement of Brake Thermal Efficiency Using Taguchi Method*

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Abstract. Now a day's need of alternative fuels for diesel engine is increasing drastically as fossils fuel may last at end of century. Also, inflation of conventional fuels, emissions and limited use have created researcher to find suitable substitute to diesel. Water Diesel emulsion is an emerging technique for emission control. However, performance like brake thermal efficiency should be optimized with experimental as well as regression tool. Taguchi method optimization is one of well-known tool. In this present work an experimental work has been carried out on a single cylinder water cooled four stroke direct injection diesel engine fuelled with water diesel emulsion fuel. Stable emulsion was produced with the help of Span80 & Tween80 used as a mixed surfactant. Emulsions were using mechanical homogenizer at a speed of 2500 rpm for 20 minutes of duration. In this work, the effect of parameters like compression ratio, water content, injection pressure and load were taken as variables for optimization with three levels. Taguchi method was used for optimization of diesel engine. The results of the Taguchi experiments identifies that 10% water content in a diesel, 18 compression ratio, 180 bar injection pressure, and 12 kg load were optimum parameters setting for highest brake thermal efficiency. Confirmation experiment was done using optimum parameter set. The predicted brake thermal efficiency 24.77% was closer by experimental results brake thermal efficiency 25.40%. It validates experimental optimized parameters with Taguchi method.

Keywords: Brake Thermal Efficiency, Diesel Engine, Parametric Optimization Taguchi

Process Parameters Optimization and Analysis of The TIG Welding for Mild Steel

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Abstract. Tungsten Inert gas (TIG) welding process is mostly used in industries to join either similar or dissimilar materials. The TIG welding process mainly focuses on increasing the depth of penetration. The quality of welded joints is directly affected by the welding input parameters. Insufficient weld bed dimensions such as welding speed, Filler diameter may lead to failure of welded structure.

It is a thought of using L9 method based upon the parameters such as welding current, welding speed and gas flow rate for optimizing and analyzing the hardness and toughness of weld bead.

Keywords: TIG, similar and dissimilar metals, Toughness, Hardness, Design of Experiments, Welding.

Effect of stroke rotation on discomfort for assembly tasks

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Abstract. This study was performed to investigate the effects of stroke rotation on human performance in terms of discomfort and productivity (duration required to perform given task). Two types of assembly tasks of the plumbing work were considered in this study: socket and threaded pipe assembly, and nut and bolt assembly. Twelve right-handed participants volunteered in this study. The participant assembled 50 assemblies of each type for three levels of stroke rotation (30°, 45° and 60°) separately in two sets. The results of MANOVA performed on the recorded data, showed that stroke rotation was highly significant on discomfort ($p < 0.001$) and duration ($p < 0.001$) for both given tasks. It was noticed that stroke rotation of 60° was very much comfortable with lowest discomfort and highest productivity. Although it was difficult to control during real life situations but may be possible in those tasks which are repetitive and productivity is important to be considered.

Keywords: Stroke rotation, discomfort, productivity, assembly task.

Analysis of Developments on Mechanical Properties of 7xxx Series Aluminum Alloys: A Review

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Abstract. This paper analysis some studies of 7xxx series of high strength aluminum alloy and a trial has been made to focus on the processing, heat treatment, properties and applications of the 7xxx Al alloy from the present literature on the 7xxx alloy. The properties of mechanical having fatigue, tensile and fracture hardness properties which further discussed and timely supported and analyzing the experimental data. The main consequences are strain corrosion exfoliation and cracking corrosion and they are also reviewed mainly. There are few samples which were welded by traditionally methods using solo sides and bobbing tool friction stir welding processes considering different parameters of welding. There were compressive behavior and processing maps of cast, as-cast and extruded 7075 Al alloy taking identical grain size of 310-360 μm which further studied and equated with references. There are some works reported the fabrication of Al alloy 7075 with corundum Al_2O_3 particles of corundum and B_4C considering stir casting methodology. The main influences after considering ageing temperatures over mechanical properties, precipitation and corrosion behavior features of 7085 Al alloy and were investigated using intergranular corrosion tests, transmission microscopy, tensile testing and polarization curve measurement observation. Main aim of conducting this type of review analysis is to realize the fact of higher understanding of all parameters which are further governing the fatigue crack effects and discontinuities to facilitate the larger prediction of lifecycle of fatigueness.

Keywords. Transmission Microscopy, 7xxx Series, Electro-Probe Microanalyzer, Electron Back Scattered Diffraction, aerospace engineering.

Comparison of Thermoacoustic Refrigeration System with VCRS

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Abstract. Thermoacoustic refrigerator works on principle of converting sound energy into mechanical energy. Thermoacoustic refrigerator (TAR) provides cooling by using sound wave & without using any refrigerants. TAR does not use any type of refrigerants so it is ecofriendly system. There is no moving parts and no costly parts use so it is inexpensive and economical. This refrigerator uses in different application and areas like military, hospital. After going through this paper one will be able to understand the basic working of a TAR and how we can differentiate this with the conventional refrigerator devices.

