

Curriculum Vitae

Name: **Dr. Madhukar Shivling Tandale**

Correspondence Address: Department of Mechanical Engineering
Dr. Babasaheb Ambedkar Technological University
PO: Lonere, Tal.: Mangaon
Dist.: Raigad, Maharashtra
Pin 402 103

Phone (+91 2140) 275142 (O)

Fax (+91 2140) 275142

Mobile 94 232 15468

Date of Birth: 29th February 1964

ACADEMIC QUALIFICATIONS

| Institute / University | Degree | Year | Class | Field of Specialization |
|--|----------------|-------------|--------------|--|
| College of Engineering, Pune 411 005 (COEP) | B.E. (Mech) | 1987 | First | Mechanical Engineering |
| IITBombay, Mumbai | M.Tech. | 1993 | 8.55 CPI | Thermal & Fluids Engineering |
| IITBombay, Mumbai | Ph.D. | 2005 | -- | Heat Transfer / Heat Exchangers /Waste Heat Recovery |

TEACHING EXPERIENCE (starting from present position)

| Institute / University | Designation | Period |
|--|--------------------------|--------------------------|
| Dr. Babasaheb Ambedkar Technological University, Lonere | Professor (under CAS) | Since 21/10/2005 |
| Dr. Babasaheb Ambedkar Technological University, Lonere | Assistant Professor | 19/08/1995 to 20/08/2005 |
| Vishwakarma Institute of Technology, Pune | Lecturer | 03/03/1993 to 14/08/1995 |
| Pravara Rural Engineering College, Loni | Lecturer | 14/02/1989 to 22/07/1991 |

PUBLICATIONS

Patents

| Sr. | Details of Patent | Status/Patent No. | File Number | Valid with effect from |
|-----|---|---|---|------------------------|
| 1 | Rane, Milind V and Tandale, Madhukar S Title: Tube-Tube Heat Exchangers | Granted & Commercialized. Patent grant No. 205362 | Indian Patent No. 1082/MUM/2002 | 3-12-2002 |
| 1* | Rane Milind V and Tandale Madhukar S, Title: Tube-Tube Heat Exchangers | PCT Granted. Publication No. WO/2004/051168, 17-06-2004 | International Application No.: PCT / IN 03 / 00377, 3-12-2003 | 3-12-2002* |
| 2 | Ankolekar Vinay V. and Madhukar S Tandale, Vortex Connector Apparatus | Filed and yet to be examined | Indian Patent Application No. 1741/MUM/2010 | 8-06-2010** |

*PCT application was filed for the patent in serial number #1 for getting priority.

**Validity will be confirmed after the grant of patent.

Referred International Journals

| Sr. | Title of paper | Authors | Publisher/Details | Date of Acceptance/ Publication |
|-----|---|---|---|---------------------------------|
| 1 | Water-to-water heat transfer in tube-tube heat exchanger: experimental and analytical study | Milind V Rane & Madhukar S. Tandale | International Journal of Applied Thermal Engineering ELSEVIER 25 (2005) 2715-2729. | 5-01-2005/ January 2005 |
| 2 | Experimental Investigations on heat transfer and frictional characteristics of a turbulator roughened solar air heater duct | Santosh B Bopche & Madhukar S Tandale | International Journal of Heat Mass Transfer, IJHMT 52 (2009) 2834-2848 | 9-09-2008/ 13-02-2009 |
| 3 | Heat Loss Characterization from Solar Concentrator Receiver – A Review” paper published in | Milind S Patil, M. S. Tandale, Ajay G Chandak, | International Journal of Engineering Science and Technology, Vol. 2(12), 2010, 7531-7539, | December 2010. |
| 4 | Blends of Jatropha and Karanja Bio-diesels for diesel engine applications | Ganesh Shirsath, M. S. Tandale, S. V. Khandal, G Suresh, N. R. | International Journal of Sustainable Engineering, Taylor & Francis, Vol. 5, No. 3, 252–264 | 11-12-2011/ January 2012 |

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|----|---|---|--|--|
| | | Banapurmath, V. S. Yaliwal&P. G. Tiwari | | |
| 5 | Effect of injection timing, injector opening pressure and nozzle geometry on the performance of a compression ignition engine operated on non-edible oil methyl esters from different sources, Paper published in | S.P. Wategave, M.S. Sawant, M.S. Tandale , G. Suresh, V.S. Yaliwal, N.R. Banapurmath & P.G. Tewari | <i>International Journal of Sustainable Engineering'</i> Taylor & Francis , Vol 7, No. 1, 71-81,January 2013. | Paper published 9-01-2013 Vol 7, No. 1, 71-81,January 2013. |
| 6 | Multi-objective performance optimization of CI engine operated on Mangifera Indica Biodiesel by applying Taguchi grey relational analysis' paper Published | Sangram D. Jadhav and Madhukar S Tandale | International Journal 'Waste and Biomass Valorization' Springer DOI 10.1007/s12649-016-9504-6 | Paper published 20-02-2016/ 10-03-2016 |
| 7 | Part load and full load multi-objective performance optimization of single-cylinder diesel engine operating on Mangifera Indica Biodiesel as a Biofuel Published | Sangram D. Jadhav and Madhukar S Tandale | International Journal 'Biofuels', Taylor and Francis http://dx.doi.org/10.1090/17597269.2016.1249740 | Paper accepted for publication on 27-09-2016 Published in 2018 Volume 9, No.1, 29-44 |
| 8 | Optimization of transesterification process using homogeneous & nano-heterogeneous catalysts for biodiesel production from Mangifera Indica oil Published | Sangram D. Jadhav and Madhukar S Tandale | International Journal 'Environmental Progress and Sustainable Energy' Wiley Online | Paper Published Volume 37, Issue 1 15, January 2018 Pages 533–545 |
| 9 | Equal-weightage based multi-objective optimization of CI engine performance on Mango Seed Oil Methyl Ester | Sangram D. Jadhav and Madhukar S Tandale | Paper under review process in 'Renewable Energy Focus', Elsevier | Paper communicated on 25 July 2017 and under review process |
| 10 | Application of Taguchi based Grey Relational Analysis (TGRA) and Simple Additive Weighting (SAW) Method for Performance Optimization of CI engine operated on Mahua Biodiesel" | Sangram D. Jadhav and Madhukar S Tandale | Paper under review process in 'Biofuels', Taylor & Francis ,TBFU | Paper communicated July 2017 and under review process |

