



Energizing Engineering - Empowering Engineers



ISO 9001 : 2008

Institute of Piping Engineering & Building Services

P. G. DIPLOMA CERTIFICATE - ONLINE TRAINING COURSE



PIPE STRESS ANALYSIS - ASME B 31.3

Course Co-Ordinator:

Mr. S. Tabraz
Piping Engineering Head
International Course Speaker

IPEBS

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ABOUT IPEBS

IPEBS was established with a vision to offer proactive training & consulting services for design, construction, Inspection, Operation & Maintenance of Process Plants & Building Services including

- a) Process Plant Engineering: Plant 3d-Modelling, Process Equipment, Piping Engineering, Pipeline Engineering, Valves, Rotating Equipments, Piping QA/QC & Inspection.
- b) Electro-Mechanical Building Services (MEP 3d Modeling, HVAC, Plumbing, Fire Protection & Electrical Systems)

IPEBS - CONSULTING

IPEBS team comprises of engineers and designers having extensive real time experience in the design, construction, inspection, Operation & Maintenance of Process Plant Engineering and Building Services.

IPEBS - TRAINING

Thousands of Engineers, Designers, Draftsman and Technicians have attended **IPEBS** training programs. On a national basis, **IPEBS** is now unquestionably the number one professional Plant Engineering, Piping Engineering & MEP course provider.

ABOUT TRAINING PROGRAM

This is a comprehensive program designed to present all major topics relative to Stress Analysis of process piping systems.

It is one of the unique training program which also covers comprehensive Static Stress Analysis of piping systems along with CAESAR – II software.

The program duration is 03 Weeks Full time Instruction including concept theory, calculations, Code requirements, exposure to industry leading Pipe Stress Analysis Software (CAESAR – II).

The **Online Training Course** is developed by the faculty of **IPEBS**, who are International Course Speakers and have more than 20 years work & training experience individually.

PROGRAM FEATURES

- ✓ In-depth course content for easy understanding.
- ✓ Blended Learning: Online contact with faculty.
- ✓ Accessibility to Course Faculty & Counseling Services.
- ✓ Job oriented training program.
- ✓ Student will be job ready, after the course.
- ✓ Student will acquire skills and knowledge similar to working professional.

WHO SHOULD ATTEND

- **Graduating College Students in the following disciplines**

- ✓ Mechanical Engineers
- ✓ Chemical Engineers
- ✓ Petroleum Engineers
- ✓ Production / Industrial Engineers
- ✓ Diploma / ITI

- **Working Professionals**

- ✓ Piping Design / Layout Engineers
- ✓ Piping 3D Cad Engineers
- ✓ Pipeline Engineers
- ✓ Offshore Platform Engineers
- ✓ Piping Draftsman
- ✓ Piping Construction Engineers
- ✓ Piping Fabrication Engineers
- ✓ Piping Supervisors
- ✓ Piping Stress Engineers
- ✓ Piping QA / QC Engineers

- **Corporate / Organizations**

- ✓ EPC Companies
- ✓ Piping Equipment Manufacturing Companies
- ✓ Piping Consultants
- ✓ Piping Contractors
- ✓ Thermal Power Plants Industry
- ✓ Ship Building / Marine Industry

COURSE MODULES:

- ✓ **Introduction**
- ✓ **Sustained Loads**
- ✓ **Occasional Loads**
- ✓ **Pipe Span Calculations**
- ✓ **Flexibility Analysis - Expansion Loops & Expansion Joints**
- ✓ **Layout Solutions for Weight, Thermal, & Wind Loads**
- ✓ **Flexibility Analysis using Code Equations**
- ✓ **CAESAR II Software**

Detail Course Content:

Introduction

- ✓ Objectives & definition of Stress Analysis
- ✓ Piping Loads – primary, secondary, sustained Loads, occasional loads, static & dynamic loads.
- ✓ Piping Stresses- primary, secondary.
- ✓ Stresses acting in pipe due to internal pressure.
- ✓ Stresses acting in pipe due to pipe weight.
- ✓ Critical line list & its criteria.
- ✓ Information required for Stress Analysis.

