UKA TARSADIA UNIVERSITY
Chhotubhai Gopalbhai Patel Institute of Technology, Bardoli
Department of Mechanical and Automobile Engineering

Organized

GUJCOST Sponsored
(GUJCOST/Seminar Grant 2022/2018-19/1624)

One Week Short Term Training Programme

on

“Fundamental Concepts of Pressure Vessel Design: Analytical Approach”

(03rd – 07th December, 2018)

Programme Coordinator

Mr. Sandip G. Patel & Mr. Sachin D. Patel
Assistant Professor,
Mechanical and Automobile Engineering Department,
C. G. Patel Institute of Technology, Bardoli

Convener

Dr. Chinmay K. Desai
Professor and Dean, Faculty of Engineering and Technology
C. G. Patel Institute of Technology, Bardoli

Patron

Dr. R. V. Patil
Director, CGPIT
C. G. Patel Institute of Technology, Bardoli
Detail about the STTP:

The institutions of higher education in India are facing crucial challenges in creating, nurturing and maintaining the level of quality engineers. The need of the hour is to provide quality engineers amongst the budding higher educational institutions and industries to cope up with future challenges and in strong fundamentals. Today, Institutes find themselves technically constrained while promoting technical skills due to lack of resources in line with industry needs. So, there is an urgency of developing and understanding in designing and carry out research that can employ skilled engineers and research scholars. The aim of the training programme is to provide a techno-environment that promotes interaction, discussion, and intellectual networking among the participants and renowned experts in the area of pressure vessel. The unique feature of training programme is to elaborate the basic concept of pressure vessel designing with ASME codes. The contents of the course covers sufficient depth, to provide participants with a general understanding of pressure vessel design requirements as per industry requirement to design the pressure vessel and various components.

**Date:** 03rd – 07th Decemer, 2018

**Time:** 08:30 AM to 04:15 PM (Monday – Friday)

**Venue:** Mechanical Engineering Department

**Coordinator:** Mr. Sandip G. Patel & Mr. Sachin D. Patel (Department of Mechanical and Automobile Engineering)

**Organizing Committee:**

1. Mr. Jayesh Jariwala (Assistant Professor)
2. Mr. Keyur Surati (Assistant Professor)
3. Mr. Piyush Patel (Assistant Professor)
4. Mr. Jainish Topiwala (Assistant Professor)
5. Mr. Pratik Umrigar (Assistant Professor)
6. Mr. Ashish Patel (Assistant Professor)
7. Mr. Sajan Joshi (Assistant Professor)
8. Mr. Sudhakar Nakka (Assistant Professor)
9. Mr. Vikesh Patel (Assistant Professor)
10. Mr. Soyeb Multani (Assistant Professor)
**Targeted Audience:**
1) Student/Research Scholar
2) Academician
3) Industry Person

**No. of Participants:**
1) Student - 10
2) Research Scholar - 03
3) Academician - 14
4) Industry Person - 00

**Banner:**

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**Summary of the STTP:**

**First day:**

Inaugural Function was held in the morning session. The function was handled by Dr. Rajkumar V. Patil, Director of CGPIT, and Dr. Chinmay K. Desai, Dean and Head of the Department, Mechanical/Automobile engineering department, CGPIT. We also had Dr. H. K. Raval, Professor in mechanical engineering department, SVNIT, Surat as our chief guest and the session expert. During his session on the first day,
Dr. H. K. Raval delivered a lecture on theory of rectangular plates and gave the brief idea about the concepts of plasticity.
The post lunch sessions were handled by Dr. Chaitanya K. Desai, Associate Professor, Mechanical Engineering Department, CKPCET, Surat. In his first session he gave the preliminary information about theory of plates. He then briefed about the theory of circular plates along with numerical examples and at last he discussed membrane theory of plates.
The Second day:

Morning session was handled by Dr. D. C. Patel, Associate Professor, GIDC Degree Engineering College, Abrama, Navsari. He gave a brief information about ASME codes and its various divisions, used to design a pressure vessel. He then emphasized on design of thin shell subjected to internal and external pressure, including various types of dish ends like ellipsoidal head, hemispherical head and torispherical head subjected to both internal and external pressures. He also discussed some important thumb rules to design shells and dish ends.