Papers Presented/Published in Proceedings of International Congress/Conferences:

| S r. | Title of paper | Authors | Conference/Place | Period |
|-------------|---|---|--|--------------------------------|
| 1 | Benefits of superheat recovery on chillers-case study for a hotel installation | Rane, M V and Tandale, M S | <i>21st IIR International Congress of Refrigeration</i> , and included in the Conference Proceedings, Washington, DC, | August, 17-22, 2003. |
| 2. | Tube-Tube Heat Exchanger for Heat Recovery from Engine Cooling Circuit: Water Heating and Space Heating Applications. Paper presented. | Rane, M V, Tandale, M S and Vidyapati Tiwari | <i>International Conference on Sustainable Habitat for Cold Climates</i> , and included in the Conference Proceedings, Leh, Srinagar, INDIA, | September, 16-18, 2004 |
| 3. | Performance Evaluation of Low-cost Domestic Parabolic Solar Cooker, Paper presented | Khandekar T N and Tandale M S , | ' <i>Third International Green Energy Conference</i> ' Vasteras, Sweden, | 17-21 st June 2007. |
| 4. | Performance Evaluation of Low-cost Domestic Parabolic Solar | Khandekar T N and Tandale M S , | <i>Third International Conference on Thermal Engineering: Theory and Applications</i> ', Amman, Jordan, | 21-23 rd May 2007. |

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| | Cooker, paper published in the proceedings | | | |
| 5. | 'Design of heat exchanger for waste heat recovery from producer gas', paper accepted and included in conference proceedings. | Joshi Sandeep and Madhukar Tandale | International Conference on Heat and Mass Transfer (HMT 08) and included in the conference proceedings, at Acapulco, New Mexico | January 25-27, 2008 |
| 6. | Study on Heat Transfer Enhancement in Solar Air Heater' paper presented. | Bopache Santosh and Tandale M S | International Conference on Advances in Energy Research' and included in the conference proceedings, at IIT Bombay, Mumbai. | 12-14 December 2007 |
| 7. | Energy Efficient Three-in-One System for Air conditioning, Water Heating and Water Cooling' paper accepted for inclusion in proceeding. | Madhukar S Tandale and Pramod G Patole | International Conference on Energy Engineering and Eco-balance (ICEEE 2009), MITR, Pune and included in the conference proceedings. | 16-18 February 2009 |
| 8. | 'Energy Efficient | Madhukar S Tandale, | International Conference on Energy Engineering (ICEE 2009), PEC Pondicherry, | 7-9 January |

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|-----|--|--|---|--------------------|
| | Household Refrigerator-cum-Water Heater' paper presented in Conference | Siddharth Waghmare and Swapnil Deshmukh, | | 2009. |
| 9. | Recent Trends in Solar Desalination. Paper presented | Madhukar S Tandale and Ramanathan V | International Conference on Energy Engineering (ICEE 2009), PEC Pondicherry, | 7-9 January 2009. |
| 10. | A Comprehensive Study of Biodiesel as an Alternative Fuel for CI Engine' Paper presented. | Sachin B. Bansode, Abhishek S. Chavan, Madhukar S.Tandale | International conference on ALTERNATIVE FUELS FOR I.C. ENGINES (Published in Proceedings: ISBN: 978-81-924029-8-7) held MNIT, Jaipur, INDIA | 6-8 February 2013. |
| 11. | A Comprehensive Study of Biodiesel as an Alternative Fuel for CI Engine' presented and published in proceedings. | Sachin B. Bansode, Abhishek S. Chavan, Madhukar S.Tandale | International Conference on BIOENERGY, ENVIRONMENT & SUSTAINABLE TECHNOLOGIES (Published in Proceedings: ISBN: 978-81-926424-0-6) held at Arunai Engineering College, Tiruvannamalai, Tamilnadu, INDIA during | 27-30 Jan 2013. |
| 12. | Performance of three-in-one system for | P.G Patole, M.S Tandale | International Conference on Advances in Mechanical Engineering at CoE Pune. | 29-31 May 2013 |

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| | air conditioning, water heating & water cooling applications, Paper presented. | | | |
| 13. | “Effect of Cooled Exhaust Gas Recirculation (EGR) on Performance-Emission Characteristics of CI Engine with Cotton Oil Methyl Ester Blends” Paper presented. | S.P.Wategave, M.S. Tandale, M.S. Sawant, N.R.Banapurmath, | <i>International Conference on Advances in Mechanical Engineering</i> ’ at CoE Pune. | 29-31 May 2013. |
| 14. | A review of Soar Cooking using Latent Heat Storage” paper presented in Proceedings Applied Mechanics and Materials, Vol 592-594 (2014). Paper presented. | Bhagwat Gore, Madhukar Tandale | “International Mechanical Engineering Congress 2014” organised by NIT Tiruchirapalli, TN. | 13-15 June 2014. |
| 15. | A review of | Sagar Sarode, | “International Mechanical Engineering Congress 2014” organised by NIT Tiruchirapalli, TN during | 13-15 June |

