



PDEU

PANDIT DEENDAYAL ENERGY UNIVERSITY

Formerly Pandit Deendayal Petroleum University (PDPU)

SOT

SCHOOL OF
TECHNOLOGY

NEWSLETTER

October
2021



SCHOOL OF TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

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Editorial Team



Dr. Anirudh Kulkarni
Faculty Coordinator



Mrs. Pooja Nimavat
Staff Coordinator



DIRECTOR'S DESK...

Prof. Sunil Khanna

Dear Colleagues and Students:

Industry 4.0 (the fourth Industrial Revolution) encapsulates the future development trends to achieve more intelligent manufacturing. As we @ PDEU (formerly PDPU) embark on this journey towards Industry 4.0, I am Happy to Introduce the next issue of the Newsletter which not only share with all its readers the latest news and developments in the Department of Mechanical Engineering but would also be sensitizing all of us on the latest trends and developments in the Fourth Industrial Revolution.

The limitless power of technology to do good and the conviction of my faculty colleagues and students that the golden age is ahead of us - and not behind us – brings about the best in all of us which is reflected in their achievements.

Compliments to the editorial team for their passion for perfection and unbound creativity which makes me always look forward to the next edition of the Newsletter.

HEAD OF THE DEPARTMENT'S DESK ...



Prof. Vishvesh Badheka

It gives me immense pleasure to share Newsletter of the Mechanical Engineering Department, October 2021. Mechanical Engineering Department is the most happening Department of the School of Technology. Newsletter gives an overview of the activities carried out by students, staff and faculties during the month. You may please share your feedback, comments & suggestions to the coordinators.



ADVANCES IN MECHANICAL ENGINEERING

DESICCANT ASSISTED VAPOR COMPRESSION REFRIGERATION SYSTEM

Dr. Vivek K Patel

The vapour compression-driven refrigeration (VCR) systems have dominating share in electricity consumption during peak sunshine hours in summers, especially in the countries with a hot and humid climate. Brookings India's report predicts the uplift in the total commercial electricity share (by air conditioning) from the current 50% to 75% by 2030. The same report predicts the household comfort demand will increase its power usage share from the contemporary 7% to 45% by 2030. In air-conditioning, dealing with a significant latent heat load along with the sensible load is an intense electricity (high-grade energy) consumption case in humid and hot regions. Vapour compression-based refrigeration systems alone can perform both sensible cooling and latent cooling at the cost of noticeable electricity consumption as the compressor needs high power. As an alternative, the liquid desiccant based air dehumidification concept has been proven fruitful wherein the humidity load (latent heat load) can be handled by the desiccant material because of its hygroscopic property. Also, liquid desiccant dehumidification technology appears more attractive as: (a) it gives good air dehumidification performance, (b) the liquid desiccant regeneration can be achieved by the renewable or waste heat, (c) the liquid desiccants can be pre-heated or pre-cooled by working as a heat exchanging media in the cooling system, (d) liquid desiccants are able to filter microbial contaminants, bacteria etc. The concept of aiding the desiccant dehumidification to VCR system seems to be a promising option with high-performance coefficient as a majority of the latent heat load of the ambient air is handled by environment-friendly liquid desiccants and allows the VCR system to cover the rest (but reduced) cooling load.

Recently, the performance of such liquid desiccant assisted VCR system to identify the energy saving aspect is investigated by mechanical engineering department of PDEU. An R134a driven VCR unit of 1 ton of refrigeration (TR) is selected which consists of a sealed compressor (1 TR), a fin and tube type evaporator, an air cooled (fin and tube type) condenser and capillary tubing for the expansion. An acrylic made (transparent) packed-bed type and counter-flow type dehumidifier component is designed to serve the purpose of humid air dehumidification using liquid desiccant. It is made rectangular in cross section with 800 mm × 300 mm × 300 mm dimensions.



ADVANCES IN MECHANICAL ENGINEERING

DESICCANT ASSISTED VAPOR COMPRESSION REFRIGERATION SYSTEM

Dr. Vivek K Patel

The Polyvinyl Chloride (PVC) sheets are selected as packing material whose height can be varied and the cross-section dimensions are same as the dehumidifier. The dimensions of packing are 300 mm × 300 mm × 300 mm. The schematic arrangement of the system provided in Fig. 1

