

DTE Code : EN6315

BROUP OF INSTITUTIONS, PANHALA
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Permanent Affiliation by Dr. Babasaheb AmbedKar Technological University, Raigad
Affiliated to Shivaji University, Kolhapur, MSBTE, Mumbai.

	Faculty Achievement							
	Name of Department		Mechanical Engineering		Year 2022-23			
Sr. No.	year	Name of the Faculty	Event Name	Title	Journal/college/university Name	Date		
1	2022-23	Dr. Vinavak Hindurao Deokar	Guest Lecture	Lecture on career guidance	Government ITI college, Bambwade	25/05/2023		
2	2022-23	Di. Villayak filildulao Deokal	Participated In Bootcamp	Participated in 5 days Innovation, Design and Entrepreneurship (IDE) Bootcamp	Ministry of Education	22/06/2023 to 26/06/2023		
3			Faculty Develoment Program	Computer Integrated Manufacturing	NITTTR, Chennai	09/01/2023 to 13/01/2023		
4]		Awareness/Training program	IP Awareness/Training program	NATIONAL INTELLECTUAL PROPERTY AWARENESS MISSION, Government of India	4/6/2023		
5			Seminar	Challenges of Implementing NEP 2020 in Higher Education Institute	KIT's College of Engineering, Kolhapur	8/18/2022		
6			Reviwer for SCI Journal	Springer Nature	SN applied Sciences	6/21/2023		
7	2022-23	Dr. Koli Gajanan Chandrashekhar	Journal paper Publication	Characterization and Superhydrophobic Anticorrosive Coating of AA- 7475/ZrO2/Polymer Nanocomposites	Hindawi, Journal of Nanomaterials	5/10/2023		
8			Journal paper Publication	Investigation of Mechanical Behavior and Surface Characteristics of Cold Spray Metallized B4C/AA7075 Composites Coated by AZ64 Alloy through Plasma Electrolytic Oxidation	Hindawi, Journal of Nanomaterials	4/20/2023		
9			Journal paper Publication	Load-bearing characteristics of a hybird Si3N4-epoxy composite	Springer , Biomass Conversion and Biorefnery	7/15/2023		

10			Conference paper	Design & Analysis of Gearless Multi-angled Transmission system Employing varierty of materials	IEEE Karnataka Flagship international Conference	December 2022
11			Ph.D.	Ph.D. completed	Visvesvaraya Technological University, Belagavi	9/3/2022
12			Journal paper Publication	Design Analysis and Optimization of SUV Chassis	International Journal of Science Technology & Engineering	4/1/2022
13			Conference	OPTIMIZATION OF MACHINING PARAMETERS OF Al6061/ SiC MMCs USING TAGUCHI APPROACH	ICRDME-2022	24-25/06/2022
14			FDP/STTP	Hybrid Electric Vehicles	GMRIT, Rajam.& VRSEC, Vijayawada	21/11/2022 to 25/11/2022
15			Seminar	Use of ICT tool for quality enhancement of higher education Institutes; Post COVID situation	Sanjeevan Engineering & Technology Institute,Panhala .& NAAC, Banglore.	9/12/2022 To 10/12/2022
16	2022-23	Dr Ajit Ashok Katkar	FDP/STTP	Outcome Based Education	PPG Institute of Technology , Coimbatore	01/02/2023 to 09/02/2023
17			FDP/STTP	Renewable Energy Sources for Sustainable Development	Yashoda Technical Campus, Faculty of Engineering, Satara	20/02/2023 to 24/02/2023
18			FDP/STTP	Resent Advancement in Heat Exchanger Technologies: Experimentation & Simulations	School of Engineering , O P Jindal University, Raigrach	13/03/2023 to 17/03/2023
19			FDP/STTP	Inclusive Procedures & Processes for NAAC Assessment and Accreditation	ACT Academy, Tamil Nadu	24/04/2023 to 30/04/2023
20			FDP/STTP	Advance in Manufacturing and Materials	Yashoda Technical Campus, Satara, in association with ISTE, New Delhi	22/08/2022 to 26/08/2022
21			FDP/STTP	A new ERA of Manufacturing challenges and opportunities	D.Y.Patil College of Engineering and Tehnology, Kasaba Bawada ,Kolhapur	25/07/2022 to 30/07/2022
22			Journal paper Publication	Multi-Criteria Optimization of Micro- Hole on Glass Using Developed μ-Abrasive Jet Machine set up	Journal of Micromanufacturing.ISSN:2516- 5984,(11):1-9	Nov. 2022
23	2022-23	Dr. V.V.Vanmore	Ph.D.	Ph.D. completed	Shivaji University Kolhapur (Research Center Walchand College of Engineering)	Nov. 30, 2022

24			Faculty Develoment Program	Introduction to intellectual Property	SWAYAM online certificate course	12 week course (Jan-May 2023)
25			Faculty Develoment Program	Materials & Advanced Manufacturing	Yashoda Technical Campus, Satara	22/08/2022 to 26/08/2022
26	2022-23	Mr. Pohul IIday IIrunkar	Faculty Develoment Program	Renewable Energy Sources for Sustainable Development	Yashoda Technical Campus, Satara	20/02/2023 to 24/02/2023
27	2022-23		Reviwer for SCI Journal	Elsevier ScienceDirect	International Journal of Hydrogen Energy	April 2023
28			Book Chapter	Hydrogen Storage Technologies and Related Heat and Mass Transfer Studies	Book Title: Hydrogen Fuel Cell Technology for Mobile Applications Publisher: IGI Global Publication	July 2023
29			Seminar	Use of ICT tool for quality enhancement of higher education Institutes; Post COVID situation	Sanjeevan Engineering & Technology Institute, Panhala	09/12/2022 to 10/12/2022
30			Faculty Develoment Program	Research Paper Writing and Publishing	Nutan College of Engineering and Research, Talegaon Dhabhade, Pune	20/02/2023 to 24/02/2023
31	2022-23	Mr. Deshmukh Sardar Balaso	Faculty Develoment Program	Renewable Energy Sources for Sustainable Development	Yashoda Technical Campus, Satara	20/02/2023 to 24/02/2023
32			Workshop	Understanding of Course Outcomes (COs) & Program Outcomes (POs)	Sanjeevan Engineering & Technology Institute, Panhala	25/02/2023
33			Faculty Develoment Program	Innovation, Research And IPR – Journy Towards Excellence	BVB's Sardar Patel College of Engineering, Mumbai	01/03/2023 to 05/03/2023
34	2022-23	Mr. Dhananiay Vacantrao Patil	Workshop	Understanding of Course Outcomes (Cos) & Program Outcomes (POs)	Sanjeevan Engineering and Technology institute, panhala.	25/02/2023
35	2022-23 Mr. Dhananjay Vasantrao Patil		Faculty Develoment Program	Renewable Energy Sources for Sustainable Development	Yashoda Technical Campus, Satara	20/02/2023 to 24/02/2023
36			Faculty Development Program	Renewable Energy Sources for Sustainable Development	Yashoda Technical Campus, Satara	20/02/2023 to 24/02/2023
37			Faculty Development Program	Materials & Advanced Manufacturing	Yashoda Technical Campus, Satara	22/08/2022 to 26/08/2022