Keywords: Ecofriendly, moving parts, Thermoacoustic refrigerator.

Validation of Drivers of Sustainable Manufacturing: A Structural Model Development

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Abstract: Manufacturing industries produce various harmful emissions, which are increasing on day by day due to inappropriate technologies adopted by industries for production and other purposes. These emissions can only be reduced by incorporating sustainable manufacturing or similar technologies. And also increasing and sustaining these technologies by working on/with their drivers. In this research Structural Equation Modeling (Exploratory factor analysis and Confirmatory factor analysis techniques) are used for structural model development. Exploratory factor analysis deals with categorization of all drivers in four major criterions and Confirmatory factor analysis works for proposing a model for relationship among all drivers, and Hypothesis Testing is used for validating this proposed model.

Keywords: Sustainable Manufacturing, Exploratory factor analysis, Confirmatory factor analysis techniques, Structural Equation Modelling, Drivers, Hypothesis.

Development of Improving Model for the Surface Finish of Ball Bearing (Deep Groove) by Optimizing Cutting Parameter

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Abstract: Deep-groove ball bearing is extensively used to support rotational shafts in engines, in order to improve the surface finish, use of design of experiment (DOE) to investigate most significant responsive factor, which is contributing in improving surface finish.

Based on results of Design of experiment is conducted try to optimize the most significant responsive factor. For performing Design of experiment, firstly selected six variable factors in Grinding & four variable factors in Honing process, obtained through brainstorming.

To improve surface finish of Inner & Outer Track of deep groove ball bearing. Hereby, the various experiments to be conducted independently to know the effect of various process parameters on surface finish of deep groove ball bearing.

Keywords: Deep Groove Ball Bearing, Design of Experiments (DOE), Grinding, Honing.

Coconut Fiber as A Reinforced Composite: A Review

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Abstract. Composite materials find in a wide range of applications in all cutting-edge ranges of advanced materials such as automotive, renewable energy industries, aerospace and medical devices. The use of renewable materials has gathered much momentum throughout the nineties. One of the major reasons for this renewed growth is an increased awareness for our environment, reflected in phrases such as protection of resources and reduction of CO emissions. The use of plant fibres as insulating or damping materials or as fillers or reinforcement in polymeric materials plays an important role. But water absorption of natural fibre polymer composites is a serious concern mainly for their potential outdoor applications. In this work, coconut fibres used as reinforcement are subjected to different chemical treatments to make them hydrophobic in nature and to improve mechanical and damping properties of composite. This review discusses the use of coconut fibre and its current status of research. Many references to the latest work on properties, processing and application have been cited in this review.

Keywords: Composite material, coconut fibre.

A comprehensive review on advanced materials for Armor application

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Abstract. The countries such as China, India, USA, and Japan have increased their military budget significantly. Their defence expenditure also includes development of various Armor materials for protection of their army and military vehicles from advanced weapons. In this regards, development of Armor material is considered as one of the major objectives of defence and research organization. However, various types of Armor materials have been developed, tested and are in use in various military applications. Various Armor materials include metals and alloys, polymers, ceramics and composites. The present review discusses about the advanced Armor material especially composite materials. In this review, firstly, each class of material is presented and then the literature has been reviewed for advanced polymeric composite material along with their physical, mechanical and ballistic impact properties. Some recent literatures have shown good results along with some limitations and suggestions.

Keywords: Armor materials, Polymer Composite, Mechanical properties.

Integrating Lean Six Sigma and Supply Chain Approach for Quality and Business Performance

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Abstract. Lean manufacturing is one of the initiatives that major businesses all around the world have been trying to adopt in order to remain competitive in the increasingly global market and six sigma was an American "invention". The central idea behind six sigma is that if you can measure how many "defects" you have in process, you can systematically figure out how to eliminate them and get as close to "Zero Defect" as possible and supply chain is the systematic and strategic coordination between supplier and customer. Integrating supply chain objectives with lean practices and six sigma methodologies can lead to superior benefits including process variation reduction, dramatic business improvement and has a substantial effect on achieving to the targets. Ultimately that integrating Lean Six sigma and supply chain can be combined for optimal results first the six sigma processes are changed from slow to fast by lean manufacturing. Six sigma and lean manufacturing provide the structure easily for optimum flow and integrating lean six sigma and supply chain has a large effect on achieving the targets and competitiveness. In plain language that the ultimate goal for the company is to create value to the customer hence the customer settles the quality and cost for the product. The quality and cost of the product is its ability to satisfy and preferably exceed the needs and expectations of the customers. Integrating lean six Sigma and supply chain approach growing prevalence and importance in industry, presently companies have acknowledged that integrating lean six sigma and supply chain share a common objective: to create value based end customer requirement.