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| | Performance & Emission Studies on CI Engine using Cotton Seed Oil Biodiesel” paper presented in | Madhukar Tandale | | 2014. |
| 1 6. | Material Characterization of Envelope Fabrics for Lighter-Than-Air Systems” presented and published in Proceedings. | Bhushan S. Sonawane, Marvin A.F. Fernandes, Varun Pant, Madhukar S. Tandale , Rajkumar S. Pant | International Colloquium on Materials, Manufacturing & Metrology 2014” Department of Mechanical Engineering, IIT Madras, Chennai during | 8-9 August 2014. |
| 1 7. | Performance of CI Engine using Simarouba Biodiesel with Varying Compression Ratio, Injection Opening Pressure & Nozzle-Hole Geometry, paper published in the proceedings. | Bharat Aher & Madhukar Tandale , | International Symposium on Aspects of Mechanical Engineering & Technology for Industry” NERIST, Itanagar, AP. | 6-8 December 2014 |

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|-----|---|---|--|---------------------|
| 18. | "Effect of Variable Compression Ratio on CI Engine Performance Using Cotton Seed Oil Biodiesel and Its Blends", paper published in the proceedings of | Sagar Sarode & Madhukar Tandale, | International Symposium on Aspects of Mechanical Engineering & Technology for Industry" NERIST, Itanagar, AP during | 6-8 December 2014. |
| 19. | A Review on Passive Techniques of Heat Transfer Enhancement", paper presented & published in the proceedings. | Ninad Patil & Madhukar Tandale, | International Conferences in Industrial, Mechanical & Production Engineering: Advancements & Current Trends" Mechanical Engineering Department, MANIT Bhopal. | 27-29 November 2014 |
| 20. | Biodiesel (Mangifera Oil Methyl Ester) derived from triglycerides of Mangifera Kernel seed & leaves oil by using heterogeneous catalyst, paper published | Sangram D Jadhav & Madhukar S Tandale, | Proceedings of SAE2015 World Congress & Exhibition 's scheduled in Detroit, Michigan, USA. | April 21 - 23, 2015 |

| | in the proceedings. | | | |
|-----------------------|---|---|---|-------------------|
| 2 1. | Optimization of Extraction Process Using N-Hexane Solvent for Mangifera Indica Oil Production from Mangifera Indica Curcas, paper accepted for poster presentation. | Sangram D Jadhav & Madhukar S Tandale, | 'SAE 2016 World Congress and Exhibition'scheduled inDetroit,Michigan,USA. | April12 - 14,2016 |
| 2 2. | Multi-objective Optimization of performance (BSFC) and emission (NOx) characteristics for CI Engine operated on Mangifera Oil Methyl Ester using Taguchi grey relational analysis' paper accepted for publication in proceedings | Sangram D Jadhav & Madhukar S Tandale, | SAE2016WorldCongress&Exhibition'scheduled during inDetroit,Michigan,USA. | April12 - 14,2016 |

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| | gs. | | | |
| 2 3. | Heat Transfer Augmentation of Helixchanger Using CFD, paper accepted for oral presentation in | Nikhil Raje, Madhukar Tandale & Manjunath C | <i>Sixth International Congress on Computational Mechanics and Simulation (ICCMS2016)</i> ' at IIT Bombay, India, organized by Department of Civil Engineering, IIT Bombay and Department of Structural Engineering, VJTI Mumbai | 27June – 1July 2016. |
| 2 4. | Optimization of performance & emission characteristics of CI engine operated on Mahua Biodiesel using Taguchi and Multi-regression Analysis, Paper presented (oral). | Madhukar S Tandale & Sangram D Jadhav | International Conference in Mechanical Engineering (ICME-2016) under 'World Congress on Engineering (WCE2016)' to be held at London, UK organized by IAENG. | 30 June to 1 July 2016 |
| 2 5. | Experimental Study on CI Engine Performance for Optimum Blending Ratio of Blended Kusum Biodiesel | Anil Poshetty and Madhukar S Tandale | International Conference on Advances in Energy Research (ICAER 2017) IIT Bombay, Mumbai | 12-14 Dec 2017 |

National Conference

Bhirud, N L and **Tandale, M S**, “Field Evaluation of Fixed-Focus Concentrator for Industrial Oven”, paper selected for presentation in *National Conference on Advances in Energy Research 2006*, IIT Bombay, Mumbai, 4-5th December 2006.

Invited Lectures Delivered

| Sr. | Topic of Expert Lecture | Place | Date | Remark |
|------------|---|---|---------------------------------|--------------------------|
| 1. | ‘Opportunities of Waste Heat Recovery in Refrigerators and Air Conditioners’ in STTP on ‘Advances in Refrigeration and Cryogenic Air Separation’ | College of Engineering, Pune (COEP) | 21 st November 2008. | STTP |
| 2 | Expert lecture given on “Education in Human Value: Essence and Challenges” at 3-day training program for Lab Assistants/Lab Technicians in during. | Dr. Babasaheb Ambedkar Technological University, Lonere | 16-18 February 2009 | Training Program |
| 3 | ‘Opportunities of Waste Heat Recovery in Refrigerators and Air Conditioners’ in the Seminar under MESH 2009 organized by MESA, | Fr. C Rodrigues Institute of Technology, Vashi on | 21 st February 2009 | Seminar |
| 4 | ‘Research opportunities through students projects: case studies’ | Amruitvahini College of Engineering Sangamner | 11 th Dec 2009 | Review of Research |
| 5 | ‘Opportunities of Waste Heat Recovery in Refrigerators and Air Conditioners’ in the 5 th National Level Workshop on ‘Recent Trends in Heat Exchangers’ | Walchand College of Engineering, Sangli | January 29-30 2010 | National Workshop |
| 6 | ‘Opportunities of Waste Heat Recovery in Refrigerators and Air Conditioners’ in the Workshop on ‘Refrigeration and Air Conditioning’ | Rajendra Mane College of Engineering and Technology, Devrukh during | August 21, 2010 | Workshop on RAC |
| 7 | Expert lecture given on ‘Opportunities of Waste Heat Recovery in Refrigerators and Air Conditioners’ in the | D Y Patil College of Engineering, Akurdi, Pune. | 29-30, July 2011 | National Workshop on RAC |