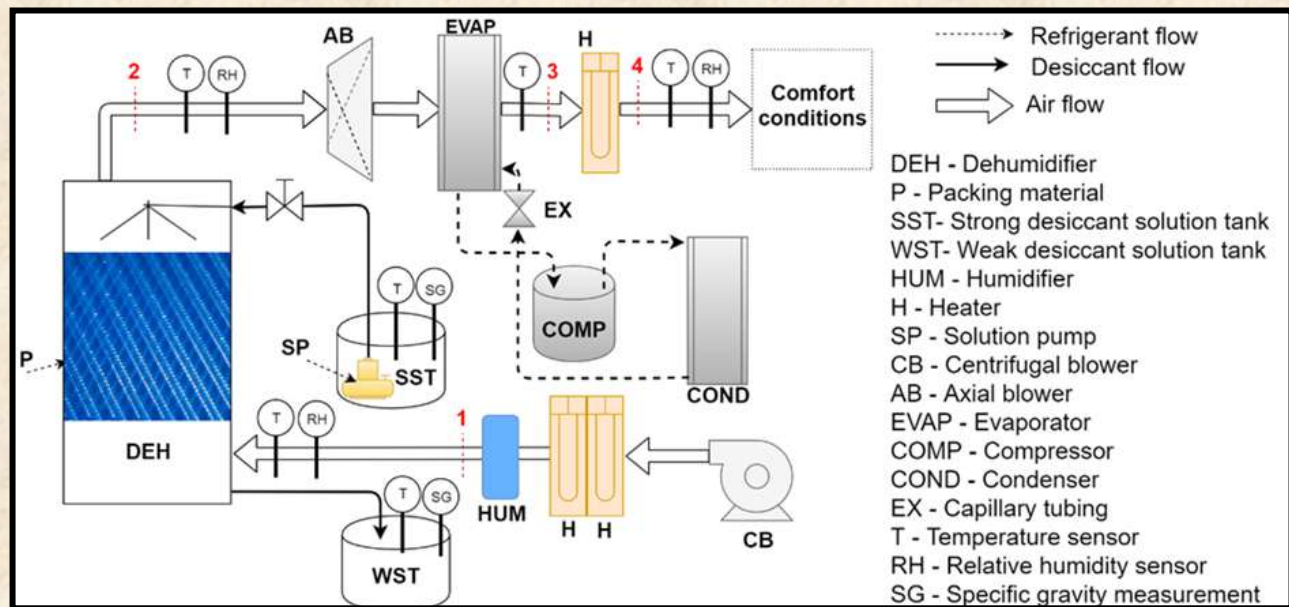


Figure 1: Schematic arrangement of hybrid liquid desiccant assisted VCR system

Series of experiments are conducted to assess the performance of the proposed hybrid system and compare its performance with standalone VCR system for same ambient (hotter and humid) conditions. The maximum of 27.54% improvement is observed when the COP_{hybrid} is found to be 2.181. Also, 54.93% of the total latent heat load is covered by the dehumidifier of the hybrid system at this condition. Further, based on the results it is projected that hybrid system (of 5 kW capacity) needs an initial extra expenditure of 48000 Indian Rupees but saves 10400 Indian Rupees annually in electricity consumption compared to standalone vapour compression refrigeration system with a payback period of 4 years considering the interest rate. The readers can read in detail about the presented article from <https://doi.org/10.1016/j.applthermaleng.2020.115288>.



FACULTY

PUBLICATIONS

JOURNAL

The following journal papers were published during the month of October 2021:

- ⇒ Shivanna, D.M., *Kiran M.B.*, Venkatesh, G.S., Kavitha, S.D., “Analyzing the effects of machining parameters on surface roughness of machined surfaces using vision system”, Materials Today :Proceedings, Volume 47, Pages 4885 - 4890 (2021)
<https://doi.org/10.1016/j.matpr.2021.06.254>
- ⇒ *Vivek Patel, Rajesh Patel*, Sumit Kumar, "Performance and Economic Analysis of Bubble Column Humidification and Thermoelectric Cooler Dehumidification Water Desalination System", Journal of Thermal Science and Engineering Applications, Vol 14(6) (2021)
- ⇒ *V Vakharia*, Ivano E Castelli, Keval Bhavsar, Ankur Solanki, “Bandgap prediction of metal halide perovskites using regression machine learning models”, Physics Letters A,127800, (2021)

BOOK CHAPTER

Dr. M. B. Kiran published the following Book Chapters in the book - Recent Advances in Mechanical Infrastructure, book subtitle - Proceedings of ICRAM 2021, ISBN978-981-16-7659-8 during the month of October 2021:

- ⇒ “Classical Lean Manufacturing Philosophy–A Review”
- ⇒ “A Novel Technique for the Surface Texture Inspection of Electrical Discharge Machined Surfaces Using Vision System”



FACULTY

PUBLICATIONS

CONFERENCE PAPERS

Department of Mechanical Engineering presented the following Conference Papers in 1st International Conference on "Additive Manufacturing and Advanced Materials" AM2 during 4th-6th October 2021. These papers have now been submitted to Material Today Proceedings for review and publishing:

Sr. No.	Title of the Paper	Authors
P6	On-Line Measurement of Tool Wear of Face Milling Cutter using Machine Vision	M.B. Kiran
P7	Machine Vision based Techniques for Inspecting 3D-Printed Spur Gears	M.B. Kiran
P36	A Brief Review on Recycling and Reuse of Wind Turbine Blade Materials	Hardik K. Jani Surendra Singh Kachhwaha Garlapati Nagababu Alok Das
P45	Magnetic field assisted finishing (MFAF) process for internal finishing of alumina ceramic tube	Mr. Manank Patel Mr. Santosh Chovatiya Abhishek Kumar Vishvesh Badheka
P52	Areas of recent developments for shape memory alloy: A review	Gautam Singh Rajput Jay Vora Parth Prajapati Rakesh Chaudhari
P53	AI in AM: An experimental investigation using adaptive neuro-fuzzy interface system as a prediction tool	Trivedi Achyut Pavan Kumar Gurrala
P54	Overview on Printability of Metals and Alloys	Falak Patel Vishvesh Badheka
P74	Recent advancements in 3D Printed Concrete Materials	Uma Chaduvula Jay Bhagat Dev Bhavsar Pankaj Sahlot



FACULTY

PUBLICATIONS

CONFERENCE PAPERS

Department of Mechanical Engineering published the following Conference Papers in during the month of October 2021:

Sr. No.	Title of the Paper	Authors
P75	Effect of deposition strategies on mechanical strength of wire arc additively manufactured Inconel 625	Gautam Singh Rajput Meet Gor Harsh Soni Vishvesh Badheka Pankaj Sahlot
P83	Experimental investigation of mechanical properties for wrought and selective laser melting additively manufactured SS316L and MS300	Meet Gor Harsh Soni Gautam Singh Rajput Pankaj Sahlot
P81	Topology Optimization and Hybrid Deposition Technique for Additive Manufacturing of a Brake Caliper	Shubham Sharma Krunal Mehta
P82	Use of Heat Transfer Search Algorithm While Optimizing the Process Parameters Of ECDM To Machine Quartz Material	Aditya Nema Vivek Patel Abhishek Kumar Ashish B Jagani d
P85	A Critical Review on Thermal Spray Based Manufacturing Technologies	Ramesh K. Guduru Uttakantha Dixit Abhishek Kumar
P86	Investigation of mechanical and surface properties of additively manufactured AISi10Mg part produced through direct metal laser sintering	Harsh Soni Nandita Limbasiya Aryan Jain Sukhjeet Singh Gill Pankaj Sahlot
P92	Discrete Element Simulation of Bulk Granular Particle for Design Improvement	H. Patel A. Srivastava S. Srinivas Vinay Vakharia
P103	A Study on Triply Periodic Minimal Surfaces: A Case Study	Aarya Hitesh Patel Neel Jignesh Baxi Pavan Kumar Gurrala
P107	Exploring photogrammetry as an indirect route in Additive Manufacturing: A case study to print bio-metric splint	Amaan Shahana Anuj Gandhi Mann Parmar Honey Shah Pavan Kumar Gurrala



FACULTY

WEBINARS DELIVERED

Dr. Vishvesh Badheka delivered webinar on “Friction Stir Welding Process & Advancement” during Fronius Digital Internship Program organised by Fronius India Private Limited, Pune on 7th October 2021 (3-5pm).

Prof. S. S Kachhwaha delivered an online invited talk on “Exergy Analysis of Solar-Wind Hybrid System” on 29th October 2021 in an online webinar organized by the J C Bose University of Science and Technology YMCA, Faridabad Short Term Course on “Exergy Analysis in Industrial Applications” during 25th -29th October 2021.



PATENTS

The following Patents were published during the month of October 2021:

⇒ **Rajesh Patel**, “A System for Water Desalination”, 202021043090 A, 29th October 2021.
(It was filed on 5th October 2021).

⇒ Mihir Raval, Harsh Shama, Neh Pandya, Rutvik Ghiya, Harshil Pancholi, **Dr. Pankaj Sahlot**, “Axle Extenders for Electric vehicle”, Indian Design Patent, 347169-001, 8th October 2021.



FACULTY

ADMINISTRATIVE ASSIGNMENTS

Dr. Vishvesh Badheka took up the following administrative assignments during the month of October 2021:

- ⇒ Coordinated 1st International Conference on Additive Manufacturing and Advanced Materials (AM2–2021) held at PDEU during 4-6th October, 2021 (Detail report enclosed).
- ⇒ Attended the Department NBA meeting (Phase II) on 13th October 2021.
- ⇒ B. Tech (Automobile Engineering) curium related interaction with DG-PDEU held on 14th October 2021 followed with interaction with Mr M M Singh, CEO, IACE and his team on 21st October 2021. The discussion was to design Modules in connect with iACE, for our current 3rd Sem students. As an outcome of same, two modules on 'Geometric Modeling and Tolerancing' (4 hours) and 'Paint Shop' (9 hours) have been completed by our students at iACE
- ⇒ Attended B. Tech 2021 Orientation Program on 20th October 2021.
- ⇒ Coordinated the visit of Australian High Commission to the 3D metal printing facility at F001, on 21st October 2021.
- ⇒ Participated in the ISO Inspection visit to the workshop on 29th October 2021.

Dr. Manjeet Keshav conducted offline Mid-Semester Review of Seminar Topics and Project of final-year M. Tech (Design) students on 21 and 22nd October 2021. The review was coupled with as interaction session with the 1st year M. Tech (Design) students for better understanding for research work undertaken by faculties and students.

The following members had undergone extensive training of Metal 3D printer, installed recently in F block at PDEU campus

- ⇒ Dr. Jay Vora
- ⇒ Dr. Pavan Gurrala
- ⇒ Mr. Ruchir Soni
- ⇒ Dr. Pankaj Sahlot
- ⇒ Mr. Kshitij Acharya



Installation of 3D Printer



M. Tech Review and Interaction



FACULTY

ADMINISTRATIVE ASSIGNMENTS

Dr. M. B. Kiran took up the following administrative assignments during the month of October 2021:

- ⇒ successfully completed all ISO audit assignments. Internal and external audits during the month of October 2021 for the Department of Mechanical Department.
- ⇒ conducted an ISO Awareness Program for the Faculty and Staff of the Department of Mechanical Engineering (Online) on 28th October 2021. The main objective of this program were (1) to introduce ISO certification awareness (2) Significance of ISO 9001-2015 (3) ISO 9001-2015 standard and its components (4) Difference between ISO 9001-2015 and other standards (5) Process orientation (6) Process design and best practices.
- ⇒ organized a departmental level IQAC meeting in coordination with members Dr. Garlapati Nagababu, Dr. Pavan Gurrala, Dr. Rakesh Chaudhari, Dr. Ravi Kant and Dr. Pankaj Sahlot on 4th October 2021. The objective of the meeting was (i) Course file review (ii) Question paper review.
- ⇒ as a placement coordinator, held discussions, shared necessary information about PDEU, and invited with the following companies during the month of October 2021 for coming over to PDEU for the placement of our final year UG and PG students:
 - ◆ Electrotherm India Ltd
 - ◆ Roop Telsonic Ultrasonix Ltd
 - ◆ GMM Pfaudler Limited
 - ◆ Hindustan Dorr - Oliver Limited
 - ◆ Hitachi - Hirel
 - ◆ Phenix Creation Simplified
 - ◆ Rexroth Bosch Group
- ⇒ **Dr. M. B. Kiran, Dr. Krunal Mehta, Dr. Anirudh Kulkarni and Dr. Kishan Fuse** attended Orientation session on Laser Metal 3D Printing Facility at PDEU on 5th October 2021 from 10.30 am onwards.