Keywords: Lean manufacturing; Six sigma; supply chain; Business performance.

An Experimental view on Flammability Behaviour of Al₂O₃ and SiC Filled Woven E- Glass Fiber Reinforcement Epoxy Composites

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Abstract. In this Paper we investigate about the physical property of flammability behavior of E-glass fiber reinforced epoxy composite filled with varying concentration of alumina and silicon carbide were studied. Composite were fabricated manually by layup technique. The main objective of this work was to study about the flammability behaviour of the fabricated composite. The experimental result show that composite filled by (6 wt%) Al₂O₃ and SiC exhibited minimum burning rate.

Keywords: E-glass fiber reinforced epoxy composite, Al₂O₃ and SiC, Flammability Behaviour.

A Comprehensive Review on Automatization of Drainage Cleaning System in India

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Abstract. This paper is tied in with supplanting the manual work in sewage cleaning via computerized framework. Presently days, computerization assumes a fundamental job in every single mechanical application. However, the best possible removal of sewage from enterprises is as yet a difficult undertaking. Sewage pipes are been utilized for the removal and lamentably now and some-times we risk human lives while cleaning and removing the blockage in the waste funnels. So as to beat the issues in manual channel cleaning, we are actu-alizing "Programmed Sewage Cleaning System", to clean and control the seep-age level. The objective of this work is to assess a set of sustainability indicators for evaluation of environmental, economic and societal aspects of wastewater treatment processes. Wastewater is characterized as the stream of utilized water from homes, organizations, ventures, business exercises and foundations which are subjected to the treatment plants by a precisely planned and built system of funnels.

Keywords: Automatic Drainage Cleaning, Robotic Arm Technique, Rocker Bogie Mechanism, BioKube for Sewage Treatment.

Hashish Augmentation Influence on Thermic and Physical & Mechanical Effects of Foam Adhesive

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Abstract. Nowadays whilst strength reserves within the world have become constrained, saving fossil strength resources and lowering CO₂ emissions have end up essential problems. These issues are important within the constructing materials enterprise and their use in energy saving. The research affords thermal, mechanical and acoustic homes of froth adhesive with hashish reinforcement. The thermal conductivity of the material become determined by the corporation's LASERCOMP gauge FOX200 FOX600, which measures the samples in step with ASTM C518-ninety one and the M Box RF1 device. The sound absorption coefficient turned into measured by using the two microphone technique according to the standard ISO 10534-2 and the common sound absorption coefficient in the variety of frequencies from 250Hz till 4400Hz changed into decided according to the usual EN ISO 11654. Bending and stress parameters have been obtained with the system Zwick Roell 2.5 TS furnished with computer and software Test Expert V9.01. It became decided that the principle component increasing thermic conductivity and mechanical power of foam adhesive with hemp reinforcement become the volume density. The mechanical power and sound absorption residences of the froth gypsum with hemp reinforcement depend at the period of hemp pieces within the composite. The sound absorption coefficient at an same volume density fee is higher for foam gypsum with brief hemp reinforcement, but long hashish reinforcement will increase the foam gypsum absorption coefficient even extra than quick hashish reinforcement. Our studies indicates that foam gypsum with hemp reinforcement In the range of extent density 250 - 450 kg m⁻³ may be used as warmth and sound insulation fabric.

Keywords: Thermic insulation coefficient, Heat transfer, Foam adhesive, hashish reinforcement.

Waste management and Life cycle Assessment (LCA) of Polyethylene Terephthalate (PET) bottles: A Review

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Abstract. The plastic/polymer becomes a necessary part of human life. The plastic is categories in two basic categories i.e. thermoset and other one is thermoplastic. The day by day uses of plastic is creating a huge adverse impact on the environment. Now it's required to develop a technology to recycle or discard of the plastic waste in a use full manner. In this study to determine the impacts of different plastic waste controlling scenario. Life Cycle Assessment is very important for different impact categories. The two main plastic reflected was Polyethylene PE and Polyethylene Terephthalate (PET). There are 4 types of scenario which is considered in this study. First one is landfilling without bio-gas recovery(LWBR), 2nd is Incineration without energy recovery(IWoER), third is Recycling and 4th is Incineration with energy recovery(IWER). The impact on environmental for all scenarios (S1- S4) was matched and assessed. CML2 baseline 2000 method is the best method for assessment. Highest environmental impacts are for Scenario 2. The recycling process of PET Bottle and various steps in recycling in this process also discussed.

Keywords: Polyethylene Terephthalate (PET), Life Cycle Assessment (LCA), Recycling of PET, CML 2 baseline 2000.