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| | National Workshop on 'Advances in Refrigeration and Air Conditioning' organized by | | | |
| 8 | 'Opportunities of Waste Heat Recovery in Refrigerators and Air Conditioners' in the STTP on 'Advances & Practices in Heating, Ventilation, Air-conditioning & Refrigeration' in the during | Department of Mechanical Engineering, Dr. Babasaheb Ambedkar Technological University, Lonere | January 8-12, 2013 | STTP |

Sessions Chaired in Intl/National Conferences

1. Chaired a session in during ICME2016 in '**World Congress on Engineering (WCE2016)**' held at Imperial College London, UK during 29-30 June and 1st July 2016.
2. Chaired a session on 'Sustainable Resource Management' in **International Conference on Advances in Mechanical Engineering (ICAME)** at College of Engineering, Pune during 29-31 May 2013.
3. Chaired a session on 'Automotive Alternative Fuels' in '**National Conference on Energy and Sustainable Development**' held at College of Engineering, Pune during 28-29 February 2012.

SHORT TERM COURSES / SEMINARS / CONFERENCES / WORKSHOPS

ATTENDED:

| Sr. | Title | Place | Conference/ Seminar/ Workshop | Period |
|-----|---|----------------------|-------------------------------------|----------------------|
| 1. | Participated in XXVII Annual Convention of ISTE and National Seminar on 'Global Interconnectivity for Technical Education in India. | MACT Bhopal | National Seminar | December 19-21, 1997 |
| 2 | Participated in the National Seminar on 'Physical Education and Sports' organized by. | University of Kerala | National Seminar | 25-27 June 1998 |
| 3 | Participated in the | Ministry of | Orientation | 5-7 November, |

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| | ‘Orientation Course on Youth Parliament’ | parliamentary affairs, GoI, New Delhi | Course | 1998 |
| 4 | Attended seminars on ‘Technology Day, Environment Day & Management Day’ | Automotive Trade Fair Pune (AUTO 98) during. | Seminar | 3-5 December 1998 |
| 5. | Participated in a seminar on ‘Synergogy’ organized and conducted by GRID | Dr. Babasaheb Ambedkar Technological University, Lonere | Seminar | 15-19 April 1999. |
| 6. | Participated in ‘Steam Engineering Program’ on the topic ‘Theory and practices in steam generation, distribution, Utilization and steam related energy conservation’ | Forbes Marshall Centre for Steam Engineering, Pune | Training Program | February 15-19 1999 |
| 7. | Participated in ‘ Indian Science Congress ’ held in Pune University during. | Pune | Indian Science Congress | 3-7 January 2000 |
| 8. | Participated in 18 th International Cryogenic Engineering Conference (ICEC-18) | IIT Bombay | International Conference | 22-26 February, 2000 |
| 9. | Participated 27 th National Renewable Energy Convention 2002 | IIT Bombay | National Conference | 30 th November to 2 nd December, 2000 |
| 10. | Participated in Workshop on ‘ Alternative Refrigerants and Cycles ’ organized jointly by IIT Bombay & NCL Pune sponsored by Swiss Agency for Development and Cooperation under HIDECOR project at during | IIT Bombay | National Workshop | 23-25 August, 2002 |
| 11. | Participated in International Conference on Sustainable Habitat for Cold Climates, | Leh, Srinagar, INDIA during | International Conference | 16-18 September, 2004. |
| 12. | Participated in one week CEP on ‘Advanced Heat Transfer’ conducted by Dr. Bhalchandra Puranik, IIT Bombay | College of Engineering, Pune. | CEP | 27 May-1 June 2006 |

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| 13. | Participated in Workshop under TEQIP on 'Promoting IPR Awareness in Technical Education' organized by on | VIT Pune | Workshop under TEQIP | April 21, 2006. |
| 14. | Attended MDP on 'Management Capacity & Vision Development' | WELINGKAR Institute of Management Development & Research, Matunga, Mumbai | MDP | 19-21 January 2006. |
| 15. | Participated a three day programme on 'Leadership Skills for Excellence' at, | Management Development Institute, Gurgaon | Three day Program | 4-9 September 2006. |
| 16. | Attended International Conference on Advances in Energy Research (ICAER 2007) held at during | IIT Bombay, Mumbai | International Conference | December 12-14, 2007. |
| 17. | Participated in Management Development Programme on 'Management Capacity & Vision Development' | -- | MDP | 19-21 st December 2006. |
| 18. | Participated in 3rd International Green Energy Conference held in held during. | Malardalen University, Vasteras, Sweden | International Conference | 17-21 June 2007 |
| 19. | Participated in One day seminar on 'CO2 as Refrigerant' conducted by Dr H Quack, Technical University, Dresden, Germany on 'CO2 as Refrigerant' conducted by Dr H Quack, Technical University, Dresden, Germany | VJTI, Mumbai | One day seminar | 1 st September 2007 |
| 20. | Participated in CEP course on 'Teaching Engineering Effectively' conducted by during September | IIT Bombay | CEP | 27- October 1, 2007. |
| 21. | Participated in National Colloquium on 'Emerging Paradigm of Service to | ICT Mumbai | National Colloquium | 2-3 November 2007. |