FACULTY

PROFESSIONAL ACTIVITIES

Dr. Vishvesh Badheka took up the following Professional Activities during the month of October 2021:

- ⇒ As a member of the committee, attended the Promotion Review Process for officers from the Grade SO-F to SO-G level at Institute for the Plasma Research, held on 7th October 2021.
- ⇒ Attended IIW Baroda Baroda Executive Committee Meeting held on 23rd October 2021.

Dr. Vinay Vakharia coordinated Comprehensive Project Interview with Arvind Ltd. conducted for 6 months Industry Based Projects for B. Tech Mechanical Engineering final year students on 28th October 2021.

Dr. M. B. Kiran was invited as a reviewer for PhD thesis from Dr. Babasaheb Ambedkar Technological University, Lonere-Raigad, Maharashtra, India on 28th October 2021



VISITS (OUTSIDE PDEU)

Dr. Vishvesh Badheka visited the following places during the month of October 2021:

- ⇒ Sense Well and Umiya Engineering Solution, Vadodara on 12th October 2021.
- ⇒ Thermax Babcock & Wilcox Energy Solutions Pvt Ltd and Worley, Vadodara on 23rd October 2021
- ⇒ Interacted with Dr B J Chauhan, Associate Professor, Department of Metallurgical and Materials Engineering and Dr Akash Pandey, Assistant Professor, Department of Mechanical Engineering, The M .S. University on 23rd October 2021.

FACULTY

VISITS AT PDEU

Dr. Vishvesh Badheka coordinated the following visits at Welding Research Lab during the month of October 2021:

- ⇒ Mr. Nirmalkumar G Patel, Lecturer in Metallurgy Engineering, Dr. S. & S.S. Ghandhy College of Engineering & Technology, Surat on 1st October 2021.
- ⇒ Prof. Ankitkumar P Shah, Assistant Professor, Mechanical Engineering, SAL College of Engineering, Ahmedabad on 1st October 2021.
- ⇒ Mr. Tushar Thakar, Assistant Professor, LJ Institute of Engineering And Technology (LJIET) on 5th October 2021.
- ⇒ ISRO team visited welding research lab on 6th October 2021.
- ⇒ Mrs. Swati Patel, Assistant Professor, L.D. College of Engineering (LDCE) on 7th October 2021.
- ⇒ Mr Harshad Jadav and Mr V. N. Modi of Government Engineering College (GEC), Gandhinagar visited on 6th October 2021.
- ⇒ Extra Lab Session cum Hands on Training conducted for students of M. Tech Mechanical Engineering (Manufacturing Technology) (MTMM21 batch) during 25-28th October 2021 (10-1pm).



ISRO Team



FACULTY

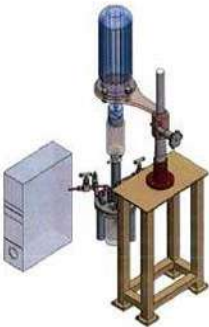
DC CONDUCTED

DC Review	Date	PhD Scholar	External Expert	Guide/Supervisor
Synopsis	21st October 2021	Subhash Sukhdev Das (17RME005)	Dr. Piyush Gohil, MSU Baroda	Dr. Jaykumar Vora
Comprehensive Exam	11th October 2021	Pushpendra Kumar Kushwaha (20RME011)	Dr. Divyang H. Pandya, LDRP-Institute of Technology and Research	Dr. Vinay Vakharia
Comprehensive Exam	11th October 2021	Kuldeep Narwat (20RME009)	Dr. Divyang H. Pandya, LDRP-Institute of Technology and Research	Dr. Abhishek Kumar



PATENT

Dr. Sukanta Kumar Dash, *Mr. Umang Kumar Soni* has been granted Design Patent titled “Multi-purpose stirred cell SS Reactor”, Application Number: 347170-001, Journal No is 41/2021.

DESIGN NUMBER	347170-001	
CLASS	23-03	
1. PANDIT DEENDAYAL ENERGY UNIVERSITY, RAISAN VILLAGE, GANDHINAGAR - 382007, GUJARAT, INDIA 2. DR. ANIRBAN DEY, ASSISTANT PROFESSOR, CHEMICAL ENGINEERING, PANDIT DEENDAYAL ENERGY UNIVERSITY, RAISAN VILLAGE, GANDHINAGAR - 382007, GUJARAT, INDIA 3. DR. SUKANTA KUMAR DASH, ASSISTANT PROFESSOR, CHEMICAL ENGINEERING, PANDIT DEENDAYAL ENERGY UNIVERSITY, RAISAN VILLAGE, GANDHINAGAR - 382007, GUJARAT, INDIA 4. MR. UMANG KUMAR SONI, LABORATORY ASSISTANT - MECHANICAL ENGINEERING, PANDIT DEENDAYAL ENERGY UNIVERSITY, RAISAN VILLAGE, GANDHINAGAR - 382007, GUJARAT, INDIA		
DATE OF REGISTRATION	02/08/2021	
TITLE	MULTI-PURPOSE STIRRED CELL SS REACTOR	
PRIORITY NA		

STUDENTS RECOGNITION

Team Destherman : **Rudra Ruparelia (18BME091) - Team Leader, Aarya Patel(18BME001) and Jay Tilwani (18BME036) - Team Member** participated in 5th edition of sustainability challenge organized during October 2021 by L’Oréal and Garnier with the main theme “to have a solution which may help L’Oréal and Garnier in their goal to stop using the virgin plastic by 2025”. Team was amongst the top 100 teams out of 4500+ teams participating nationally from various undergraduate and MBA universities of India. Additionally, the Team Destherman stood in the top 3 teams out of 500+ teams from the various engineering universities/ colleges of India.