Hybrid and Composite Biomaterials in Tissue Engineering

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Abstract. Biomaterials play a critical role in the success of tissue engineering approaches, as they guide the shape and structure of developing tissues, provide mechanical stability, and present opportunities to deliver inductive molecules to transplanted or migrating cells. Therefore, the selection of the appropriate biomaterial can have a profound impact on the quality of newly formed tissue. A major challenge facing the field of tissue engineering is the development or identification of materials capable of promoting the desired cellular and tissue behavior. Given that few biomaterials possess all the necessary characteristics to perform ideally, engineers and clinicians alike have pursued the development of hybrid or composite biomaterials to synergize the beneficial properties of multiple materials into a superior matrix. The combination of natural and synthetic polymers with various other materials has demonstrated the ability to enhance cellular interaction, encourage integration into host tissue, and provide tunable material properties and degradation kinetics. In the current review, we describe the selection and utilization of numerous hybrid and composite materials to promote the formation of bone, vascular, and neural tissues. The continued development and implementation of hybrid biomaterials will lead to further successes in tissue engineering and regenerative medicine.

Keywords: Composites, Biodegradable polymers, Bioceramics, Inductive factors.

A Review on Bone Regeneration via Porosity Development using Smart Manufacturing Techniques

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Abstract. Biomaterials are those materials be in natural or synthetic, alive or lifeless and usually made of multiple components that interact with biological systems. Biomaterials are often used in medical applications to augment or replace a natural function. Additive manufacturing methods are used to create part or prototype of 3D structure in layer by layer form directly by computer aided design. Porosity in biomaterials improve biocompatibility and help in cell in growth, but decreases physical properties due to increase in surface area which reduces mechanical strength of scaffold. In this review, porosity of titanium alloy is increased by hydrogen trapped technique using TiH₂ and Ti solution by using selective laser sintering or selective laser melting. Density of scaffold is increased by pre sintering and then post processing with hot isostatic pressing technique.

Keywords: Additive manufacturing, 3D printing, Biomaterials compatibility, Bio-composites, Bio printing, Tissue engineering, Bone tissue scaffold, Bone regeneration, porosity enrichment, HAp scaffold, Ti alloy scaffold.

Mode of Metal Transfer in Different Welding Process

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Abstract. The transfer of metal droplets from the electrode to the weld pool or work surface is considered as a metal transfer. Metal transfer plays a decisive role in the weld bead geometry and joint characteristics. The size of the droplet, shape of droplet and rate of transfer depends on the various factors of power source and welding power characteristics. These parameters mainly depend on the forces which are responsible for metal transfer. There are two generous forces act on the droplet i.e. aid metal transfer force and the other one is retarding force. The various mode of metal transfer i.e. globular metal transfer, spray metal transfer, short circuit metal transfer, cold metal transfer, and their causes and affecting parameters have reviewed in this article. The novel technique to control the mode of metal transfer in Gas Metal Arc Welding with double wire and double pulse and underwater flux-cored wet welding as also discussed.

Keywords: Metal transfer, short-circuiting metal transfer, globular metal transfer, cold metal transfer, droplet size, DPS, DPA, underwater flux-cored wet welding, double wire double pulse GMAW, GMAW.

Research finding of Artificial Intelligence in Automated Manufacturing Technology in FMS

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Abstract. Artificial intelligence has shown promising tool in the automation and control of flexible manufacturing system. Each and every part of flexible manufacturing system has intelligently improved due to technological advancement in artificial intelligence. This paper focuses on the fundamental concept of FMS, advancement in FMS due to Artificial intelligence followed by recent advancement and future possibilities. The major factor effecting FMS and artificial intelligence have been discussed. The limitation of Artificial intelligence and suggestions for further development have been also discussed.

Keywords: Artificial Intelligence, Automated Manufacturing Technology, FMS.

A Review on Holography Technology

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Abstract. Holography is the science and practice of making the holograms. A hologram (disambiguation) is a photographic recording of a light field, relatively different than of an image formed by a lens, and it is used to display a full three-dimensional image for holographic object, which is seen without the help of special glasses or other intermediate optics. It is usually impenetrable when observed under diffused atmospheric light. Reflective holography is a related technique for making three-dimensional images by controlling of motion of the reflections on a two-dimensional surface. It works by reflectively or manipulating bundles of light rays, whereas in Gabor style holography diffractively reconstructing wave fronts is used. In general, we use laser light for illuminating the subject.

Keyword: Red lasers, lenses, beam splitter, mirror and holographic film.