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| | Society' | | | |
| 22. | Participated in International Conference on Energy Engineering (ICEE 2009) organized by PEC | Pondicherry Engineering College, Puducherry | International Conference | 7-9 January 2009 |
| 23. | Participated in 2-day training program on 'Effective Role Execution for Institutional Development' | VIT, Pune | Two-day Training Program | 10 th February 2009 |
| 24. | Participated in one week STC under QIP on 'Recent Advances on Utilization of Alternative Fuels for Transportation' organized by during. | Center for Energy Studies, IIT Delhi | STC under QIP | 6-11 December 2010 |
| 25. | Participated in Workshop on 'Industry-Institute Interaction' | College of Engineering Pune | Workshop | August 11, 2012 |
| 26. | Participated in ' TEQIP Innovative Meet 2013 ' | ICT Mumbai | TEQIP Meet | Sept 25-26, 2013. |
| 27. | Participated in CEP course on ' <i>Institution Building through Appreciative Mindset</i> ' | IIT Bombay | CEP | August 29, September 2-4, 16, 2013 |
| 28. | Participated in CEP course on ' <i>Inter-disciplinary Aspects of Modeling of Manufacturing Processes</i> ' organized by during. | IIT Bombay | CEP | October 2-6, 2013 |
| 29. | Participated in the 5 day Proficiency Improvement Program (PIP) on ' <i>Engine Testing and Certification</i> ' jointly organized by ARAI Pune and AVL India | ARAI Pune | PIP | 19-23 August 2013. |
| 30. | Participated in EPICS (Engineering Project in Community Services) Workshop on 'Integrating Design and Service-Learning into the Curriculum' organized by IEEE and Purdue | Hyderabad. | Workshop | 29-31 October 2013 |

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| | University, USA are jointly during at | | | |
| 31. | Participated in Quality Enhancement in Engineering Education (QEEE) training workshop held in on | IIT Madras, Chennai | QEEE Workshop | 13-14 December 2013 |
| 32. | Attended one week STTP on "Advanced Engineering Optimization through Intelligent Techniques' | SVNIT Surat | STTP | 22-26 September 2014 |
| 33. | Participated in " 102th Indian Science Congress " | Mumbai University, Mumbai | Indian Science Congress | 3-7 January 2015 |
| 34. | Attended one week CEP on "Engineering & Design Optimization' | IIT Bombay, Mumbai | CEP | December 2015 |
| 35. | Participated in Workshop on 'Quality Initiatives in Technical & Higher Educational Institutes (In compliance with NBA & NAAVC Accreditation)' | Engineering Staff College of India (ESCI) Hyderabad | Workshop | 23-25 February 2016. |

PARTICIPATION IN INDUSTRIAL TRAINING PROGRAMMES

- a. Attended **two weeks** training in Thermax Ltd, Pune on 'Vapour Absorption Systems' in their Chiller plant
- b. Participated in **one week** course at 'Forbes Marshall, Pune'.
- c. Attended about **two weeks** training programme in Kirloskar Cummins Ltd, Pune.

Besides, I have visited various companies like Tata Motors, Wartsila Diesel, Thermax Ltd etc. several times during follow-up programme of the in-plant training of the students of sandwich course.

INDUSTRIAL / RESEARCH EXPERIENCE

1987-1988 Bajaj Auto Ltd, Aurangabad, as a Trainee Engineer and Assistant Engineer
2001-2004 Heat Pump Lab, IIT Bombay, as a Research Scholar

TEACHING EXPERIENCE

A. At PG Level (M.Tech)

Courses taught: Advanced Heat Transfer, Advanced Thermodynamics, CI Engines, SI Engines, Utilization of Solar Energy, Design of Heat Exchange Equipment.

Projects: 36 students have completed dissertation and 5 students are presently working under my guidance.

List of M.Tech projects guided/guiding:

| Sr. | Name/Roll No. of Students | Title of MTP | Year of Completion Or Status |
|-----|--------------------------------------|---|------------------------------|
| 1. | Bhirud Niteen L (MT 2004601) | Field Evaluation of Fixed Focus Concentrators for Industrial Oven | 2007 |
| 2. | Bopche Santosh B (MT2005603) | Experimental Investigations on Heat Transfer Enhancement in Solar Air Heater by Using Artificial Roughness | 2007 |
| 3. | Ramanathan V (MT2006606) | Development of Low-cost, Efficient Solar Still | 2008 |
| 4. | Patole Pramod (MT2005605) | Performance Evaluation of Three-in-One Air Conditioning System | 2008 |
| 5. | Waghmare Siddharth (MT2004611) | Design, Fabrication and Testing Performance of Water Heater-cum-Refrigerator | 2008 |
| 6. | Sutar Kailasnath B (MT2005614) | Experimental Investigations on Heat Transfer Enhancement in Solar Air Heater by Using pin-fins | 2008 |
| 7. | Barai Chandrashekhar (MT20056020) | CFD Analysis of Gas Engine Air Handling System of V-type Diesel Engine | 2008 |
| 8. | Joshi Sandip (MT | Design, Fabrication and Testing of Pancake (Spiral Shell & Coil type) Type Heat Exchanger for Waste Heat Recovery from Producer Gas | 2008 |
| 9. | Ankolekar Vinay (MT2005601) | Investigation of Performance of Various Vortex Tube Refrigerators with Few Modifications | 2010 |
| 10. | Khandekar T N (MT2004605) | Performance Testing of Parabolic Solar Cooker with Mirror type Reflector and its Comparison with Aluminium Reflector | 2010 |
| 11. | Kajale Jayant N (MT2007605) | Experimental Investigations on 'Heat Transfer Enhancement in Solar Air Heater by Using Expanded Metal Mesh | 2010 |
| 12. | Milind Patil (MT 2009612) | Heat loss characterization of receiver of solar scheffler type solar system' jointly co-guided by | 2011 |