L’Oreal Sustainability Challenge 2021	
Result	
Results displayed in alphabetical order of team name	
Team Name	Name / College
Sustainers	Kavyashree S Indian Institute of Management (IM), Kozhikode +2 Player(s)
Tachyon	Soumyaranjan Jena Faculty of Management Studies (FMS), University of Delhi, New Delhi +2 Player(s)
Tao	Kshitij Lokhande National Institute of Technology (NIT), Trichy +2 Player(s)
Team Achievers	BARSAGADE BHAGYASHREE Indian Institute of Management (IM), Rohtak +2 Player(s)
Team Bibhitaki	Yatharth Yadav Symbiosis Centre for Management and Human Resource Development (SCMHRD), Pune +2 Player(s)
Team Brainiacs	Tejas Joshi Jamnalal Bajaj Institute of Management Studies (JBIMS), Mumbai +2 Player(s)
Team Daredevil	Shubham Gupta K J Somaiya Institute of Management (KJ SIM), Mumbai +2 Player(s)
Team Deadpool	Supratik Sinha Xavier School of Management (XLSM), Jamshedpur +2 Player(s)
Team Destherman	Rudra Ruparelia Pandit Deendayal Petroleum University (PDPUI), Gandhinagar +2 Player(s)
Team GOAT	Aarya Patel Pandit Deendayal Petroleum University (PDPUI), Gandhinagar
Team Mustang	Jay Tilwani Rajeshbhai Pandit Deendayal Petroleum University (PDPUI), Gandhinagar

STUDENTS RECOGNITION

Team Sovereign

TEAM SOVEREIGN has secured AIR 4 in the presentation round in preliminary round of BAJA SAEINDIA 2021-2022 in the eBAJA category.

Faculty Advisors

Mr. Rahul Deharkar and Dr. Alok Jain

Rudra Ruparelia (18BME091),
Captain,
Nidhi Padalia (18BEE061),
Vice-Captain,
Neel Baxi (18BME065),
Manager,
Aarya Patel (18BME001),
Advisor
Dhanraj Patel (18BME015),
Advisor
Deep Patel (18BME012),
Advisor

Members

Ankur Lal (20BME106),
Bhawani Singh (20BME146D),
Harsh Raval (20BME102),
Meet Lakhani (20BME035),
Prashant Shah (20BME003),
Siddharth Soni (20BME061),
Smit Patel (20BME059),
Utsav Talaviya (20BME065)
 Aayash Mishra (20BEE065)
 Dhruv Odedra (20BEE033)
 Harshil Solanki (20BEE011)
 Harshvardhan Gaikwad 20BEE017)
 Vrinda Dadheech (20BEE044)
 Vishal Gandhi (20BEE095D)

Additionally, Team Sovereign secured 1st rank in the state (Gujarat) in the presentation round and 2nd rank in the state (Gujarat) in the quiz round as well as for the complete preliminary round of BAJA SAEINDIA 2021-2022.



STUDENTS PUBLICATIONS JOURNAL

The following journal papers were published by the students during the month of October 2021 :

⇒ **Raghavendra Darji, Vishvesh Badheka**, Kush Mehta, Jaydeep Joshi, Ashish Yadav, Arun Kumar Chakraborty, “Investigation on stability of weld morphology, microstructure of processed zones, and weld quality assessment for hot wire gas tungsten arc welding of electrolytic tough pitch copper”, *Materials and Manufacturing Processes* (2021). Published online:18th October.

<https://www.tandfonline.com/doi/full/10.1080/10426914.2021.1981931?src=>

⇒ **Meet Gor, Harsh Soni, Vishal Wankhede, Pankaj Sahlot**, Krzysztof Grzelak, Ireneusz Szachgluchowicz and Janusz Kluczyński, A Critical Review on Effect of Process Parameters on Mechanical and Microstructural Properties of Powder-Bed Fusion Additive Manufacturing of SS316L, *Materials* 2021, 14, 6527. <https://doi.org/10.3390/ma14216527>

WEBINAR ATTENDED

Sanjay Ranjan Tiwari (21RME003) participated in Webinar on “Applications of Boundary Element Methods to Water Wave Problems” (ABEMWWP) organized by the Department of Mathematics, School of Technology, Pandit Deendayal Energy University, Gandhinagar, Gujarat on 23rd October 2021.

Sanjay Ranjan Tiwari (21RME003) completed the course “Foundations of Computational Materials Modelling with a consolidated score of 47% during July-October 2021 (12 week course). He was amongst the total of 10 candidates who certified in this course.

STUDENTS WEBINAR ATTENDED

The following activities were attended by the students at ‘International Automobile Centre of Excellence (iACE)’ coordinated by **Dr. Krunal Mehta**:

⇒ Skill Development program for current B.Tech. Sem-3 (Automobile Engineering) Students:

- ◆ Paint Shop (9 hours)
- ◆ Geometric Dimensioning and Tolerancing (4 hours)

⇒ Lab for ‘Automotive Chassis and Components’ (Sem-4) will be conducted at iACE





**1st International Conference on
Additive Manufacturing and
Advanced Materials
(AM²-2021)**

Program Report

04-06 October, 2021

**School of Technology,
Pandit Deendayal Energy University
(Pandit Deendayal Petroleum University)
Gandhinagar, Gujarat, India**

An Overview of the Conference

The 1st International Conference on Additive Manufacturing and Advanced Materials (AM²-2021) was held at Pandit Deendayal Energy University (formerly Pandit Deendayal Petroleum University) during 4th-6th October 2021 organized by the Office of Dean (R&D) and IQAC Cell, PDEU. It was a platform to the researchers across the globe to come forward from multidisciplinary areas of Additive Manufacturing and Advanced Manufacturing. Industry personnel, academicians, research scholars and students working in the domain of mechanical, electrical, civil, chemical, computer science, information and communication technology, petroleum engineering as well as basic sciences contributed and presented their work in the conference.