The second session handled by Dr. D. S. Sharma, Professor and Head of the Mechanical Engineering Department, MSU, Baroda. He started the discussion with various types of loads on pressure vessels. He then delivered an expert talk on stress concentration, and its determination using complex variable methods. He then briefed about some research topics in the field of plane elasticity.
The third session was handled by Mr. Sandip G. Patel, Assistant Professor, Mechanical/Automobile Engineering Department, CGPIT. He conducted a tutorial session on design of dished end and shells.

The Third Day:

Morning session was handled by industry expert Mr. Ravi Abuwala, Assistant Manager, GMM Pfaudler Limited, Anand. He delivered an expert talk on design for opening and reinforcement pads in pressure vessels. In the talk, he briefed on various types of openings and their locations based on practical requirements in the industry. He also discussed about the design of unconventional flanges and the selection of conventional flanges based on ASME code.

The next session was handled by Mr. Jayesh Jariwala, Assistant Professor, Mechanical/Automobile Engineering Department, CGPIT. He discussed about the important parameters for designing a pressure vessel under wind and seismic loading. He then briefed on IS878 code to design tall structures and discussed the terrain conditions of India as per IS878 standards. He conducted a tutorial on numerical tools for designing the pressure vessel.
The Fourth Day:

Morning session was handled by Mr. Surendra Patil, Design Engineer, HSB Inspection and Insurance Company, Baroda. He discussed about design of saddle supports and base support for tall vessels. He also briefed us on skirt design and zik analysis in detail for design of saddle support.

The next session was conducted by Mr. Manish Sonar, Manager, L and T, Hazira. He gave the details on designing of lifting lugs, trunnions, and bottom plate. He then showed some case studies on evacuation of large vessels using lugs. He then briefed on industry practice for client orders.
The post lunch session was handled by Mr. Sandip G Patel on design of multilayered cylinders. He then discussed the different aspects like designing and manufacturing of composite cylinders, and the concepts of interference pressure in multilayered cylinders. At last, he conducted a tutorial on design of reinforcement pads at opening using a case study.

The Fifth Day:
Morning sessions were engaged by Dr. Chaitanya K. Desai, Associate Professor, Mechanical Engineering Department, CKPCET, Surat. He discussed about the finite element analysis of pressure vessels using a two case studies. In first case study, he derived the equations of shells using membrane theory and showed the analysis of multilayered cylinders. In the second case study, he performed the finite analysis of pressure vessels under wind loadings. He then briefed on important using appropriate elements while performing finite element analysis.
The post lunch session was conducted by Mr. Chaitanya Purohit, CEO of Q-Tech consultancy, Surat. He briefed on inspection safety and servicing requirements for in service pressure vessels. He also discussed the various inspection techniques like NDT, ultrasonic testing and radiography tests.

Valedictory function was held in the last session. The function was handled by Dr. Rajkumar V. Patil, Director of CGPIT, and Dr. Chinmay K. Desai, Dean and Head of the Department, Mechanical/Automobile engineering department, CGPIT, and Dr. N. C. Shah, Advisor, Uka Tarsadia University, and Mr. Chaitanya Purohit, CEO of Q-Tech consultancy, Surat as a guest of honor. At the end certificate distribution ceremony has conducted by all present dignitaries.
Speaker's Short Profile:

1) Dr. H. K. Raval

Dr. H. K. Raval has earned his B.E in Mechanical Engineering and M.E. in Mechanical Engineering in 1987 and 1990 from South Gujarat University, Surat, Gujarat. He has earned his PhD in Mechanical engineering in 2003 from South Gujarat University, Surat, Gujarat. He is working as an Professor in Mechanical Engineering Department of S.V. National Institute of Technology, Surat. He is having more than 25 years of teaching experience and also published more than 150 Conference/Journals papers in the field of engineering. He has delivered more than 56 expert lectures at various engineering colleges of Gujarat including. He has also organized various Faculty Development Programs at S.V. National Institute of Technology, Surat. He has also done so many consultancy and Testing work in the era of engineering. He has guided 13 Ph. D students and 64 M. E dissertation in the field of Manufacturing. His area of interest is CAD-CAM, Metal Forming Technology, Advance Manufacturing Processes, Production Technology, Metal Forming Analysis, Metal Cutting, Advance Manufacturing Processes, and Computer Aided Manufacturing & C.I.M.