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| | | MS Tandale & Dr. Neeraj Agrawal. | |
| 13. | Ganesh Shirsath (MT 2009606) | Engine performance and exhaust emission analysis of Multicylinder CI engine using Biodiesel | 2011 |
| 14. | Ajit Mane (MT2009615) | Study the effect of operating parameters on the performance of heat-pipe based indirect evaporative system | 2012 |
| 15. | Avinash Jadhav (MT2009605) | Heat transfer and friction characteristics of rectangular duct with enhanced surface geometry | 2012 |
| 16. | Deepak Patil (MT2009602) | Exhaust Heat Waste Heat Recovery from CI Engine | 2012 |
| 17. | Wategave Sumeet (MT | Testing of Engine Performance on various blends of Bio-diesel with EGR | 2012 |
| 18. | Mahesh Sawant (MT2010606) | Testing of Engine Performance on various blends of Bio-diesel | 2012 |
| 19. | Mirza Mustaeenulla Baig (MT2010604) | Study of Heat Transfer Enhancement in a Circular Tube using Diamond Shape Strip Inserts | 2012 |
| 20. | Abhishek Chavan (MT2011604) | Performance & Emission Studies on CI Engine Using Mahua Bio-diesel and Its Blends | 2013 |
| 21. | Nilesh Arjun Patil (MT2011609) | Study on Effects of PCM on Performance of ETC type Domestic Solar Water Heater | 2013 |
| 22. | Sachin Bansode (MT 201160). | Study of Performance and Emission on CI Engine using Neem Oil Bio-diesel | 2013 |
| 23. | Shaikh M Shahezad (MT 2012615) | Numerical Analysis of Centrifugal Pump on ANSYS CFX & ANSYS FLUENT | August 2014 |
| 24. | Sagar Sarode (MT2012613) | Performance Studies on CI Engine Using Cotton Seed Oil as Biodiesel & its Blends | August 2014 |
| 25. | Mayur Jadhav (MT2012607) | Numerical Analysis of Transonic Axial Compressor using Rotor 37” by Completed in. | August 2014 |
| 26. | Gore Bhagwat (MT2012606) | Study of Parabolic Solar Cooker with PCM for Energy Storage & Improving its Performance with Utility | August 2014 |
| 27. | Chaudhari Vasudev (MT2012603) | Effect of Intercooler on Performance of Turbocharged Multicylinder Engine & Performance of Single Cylinder Diesel Engine | August 2014 |

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| | | with Mahua Oil Biodiesel | |
| 28. | Aher Bharat (MT2012601) | Performance Studies on CI Engine Using Simarouba Biodiesel & its Blends | August 2014 |
| 29. | Ninad Patil (MT2012610) | Experimental investigations on heat transfer enhancement in a circular tube using conical shape strip inserts | December 2014 |
| 30. | Manohar Sachin (MT2013613) | Design, fabrication & testing performance of small Scheffler collector system for cooking application | August 2015 |
| 31. | Kasabe Asmita Ananda (MT2013610) | Numerical analysis of crystallization fouling in PHE using ANSYS | August 2015 |
| 32. | Jadhwari Jagdish S (MT2013609) | Design, fabrication & testing of Aerostat for various applications in University campus'by Completed at IIT Bombay | August 2015 |
| 33. | Bichkar Onkar Vijay (MT2013604), | Analysis of heat transfer from Tethered Aerostat' Completed at IITBombay | August 2015 |
| 34. | Bane Sagar Bhimrao (MT2013602) | Experimental study on three expansion devices in small capacity air-conditioning system | August 2015 |
| 35. | Aitawadekar Priyant S (MT2013601) | Optimization of shape of the tethered aerostat & fins' Completed in IIT Bombay | August 2015 |
| 36. | Barahate Sagar Jeevan (MT2014601) | -- (Report Not yet submitted) | August 2016 |
| 37. | Kamble Pratap Nivrutti (MT2014607) | Multi-Objective Optimization of Diesel Engine Performance by Using Various Optimization Techniques | August 2016 |
| 38. | Shaikh Javed Sikandar (MT2014611) | Energetic-exergetic modeling and performance evaluation of solar water heating system | August 2016 |
| 39. | Raje Nikhil Shivaji (MT2014618) | CFD analysis of helically baffled shaft and tube heat exchanger using structured multi-block mesh | August 2016 |
| 40. | Shimpi Dnyaneshwar K (MT2014618) | | August 2016 |
| 41. | Kamble Sonal Manohar (MT2011605) | Development of low-cost efficient solar still. | August 2016 |
| 42. | Ansari Shoyeb (MT20156010) | Design of boiler blow-down heat recovery system for a power plant. | August 2017 |
| 43. | Khot Kiran (MT2015609) | Experimental study on heat transfer in a liquid flat plate collector with different tube-fin materials. | August 2017 |
| 44. | Moon Vaibhav | Study of performance and emission | August 2017 |