39 Memorandum of Understanding [MoU] Memorandum of Understanding [MoU] with CAD MANTRAA, Warana Nagar CAD MANTRAA, Warana Nagar 2/12/2022 International Conference Comparing the Economic and Proc. International Conference on Mechanical, Automotive and Mechatronics Engineering Automotive and Mechatronics Engineering	38	2022-23	Mr. Praveen Shivaji Atigre	Memorandum of Understanding [MoU]	Memorandum of Understanding [MoU] with Info Grow	Info Grow Kolhapur	6/2/2023
International Conference Comparing the Economic and Automotive and Mechatronics Engineering	39			Memorandum of Understanding [MoU]	Memorandum of Understanding [MoU] with CAD MANTRAA, Warana Nagar	CAD MANTRAA, Warana Nagar	2/12/2022
40 Environmental Compatibility of Battery Electric and Conventional Vehicles in India 29-30 April 2023, Dubai, UAE	40			International Conference Paper	Comparing the Economic and Environmental Compatibility of Battery Electric and Conventional Vehicles in India	Proc. International Conference on Mechanical, Automotive and Mechatronics Engineering (ICMAME 2023) 29-30 April 2023, Dubai, UAE	29-30/04/2023





DTE Code : EN6315

AICTE ID : 1-8019451 AISHE Code : C-11165

	Faculty Achievement								
	Name of Department		Mechanical Engineering Y		Year 2022-23				
Sr. No.	year	Name of the Faculty	Event Name	Title	Journal/college/university Name	Date			
1	2022.22	De Masuel History Declar	Guest Lecture	Career guidance	Government ITI college, Bambwade	25/05/2023			
2	2022-23	Dr. Vinayak Hindurao Deokar	Bootcamp	Innovation, Design and Entrepreneurship (IDE) Bootcamp	Ministry of Education	22/06/2023 to 26/06/2023			

Date - 27th May 2023

Dr. Vinayak H. Deokar Sanjeevan Engineering and Technology Institute, Panhala.

Subject - Thanking letter

Dear Sir,

0

To,

We are pleased to express our gratitude towards your presence at our career guidance camp organized on 25th May, 2023. Your presence and guidance in the event enriched the beauty of that function.

We sincerely thank you for sparing your valuable time and experience with our students. We expect same cooperation in the future.

Thank you very much.

Your's sincerely,

reine

Mr. M. A. Bamane Principal, Govt. ITI, Shahuwadi







NAAC Accredited AICTE ID : 1-8019451

AISHE Code : C-11165

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	Faculty Achievement								
	Name of Department		Mec	hanical Engineering	Year 2022-23				
Sr. No.	year	Name of the Faculty	Event Name	Title	Journal/college/university Name	Date			
1	2022-23	Dr. Koli Gajanan Chandrashekhar	Faculty Develoment Program	Computer Integrated Manufacturing	NITTTR, Chennai	09-01-2023 to 13-01-2023			
2	2 2022-23	Dr. Koli Gajanan Chandrashekhar	Awareness/Training program	IP Awareness/Training program	NATIONAL INTELLECTUAL PROPERTY AWARENESS MISSION, Government of India	06/04/2023			
3	8 2022-23	Dr. Koli Gajanan Chandrashekhar	Seminar	Challenges of Implementing NEP 2020 in Higher Education Institute	KIT's College of Engineering, Kolhapur	18/08/2022			
4	2022-23	Dr. Koli Gajanan Chandrashekhar	Reviwer for SCI Journal	Springer Nature	SN applied Sciences	21/06/2023			
5	2022-23	Dr. Koli Gajanan Chandrashekhar	Journal paper Publication	Characterization and Superhydrophobic Anticorrosive Coating of	Hindawi, Journal of Nanomaterials	10/05/2023			
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8	3 2022-23	Dr. Koli Gajanan Chandrashekhar	Conference paper	Design & Analysis of Gearless Multi-angled Transmission system Employing varierty of materials	IEEE Karnataka Flagship international Conference	December 2022			

Certificate No. 2023-PDPOM-172/5824



National Institute of

Technical Teachers Training and Research, Chennai

(Ministry of Education, Government of India) Certificate of Harticipation

This is to certify that

KOLI GAJANAN CHANDRASHEKHAR

Assistant Professor in Mechanical Engineering Sanjeevan Engineering & Technology Institute Kolhapur, Maharashtra Participated in the Professional Development Programme on

' Computer Integrated Manufacturing '



conducted by this Institute from 09/01/2023 to 13/01/2023 (One Week)

through Online Mode duly sponsored by the organisation / self

Course Coordinator

Ushajatesan



221121455







Government of India Ministry of Commerce and Industry Department for Promotion of Industry and Internal Trade Office of the Controller General of Patents, Designs and Trade Marks



This is to certify that, DR. KOLI GAJANAN CHANDRASHEKHAR , FACULTY of

SANJEEVAN ENGINEERING & TECHNOLOGY INSTITUTE, PANHALA has successfully

participated in IP Awareness/Training program under

NATIONAL INTELLECTUAL PROPERTY AWARENESS MISSION

on April 06,2023

IP Trainer Name: Vinoth Nagarajan Organized by



NTELLECTUA

PROPERTY INDIA PATENTSI DESIGNS I TRADE MARKS GEOGRAPHICAL INDICATIONS

Date: April 20, 2023

Intellectual Property Office, India



Previt i

(Prof. (Dr) Unnat P. Pandit) CONTROLLER GENERAL OF PATENTS, DESIGNS & TRADE MARKS







This is to Certify that

Mr./Mrs./Dr.

of

Koli G.C.

Sanjeevan Engineering & Technology Institute , Panhala

has participated in National Level One Day Seminar on **"Challenges of Implementing NEP 2020 in Higher Educational Institute"** organized by Kolhapur Institute of Technology's College of Engineering (Autonomous), Kolhapur in association with Kolhapur Institute of Technology's Institute of Management, Education and Research, Kolhapur under Internal Quality Assurance Cell (IQAC) with Academic Support by NAAC, Bengaluru on 18th August, 2022.



Dr. Mukesh Goyal Director KIT IMER Dr. Mohan B. Vanarotti

Director, KITCOEK

Dr. Vilas V. Karjinni Executive Director, KITCOEK

SPRINGER NATURE



VERIFICATION CERTIFICATE OF PEER REVIEWER CONTRIBUTION



This certificate verifies that

Dr. Koli Gajanan Chandrashekhar has completed 01 review(s) in 2023 for

SN Applied Sciences

The editors thank you for your valuable contribution. Your support is greatly appreciated.











Research Article

Characterization and Superhydrophobic Anticorrosive Coating of AA-7475/ZrO₂/Polymer Nanocomposites

Anil Kumar Bodukuri ^(D),¹ Aniket Bhanudas Kolekar ^(D),² Rohit Pandey,³ Koli Gajanan Chandrashekhar,⁴ P. Ram Kumar ^(D),⁵ K. Anandan,⁶ C. Devanathan ^(D),⁷ Shubhajit Halder ^(D),⁸ and Balkeshwar Singh ^(D)⁹

¹Department of Mechanical Engineering, Kakatiya University College of Engineering and Technology, Warangal 506009, Telangana, India

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⁵Department of Chemistry, V.O. Chidambaram College, Tuticorin 628008, India

⁶Department of Physics, Academy of Maritime Education and Training (Deemed to be University), Kanathur 603112, India

⁷Department of Mechanical Engineering, Rajalakshmi Engineering College, Thandalam, Chennai 602105, India