Recent Applications, Developments and Challenges in Waterjet Technology

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Abstract. Waterjet technology can cut soft, brittle, fibrous and difficult to cut materials without producing any heat affected zone. This paper presents a vast review on recent applications, developments and challenges in waterjet technology. The new applications of waterjet technology namely 3D machining, tool making, hydroentangling, comminution, etc are elaborated in this paper. In order to increase the performance characteristics and for new application areas, many developments and modifications in AWJ machining process has taken place. And, some of the recent developments are ice waterjet machining, assisted processes, micro machining and submerged waterjet machining. Finally, the review is completed by discussing the challenges in existing waterjet technology for further improvement of the process. The problems like grit embedment, backflow of AWJ, etc are very well elaborated in this work.

Keywords: Waterjet, Developments, Grit embedment, Challenges.

Modeling and Simulation in Waterjet Technology

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Abstract. Waterjet technology can cut soft, brittle, fibrous and difficult to cut materials without producing any heat affected zone. This paper presents a vast review on modeling and simulation in pure and abrasive waterjet machining. The modeling in WJ can be divided in volume displacement models, energy conservation models, models developed on the basis of regression and dimensional analysis, and fracture mechanics based models. In simulation of abrasive waterjet machining, water is considered as a medium to accelerate the abrasive particles. The simulation in this area is generally divided into erosion by single particle impact and multi particle impacts. Finally, the review is completed by discussing the challenges in modeling and simulation.

Keywords: Modeling, Simulation, abrasive waterjet, volume displacement model

Elastic-Plastic Stability Analysis of Perforated FGM Plate

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Abstract. Present work examines the elastic-plastic behavior of shear deformable FGM plate using ANSYS. The proportions of the parent materials are varied across the thickness of FGM plate via power law. The results from present formulation are compared with the available literature and various parametric studies are conducted. From the current study it has been revealed that the plate thickness induces plasticity region prominently especially in around the cutout regions in the FGM plate. Moreover the FGM plate with higher ceramic proportion possess higher buckling and failure load. The cutout size affects the buckling load significantly and plate with larger size of cutout depicted lower buckling strength.

Keywords: Elastic-Plastic FGM; stability analysis; functionally graded material (FGM); nonlinear finite element analysis; FGM failure.

Optimization of Heat Transfer Rate, Efficiency and Effectiveness for Thermal Performances of Stepped Rectangular Fin

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Abstract. In present experimental assessment, an effort has been made to investigate the effect of Fin height, Step Length Ratio, and Temperature difference on the thermal performance of the single stepped rectangular fin. The optimization of given parameters using Taguchi phenomenon has been done for maximum heat transfer rate, efficiency and effectiveness. Step length ratio was found to be significant parameter. Increased value of step length ratio leads to lower the efficiency of fin and heat transfer.

Keywords: Stepped Rectangular Fin, Optimization, Taguchi Method, Thermal Performance.

Heat transfer enhancement of parallel and counter flow heat exchangers with varying size and fins number

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Abstract. Parallel as well as counter flow heat exchanger plays essential role for industry and become most significant parts of the major industrialized processes involving heat transfer. Heat exchanger are also very important in waste heat recovery process, which is considered as one of the major energy intensive area, where its role is noteworthy. In the present study, parallel flow heat exchanger (PFHE) and counter flow heat-exchanger (CFHE) were numerically analysed and its results were validated experimentally. The number of fins and stature of fins on thermal performance of PFHE was investigated using computational fluid dynamics. It was seen from the results that increasing the height and fins number, enhance the heat transfer rate of CFHE. The best results were evaluated for five fins with 12 mm height. It was inferred from the results that, fins additions in CFHE can improved the effectiveness of the heat exchangers. By using CFD analysis, heat exchangers can be fully optimized in order to obtain high performance and the heat exchanger sizing can be accurately and efficiently précised using this numerical tool.

Keywords: Heat exchanger, Counter flow heat exchanger, Parallel flow heat exchanger, Fin height, Heat transfer analysis, CFD.

A Review of Performance of Solar Photovoltaic Refrigerator

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Abstract. Solar photovoltaic refrigerator is one of the solutions to provide the refrigeration facility to remote areas especially for storing the vaccines and milk preservation. Solar energy is renewable and eco-friendly source of energy. This paper describes a review of design and performance of various solar photovoltaic refrigerators. The different solar refrigerator models inculcating phase change material (PCM), AC Compressor, DC compressor, Accumulator, Lead acid batteries have been discussed. Various studies showed that solar photovoltaic refrigerator could be successfully used for hot arid areas for refrigeration. In this paper, a novel solar photovoltaic milk refrigerator is proposed that has not been discussed by any researcher so far. It can solve the problem of milk preservation at remote areas. It is based on variable refrigerant flow system and eco-friendly refrigerant R290. This refrigerator also addresses the global issues like ozone depletion and global warming.

Keywords: Solar Photovoltaic Refrigerator, Variable Refrigerant Flow, R290, Ozone Depletion Potential, Global Warming Potential.