The conference was convened by Dr. Vishvesh Badheka and Co-convened by Dr. Dr. Pankaj Yadav, Dept. of Solar Energy, Dr. Swapnil Dharaskar, Dept. of Chemical Engg., Dr. Amit V. Sant, Dept. of Electrical Engg. and Dr. Paawan Sharma, Dept. of ICT under the able guidance of Dr. Anirbid Sircar, Dean R&D making this conference a multi-disciplinary event.

A total number of 115 papers were received from all over the world of which 66 were from PDEU, 83 from Gujarat, 17 from outside. Out of 115 papers 93 papers were accepted with minor/major revisions and approved for presentation. 83 papers were presented during the three days.

The accepted and presented papers shall be submitted to Materials Today (Scopus indexed) proceedings as per the format and requirements for publication.

The conference was arranged in a hybrid mode.

Conference Schedule

Date	Time	Function
4 th October 2021, Day 1	11:00 AM – 12:25 PM	Inaugural Function
	12:25 PM – 12:45 PM	Distinguished Talk
	12:45 PM – 1:25 PM	Keynote Address
	2:25 PM – 3:20 PM	Expert Talk
	4:00 PM – 5:00 PM	Parallel Oral Sessions
5 th October 2021, Day 2	09:30 AM – 10:40 AM	Keynote Address
	11:00 AM – 5:00 PM	Parallel Oral Sessions
6 th October 2021, Day 3	09:30 AM – 5:00 PM	Parallel Oral Sessions
	5:00 PM – 6:00 PM	Valedictory Session

DAY 1: 4th October 2021

Summary of Inauguration

The inauguration for the Conference was held on 4th October 2021 at PDEU Auditorium. PDEU also proudly launched an Additive Manufacturing Facility (3D Printer) as one of the 'Atmanirbhar Bharat' Initiative which was inaugurated just before the conference.

The inauguration ceremony was hosted by Dr. Shakti Mishra and Dr. Namrata Bisht. PDEU was delighted to have on the dais Hon'ble Governor Shri of Gujarat "Shri Acharya Devvrat ji", Hon'ble Minister of Education, Shri Jitendra Vaghani ji, Hon'ble Minister for State, Higher and Primary Education Shri Kuberbhai Dindor ji which started with the Urja Stuti followed by Lightening of the Lamp and felicitation of the honorable guests with Mementos. PDEU was pleased to hear the Welcome Address by DG-PDEU, motivating address from Hon'ble Minister of Education, Hon'ble Governor Shri of Gujarat and Vote of Thanks by Director-SoT who put forth their views for the conference and the way ahead. The event was concluded with National Anthem.

Many eminent personalities were a part of the inauguration ceremony along with delegates from various fields. The Guests for the event were as follows:

1. **Dr. G. Satheesh Reddy**, Secretary, Department of Defence R&D and Chairman, Defence Research and Development Organisation (DRDO)
2. **Prof. Chaitanyamoy Ganguly**, Distinguished Professor, PDEU
3. **Dr. S. K. Jha**, Chairman & Managing Director, Mishra Dhatu Nigam Limited (Online)
4. **Dr. Dinesh Srivastava**, Chairman & Chief Executive, Nuclear Fuel Complex, Hyderabad (Online)
5. **Mr. Pradeep Nair**, Vice President, Intech Additive Solutions, Bengaluru
6. **Mr. Virendra Kumar Gupta**, Head R&D Polymer and Senior Vice President at Reliance Industries Limited, Navi Mumbai (Online)
7. **Er. Kaushal Chovatiya**, Director, Hi-Bolt Industries Pvt Ltd

Distinguished Talk

The second phase of the inaugural ceremony started with a brief introduction to Dr. G Satheesh Reddy, Secretary, Dept of DRDO followed by an address from him through video lecture. The distinguished guests and delegates were invited to the dais followed by felicitation with memento and shawl.

The audience were benefitted with distinguished talk by Prof. Chaitanyamoy Ganguly, a renowned nuclear metallurgist in the nuclear energy community in India and abroad and recipient of the first Indian Nuclear Society Award from the Honorable Prime Minister of India the Late Shri Atal Behari Bajpei in 2001 and was conferred the "Padmashri" in 2002 by the Honorable President of India. He explained about "Advanced Nuclear Fuels and Potential of Additive Manufacturing for Fabricating Structural Components of Nuclear Fuel Assembly" which are the crucial areas in recent time for the researchers.

Keynote Address

After the distinguished talk, the listeners had a knowledge filled keynote address from Dr. S. K Jha, Chairman & Managing Director who has more than 27 years of experience with DAE involved in technology development for processing of nuclear materials for India's Nuclear Power program and strategic materials used in Missile, Space and Defense projects. The talk was delivered through the online mode in the area of his expertise in such a way that all the research scholars and students of every branch can understand the application easily.

Another eminent person addressed the participants - Dr. Dinesh Srivastava, Chairman & Chief Executive, Nuclear Fuel Complex, Hyderabad who has contributed exclusively in the development of advanced structural materials of extreme strategic value for Nuclear Energy program in India. The address was done via online platform on the topic ""Advances in Materials and Manufacturing Technologies for Strategic Applications".