2) Dr. Chaitanya K. Desai

Dr. Chaitanya K Desai has earned his B.E in Production Engineering and M.E. in Mechanical Engineering in 1999 and 2001 from Sardar Vallabhbhai Regional College of Engineering and Technology, (now NIT Surat) Surat, Gujarat. He is working as an Associate Professor in Mechanical Engineering Department of C. K. Pithawalla College of Engineering and Technology. In 2008, he joined Indian Institute of Technology Kanpur (IITK) as a research scholar and completed his PhD in Fracture Mechanics from the same. He is having 18 years of teaching experience and also published more than 50 Conference/Journals papers in the field of solid mechanics and design. He has delivered more than 100 expert lectures at various engineering colleges of Gujarat including. He has also organized various Faculty Development Programs at C. K. Pithawalla College of Engineering and Technology. He has also conducted Career Guidance seminars in various cities of Gujarat. He has guided 25 M. E dissertation in the field of Machine Design. His area of interest is Fracture
Mechanics, Plasticity, Continuum Mechanics, Experimental Stress analysis and Nonlinear Finite Element Analysis.

3) Dr. Dilip C Patel

*Dr. Dilip C. Patel* has earned his B.E in Mechanical Engineering and M.E. in Mechanical Engineering in 1999 and 2003 from *Sardar Vallabhbhai Regional College of Engineering and Technology, (now NIT Surat) Surat, Gujarat*. He has earned his PhD in Mechanical engineering in 2012 from *S.V. National Institute of Technology, Surat*. He is working as an Associate Professor in Mechanical Engineering Department of GIDC Degree Engineering College. He is having 15 years of teaching experience and also published more than 50 Conference/Journals papers in the field of design. He has delivered more than 10 expert lectures at various engineering colleges of Gujarat. He has also organized various Faculty Development Programs at GIDC Degree Engineering College. He has also done so many consultancy and Testing work in the era of engineering. He has guided more than 100 B. E Project in the field of Machine Design. His area of interest is Machine design, Dynamics and Design of Machine, Experimental Stress analysis, Finite Element Analysis, and Nonlinear Finite Element Analysis.

4) Dr. Dharmendra S. Sharma

*Dr. D. S. Sharma* has earned his B.E in Mechanical Engineering from Sardar Patel University and M.E. in Mechanical Engineering from Indian Institute of Technology-Bombay. He has earned his PhD in Mechanical engineering from Indian Institute of Technology- Bombay. He is working as Professor in Mechanical Engineering Department of Maharaja Sayajirao University of Baroda. He is having 22 years of teaching experience and also published more than 90 Conference/Journals papers in the field of design. He has delivered more than 100 expert lectures at various engineering colleges of Gujarat. He has also organized various Faculty Development Programs at Maharaja Sayajirao University of Baroda. He has also published 2 book in the era of engineering. He has guided more than 7 Ph.D Student, 51 M.E Dissertation in the field of Mechanical Engineering. His area of interest is Stress Analysis, Composites, Dynamics & Design of Machines, Computational Methods.
5) Mr. Ravi Abuwala

Mr. Ravi Abuwala has earned his B.E in Mechanical Engineering and M.Tech. in Mechanical Engineering in 2008 and 2010 from Dr. S.& S.S. Gandhy Government Engineering College, Surat and Sardar Vallabhbhai National Institute of Technology, Surat, Gujarat respectively. He is working as an Assistant Manager in Heavy Engineering Department of GMM Pfaudler Ltd. He is having 8 years of Industrial experience and through knowledge in the field of Design & FEA. He is having expertise in pressure vessel design & analysis. He has also worked with Oceaneering Internation Ltd, Chandigarh (US MNC) & Inox India LTD, Vadodara.

6) Mr. Sandip G. Patel

Mr. Sandip G. Patel has earned his B.E in Mechanical Engineering and M.E. in Mechanical Engineering in 2012 and 2015 from Charotar Institute of Technology, Changa and C. K. Pithawala College of Engineering and Technology, Surat. He is working as an Assistant Professor in Mechanical Engineering Department of Chhotuhai Gopalbhai Patel Institute of Technology. He is having 4.5 years of teaching experience and also published more than 10 Conference/Journals papers in the field of design. He has delivered more than 4 expert lectures at various engineering colleges of Gujarat. He has also organized various Faculty Development Programs at Chhotuhai Gopalbhai Patel Institute of Technology. He has guided more than 25 B. E Project in the field of Machine Design. His area of interest is Solid Mechanics, Fracture Mechanics, Finite Element Method/Analysis, and Machine Design.