| | | | |
|-----|--------------------------------|---|--------------------|
| | (MT2015613) | characteristics of single-cylinder VCR engine using biodiesel obtained from soap-nuts. | |
| 45. | Poshetty Anil (MT2015615) | Studies on biodiesel production process from Kusum oil and testing of engine performance using this biodiesel | August 2017 |
| 46. | Sadgir Shankar (MT2015616) | Experimental study on heat transfer in internal flow through tube using different enhancement techniques | August 2017 |
| 47. | Shivsharan Sandesh (MT2015617) | Experimental study of heat transfer in tube-in-tube heat exchanger | August 2017 |
| 48. | Mohite Prashant (MT2015612) | Optimization of Gasifier performance using different types/shapes of fuels. | August 2017 |
| 49. | Patil Sagar (MT2015614) | Performance evaluation of vortex-tube with effect of cone angle | August 2017 |
| 50. | Malekar Jayraj (MT2015611) | Design and simulation of tube-fin heat exchanger for different applications. | August 2017 |
| 51 | Bamane Atul (MT2016601) | Oil from Cashew Nut Shell | Ongoing |
| 52 | Bari Vandan B (MT2016602) | Kusum oil | Ongoing |
| 53 | Chaudhari Hitendra (MT2016604) | Solar Chimney Power Plant | Ongoing |
| 54 | Dawange Vivek (MT2016606) | Industrial-Hindusthan Unilever Ltd | MST+HNW Ongoing |
| 55 | Jagdale Vishal S (MT2016607) | IIT Indore | Ongoing |
| 56 | Sumedhkumar Wakode (MT2015618) | Heat Trasfer Enhansment | Ongoing |

PhD Thesis:

Sangram Jadhav (RS20120116) is working under my guidance for his PhD. His research topic is 'Investigation on Suitability of Alternative Fuel obtained from Regional Feed stock for CI Engine'. He has completed his PhD on 05-08-2017 (Date of Defense).

B. At UG Level (B.Tech)

Courses taught: Thermodynamics, Applied Thermodynamics I, II, III, Heat Transfer, Power Plant Engineering, Fluid Machinery, I C Engines, Refrigeration & Air Conditioning, and Strength of Materials.

Projects: About 100 students have completed projects under my guidance. Many projects were innovative. Based on the project work, a few students have published papers in the conferences.

POSITIONS HELD

- Worked as **Head of the Department**, Dr. Babasaheb Ambedkar Technological University, Lonere, 1995-1999.

- Worked as **Head of the Department**, Dr. Babasaheb Ambedkar Technological University, Lonere, 6th Feb 2006- 23rd April 2010
- Member, Executive Council, Dr. Babasaheb Ambedkar Technological University, Lonere (1st July 2010 to 30th June 2013)
- Member, Academic Council, Dr. Babasaheb Ambedkar Technological University, Lonere (1st July 2010 to 30th June 2013)
- In-charge Registrar, Dr. Babasaheb Ambedkar Technological University, Lonere from December 2009-October 2010.
- Member, Academic Council, Dr. Babasaheb Ambedkar Technological University, Lonere (2005-2010)
- Member, Executive Council, Dr. Babasaheb Ambedkar Technological University, Lonere (2004-2006)
- Member, Academic Council, Dr. Babasaheb Ambedkar Technological University, Lonere (2000-2001)
- Member, Academic Council, Dr. Babasaheb Ambedkar Technological University, Lonere (1995-1999)
- Member Secretary, Board of Studies for Mechanical Engineering, Dr. Babasaheb Ambedkar Technological University, Lonere (1995-1999).
- Coordinator, Post Graduate Education & Research Cell, (June 2005- August 2014).
- Vice-President, Students Gymkhana, Dr. Babasaheb Ambedkar Technological University, Lonere (1998-2001).
- Worked on several committees of this University as a member; purchase committee, selection committees etc.

ORGANIZING EXPERIENCE

| Sr. | Activity/Event | Place | For Whom | Period |
|------------|--|---------------------------|----------------------|---------------|
| 1. | Organized 'Youth Parliament, for the university students. I had trained ten students for participation in the competition held at regional level. Our students had shown excellent performance and received certificates of appreciation from the Ministry of Parliamentary Affairs. | University Campus, Lonere | B.Tech students | -- |
| 2. | I was a member of organizing committee for the workshop on 'Alternative Refrigerants | IIT Bombay | Faculty and Research | 23-25 August, |

| | | | | |
|----|--|---|---------------------------|--------------------|
| | and Cycles' at IIT Bombay during. This workshop was coordinated by Prof Milind V Rane | | Scholars | 2002 |
| 3. | Organized a one day programme on 'Patent Awareness' for the faculty members of University on. Prof. Vishal Kartaria, IPR Chair, University of Pune delivered series of lectures on the topic. | University Campus, Lonere | Faculty Members | 10 Dec 2004 |
| 4. | Co-coordinated a 2 day National Refresher Course on 'Environment Management' held in the University under TEQIP jointly with Petrochemical Engineering Department in collaboration with uring. | ICT, Matunga, Mumbai | National Refresher Course | 27-28Jan 2006 |
| 5. | Coordinated One Week Short Term Training Program, jointly with Dr. Neeraj Agrawal, on 'Advances & Practices in Heating, Ventilation, Air-conditioning & Refrigeration' in the Department of Mechanical Engineering | Dr. Babasaheb Ambedkar Technological University, Lonere | STTP | January 8-12, 2013 |
| 6. | Organized an Industrial Visit of Third Year B.Tech and I year M.Tech Students to Kisan Veer Satara Co-operative Sugar Mill, Bhujinj and Wind Mill site of Suzlon Energy Pvt Ltd at Chalkewadi, Dist. Satara during. Total number of participants in the visit was 90 (71+17+2 staff/faculty) | Sugar Mill and Wind Mill near Satara | Industrial Visit | 19-20 March 2016 |
| 7. | Organized an Industrial Visit of Third Year B.Tech and I year M.Tech Students to Dahanu Thermal Power Station, Dahanu | Dahanu | Industrial Visit | -- |