⁸Department of Chemistry, Hislop College, Nagpur 440001, Maharashtra, India

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An AA-7475 is coated with superhydrophobic (SH) polymer nanocomposites (PNCs), emphasizing the coating's manufacturing, characterization, and anticorrosive qualities. Coating AA-7475 alloy with polyvinyl chloride (PVC), copper stearate (CS), and zirconium oxide (ZrO₂) nanoparticles produces the desired superhydrophobic. Using an X-ray diffractometer, field-emission scanning electron microscopy, Fourier-transform infrared spectrometer, ZrO₂ nanoparticles, CS, and PVC PNCs are analyzed structurally and molecularly. The atomic force microscope picture was analyzed to determine how the surface roughness affected the SH behavior reached by changing the weight percentage of ZrO₂ nanoparticles from 0.6 to 3.0 wt%. PNC-5 with 3.0 wt% ZrO₂ nanoparticles is used as resistance to corrosion coating for AA-7475 due to its water contact angle of 154°. In a 3.5% NaCl solution, uncoated and PNC-5-coated AA-7475 are examined using potentiodynamic polarization and electrochemical spectroscopy. PNC-5 coating reduces AA-7475 corrosion rate from 23.75 to 0.2253 mpy. In this study, we use polarization resistance, corrosion resistance efficiency, double layer capacitance, corrosion current density, and charge transfer resistance to demonstrate that the SH surface air trapping phenomena are responsible for effective corrosion resistance.

1. Introduction

Except for the few noble metals, all other metals oxidize spontaneously in the atmosphere to reach a stable state, making corrosion an inevitable part of their existence [1]. Atmospheric moisture that makes its way to the surfaces of metallic structures promotes the creation of the necessary ions that ultimately lead to the formation of the metal's most stable oxide [2, 3]. Climate change, thermal fluctuation (day and night), environmental pollutants, and corrosive elements like acidic or alkaline compounds all affect the corrosion process [4]. Still, water molecules play the most important role. An oxide layer formed by the spontaneous reaction of aluminum with oxygen and water in the air to produce aluminum oxide can protect the metal against corrosion even in the presence of water [5]. Despite aluminum's inertness in water, its oxide coating quickly deteriorates upon contact with chloride ions [6, 7]. Corrosion of metals occurs when chloride ions penetrate the



Research Article

Investigation of Mechanical Behavior and Surface Characteristics of Cold Spray Metallized B₄C/AA7075 Composites Coated by AZ64 Alloy through Plasma Electrolytic Oxidation

Selvakumaran Thunaipragasam,¹ Aniket Bhanudas Kolekar,² Koli Gajanan Chandrashekhar,³ Rohit Pandey,⁴ Mohammad Shahid,⁵ K. Rajesh,⁶ P. Ragupathi,⁷ Asheesh Kumar ⁽¹⁾,⁸ and Balkeshwar Singh ⁽¹⁾,⁹

¹Department of Aerospace Engineering, SRM Institute of Science and Technology, Kattankulathur 603203, Chennai, India ²Department of Mechanical Engineering, Dr. D Y Patil Institute of Engineering Management and Research, Pune 411044, India ³Department of Mechanical Engineering, Sanjeevan Engineering and Technology Institute, Kolhapur 416201, India ⁴Department of Mechanical Engineering, Amity University Madhya Pradesh, Maharajpura Dang, Gwalior 474005, Madhya Pradesh, India

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Metallized cold-spray coatings were employed to make $B_4C/AA7075$ and aluminum + plasma electrolytic oxidation (PEO) duplex coatings on AZ64. In addition, the phase structure, mechanical characteristics, wear, and PEO ceramic coatings examine the corrosion resistance. According to the findings, the PEO ceramic coating comprises α -aluminum oxide and γ -aluminum oxide, with some remnants of B_4C still being preserved. PEO ceramic coatings outperformed their corresponding CS counterparts regarding mechanical characteristics and wear resistance. For example, the PEO- B_4C coating achieved a hardness of 13.8 GPa and an elastic modulus of 185.5 GPa, which were 21.0% and 23.5%, respectively, more significant than the comparable values for the coating with CS. The PEO- B_4C coating was 58% and 15.7% less abrasive than the equivalent CS coating due to its lower wear rate of 4.84×10^{-5} mm³/Nm and relatively lower of 0.64. The density of corrosion current in the PEO-treated B_4C -AA7075 coating (3.735 × 10⁶ A/cm²) is similar to the corrosion current density in the untreated CS coatings. Finally, compared to untreated CS B_4C -AA7075, the coating's mechanical characteristics and wear resistance are considerably enhanced by the PEO treatment.

1. Introduction

Roughening components and low surface energy are combined to form an SH surface with a water contact angle (WCA) of more than 150° when PVC binder in THF solvent is mixed with roughening components (referred to as "superhydrophobic") [1]. Since AZ91 alloys are not very hard, corrosion resistant, and wear resistant, they are used in high-stress technical applications [2, 3]. Material characteristics improve by employing a wide variety of surface engineering techniques. It is called CS, and it is a new way to alter textures [4–6]. While still in solid, CS particles

ORIGINAL ARTICLE



Load-bearing characteristics of a hybird Si₃N₄-epoxy composite

Koli Gajanan Chandrashekhar¹ · Shashishankar A² · Depaa RA. B³ · G. Laxmaiah⁴ · Joseph Arockiam A⁵ · Padmanabhan R. G⁵ · Ram Kumar P⁶ · Kirubakaran D⁷ · B. Ramesh⁸

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Abstract

In this study, the epoxy composites were made using Si_3N_4 nanoparticle obtained from red matta rice husk ash and aluminised glass/pineapple hybrid fibre. The primary objective of this study was to develop lightweight structural composites for domestic infrastructure applications using biomass wastes. The epoxy composites were made using Si_3N_4 nanoparticle of 0.5 to 4 vol% and hybridised fibre of 40 vol% by hand lay-up method. The mechanical, fatigue and low-velocity impact characteristics of the composites were evaluated as per ASTM standards. The results showed that, among the composites that had been produced, composites with 2 vol% Si_3N_4 nanoparticle had the highest tensile, impact, flexural and hardness, measuring 168 MPa, 202 MPa, 6.2 J and 93 shore-D. Also, at 50% of UTS, the composite with the addition of 2 vol% Si_3N_4 nanoparticle had a better fatigue life count of about 36273. Similarly, the improved low-velocity impact strength of composite having 1 vol% of Si_3N_4 nanoparticle has maximum energy absorption of 11.4 J. Moreover, with the insertion of stacked fibre and Si_3N_4 nanoparticle, the epoxy composites have low combustion rate showing better flame-retardant behaviour. The results show that composites have been successfully produced for potential applications such as domestic infrastructure products like lightweight man-hole cover, hand rails, gratings, interior decoration panels, doors and windows.