Multi criteria decision making approaches for ergonomic solutions: A literature review

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Abstract. Ergonomic principles are the best technique for implementing in any industry for evaluating and controlling the risks arising due to various work activities. There is a variety of risk assessment approaches available. However, the use of multi-criteria decision making (MCDM) approaches with ergonomics principles are explored by fewer researchers. This article conducts a review of human factors and ergonomic principles based on studies utilizing MCDM approaches. A sum of 38 articles is classified in eight distinctive application zones. These articles are investigated to analyze the trend of publication, risk factors/sub-factors, and MCDM tools used. This critical review gives knowledge to researchers and professionals about the current status and untapped sectors in MCDM-based human factors and ergonomic methodologies for future work. These techniques help to generate a faster solution, create a ranking priority for better selection, etc. These type of results helps to solve the problems faced in various industries.

Keywords: Decision making, ergonomics, multi-criteria decision making, MCDM.

Effect of percentage weight of Al₂O₃ on the physical properties of glass fiber reinforced composites

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Abstract. Presently, lot of implementation on polymer based composites is being used in different field of applications. Lots of research is going on to develop newer FRP (Fiber Reinforced polymer) composites with varied combinations of fibers and fillers, so as to make them usable under different operational conditions. The core objective of present research work is to investigate the physical characteristics (void, moisture content, linear swelling and water absorptivity) of unfilled and Al₂O₃ filled glass fiber reinforced composites (0wt%, 3wt%, 6wt%, 9wt %). The results revealed that glass fiber reinforced epoxy composite filled with 9% wt. Al₂O₃ particulates have been exhibited the better physical properties among all fabricated unfilled and Al₂O₃ filled glass fiber reinforced epoxy composites.

Keywords: Epoxy composite, glass fiber, aluminum oxide, physical properties.

Effect of EDM Parameters on Metal Removal Rate During The Machining of Hastelloy C-276

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Abstract: The unconventional machining methods have respective, specific advantages over conventional methods of machining. Among the all unconventional machining methods electric discharge machining is widely used in industries for the production of complex shape. Therefore, these machining conditions should be optimized to achieve the desire quality of workpiece at minimum machining cost. The main objective of work is to investigation of the effect of EDM parameters (voltage, current and, pulse on time) on metal removal rate. The maximum metal removal rate has been achieved at highest level of pulse on time lowest level of voltage & highest level of peak current.

Keywords: EDM, Metal removal rate, Design of experiments.

Investigation of the sliding wear behavior of Al₂O₃ filled glass fiber reinforced composites

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Abstract. The objective of present research work is to investigate the effect of sliding wear conditions on the wear rate of unfilled and Al₂O₃ filled glass fiber reinforced composites (0wt%, 3wt%, 6wt%, 9wt %). The filler loading has been found most important parameter that influences the sliding wear followed by load, sliding distance and sliding speed. On the other hand, it has been found that sliding wear continuously decreases with increase in filler loading from 0% wt. to 9% wt. With an increase in applied load, sliding velocity and sliding distance, the wear increases. The minimum wear volume has been obtained for 9% wt. Al₂O₃ filled glass fiber reinforcement composites at 10 N applied load, 1 m/s sliding velocity and 300 m sliding distance.

Keywords: Epoxy composite, glass fiber, Aluminum oxide, sliding wear.

Investigation of the effect of percentage weight of Al_2O_3 on the mechanical properties of glass fiber reinforced composites

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Abstract. In this work, attempt has been made to examine the effect of percentage weight of Al_2O_3 on the mechanical properties of Al_2O_3 filled glass fiber reinforced composites (0wt%, 3wt%, 6wt%, 9wt %). It has been revealed that Al_2O_3 filled glass fiber reinforcement composites exhibit better mechanical properties as compared to unfilled glass fiber reinforcement composites. The hardness of glass fiber reinforcement composites with 9% Al_2O_3 has been found much better among all fabricated composites. On the other hand, 3% Al_2O_3 filled glass fiber reinforcement composites exhibit better tensile strength, flexural strength and impact strength among all fabricated composites.

Keywords: Epoxy composite, glass fiber, Aluminum oxide, mechanical properties.

Evaluating and Comparing Forecasting Models

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Abstract. Forecasting can be termed as prediction of future sales or demand of a particular product. It is a projection based upon past data and the art of human judgement. Forecasting is a very important aspect of any business, and has enormous social, economic, and environmental impacts. Various forecasting models have been developed to help people make right decisions against future uncertainties. However, all forecasting models have distinct advantages and limitations. Selecting appropriate forecasting methods from numerous alternatives is crucial to success. This paper briefly summarizes the state-of-the-art forecasting methods in terms of basic procedure, underlying assumptions, applications and limits. And then the most popular model selection criteria and guidelines are presented.

Keywords: Forecasting models, forecasting model selection.