ADMINISTRATIVE RESPONSIBILITIES

| | |
|--|---|
| 22 nd Dec 2009-11 th Oct 2010 | Worked as I/c Registrar, Dr. Babasaheb Ambedkar Technological University, Lonere |
| 6 th Feb 2006-23 rd April 2010 | Worked as Head of the Department , Dr. Babasaheb Ambedkar Technological University, Lonere |
| 1995-1999 | Worked as In-charge Head , Department of Mechanical Engg Dr. Babasaheb Ambedkar Technological University, Lonere |
| June 2005-August 2014 | Worked as Co-ordinator, Cell for Post Graduate Education and Research(PGE&RC) |

- Led the development activity of Department of Mechanical Engineering in this University.

- Led sports activities for entire University during 1998-2001: I was holding the post of Vice-President, Gymkhana for about three years. I was responsible for conduct of various sport activities. The work include preparation of annual budget, preparation of sport facility, selection of student representatives, conduct of events, participation of students in inter-university events like Ashwamedh.
- Working as a Coordinator, Post Graduate Education and Research Cell: I was responsible for streamlining the activities of post graduate and PhD programs like admission, evaluation etc.

RESEARCH INTERESTS

Vented double-wall tube-tube heat exchanger for waste heat recovery applications like desuperheating, condenser heat, radiator heat etc

LABORATORY DEVELOPMENT

- Led the development activity of all the thermal engineering related laboratories of the Department of Mechanical Engineering.
- **In-house fabrication of major lab equipment:-** Led the department for in-house fabrication of major lab equipment of Heat Transfer, Refrigeration and Air Conditioning, Fluid Machinery and I C Engines Laboratories. This in-house fabrication of laboratory equipment in the department resulted in savings of more than 20 lacsof Rupees for this University.
- Developed IC Engines Lab with the investment worth of Rs.40 lakh. This include three test rigs for testing performance of Petrol & Diesel Engines, Biodiesel production & testing facility, Engine exhaust emission measuring equipment.

EXPERIENCE ON CONSULTANCY PROJECTS UNDERTAKEN BY MY RESEARCH GUIDE AT IIT BOMBAY

Following projects were undertaken by my Supervisor Prof. M V Rane in Heat Pump Laboratory, IIT Bombay, Mumbai during my PhD research at IIT. I was involved in design, fabrication and testing of these heat exchangers since these applications were based tube-tube heat exchanger technology.

- Development of a Tube-Tube Heat Exchanger (prototype) for superheat recovery water heating (SHRWH) application in a 60 TR R22 based chiller**
Vented double walled tube-tube heat exchanger was designed for recovery of superheat from a 60TR R22 based chiller. This heat exchanger was fabricated in Heat Pump Laboratory of IIT Bombay, Mumbai and commissioned in one of the hotels in Mumbai.
- Development of a Tube-Tube Heat Exchanger (prototype) for superheat recovery water heating (SHRWH) application in a 2x135 TR NH₃ based chiller**
Vented double walled tube-tube heat exchanger was designed for recovery of superheat from a 2x135 TR NH₃ based chiller. This prototype heat exchanger was fabricated in Heat Pump Laboratory, IIT Bombay, Mumbai and commissioned at Worli Dairy, Mumbai.

COMMERCIALIZATION OF TECHNOLOGY BASED ON PhD RESEARCH

Based on Tube-Tube Heat Exchanger technology developed, following companies were then identified/launched for marketing heat exchangers for various applications(non-exclusive basis). [However, at present, the product is not marketed by these companies].

- M/s Aqua Engineering, Mumbai
- M/s Rhizo Technologies, Mumbai
- M/s Adittyia Enterprises, Mumbai

MEMBERSHIP OF PROFESSIONAL BODIES

1. Member, Institution of Engineers (India)
2. Life Member, Indian Society for Technical Education
3. Associate Member, Institution of Automobile Engineers, India
4. Member, ISHRAE, Mumbai Chapter.

ABOUT PATENTS AWARDED/FILED by Dr. Madhukar Tandale along with co-investigators

- 1) **Title:** **Tube-Tube Heat Exchangers**
Inventors: Dr. Milind V Rane, Madhukar S Tandale

Summary: Heat exchangers find a wide variety of applications in the chemical industry. In the case of heat exchangers employing fluids as heat transfer means, it is desirable to have a heat exchanger with low pressure drop on all fluid streams exchanging heat with each other for specified design conditions with respect to heat duty, inlet-outlet temperatures, size, cost and maintainability. Solutions are therefore necessary to provide designs of heat exchangers that maximize heat transfer while keeping pressure drop minimum.

The present invention relates to Tube-Tube Heat Exchangers (TTHE), for effective transfer of heat in multi-stream multi phase heat transfer applications by selecting combinations of bends and straight lengths to optimize the performance for heat transfer and pressure drop.

One prototype TTHE has been developed and installed in one hotel in Mumbai and is working well. Another prototype for recovery of superheat from 135 x 2 TR Ammonia chiller for dairy in Mumbai was developed and commissioned. The technology is ready now to get commercialized. There are many companies like Blue Star, Voltas etc. who have shown interest in this technology.

OTHER INTERESTS& ACTIVITIES:

- "Vipassana" Meditation: Attended 12 ten-day courses and 3 STP courses

- Organization of one day Vipassana Meditation Courses: organised several one day courses in IIT Bombay during 2001-2004. Also, organized one day course in our university for children.
- Collection of books and reading.