Keywords Composites · Fibre · Nanoparticle · Mechanical · Fatigue · Flammability

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- ³ Department of Civil Engineering, Dr. M. G. R. Educational and Research Institute, Maduravoyal, Chennai 600095, Tamil Nadu, India
- ⁴ Department of Mechanical Engineering, Chaitanya Bharathi Institute of Technology, Hyderabad, India
- ⁵ Department of Automobile Engineering, Arasu Engineering College, Kumbakonam 612501, Tamil Nadu, India
- ⁶ Department of Chemistry, V. O. Chidambaram College, Tuticorin 628008, Tamil Nadu, India
- ⁷ Department of Electrical and Electronics Engineering, St. Joseph's Institute of Technology, Chennai 600119, Tamil Nadu, India
- ⁸ Department of Mechanical Engineering, J.J. College of Engineering and Technology, Tiruchirappalli 620009, Tamil Nadu, India

1 Introduction

Composite material is made usually from two phases, i.e. reinforcement and matrix. Reinforcement works as loadbearing member and the matrix work as stress transfer among reinforcement elements. Due to their extensive application in the aerospace, automotive, construction and sporting industries, fibres are firmly regarded as reinforcement element in composite materials where they bear the majority of the loading [1-3]. Due to their durability and affordable pricing, glass fibres (GF) are one of the most popular reinforcement materials [4-6]. Nowadays, lignocellulosic fibres have been used as a reinforcement material to produce a polymeric composite and are receiving a lot of attention in the place of glass or other synthetic fibres [7-10]. Meanwhile, it is economical, commonly available and a recurrent crop with very high potential mechanical properties such as lightweight, high tensile strength, high thermal stability, flame-retardant property and prominent stiffness. Among the lignocellulosic fibres, pineapple is the promising fibre to be used as a reinforcement material due its easy availability. In order to create the faux celling board composite,

Design and Analysis of a Gearless Multi-Angled Transmission System Employing a Variety of Materials

December 2022

Conference: 2022 IEEE North Karnataka Subsection Flagship International Conference (NKCon) · At: Karnataka

Authors:







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	Faculty Achievement								
	Name of Department		Mech	Mechanical Engineering		Year 2022-23			
Sr. No.	year	Name of the Faculty	Event Name	Title	Journal/college/university Name	Date			
1			Ph.D.	Ph.D. completed	Visvesvaraya Technological University, Belagavi	9/3/2022			
2			Journal paper Publication	Design Analysis and Optimization of SUV Chassis	International Journal of Science Technology & Engineering	4/1/2022			
3			Conference	OPTIMIZATION OF MACHINING PARAMETERS OF Al6061/ SiC MMCs USING TAGUCHI APPROACH	ICRDME-2022	24-25/06/2022			
4			FDP/STTP	Hybrid Electric Vehicles	GMRIT, Rajam.& VRSEC, Vijayawada	21/11/2022 to 25/11/2022			
5			Seminar	Use of ICT tool for quality enhancement of higher education Institutes; Post COVID situation	Sanjeevan Engineering & Technology Institute,Panhala .& NAAC, Banglore.	9/12/2022 To 10/12/2022			
6		Dr Aiit Ashok Katkar	FDP/STTP	Outcome Based Education	PPG Institute of Technology , Coimbatore	01/02/2023 to 09/02/2023			
7	2022-23		FDP/STTP	Renewable Energy Sources for Sustainable Development	Yashoda Technical Campus, Faculty of Engineering, Satara	20/02/2023 to 24/02/2023			
8	-		FDP/STTP	Resent Advancement in Heat Exchanger Technologies: Experimentation & Simulations	School of Engineering , O P Jindal University, Raigrach	13/03/2023 to 17/03/2023			
9			FDP/STTP	Inclusive Procedures & Processes for NAAC Assessment and Accreditation	ACT Academy, Tamil Nadu	24/04/2023 to 30/04/2023			
10			FDP/STTP	Advance in Manufacturing and Materials	Yashoda Technical Campus, Satara, in association with ISTE, New Delhi	22/08/2022 to 26/08/2022			
11			FDP/STTP	A new ERA of Manufacturing challenges and opportunities	D.Y.Patil College of Engineering and Tehnology, Kasaba Bawada ,Kolhapur	25/07/2022 to 30/07/2022			

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

This is to contify that

KATKAR AJIT ASHOK

has been conferred the Degree of

Poctor of Philosophy

FACULTY OF MECHANICAL ENGINEERING SCIENCES

ur

for the thesis entitled

MACHINABILITY STUDIES ON SIC REINFORCED WITH ADJMINIUM 6061 AND 7075 ALLOY

in recognition of the fulfillment of requirements for the said degree

601496 Given under the seal of the University

USN SVX15PMJ90

BELAGAVI DATE MARCH 10, 2022

VICE CHANCELLOR

Design Analysis and Optimization of SUV Chassis

Abhijeet Bapuso Chopade

PG Student Department of Mechanical Engineering Sanjeevan Engineering and Technology Institute, Panhala, Kolhapur, India

Koli G. C.

Assistant Professor Department of Mechanical Engineering Sanjeevan Engineering and Technology Institute, Panhala, Kolhapur, India Ajit Ashok Katkar

Assistant Professor Department of Mechanical Engineering Sanjeevan Engineering and Technology Institute, Panhala, Kolhapur, India

Ranjeet Baburao Chougule

PG Student Department of Mechanical Engineering Sanjeevan Engineering and Technology Institute, Panhala, Kolhapur, India

Abstract

Generally, with in the Automotive Industry weight reduction, cost of engineering design and reduction in vehicle development cycle time are getting increasingly focused on. In order to tack le this, Computer-Aided Engineering (CAE) is popularly being used to lead the design process. This is more efficient than simply, using CAE as a verification tool. The Crush Box Analysis is carried based on the basic principle of FMVSS by using Finite Element Method. Federal Motor Vehicle Safety Standards (FMVSS) are U.S. federal regulations specifying design, construction, performance, and Sturdiness requirements for Automobile and Controlled Automobile safety-related components, systems, and design features. The Solid work software is used for CAD modeling and ANSYS software is used for FEA analysis. Evaluate the results by changing thickness and design of the crush box. Von misses stress and deformation, by comparing the results that can suggest that using Rohacell 110 IG foam in crash box of the chassis absorbs optimum stress and more energy than others.

Keywords: FMVSS, Chassis, Foam, Von Misses

I. INTRODUCTION

This study scrutinizes vehicle chassis assembly in the automotive industry. The building of vehicle chassis in the automotive industry is the subject of intense research. It concentrates on the upsurge of Chassis and the implications for vehicle manufacturing and customer order satisfaction. Today's Chassis must have a high strength-to-weight ratio and rigidity and be cost-effective and simple to manufacture. Unfortunately, five Indian cars including the Mahindra Scorpio failed the Worldwide New Car Assessment Program's crash tests (NCAP). Global NCAP has given Hyundai Eon, Maruti Suzuki Eeco, Maruti Suzuki Celerio, SUV and Renault Kwid zero stars for safety. The Global New Car Assessment Program aims to promote public safety and health as well as the conservation and improvement of the natural environment, in particular by:

Establishing & carrying out autonomous study and evaluating programs to examine the safety and environmental aspects of automobiles, as well as their comparative performance and communicating the findings to the public Fostering new automotive evaluation programs by giving financial and technical support and enabling international collaboration with and among these programs.

II. LITERATURE REVIEW

The literature review for the dissertation project outlined in the previous chapter falls under this heading.

- Hari Kumar A. et al.[1] in this study analyzed ladder-type chassis frame for the TATA Turbo Truck by employing ANSYS 14.5" package. According to findings, the Rectangular Box section of the Ladder Chassis has greater strength than the C and I Cross-section types. For Aluminum Alloy 6063-T6. The design stages of conceptualization and formulation are efficiently addressed using finite element analysis.
- 2) Syed Altaf H. et al.[2] investigated alternative chassis materials. Carbon/Epoxy, E- glass/Epoxy, and S-glass/Epoxy as chassis materials were examined and analyzed in different cross-sections such as C, I and Box Section. TATA 2515 EX chassis have been used in the study. For this project, Pro-E and Ansys software were employed. It is noted that in comparison to other materials and cross-sections, the Carbon/Epoxy I section Chassis offers more remarkable results in all parameters.