Sustained Loads

- ✓ Primary Load
- ✓ Secondary Load

Occasional Loads

- ✓ Wind load.
- ✓ Seismic load.
- ✓ Water hammer load.
- ✓ Theories of failure.
- ✓ Stress requirements of ASME B 31.3 code – sustained loads, thermal expansion & occasional loads.

Pipe Span Calculations

- ✓ Span limitations based on stress, deflection & natural frequency.
- ✓ Allowable pipe span calculations.
- ✓ Suggested pipe support spacing.

- ✓ Pipe span reduction factor for elbows, concentrated loads etc.
- ✓ Insulation types & densities.

Flexibility Analysis – Expansion Loops & Expansion Joints

- ✓ Concept of thermal expansion
- ✓ Providing flexibility in piping
- ✓ Minimum leg required to absorb thermal expansion
- ✓ Stress nomographs for pump and vessel piping
- ✓ Types of expansion loops
- ✓ Expansion loop sizing for hot piping
- ✓ Expansion loops requirements on pipe racks
- ✓ Thermal calculation by nomographs - pumps, vessels, heat exchangers.
- ✓ Nozzle thermal growth calculations – columns, vessels.
- ✓ Expansion Joints – types, application & selection.
- ✓ Bellow materials, hydrostatic test pressure for bellows.
- ✓ Guide spacing for expansion joints.
- ✓ Severe cyclic conditions.

Layout Solutions for Weight, Thermal, Vibration & Wind Loads

- ✓ Causes of Pipe Stress.
- ✓ Solving concentrated loads and reducing loads on equipment nozzles.
- ✓ Checking piping layout in pipe racks.

- ✓ Checking piping layout for reciprocating equipment.
- ✓ Checking piping layout for wind load.
- ✓ Solutions for piping loads.
- ✓ Selection of supports, location of supports and restraints on a pump piping layout.

Flexibility Analysis using ASME B 31.3 Code Equations

- ✓ Thermal Expansion Stress – se, code allowable thermal displacement stress range SA.
- ✓ Stress range reduction factors – F.
- ✓ Bending & torsion stress.
- ✓ Formal Analysis Requirements.
- ✓ Inplane & outplane bending moments
- ✓ Stress intensification factors – SIF.
- ✓ Calculation of thermal expansion stress
- ✓ Cold spring & its code requirements.

CAESAR – II – Pipe Stress Analysis Software

- ✓ Introduction.
- ✓ Piping input spreadsheet.
- ✓ Modeling of piping isometrics – bends, returns, reducers, valves, loops etc.
- ✓ Performing Static Analysis.
- ✓ Load case explanations
- ✓ Modifying load cases.
- ✓ Hanger selection.
- ✓ Set up of SUS, OPE, EXP, HYD, HGR Load cases.
- ✓ Set up of wind load cases.
- ✓ Set up of uniform load cases.
- ✓ Load Case Editor.
- ✓ Evaluating API 610 Pump Nozzle Loads.

- ✓ WRC Nozzle load calculations.
- ✓ Viewing Reports.
- ✓ Word/Excel file conversion of reports.
- ✓ Making/Reviewing unit files.
- ✓ Importing lines for stress analysis.
- ✓ 10 Practical examples – input, analysis & redesign.

Course Fee Details:

Course Title	Fee for Indian Participants	Fee for International Participants
Pipe Stress Analysis - ASME B 31.3 – Online Training Course	INR 26,000/- (Spl Offer: INR 22000/-)	USD 600/- (Spl Offer: USD 500/-)

For making e – payment for the course fee please find **IPEBS** Bank account details below.