7) Mr. Manish Sonar

Mr. Manish U Sonar has earned his B. E. in Mechanical Engineering from Sanjivani College of Engineering, Kopargaon affiliated with Pune University in 2008 and M. Tech. in Industrial Process Equipment Design in 2010 from Sardar Vallabhbhai National Institute of Technology, Surat, Gujarat. He is working as a Manager in Design Competency Center in RPV-PBU of Heavy Engineering arm of Larsen & Toubro Ltd located at Surat. He is having total 08 years of industrial experience comprises of 4 years in design and 4 years in finite element analysis of pressure vessels. He has delivered more than 10 lectures on
improvement in pressure vessel design within L&T. His area of interest is design optimization of pressure vessel through Finite Element Analysis.

8) Mr. Surendra Patil

Mr. Surendra Patil has earned his B. Tech in Mechanical Engineering from Sardar Vallabhbhai Patel National Institute of Technology, Surat. He is working as Design Engineer at Hartford Steam Boiler Inspection and Insurance Company, Baroda. He is having more than 7 years has principally been in the area of pressure equipment design and construction. 4+ years as Fabrication Supervisor, Finite Element Analyst and as Design Engineer with Larsen & Toubro Ltd. (Heavy Engineering) for equipment constructed to ASME BPVC Section VIII. Presently, working with Hartford Steam Boilers (HSB) Inspection & Insurance Company, world's leading ASME pressure equipment Authorized Inspection Agency (AIA); after successful completion of "National Board Preparatory Course" at HSB HQ in Hartford, CT, USA. Presently, perform 'Design Review & Certification' of Boilers & Pressure Vessels constructed to ASME Boiler & Pressure Vessel Codes & Standards (Sections I, B31.1, B31.3, VIII Div. 1/ Div. 2) & local jurisdictional codes viz., DOSH Malaysia, Singapore MOM, Australian-New Zealand Standards, Brazil NR-13, Indian Boiler Regulations (IBR), etc. Provide technical support to the HSB's Authorized Inspectors in India and to clients across the globe on design aspects of these Codes & Standards.

9) Mr. Jayesh Jariwala

Mr. Jayesh N. Jariwala has earned his B.E in Production Engineering and M.E. in Mechanical Engineering in 2000 and 2003 from Sardar Vallabhbhai Regional College of Engineering and Technology, (now NIT Surat) Surat, Gujarat. He is working as an Assistant Professor in Mechanical Engineering Department of Chhotubhai Gopalbhai Patel Institute of Technology. He is having 13 years of industrial experience. He worked in industry mostly in Design department. He worked with textile machinery pioneers like Himson, TMT – Japan and Murata-Japan. He has exposure to pressure equipment design for more than 6 years while he was working with engineering solutions consultancy firm. For four years, he was the member of Joint Special Design Team for DEMO Fusion Reactor at Quantum and Radiological Science and Technology (QST) under hood of Japan Atomic Energy Agency
(JAEA), Rokkasho, Aomori, Japan. He also worked on IFMIF (International Fusion Material Irradiation Facility) and LIPAc (Linear IFMIF Prototype Accelerator) projects there at JAEA. He has 4 years of teaching experience. He is regularly organizing various Faculty Development Programs at Chhotubhai Gopalbhai Patel Institute of Technology. He has also conducted numerous Career Guidance seminars for XI and XII standard students. He has expertise in Pressure equipment design and he has good command over CAD/CAE tools.

10) Mr. Chaitanya Purohit

*Mr. Chaitanya Purohit* is working as a CEO in Q-tech consultant. He is having 15+ years of industrial experience. He worked in industry mostly in heavy engineering and petroleum industries.
## Chhotuhaai Gopalbhai Patel Institute of Technology - Bardoli

### Income and Expenditure Statement for STTP on

"Fundamental Concepts of Pressure Vessel: Analytical Approach"

on

3rd - 7th December, 2018

### Income

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<th>Sr. No.</th>
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