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	Faculty Achievement								
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Sr. No.	year	Name of the Faculty	Event Name	Title	Journal/college/university Name	Date			
1			Journal paper Publication	Multi-Criteria Optimization of Micro- Hole on Glass Using Developed μ-Abrasive Jet Machine set up	Journal of Micromanufacturing.ISSN:2516- 5984,(11):1-9	Nov. 2022			
2	2022-23	Dr. V.V.Vanmore	Ph.D.	Ph.D. completed	Shivaji University Kolhapur (Research Center Walchand College of Engineering)	Nov. 30, 2022			
3			Faculty Develoment Program	Introduction to intellectual Property	SWAYAM online certificate course	12 week course (Jan-May 2023)			

Multi-criteria optimization of micro-hole on glass using developed μ -abrasive jet machine set-up

Journal of Micromanufacturing 1–9 © The Author(s) 2022 Reprints and permissions: in.sagepub.com/journals-permissions-india DOI: 10.1177/25165984221135047 journals.sagepub.com/home/jmf ©SAGE

Vinod V. Vanmore¹ and Uday A. Dabade¹

Abstract

In non-traditional machining, micro-abrasive jet machining (MAJM) is a cost-effective machining process. MAJM has been used for fabricating electronic devices and microfluidic channels. This work has made an effort to utilize MAJM for glass. A new design and fabrication of the Laval type of nozzle have been proposed to improve machining accuracy. A nozzle is conceived to ensure specific characteristics of the mixture (compressed air and abrasive particles) pass through it. The abrasive particle force is converted to kinetic energy, increasing the mixture's velocity. The cross-sectional area of the nozzle can be circular, rectangular, square, or oval. A circular cross-sectional nozzle has been developed for high velocity, precise etching, and patterning on difficult-to-machine materials such as steel alloys. A circular cross-sectional micro-nozzle with a large aspect ratio is proposed, and the flow characteristics and cutting performance are examined precisely by the experiment. Efforts are being made to make machining processes sustainable, productive, and efficient. Here, the Taguchi-grey relational analysis integration approach has been used to analyze the machining parameters such as air pressure, stand-off distance, and abrasive mesh size (AMS). The top hole diameter, bottom hole diameter, material removal rate, and radial overcut are the response variables in this investigation. Analysis of variance (ANOVA) results showed that the AMS was the most efficient parameter, which followed the processing condition on the total input of the multi-purpose function. The reported optimized process parameters are air pressure of 8 bar, stand-off distance of 2 mm, and AMS mix (50%+100%) micron, which significantly affects the top and bottom micro-hole diameters.

Keywords

Micro-abrasive jet machining, Taguchi method, grey relational analysis, analysis of variance, radial over cut, material removal rate

Received 6 January 2022; Revised 23 May 2022; Accepted 12 September 2022

Introduction

Nowadays, micro-abrasive jet machines (MAJM) have become very popular. It is used to perform mass production with low capital and operating costs.1 One of the main advantages includes instant through-holes in brittle materials without creating burrs on the surface.² One of the best properties of glass is that it allows the selection of the best material for many applications.³ Glass is used in small-scale hardware ventures⁴ and semiconductors because it is biologically inactive and has optical properties.⁵⁻⁷ It is commonly used in the biochemistry and clinical fields, especially in the manufacturing of microfluidic devices.8 Though glass is a strong material choice, the glass processing for various applications poses many challenges.9 MAJM is a new technology that demonstrates a huge potential for microdevices, particularly to create precise micro-holes, channels, and grooves for fluidic applications.¹⁰ However, to achieve better development in this technology, there should be a known and reliable relationship between input parameters and their desired output parameters, such as material removal rates (MRR) and dimensional shape accuracy, so that optimal process parameters can be predicted.

A number of studies have been carried out on the shape and size of the micro features on glass, polymers, and ceramics by MAJM. Yin et al.¹¹ investigated machining on ceramic dental crowns using Al₂O₃ abrasive powder with different grit sizes. The standoff distance (SOD) is an imperative parameter for shape and size, along with MRR for creating holes.¹² The MRR has been found to increase to a maximum with increasing SOD ¹³ and decrease with further increasing SOD.^{14–15} It has been reported that computer simulation for erosion of particle impingement and reducing the SOD reduces the divergence of generated holes and improves dimensional accuracy. Balasubramaniam et al.¹⁶ examined the effects of jet particle

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Faculty Achievement Year 2022-23 Name of Department Mechanical Engineering Title Sr. No. year Name of the Faculty **Event Name** Journal/college/university Name Date Faculty Develoment Program Materials & Advanced Manufacturing Yashoda Technical Campus, Satara 22/08/2022 to 26/08/2022 1 Renewable Energy Sources for Sustainable 2 Faculty Develoment Program Yashoda Technical Campus, Satara 20/02/2023 to 24/02/2023 Development 2022-23 Mr. Rahul Uday Urunkar 3 Reviwer for SCI Journal Elsevier ScienceDirect International Journal of Hydrogen Energy April 2023 Book Title: Hydrogen Fuel Cell Technology for Hydrogen Storage Technologies and 4 Book Chapter Mobile Applications July 2023 Related Heat and Mass Transfer Studies Publisher: IGI Global Publication



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Chapter 8 Hydrogen Storage Technologies and Related Heat and Mass Transfer Studies

Rahul Uday Urunkar

Department of Mechanical Engineering, Sanjeevan Engineering and Technology Institute, Panhala, Kolhapur, India

Sharad Dattatray Patil

Department of Mechanical Engineering, Rajarambapu Institute of Technology, Affiliated to Shivaji University, Kolhapur, India

ABSTRACT

The energy demands of the future are ever increasing, and hydrogen as an ideal energy carrier can fulfil these demands. The production, purification, delivery, storage, and application are the significant measures of the hydrogen-based economy. The utmost challenge to utilize hydrogen as a fuel lies in the improvement of storage techniques. Hydrogen storage technologies comprise of high-pressure compression, cryogenic liquefaction, and absorption in solid state such as metal hydrides and complex hydrides. As compared with other techniques, hydrogen storage in solid form seems to be one of the utmost likely solutions. However, it involves extremely coupled transport processes such as chemical kinetics, heat, and mass transfer. Complex hydrides are capable substitute aspirants for solid state hydrogen storage because of many advantages, but many of such hydrides suffer from poor kinetics as well as great thermodynamic stability. Significant heat transfer techniques and issues associated with hydrogen storage methods are discussed, with emphasis on metal hydride.