Expert Talk

Other than the above, there were three Expert Talks by the Industry Personnel Mr. Pradeep Nair from Intech Additive Solutions, Bengaluru on the topic: "Fostering Aatmanirbhar Bharat in Additive Manufacturing", Mr. Virendra Kumar Gupta from Reliance Industries Limited, Navi Mumbai through Virtual mode who talked about "Advanced Polyolefin Material for Additive Manufacturing" and Mr. Kaushal Chovatiya from Hibolt Pvt Ltd. They shared their experience and views about the conference in addition to their support for the same. They delivered the talk covering the practical problems with industrial perspective.

Parallel Oral Sessions

Post the inaugural function, the parallel technical sessions started at three places physically at E-201, 202 and 203 and online through MSTeams Platform. The participants were given total time of 15 minutes: 10 minutes for the presentation and 5 minutes for the question-answers. The Papers were displayed as Oral Presentations by the presenting authors in presence of the Session Chairs and Technical Coordinator. The sessions were supported by the Lab Staff for smooth functioning.

9 papers with were presented in total by internal as well as external authors under both the tracks Additive Manufacturing and Advanced Materials.

The sessions were Chaired by Dr. Surendrasingh Kachhawaha, Dr. Bharat Parekh and Dr. Dhruvesh Patel and technically coordinated by Dr. Krupal Mehta, Dr. Balamurli Mayya and Ms Mrunalini Rana.

Paper IDs Presented: P5, 72,20,106,69,67,13,14 and 15.

The schedule of the inauguration function was as follows:

Time	Activity
11:00 AM- 11:05 AM	Chief Guest Reception at C-Block Foyer PDEU by DG, Registrar and Directors
11:05 AM- 11:20 AM	Visit to Translational Research Center , To Inaugurate The laser 3D Metal Printer
11:20 AM- 11:25 AM	Reach PDEU Auditorium
11:25 AM- 11:30 AM	Urja Stuti
11:30 AM- 11:32 AM	Lighting of the Lamp
11:32 AM- 11:35	Felicitation of Hon'ble Governor Shri of Gujarat " Shri Acharya Devvrat ji " (By Director General,PDEU), Hon'ble Minister of Education, "Shri Jitendra Vaghani ji" (By Director SOT, PDEU), Hon'ble Minister for State, Higher and Primary Education "Shri Kuberbhai Dindor ji" (By Director SPT- PDEU))
11:35 AM-11:40 AM	Welcome Address by Director General, PDEU
11:40 AM-11:45 AM	Address by Hon'ble Minister of Education
11:45 AM-12:00 Noon	Address by Hon'ble Governor Shri of Gujarat "Shri Acharya Devvrat ji"
12:00 Noon -12:02 PM	Vote of Thanks by Director SOT, PDEU
12:02 PM- 12:03 PM	National Anthem
12:03 PM - 12:05 PM	Brief Profile of Dr. G. Satheesh Reddy, Secretary, Department of Defence R&D and Chairman, Defence Research and Development Organisation (DRDO)
12:05 PM- 12:15 PM	Address by Shri Dr. G. Satheesh Reddy, Video Lecture
12:15 PM- 12:20 PM	Invitation to Dais {Prof. Chaitanyamoy Ganguly- Distinguished Professor, PDEU, Dr. S. K. Jha, Chairman & Managing Director, Mishra Dhatu Nigam Limited, Dr. Dinesh Srivastava, Chairman & Chief Executive, Nuclear Fuel Complex, Hyderabad, Mr. Pradeep Nair, Vice president, Intech Additive Solutions, Bengaluru, Mr. Virendra Kumar Gupta, Head R&D Polymer and Senior Vice President at Reliance Industries Limited, Navi Mumbai}
12:20 PM - 12:25 PM	Felicitation of Distinguished Guests and Delegates
12:25 PM- 12:45 PM	Distinguished Talk by Prof. C. Ganguly
12:45 PM- 1:05 Pm	Keynote Address by Dr. S.K. Jha, Chairman & Managing Director, Mishra Dhatu Nigam Limited, Hyderabad
1:05 PM -1:25 PM	Address by Dr. Dinesh Srivastava, Chairman & Chief Executive, Nuclear Fuel Complex, Hyderabad
2:25 PM- 2:45 PM	Expert Talk By Mr. Pradeep Nair, Vice president, Intech Additive Solutions, Bengaluru
2:45 PM - 3:10 PM	Expert Talk By Mr. Virendra Kumar Gupta, Head R&D Polymer and Senior Vice President at Reliance Industries Limited, Navi Mumbai (Virtual)
3:10 PM - 3:20 PM	Talk by Mr.Kaushal Chovatiya, Hibolt Pvt Ltd
4:00 PM - 5:00 PM	Parallel Oral Sessions Session 1 Session 2 Session 3

The Photo summary of the occasion is as follows:



Photo 1. Chief Guest Reception at C-Block Foyer PDEU by DG, Registrar and Directors



Photo 2. Visit to Translational Research Center , To Inaugurate The laser 3D Metal Printer



Photo 2. Visit to Translational Research Center , To Inaugurate The laser 3D Metal Printer



Photo 3. Arrival at PDEU Auditorium



Photo 4. Urja Stuti



Photo 5. Lighting of the Lamp



Photo 6. Felicitation



Photo 7. Welcome Address by Director General, PDEU



Photo 8. Address by Hon'ble Minister of Education



Photo 9. Address by Hon'ble Governor Shri of Gujarat "Shri Acharya Devvrat ji"