Account Name	IPEBS
Account Number	03182020005287
Bank Name	HDFC
Branch	ABIDS
RTGS / NEFT / IFSC Code	HDFC0004125
SWIFT Code	HDFCINBB

IPEBS Corporate Training Clients:

Company Name	Location	Company Name	Location
Intergraph Consultants	India	SPPC	Sudan
Port of Sohar	Oman	CFPE Technology Solutions	Malaysia
Uhambiso Consultant	South Africa	Qatar Petroleum Technical Center	Qatar
Newtech Consulting Group	Sudan	Petro Vietnam Marine Shipyard	Vietnam
Yashada Consultant	India	Locus Technologies	India
Telstar Life Science Pvt Ltd	India	RasGas	Qatar
BHEL	India	ICB Technimont	India & Italy
IDC Training House SDN BHD	Malaysia	LG-Digitech	Sudan
Sakhlain Energy	Russia	Infotech Enterprises	India
Aveon Offshore	Nigeria	Petroleum Operating Company	Sudan
BPCL	Bhutan	Dr. Reddy's Labs	India
Saitech Engineers	India	Vasavi Power Services	India
Riyan Architects	Maldives	Siddhi Consulting	India
Oryx GTL	Qatar	Qatar Petroleum	Qatar
WNPOC	Sudan	Centroid Technical Services	Sudan
GNPOC	Sudan	MG – Vowgas Group	Nigeria
Fleming gulf	UAE	DAL Group	Sudan

Terms & conditions:

CANCELLATIONS: IPEBS does not provide refunds for Cancellations done after registration & fee payment. However, credit maybe granted to a later program. This credit will be available for up to one year from the date of issuance.

COURSE MATERIAL AGREEMENT: It is the intention of **IPEBS** that the course text and materials supplied to participants at **IPEBS** courses are prepared and issued for the participants' sole use. Codes and standards constantly change and interpretations are issued by the publishing societies. Information contained in **IPEBS** course materials is based on the best available data obtained by **IPEBS** at the time of publication. **IPEBS** is in no way responsible for subsequent use regardless of intention.

PROGRAM CHANGE POLICY: Please note that instructors and topics were confirmed at the time of publishing this document; however, circumstances beyond the control of the training organizers may necessitate substitutions, alterations or cancellations

of the instructors and/or topics. As such, **IPEBS** reserves the right to alter or modify the instructors and/or topics if necessary. Any substitutions or alterations will be updated on our web site.

COURSE CANCELLATION BY IPEBS: IPEBS reserves the right to cancel any course due to circumstances beyond our control. All tuition fees will be refunded in the event of cancellation. **IPEBS** liability is limited to only those tuition fees paid in advance.

FORCE MAJEURE: Except for the obligations to make money payments as outlined hereunder, neither party shall be responsible to the other for delay or failure to perform any of the terms and conditions, or other activities, of this agreement if such delay or failure is caused by strike, war, act of God, or force majeure.

Frequently Asked Questions – FAQ's

Duration of the course?

Ans: Course Duration is 03 Weeks.

Daily Class Duration?

Ans: Daily class will be for 02 to 03 Hours.

Requirement for the course?

Ans: Computer / Laptop with good internet connection, Camera and Mic.

Support from IPEBS?

Ans: Faculty assigned to all registered participant of the course. Faculty not only helps to clear the participant's queries while doing the course but also monitors the progress of the participant to help in successful completion of the course.

Mode of Payment?

Ans: You can make the payment through electronic transfer or at IPEBS office.

Issue of Certificate?

Certificate would be issued by **IPEBS** only on successful completion of the course.

Training Methodology?

Ans: Online Streaming of lectures, contact with faculty by email or chat groups.

Training Material?

Ans: Course Handouts will be shipped (within India) to the participants.

Soft copy material also provided including data tables, charts, nomographs, drawings, concept theory, design calculations and practice exercises.

Demonstration software's and excel spread sheets will be provided.

****** International Shipping charges of course Handouts to be borne by participants.