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2	2022-23	Mr. Deshmukh Sardar Balaso	Faculty Develoment Program	Research Paper Writing and Publishing	Nutan College of Engineering and Research, Talegaon Dhabhade, Pune	20-02-2023 to 24-02-2023				
3	2022-23	Mr. Deshmukh Sardar Balaso	Faculty Develoment Program	Renewable Energy Sources for Sustainable Development	Yashoda Technical Campus, Satara	20-02-2023 to 24-02-2023				
4	2022-23	Mr. Deshmukh Sardar Balaso	Workshop	Understanding of Course Outcomes (COs) & Program Outcomes (POs)	Sanjeevan Engineering & Technology Institute, Panhala	25-02-2023				
5	2022-23	Mr. Deshmukh Sardar Balaso	Faculty Develoment Program	Innovation, Research And IPR – Journy Towards Excellence	BVB's Sardar Patel College of Engineering, Mumbai	01-03-2023 to 05-03-2023				



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2			Faculty Development Program	Materials & Advanced Manufacturing	Yashoda Technical Campus, Satara	22/08/2022 to 26/08/2022				
3	2022-23	Mr. Praveen Shivaji Atigre	Memorandum of Understanding [MoU]	Memorandum of Understanding [MoU] with Info Grow	Info Grow Kolhapur	6/2/2023				
4			Memorandum of Understanding [MoU]	Memorandum of Understanding [MoU] with CAD MANTRAA, Warana Nagar	CAD MANTRAA, Warana Nagar	2/12/2022				
5			International Conference Paper	Comparing the Economic and Environmental Compatibility of Battery Electric and Conventional Vehicles in India	Proc. International Conference on Mechanical, Automotive and Mechatronics Engineering (ICMAME 2023) 29-30 April 2023, Dubai, UAE	29-30/04/2023				





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Mr. Anand S'Shivade Co-ordinator

Dr. Tarang R. Shinde Convener

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Memorandum of Understanding (MOU)

For Academic & Technical Tie Up

Between

Sanjeevan Engineering & Technology

Institute, Panhala



And

Info Grow

Sambhaji Nagar, Kolhapur 416012



With Effective from 6th February 2023





PRINCIPAL Sameevan Eliog, & Tech, Institute Sonwer Peth, Panheia, Dist, Kolhapur, (MD)





Memorandum of Understanding

This Memorandum of Understanding is executed on Monday, 06/02/2023

Between

Mechanical Engineering Department of Sanjeevan Engineering & Technology Institute Panhala, here in after referred as "SETI Panhala" (Which term shall so far as the context admits be deemed to mean and include its successors and assignees) of the First Part.

And

Info Grow, a Training Institute duly organized and existing under the laws of India having its registered office at 101, Kedar Residency, besides Krishna Hospital, Sambhaji Nagar, Kolhapur 416012 (hereafter referred to as "Info Grow"), which expression shall unless repugnant to the context or meaning there of, include its successors, legal representative and permitted assignees) on Second Part.

WHEREAS:

- 1. SETI Panhala is anoteworthy academic institute of Kolhapur region offering U.G. and P.G. programs in Engineering. SETI Panhala is an educational institution affiliated to Dr. Babasaheb Ambedkar Technological University Lonere.
- Mechanical Engineering Department of SETI Panhala is willing to enter into a Memorandum of Understanding (MOU) with Info Grow for the purpose of Students Internship / Expert Lectures / Projects / Students Placement / Faculty Exchange / Engineering Consultancy etc.
- 3. SETI Panhala and Info Grow are desirous of associating with each other to expertise the students of SETI Panhala by providing Student Internships / Expert Lectures / Student Placements / Student Projects / Faculty Exchange / Engineering Consultancy etc. Now therefore, in consideration of the premises and the actual covenants hereincontained, it is agreed by both SETI Panhala and Info Grow as under.

1.0 Definitions and Interpretation

1.1 "MOU" shall mean this Memorandum of Understanding executed between SETI Panhala & Info Grow on Monday, 06/02/2023.

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- 3.3 SETI Panhala shall create awareness amongst its students for the promotion of the activity especially Internship Program / Training Programs / Projects / Expert Lectures etc.
- 3.4 Each party will nominate one of its members as its representative in charge of the cooperative program. Individual programs of work under this Memorandum will be jointly planned and conducted by the nominees of both parties.
- 3.5 Progress of work by the individual program will be reviewed and approved by designated project officers of both parties. It is anticipated that a detailed plan of joint activities will be completed by the nominees of both parties.
- 3.6 The final approval of any project will be dependent upon the availability of guaranteed support funds.

4.0 Relationship

A and

This MOU relates solely to the intention of the parties, wherein SETI Panhala and Info Grow jointly work together and shall not extend to any other activity or create a partnership between the Parties hereto and under any law of any country. The parties agree that it is not their intention to share any loss or profit between them in their respective fields, except to the extent expressly provided herein.

5.0 Authority to Bind

No party shall act on behalf of the other party to contractually bind the other Party under the terms of this MOU having first obtained the other Party's written agreement.

6.0 Validity & Termination

This MOU shall remain in force for a period of three (03) years commencing from effective date. Institute may extend the term by written agreement signed by both after review. During the initial term or any renewal term, either party may terminate this MOU, after mutually agreed days, with prior written notice to the other party.

7.0 Amendment & Modification

This MOU may be amended or modified by a written agreement signed by the representatives of both organizations (SETI Panhala & Iafo Grow).

- 1.2 "Party" or "Parties" shall mean SETI Panhala & Info Grow individually and collectively as the context may require.
- 1.3 The headings / subheadings / titles sub-titles are only for the sake of convenience and shall not be interpreted to restrict or otherwise affect the meaning or import of the clauses, which shall be interpreted solelyin light of the contents thereof.
- 1.4 Use of words in the singular includes the plural and vice versa and the masculine gender includes the feminine where applicable.
- 1.5 Where a word or phrase is defined, other parts of speech and grammatical forms of that word or phrase shall have the corresponding meanings. Any reference to 'Writing' includes printing, typing, lithography and other means of reproducing words in visible form.

2.0 Focus Area & Objectives

The main intention of this MOU is to expertise the students of SETI Panhala with the help Info Grow by providing the students with Internships / Expert Lectures / Student Placements / Student Projects / Faculty Exchange / Engineering Consultancy etc. The purpose of this Memorandum of Understanding is to set out the basic consensus about respective roles and responsibilities of the Parties in working cooperatively to develop and carry out collaborative activities in furtherance of the common interest of the institutions by

a) Exchange of faculty members and students for study and training

b) Exchange of invitations to scholars for lectures & sharing of experience through faculty exchange, guest lectures etc.

c) Facilitate training programs & sponsored projects.

d) Exchange of information on professional experience in fields of interest to both institutions.

3.0 Responsibility Structure

- 3.1 SETI Panhala shall provide the infrastructure of systems, LCD projector etc. for the expert lectures. Also the laboratories and other research equipments available in the laboratories.
- 3.2 Info Grow shall be responsible for arrangements & coordination for supply of industry experties, providing training programs, process of necessary appointments with industries for industry internship program, projects, expert lectures in coordination with staff of SETI Panhala.

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8.0 Consequential Damages

Other than explicitly mentioned in this MOU, either Party shall not under any circumstances or at any time be liable to the other under or in connection with the MOU for any special or any direct or indirect loss or damage or for any consequential loss or damage, whether direct or indirect, including but without limiting the generality of the foregoing, loss of profits, loss ofproduction, or loss of opportunities.

9.0

If any provision of this MOU or the application thereof to any person, entity or circumstance shall be invalid or unenforceable to any extent, the remainder of this MOU shall not be affected thereby and the application of such provision shall be enforced to the greatest extent

10.0 Dispute Resolution

In case, there be a dispute relating to any aspect of academic cooperation, Principal of SETI Panhala & Owner of the Info Grow will jointly resolve the dispute in a spirit of independence, mutual respect & shared responsibility. If such a settlement cannot be reached, the dispute will be settled in the Courts of Maharashtra (India).

11.0 Notices

11.1 Any notice and other communications provided for in the agreement shall be in writing in English and shall be first transmitted by facsimile transmission and/or by internationally recognized courier service, in the manner as elected by the Party giving such notice: In case of notices to Info Grow.

Reg.Office Address:

Info Grow.