Friction welding process of AA7075 aluminium alloy to mild steelJitendra Gupta¹, Bhuvnesh Bhardwaj², Varun sharma³^{1,2} Department of Mechanical Engineering, Jaipur Engineering College and Research Centre, Jaipur, India³ Department of production and Industrial engineering, NIT Jalandhar, Punjab, India

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Abstract: The objective of present research is to examine the effect of friction welding parameters on the impact energy of fabricated weldments during the welding of mild steel with aluminium alloy AA7075. An attempt has also been made to formulate the mathematical relationship between the welding conditions and impact strength. The rotational speed, welding time and workpiece diameter have been considered as welding conditions. The workpiece diameter has been found most significant welding parameter that affects the impact strength of weldments followed by rotational speed and welding time. The R^2 and adjusted R^2 values for the impact strength prediction model have been found as 0.991 and 0.980 respectively, which are very close to each other.

Keywords: Friction welding, impact energy, AA7075, mild steel.

**Effect of EDM Parameters on Surface Roughness During The
Machining of Hastelloy C-276**
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Abstract. The unconventional machining methods have respective, specific advantages over conventional methods of machining. Among the all unconventional machining methods electric discharge machining is widely used in industries for the production of complex shape. The quality of workpiece and economics of the EDM machining is mainly depends on the selected machining conditions and the level of selected machining conditions. Objective of work is to investigation of the effect of EDM parameters (voltage, current and, pulse on time) on surface. The pulse on time has been found most significant machining condition for surface roughness. The minimum surface roughness has been obtained at lowest level of pulse on time highest level of voltage & lowest level of peak current.

Keywords: EDM, Surface roughness and Design of experiments.

Sugarcane Bagasse Future Composite Material - A review

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Abstract. Increasing demand of materials based products and reduction in natural materials; increase the interest of researcher towards the new alternative solution like composite materials. These materials can be used for various applications like house-hold, industrial, structural, medical, construction and building materials, transportation, electronics & electrical etc. Composite material is defined as the mixture of two or more materials whose property is different from original one. There are various types of filler materials are used for composite manufacturing as per application but in this paper cellulose based Sugarcane bagasse fiber and it's hybridization with other fillers, studied it's properties with various natural and synthetic matrix materials. Review shows that Sugarcane bagasse has vast application in the manufacturing of composite materials and there is still scope with hybridization with other materials too.

Keywords: Sugarcane Bagasse Fiber, polymer Composite, Bio-polymers, Hybrid composite materials.

Effect of Tool Tilt Angle on The Mechanical and Metallurgical Properties of Aluminium Alloy 6061-T6 Welded by Friction Stir Welding Process

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Abstract. The present study investigates the effect of tool tilt angle on the weldability, mechanical and metallurgical properties of aluminium alloy when welded by friction stir welding process. During this study, 6 mm thick plates of aluminium alloy of grade AA6061-T6 were friction stir welded using heat treated high strength steel tool material. The scroll tool consists of spiral geometry on the shoulder of 18 mm diameter and threaded tapered pin of 5.8 mm length. The friction stir welded joints of 80 mm weld length were fabricated at 45 mm/min tool travel speed using tool rotational speed of 800 rpm with 0° and 2° tool tilt angle. The weldability of the joints was measured in terms of mechanical and microstructural properties. The experimental results obtained as mechanical properties in terms of tensile strength and micro-hardness revealed a significant improvement by tool tilt angle as compared to without tool tilt angle. Further, the microstructural observations obtained using optical microscopy clearly depicts the grain size reduction in stir zone and thermo-mechanically affected zones of welded joints fabricated by tool tilt angle.

Keywords: Friction stir welding, Scroll tool, tilt angle, mechanical properties, metallurgical characterization.

Energy Performance Evaluation of Variable Speed Milk Refrigerator using R290

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Abstract. Hydrofluorocarbons (HFCs) such as R134a, R410A & R407C could not be the long term solution for the HVAC & R industry due to the higher potential of Global warming. People's interest is now shifting toward alternate refrigerants like Hydrocarbons (HCs). In this paper, an experimental investigation on the performance of a vapor compression based milk refrigerator using R290 as refrigerant is carried out. R290 is a fourth-generation refrigerant. It has excellent thermodynamic properties, environmental characteristics, and low cost. Various performance parameters i.e. Coefficient of Performance, Cooling Capacity, and Energy Consumption, etc are investigated for room temperature using different speeds of DC compressor. The results obtained from the tests are presented and discussed.

Key words: R290; Variable Speed DC Compressor; Ozone Depletion; Global Warming.

