

PRESSURE VESSEL TRAINING COURSE

ASME BPVC CODE AND PVELITE SOFTWARE TRAINING

COURSE CONTENTS

1. Pressure vessels
 - ✘ Definitions and basics
 - ✘ Various units, its conversion and significance.
 - ✘ Manual Problem solving
2. Introduction to ASME BPVC code
3. Material of constructions
4. Vessel component design
 - ✘ Minimum thickness requirements
 - ✘ Various types of loadings
 - ✘ Thickness calculations
5. Nozzle evaluation & design
6. Wind and Seismic analysis
7. PWHT requirements of code
8. Impact testing requirements of code, it's significance and procedure.
9. Post forming requirements of code
10. Various types of welding figures and its applications
11. Flange Design
12. Hydrotest and Pneumatic test significance and requirements
13. Introduction to WRC 107/297
14. PvElite software for Pressure Vessel design
15. Heat Exchanger design
 - ✘ Introduction to various types of Shell and Tube Heat exchanger, to ASME UHX and design procedure for tubesheet.
 - ✘ TEMA classes of heat exchanger
16. PvElite for Heat exchanger design
 - ✘ Introduction to PvElite software for Heat exchanger design.
 - ✘ Modelling of Fixed tube sheet heat exchanger,
 - ✘ Floating head heat exchanger (AES type) in PvElite,
 - ✘ expansion joint, expansion joint.
 - ✘ Tubesheet modelling as per UHX and TEMA
 - ✘ Calculation of Thermal expansion of various parts
 - ✘ Analysing and understanding of report.
 - ✘ Customizing & generation of 3D model and report
17. Design of non-circular vessels as per Appendix 13
18. Design of Non circular flange
19. Bolt torque selections and calculations

Protton synergy delivers Corporate as well as Individual training...

- ✘ Training makes you confident
- ✘ Trained staff is more productive
- ✘ Investment in training is 'lifelong'

We 'Invest' and 'Not waste' in getting Trained..

In our Training , We

- ✘ Make your 'WHY' clear
- ✘ Make you solve real life problems
- ✘ Make you interact with Industry Experts

We provide training only in domain where we have experience & Expertise

- ✘ Advance Pipe Stress Analysis (Static & Dynamic)
- ✘ Pipeline Stress Analysis
- ✘ Surge Analysis
- ✘ Pressure Vessel Design

ABOUT FACULTY

Name: Mr. Gaurav Bhende

Qualification: M. Tech., Chartered Engineer

The faculty has more than 19 years of experience in Pipe Stress Analysis and conducted several Professional Training Courses on Stress Analysis using CAESAR II software in numerous international engineering companies and Institutes as a Freelance Trainer since 2009. Mr. Gaurav has won the First Prize in a Global competition called "Driver of Success" where case your excellence in CAESAR II usage in Pipe Stress Analysis is to be demonstrated.



Mr. Gaurav is also invited to participate as a speaker in International conferences held in USA, India and UAE.

Mr. Gaurav has presented numerous whitepapers on various topics of Pipe Stress Analysis like Buried Pipe Analysis, Seismic Analysis, Stress Intensification Factors, Surge Analysis in International Journals and Conferences including ASME conference.

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CORPORATE AND INDIVIDUAL TRAINING



'We make your
HY' clear!

PIPE STATIC STRESS ANALYSIS

The course starts with the fundamentals required to perform Pipe Stress Analysis. It also talks about the International code requirements, best industry practices and then ends with Practical application of Pipe Stress Analysis using "CEASAR II" software to build piping system models and to analyze the output.

The piping Engineer with knowledge of "Pipe Stress Analysis" can work in all core engineering industries (viz. Refineries, Oil and Gas, Petroleum sector). He/She will be able to deliver independently in areas of Piping Design, Layout and Analysis.