101, Kedar Residency, besides Krishna Hospital, Sambhaji Nagar, Kolhapur 416012

In the case of notices to SETI Panhala,

College Address:

Sanjeevan Engineering & Technology Institute Panhala, Sanjeevan Knowledge City, A/P - Somwar Peth, Panhala, Kolhapur - 416201.

PRINCIPAL sempervan Enod, & Tech, Institute Somwar Perfs, Penhata, Dig. Kolhabor, (MS)

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11.2 Either Party may, from time to time, change its address or representative for receipt of notices or other communications provided for in this agreement by giving to the other not less than 15 days prior written notice.

12.0 Entire understanding

This MOU expresses the whole agreement reached between the Parties. Consequently, this agreement supersedes any previous letter or document of whatsoever nature exchanged between the Parties with respect to this agreement.

13.0 Amendment

No amendment to this MOU shall be valid and binding to the parties unless it is made in writing and signed by authorized representative of all parties to this agreement. In witness where of the parties have caused this agreement to be executed by their duly authorized representatives on this 6th Day of February 2023.

ACCEPTED:

For Info Grow

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Name: Mr. Dhaval Bagawade Designation : Owner Info Grow Kolhapur 416012

Witness: Prof. S. B. Deshmukh Designation: Head (Mech. Dept.) Sanjeevan Engineering & Technology Institute, Panhala



Sanjeevan Engg. & Tech, Institute Sonowar Peth, Frankala, Dist. Kolhapur, (MS) R our

Name: Dr. Sanjeev N. Jain Designation : Principal Sanjeevan Engineering & Technology Institute, Panhala

For SETI Panhala

P.S. Arigm

Witness: Prof. Praveen S. Atigre Designation: Coordinator for Industry Internship Activity Sanjeevan Engineering & Technology Institute, Panhala





Memorandum of Understanding

This Memorandum of Understanding is executed on Friday, 02/12/2022

Between

Sanjeevan Engineering & Technology Institute Panhala, here in after referred as "SETI Panhala" (Which term shall so far as the context admits be deemed to mean and include its successors and assignces) of the First Part.

And

CAD MANTRAA, is an ISO 9001:2015 certified Training Institute having its registered office at Venkatrao Complex College Road near Sidheshwar Patsanstha Warana Nagar, Maharashtra 416113 India (hereafter referred to as "CAD MANTRAA", which expression shall unless repugnant to the context or meaning thereof, include its successors, legal representative and permitted assignees) on Second Part.

WHEREAS:

- SETI Panhala is a noteworthy academic institute of Kolhapur region offering U.G. and P.G. programs in Engineering. SETI Panhala is an educational institution affiliated to Dr. Babasaheb Ambedkar Technological University Lonere.
- SETI Panhala is willing to enter into a Memorandum of Understanding (MOU) with CAD MANTRAA for the purpose of Students Internship / Student Workshops / Expert Lectures / Student Projects / Faculty Exchange / Engineering Consultancy etc.
- SETI Panhala and CAD MANTRAA are desirous of associating with each other to expertise the students of SETI Panhala by providing Students Internship / Student Workshops / Expert Lectures / Student Projects / Faculty Exchange / Engineering Consultancy etc.
- 4. Now therefore, in consideration of the premises and the actual covenants herein contained, it is agreed by both SETI Panhala and CAD MANTRAA as under.

1.0 Definitions and Interpretation

1.1 "MOU" shall mean this Memorandum of Understanding executed between SETI Panhala & CAD MANTRAA on Friday, 02/12/2022.



PRINCIPAL Sanjeevan Erigg. & Tech. Institute Soriwar Peth, Panhaia, Dist. Kolhapur. (MS)

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- 1.2 "Party" or "Parties" shall mean SETI Panhala & CAD MANTRAA individually and collectively as the context may require.
- 1.3 The headings / subheadings / titles sub-titles are only for the sake of convenience and shall not be interpreted to restrict or otherwise affect the meaning or import of the clauses, which shall be interpreted solelyin light of the contents thereof.
- 1.4 Use of words in the singular includes the plural and vice versa and the masculine gender includes the feminine where applicable.
- 1.5 Where a word or phrase is defined, other parts of speech and grammatical forms of that word or phrase shall have the corresponding meanings. Any reference to 'Writing' includes printing, typing, lithography and other means of reproducing words in visible form.

2.0 Focus Area & Objectives

The main intention of this MOU is to expertise the students of SETI Panhala with the help CAD MANTRAA by providing the students with Internships/ Industrial Visits / Expert Lectures / Student Workshops /Student Projects/ Faculty Exchange / Engineering Consultancy etc. The purpose of this Memorandum of Understanding is to set out the basic consensus about respective roles and responsibilities of the Parties in working cooperatively to develop and carry out collaborative activities in furtherance of the common interest of the institutions by

a) Exchange of invitations to scholars for lectures & sharing of experience through faculty exchange, guest lectures etc.

b) Promote joint student development activities

c) Facilitate training programs, industrial visits & sponsored projects.

d) Exchange of information on professional experience in fields of interest to both institutions.

e) Exchange of invitations to scholars to participate in conference and symposium

3.0 <u>Responsibility Structure</u>

- **3.1** SETI Panhala shall provide the infrastructure of systems, LCD projector etc. for the expert lectures. Also the laboratories and other research equipments available in the laboratories.
- 3.2 CAD MANTRAA shall be responsible for arrangements & coordination for supply of industry experties, providing training programs, process of necessary appointments with industries for industry internship program, projects, expert



PRINCIPAL Sonyeevan Englg. & Tech. Institute Sonwar Peth, Panhaia, Dist. Kolhapur. (MS)



lectures as well as visits in coordination with staff of SETI Panhala.

- 3.3 SETI Panhala shall create awareness amongst its students for the promotion of the activity especially Internship Program/ Industrial Visits / Projects / Expert Lectures etc.
- 3.4 Each party will nominate one of its members as its representative in charge of the cooperative program. Individual programs of work under this Memorandum will be jointly planned and conducted by the nominees of both parties.
- 3.5 Progress of work by the individual program will be reviewed and approved by designated project officers of both parties. It is anticipated that a detailed plan of joint activities will be completed by the nominees of both parties.
- **3.6** The final approval of any project will be dependent upon the availability of guaranteed support funds.

4.0 Relationship

This MOU relates solely to the intention of the parties, wherein SETI Panhala and CAD MANTRAA jointly work together and shall not extend to any other activity or create a partnership between the Parties hereto and under any law of any country. The parties agree that it is not their intention to share any loss or profit between them in their respective fields, except to the extent expressly provided herein.

5.0 Authority to Bind

No party shall act on behalf of the other party to contractually bind the other Party under the terms of this MOU having first obtained the other Party's written agreement.

6.0 Intellectual Property Rights:

6.1 Ownership of any intellectual property (including but not limited to confidential information, know-how, patents, copyrights, design rights, rights relating to computer software, and any other industrial or intellectual property rights) developed jointly during the course of this MOU shall be vested in both institutes to this Memorandum.

6.2 Both institutes shall have the joint right to determine the commercial exploitation and disposition of such intellectual property, and both institutes shall make joint applications for the registration of the same. Before any registration or commercialization of any intellectual property



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takes place, the institutes agree to reach a separate agreement covering issues such as exploitation rights and revenue sharing.

6.3 Any publication regarding such intellectual property shall only be possible with the prior written consent of both institutes, such consent not to be unreasonably withheld.