Physiological evaluation of normal and inclined walking in unorganized sector workers

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Abstract. The economy of any country is divided into two parts that are organized and unorganized sectors. A significant part of the workforce is employed in informal sectors; hence unorganized sector workers play a vital role in the Nation's economy. Manual material handling is the prominent activity in the workplace through which a vast amount of finished goods or raw material is handled manually without caring for their physical capacity. Ergonomics is sciences that identify the erroneous working technique and provide a safe and convenient method to perform the task. This research aims to find out the stress in the various muscle of the body during various locomotion conditions. The desired objective is fulfilled by performing an exercise test on sixty male workers of three different age group of 21-30, 31-40 & ≥ 41 year that are involved in the construction and housekeeping sector are chosen to walk on a treadmill with their self-selected speed of 3.6-3.8km/hr at 0°, 5°, 10°, 15°, 20° walking inclination. The stress in muscles is measured in terms of amplitude by measuring physiological performance like HR and VO₂ uptake. Experimental data are interpreting using SPSS to find out the best results, which reduces fatigue in muscle during different locomotion situations. The study results illustrate that for the age group 21-30year, 31-40year & ≥ 41 years worker, the most favorable angle of walking surface is $<15^\circ$, $\leq 10^\circ$ & $\leq 5^\circ$ respectively.

Keywords: Ergonomics, walking, physiological, unorganized sector workers.

Optimized Controller for Manipulator System Using Genetic Algorithm

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Abstract. Manipulator helps us to reach to unreachable locations and are nowadays being using in each discipline thus become an important part of mankind by seeing today's century framework we can realize that how the world is on the move to automation and robotization. But as the links of manipulator increased entanglement increased so it is an exigent duty for control and robotics engineers to command the perfection of manipulator in all the parameters which includes trajectory tracking, repression of noise and at the foremost error free control. In this project we have used Genetic Algorithm (GA) to optimize the controller and to produce the least value of error as possible various controllers' structures are being feed through this algorithm and as a result, we got a comparative result of the various designed controller.

Keywords: Manipulator: Automation: Optimization: Genetic algorithm.

Analyzing The Effects of Industrial Protective Glove's Material on Hand Grip Strength

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Abstract. Hand and forearm muscles contribute significantly in grip force execution during routine and industrial activities. Industrial gloves are used in various small scale industries for safety purpose. However the use of hand gloves may lead to the change in grip strength. The present study has been designed to investigate the effect of hand glove's material on hand grip strength of workers employed in various Small and Medium Enterprises (SMEs). During this study, to record the strength of workers' hand grip while performing work using different gloves, a digital hand grip dynamometer was used. Statistical tests one way ANOVA was applied to analyze the collected data. From the analysis of data it can be concluded that there are significant differences among the grip strength means with various glove's material at the 0.05 level of significance. It is also observed that fabric gloves give best grip strength, however, there are limitations in its use.

Keywords: ANOVA, Gloves, Hand grip strength, Muscles.

A Comprehensive Study of Image Segmentation Techniques

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Abstract. One of the famous processes for processing of image is the division of images the name given to this process was segmentation which basically work on the principle of division. This technique is used to separate an image, which is called segments. For applications such as compression of an image or object recognition, it is most useful because it is expensive to process the entire image for these types of applications. For further processing, therefore, image segmentation is used to segment image components. Segmentation used generally for the identification in digital images of objects, borders, and other related details. Segmentation such as thresholds, clustering, and transformation methods, etc. are different methods. The resulting separated image is a composite element collection of the complete image after these approaches have been taken. In This paper a detailed description of various techniques are given which are used for division of images.

Keywords: Segmentation; edge discernment; Image Processing; object recognition.

Optimization of Surface Roughness in Electric discharge Machining

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Abstract. Electrical discharge machining (EDM) process also referred to as spark machining process is one of the most effective process of machining as today's era of global competition and technical growth needs high quality products. Surface roughness is one of the critical and one of the most effective parameter that affects several Mechanical properties, thus desired surface quality is of great importance for the functional behaviour of machines. It is also recognised that machining conditions affects the quality of the operation performed. Such parameters should be carefully selected so as to maximize the economics of machining. The D3 steel is widely used as a main material in die manufacturing industries where superior machinability is most important factor. In the present work the design of experiments have been selected to optimize EDM parameters for minimizing surface roughness during machining of AISI D3 steel with kerosene and kerosene + SiC as dielectric.

Keywords: Electrical Discharge Machining (EDM), ANOVA, DOE, RSM.

Autoencoder: Issues, Challenges and Future Prospects

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Abstract. As of more recently, deep learning based models have demonstrated considerable potential, as they have outperformed all traditional practices. When data becomes high dimensional, extraction of features and compression of data become progressively significant. In this paper, we describe the Autoencoder deep learning algorithm. Autoencoder is primarily a neural network based feature extraction methodology that accomplishes outstanding victory in producing highlights of high dimensional data. Autoencoder assumes a principal job in unsupervised learning which targets to rework inputs into outputs with minimal reconstruction error.

Keywords: Autoencoder, convolutional autoencoder, denoising autoencoder, unsupervised learning.

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