COURSE CONTENTS

Theory:

- ✍ Introduction to Stress Analysis and Role of Stress Engineer.
- ✍ Basic Stress concepts applicable in Stress Analysis.
- ✍ Theories of Failure
- ✍ Interpreting International Piping code equations, ASME B31.1, B31.3
- ✍ Theory behind load case formation.
- ✍ Support types and their application. Special supports like snubbers, struts, sway Braces
- ✍ Manual Spring Selection and theory behind it
- ✍ Pipe Span Calculation
- ✍ Nomograph, Thumb Rules for flexibility
- ✍ Criteria to identify stress critical lines and system Formation
- ✍ Slug force, PSV Thrust force, Rupture Disk Calculations and load cases
- ✍ Piping flexibility and Stress Intensification factor
- ✍ Flange leakage analysis calculations
- ✍ Expansion loop manual calculations

Practical:

- ✍ Introduction to CAESAR II software and its Configuration file etc.
- ✍ Column to Pump Piping, PSV piping, Heat Exchanger Piping
- ✍ WRC 107 / 297 Nozzle flexibilities
- ✍ API610 calculations in CAESAR II
- ✍ Practical on occasional forces like slug, PSV pop up.
- ✍ Modelling of Special Equipment piping like Turbine, AirFin Coolers : Overview
- ✍ Expansion Joints (Bellow)
- ✍ Spring selection using CAESAR II.

PIPE DYNAMIC STRESS ANALYSIS

Dynamic Stress analysis is considerably different in concept than static analyses. Here we mainly deal with real life problem of vibrations due to slug, compressors, earthquake etc.

COURSE CONTENTS

Theory:

- ✍ Overview of Dynamic Analysis
- ✍ Engineering basics required to perform dynamic analysis
- ✍ Modal analysis
- ✍ Response spectrum method analysis
- ✍ Harmonic Analysis
- ✍ Time history analysis
- ✍ Dynamic Restraints/supports

Practical:

- ✍ One practical case study on each topic

SURGE ANALYSIS TRAINING COURSE

Surge pressure or water hammer is always misunderstood by engineers. Most of the time it is analyzed by process engineers where its impact on piping routing & stress analysis is not known. We try to bridge the gap between 'Surge Pressure' & 'Surge Force'. Also cover the theory & Practical problems to mitigate the surge.

COURSE CONTENTS

1. Engineering basics required to understand Surge Analysis.
 - ✍ Static Head Calculations
 - ✍ Absolute & Gauge Pressure
 - ✍ Pump Curve
 - ✍ NPSH Requirement
 - ✍ Friction Loss in Pipe
 - ✍ Valve Cv Calculation
 - ✍ Cavitation
 - ✍ Various types of Valve and their closing characteristics
 - ✍ Reading of Piping drawing
 - ✍ Bulk / Elastic Modulus
 - ✍ Vapor Pressure
2. Surge Calculation using manual methods (Joukowsky Equation)
3. Surge Analysis using AFT Impulse Software
4. Case Studies
 - ✍ Valve Closure Case
 - ✍ Pump Trip Case
5. Surge Mitigations
 - ✍ Air Relief Valve
 - ✍ Anti-surge Tanks

ADVANCE PIPELINE STRESS ANALYSIS

The Stress Analysis is an Integral part of Safety requirements of Piping and Pipelines. If you are working in Design or Operations domain, don't you think the knowledge of Stress Analysis will give a big leap in your career?

Most of us know 'What to do' in design but very few know 'Why to do it'. To get the answer of 'Why'; Protton Synergy conduct courses in Piping & Pipeline Stress Analysis.

COURSE CONTENTS

Theory:

- ✍ Introduction to Pipeline Stress Analysis and Role of Stress Engineer.
- ✍ Basic Stress concepts applicable in Stress Analysis.
- ✍ Theories of Failure
- ✍ Interpreting International Piping code equations, ASME B31.4, B31.8, AS-2885.
- ✍ Theory behind load case formation.
- ✍ Support types and their application. Anchor block calculation.
- ✍ Pipe Span Calculation
- ✍ Piping flexibility and Stress Intensification factor
- ✍ Flange leakage analysis calculations
- ✍ Various engineering calculations like Buoyancy, Upheaval buckling, Anchor Flange force, Bend radius calculations.
- ✍ Detail discussion of Buried Pipe behavior.
- ✍ To understand significance of various soil properties like density, cohesive pressure, friction angle etc.
- ✍ Comparing various methods of analyzing buried pipe including American Lifeline Alliance Method.

Practical:

- ✍ Introduction to CAESAR II software and its Configuration file etc.
- ✍ Quick and effective techniques to model Buried pipe.
- ✍ Buried Pipe analysis using Peng's Method.
- ✍ Buried Pipe Analysis using American Lifeline Alliance Method.
- ✍ Buried Pipe analysis using manually calculated soil stiffness.
- ✍ Load case formation
- ✍ Virtual Anchor