6.4 SETI Panhala shall be free to use perpetually the results arising out of the collaborating activities for its own internal teaching, research, educational, clinical and publication purposes without the payment of royalties or other fees to the other party.

7.0 Validity & Termination

This MOU shall remain in force for a period of three (03) years commencing from effective date. Institute may extend the term by written agreement signed by both after review. During the initial term or any renewal term, either party may terminate this MOU, after mutually agreed days, with prior written notice to the other party.

8.0 Amendment & Modification

This MOU may be amended or modified by a written agreement signed by the representatives of both organizations (SETI Panhala & CAD MANTRAA).

9.0 Consequential Damages

Other than explicitly mentioned in this MOU, either Party shall not under any circumstances or at any time be liable to the other under or in connection with the MOU for any special or any direct or indirect loss or damage or for any consequential loss or damage, whether direct or indirect, including but without limiting the generality of the foregoing, loss of profits, loss of production, or loss of opportunities.

10.0 Severability

If any provision of this MOU or the application thereof to any person, entity or circumstance shall be invalid or unenforceable to any extent, the remainder of this MOU shall not be affected thereby and the application of such provision shall be enforced to the greatest extent permitted by law.



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11.0 Dispute Resolution

In case, there be a dispute relating to any aspect of academic cooperation, Principal, Vice Principal of SETI Panhala & Owner of the CAD MANTRAA will jointly resolve the dispute in a spirit of independence, mutual respect & shared responsibility. If such a settlement cannot be reached, the dispute will be settled in the Courts of Maharashtra (India).

12.0 Notices

12.1 Any notice and other communications provided for in the agreement shall be in writing in English and shall be first transmitted by facsimile transmission and/or by internationally recognized courier service, in the manner as elected by the Party giving such notice:

In case of notices to CAD MANTRAA.

Reg.Office Address:

CAD MANTRAA.

Venkatrao Complex College Road Near Sidheshwar Patsanstha Warana Nagar, 416113 Maharashtra, India

In the case of notices to SETI Panhala,

College Address:

Sanjeevan Engineering & Technology Institute Panhala, Sanjeevan Knowledge City, A/P - Somwar Peth, Panhala, Kolhapur - 416201 Maharashtra, India

12.2 Either Party may, from time to time, change its address or representative for receipt of notices or other communications provided for in this agreement by giving to the other not less than 15 days prior written notice.

13.0 Entire understanding

This MOU expresses the whole agreement reached between the Parties. Consequently, this agreement supersedes any previous letter or document of whatsoever nature exchanged between the Parties with respect to this agreement.



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14.0 Amendment

No amendment to this MOU shall be valid and binding to the parties unless it is made in writing and signed by authorized representative of all parties to this agreement. In witness where of the parties have caused this agreement to be executed by their duly authorized representatives on this **2nd Day of December 2022**.

ACCEPTED:

For CAD MANTRAA

Name: Mr. Ritosh Prakash Koli Designation: Owner CAD MANTRAA Warana Nagar Kolhapur

Manut

Name: Dr. Suhas G. Sapate Designation: Vice Principal Sanjeevan Engineering & Technology Institute, Panhala For SETI Panhala

Name: Dr. Sanjeev N. Jain Designation: Principal Sanjeevan Engineering & Technology Institute, Panhala

Name: Dr. Ajay K. Maske Director Corp. Communication Sanjeevan Engineering & Technology Institute, Panhala EM

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P.C. Align

Witness: Prof. Praveen S. Atigre Designation: Coordinator for Industry Internship Activity Sanjeevan Engineering & Technology Institute, Panhala



PRINCIPAL

Sanjeevan Engg. & Tech. Institute Somwar Peth, Fanhaia, Dist. Kolhapur. (M.)



Comparing the Economic and Environmental Compatibility of Battery Electric and Conventional Vehicles in India

Amrut P. Bhosale Department of Mechanical Engineering, Veermata Jijabai Technological Institute (VJTI), Mumbai, India & Sanjeevan Engineering and Technology Institute, Kolhapur-India ap_bhosale_p18@me.vjti.ac.in Sachin A. Mastud Department of Mechanical Engineering, Veermata Jijabai Technological Institute (VJTI), Mumbai, India. samastud@me.vjti.ac.in Viraj I. Pasare, Department of Mechanical Engineering, D.Y.Patil College of Engineering and Technology, Kolhapur- India vpasare11@gmail.com

Ketaki A. Bhosale Department of Computer Science and Engineering, D.Y.Patil College of Engineering and Technology, Kolhapur- India ketakibhosale28@gmail.com

Abstract-Conventional vehicle fuel resources are encompassed with the jeopardy of being scarce; eventually exacerbating fuel prices. This high fuel prices further aggregate to elevate the total ownership cost and have led to an epiphany of national energy security. Further, the emission from conventional fuel combustion urges a need to cogitate about the already saddled environmental concerns. Alternatively, electric vehicles are looked upon as a potential option to conventional vehicles due to no tail-pipe emissions and low operating costs. However, if a complete life cycle is considered, an intuitive assumption that electric vehicles have no emissions and costs less can be a deception. Hence, the feasibility of electric vehicles as an option for conventional vehicles needs to be contemplated in economic and environmental aspects. This article presents the comparison between battery electric vehicles and conventional vehicles by performing a life cycle analysis (economic and environmental) in the Indian context. A Total Cost of Ownership (TCO) model is developed for financial analysis to depict the compatibility status of battery electric vehicles. The environmental analysis is conducted by using OpenLCA software based on ReCePi 2016 method for all the impact categories at mid-point as well as end-point levels. The results reckon electric vehicles are costlier than conventional vehicles with current statistics and policies in India. However, by implementing certain optimizing parameters in sensitivity analysis, electric vehicles are found to have cost parity and even become more economical than conventional vehicles in some cases. The outcomes from environmental analysis unveil that the GHG emissions from battery electric vehicles are less than that from conventional vehicles. However, out of the 18 impact categories considered, battery electric vehicles have less impact in 10 categories and even have less impact score at the end-point level.

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Praveen S. Atigre

Department of Mechanical

Keywords— Battery electric vehicles, life cycle analysis, environmental concerns, total cost of ownership, battery electric vehicles environmental impacts

I. INTRODUCTION

The pursuit for mode shift towards carbon-neutral transportation is intensified, provoking the researchers across the globe to come up with better sustainable transport options. As a result umpteen electric vehicles are being witnessed by the global vehicle fleet. The omission of tail pipe emissions and achieving national energy security with the help of an alternative for conventional high-priced fuels are the drivers of electric vehicle's bandwagon Petrauskiene et al.[1]. The debates regarding the sustainability, feasibility, techno-economic-environmental aspects of Electric Vehicles (EVs) have still not lead to any consensus among the EV's research fraternity. It is still unclear whether electric vehicles would prove to be a credible alternative and if yes then under which situation? Kalghatgi [2] states complete adoption of electric vehicles would not be feasible by 2040 however hybrid electric vehicles will be a better option for the conventional fuelled vehicles. On the contrary, researchers Hauschild et al [3], favor electric vehicles as a better option on various grounds such as economic, technical and environmental.

The Global EV Outlook report highlights the uneven uptake of electric vehicles is different parts of the globe [4]. Similarly, the barriers for uptake of battery electric vehicles (BEV), public opinion and policies to enhance the uptake of the electric vehicles across the world are brought forward by various literatures Lieven et al. [5], Heidrich et al. [6]. These literatures further highlight the common barriers for electric vehicles are economic aspect, lack of credible infrastructure