Photo 10. Vote of Thanks by Director SOT, PDEU



Photo 11. National Anthem



Photo 12. Invitation to Dais



Photo 13. Felicitation of Distinguished Guests and Delegates



Photo 14. Distinguished Talk by Prof. C. Ganguly



Photo 15. Keynote Address by Dr. S.K. Jha, Chairman & Managing Director, Mishra Dhatu Nigam Limited, Hyderabad



Photo 16. Address by Dr. Dinesh Srivastava, Chairman & Chief Executive, Nuclear Fuel Complex, Hyderabad



Photo 17. Expert Talk By Mr. Pradeep Nair, Vice president, Intech Additive Solutions, Bengaluru



Photo 18. Talk by Mr. Kaushal Chovatiya , Hibolt Pvt Ltd





Photo 19. Some More Glimpses of Inauguration



Photo 20. Parallel Oral Sessions

Day 2: 5th October 2021

The second day started with the enthusiastic Keynote Address by Dr. Anand Gupta, Executive Director at Oil and Natural Gas Corporation Ltd and ADG (Dev) DGH, Ahmedabad. The address was done through the virtual mode. He discussed about on “Indian Oil & Gas Industry – Scenario in coming decades”. He gave a futuristic vision to the beneficiaries.

There was another Keynote Address by Dr. U. Chandrashekhar, Program Director – Addwize, Advanced Technology Centre, Wipro 3D Bangalore. His lecture was also delivered virtually. The content of the speech was “Industrial Applications of laser powder bed fusion based additive manufacturing and essentiality of process optimization for ensuring structural integrity”. It was an important lecture and presentation.

After the Keynote Sessions, the parallel technical sessions started at three places physically at E-201, 202 and 203 and online through MSTeams Platform as earlier. The participants were given total time of 15 minutes: 10 minutes for the presentation and 5 minutes for the question-answers. The Papers were displayed as Oral Presentations by the presenting authors in presence of the Session Chairs and Technical Coordinator. The sessions were supported by the Lab Staff for smooth functioning.

40 papers were presented in total by internal as well as external authors under both the tracks Additive Manufacturing and Advanced Materials. The sessions were Chaired by "Prof Vishvesh Badheka, Dr Manoj K Pandey, Dr. Debasis Sarkar, Dr. Pavan Kumar Gurrala, Dr. Manish Sinha, Dr. Anurag Kandya, Dr. M.B. Kiran, Dr. Ashish Unnarkat, Dr. Brajesh Kumar Jha, Dr. Vinay Vakharia, Prof. Rajib Bandyopadhyay, Dr. Praghnesha Bhatt and technically coordinated by Dr Anirudh Kulkarni, Khayati Mistry, Arohi Ankit Bhadiyadra, Dr. Krunal Mehta, Mr. Tushar Patil, Arohi Ankit Bhadiyadra, Mrunalini Rana, Ms. Komal Desai, Dr. Pritam K., Dr Krunal Mehta, Krunal Parekh, Mr. Sagar.

Paper IDs Presented: P7, 21, 22, 37, 42, 43, 17, 74, 108, 36, 45, 46, 53, 51, 77, 95, 98, 88, 100, 87, 54, 73, 81, 105, 1, 49, 76, 59, 39, 31, 82, 83, 85, 27, 28, 29, 11, 34, and 84.



Photo 21. Parallel Oral Sessions

Day 3: 6th October 2021

Parallel Sessions

The third and final day of the conference was dedicated to the parallel Oral Sessions which continued for the whole day. 34 papers were presented in total by internal as well as external authors under both the tracks Additive Manufacturing and Advanced Materials. The participants were given total time of 15 minutes: 10 minutes for the presentation and 5 minutes for the question-answers. The sessions were Chaired by Dr. Anurag Mudgal, Dr Anirban Das, Dr Praghmesh Bhatt, Dr Poonam Mishra, Dr Nitin K Chaudhari, Dr Md Ansari, Dr. Surendra Singh Kachhwaha, Dr Satyam Shinde, Dr. Abhijit Ray, Dr. Abhishek Kumar, Dr Manoj Kumar Pandey, Dr. Bhasha V. and technically coordinated by Dr Krunal Mehta, Hardik Koshti, Dr. Dishant Pandya, Dr. Pritam K., Krunal Parekh, Dr. Dishant Pandya, Dr Anirudh Kulkarni, Dr. Ankur Solanki, Mr. Sagar, Dr. Krunal Mehta, Hardik Koshti, Mr. Sagar.

The sessions included 2 Oral Presentation from Dr. Jigish M Patel from SAC, ISRO.

Paper IDs Presented: P86, 91, 103, 107, 32, 90, 89, 102, 63, 109, 35, 52, 60, 96, 26, 18, 19, 79, 70, 94, 6, 44, 48, 99, 101, 40, 41, 75, 113, 114, 78, 61, 65, 93.

Valedictory Session

The Conference was concluded with a valedictory function arranged at E-201 on 6th October 2021 after the parallel sessions. The session started with a welcome and thanks giving speech by Dr. Vishvesh Badheka, Convener of the Conference. He invited a few authors to share their experience during the conference including internal and external participants from SAC ISRO. There was also a sharing of the views from Session Chairs and Dr. Anirbid Sircar, Dean R&D who gave an overview of the Conference during these 3 days as well as the efforts made by the teams involved in the success of the same. The valedictory session was motivational words from DG sir.



Photo 22. Parallel Oral Sessions



Photo 23. Welcome Address by Dr. Vishvesh Badheka



Photo 24. Experience Sharing by Authors



Photo 25. Remarks from Session Chair and Dr. Anirbid Sircar



Photo 26. Concluding Speech by DG sir