

**Training Title**

**PIPE STRESS ANALYSIS TRAINING (CEASAR II APPLICATION)**

**Training Duration**

**5 days**

**Training Dates & Venue**

REF			14-18 June		Dubai,
ME049	Pipe Stress Analysis (CAESAR II Application)	5	2020	\$4,500	U.A.E

**In any of the 5 star hotels. The exact venue will be intimated upon finalizing.**

**Training Fees**

- **US\$ 4,500 per participant for Public Training includes very useful illustrative Materials/Handouts, tea/coffee breaks, refreshments, Break Fast & International Buffet Lunch each day.**

**Training Certificate**

**Define Management Consultancy & Training Certificate of course completion will be issued to all attendees.**

**TRAINING OVERVIEW**

**TRAINING DESCRIPTION**

**Piping Stress Analysis involves examining the flexibility and stiffness of a particular piping configuration under different types of loading, primary and secondary types. Piping Stress Analysis determines the maximum stresses in the piping system and suggests necessary modifications. Less flexible systems are susceptible to failure more. Stress analysis helps revising the piping layout and its supports to avoid high local stresses. The course will discuss different types of stresses affecting piping flexibility, code criteria and methods of analysis, simple methods and computerized methods. Participant will practice performing such analysis using one of the software's for the same.**

**WHO SHOULD ATTEND**

**Engineers who are responsible for performing piping system stress analysis and others who must have a good understanding of its requirements are invited to attend this course.**

**COURSE OBJECTIVES**

**Upon completion of this course, attendees will be able to apply the piping system stress analysis requirements of ASME B31.3 to process plant piping systems and understand how to use piping analysis software to meet these requirements.**

*DMCT/OL/9/18(Rev3Dt:23/9/18)*

### WHO SHOULD ATTEND

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### TRAINING METHODOLOGY

A highly interactive combination of lectures and discussion sessions will be managed to maximize the amount and quality of information and knowledge transfer. The sessions will start by raising the most relevant questions, and motivate everybody find the right answers. The delegates will also be encouraged to raise their own questions and to share in the development of the right answers using their own analysis and experiences.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Group Work& Practical Exercises
- 20% Videos& General Discussions

### COURSE OUTLINE

#### **Ch 1 Piping System Layout, Supports, and Restraints**

Introduction

General System Layout Considerations

Layout Considerations for Specific Piping Systems

Support and Restraint Considerations

Types of Pipe Support

Estimating Maximum Permitted Support Span

Estimating Loads at Supports

Types of Pipe Restraints

#### **Ch 2 Engineering Mechanics of Piping**

Piping Criteria

Stress Categories:

Primary and Secondary Stresses

Classification of Loads

Primary loads

Sustained loads

Occasional loads

Expansion loads

Allowable Stress Range for secondary Stresses

Stress Acting on Piping Elements

Stress Calculations

Code Stresses

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### **Ch 3 Piping Flexibility and Stiffness**

**Introduction**

**Fundamentals**

**Flexibility Analysis**

**Identifying Lines with Adequate Flexibility**

**Stiffness and Large Piping**

**Flexibility Method**

**Pipe Offsets and Loops**

**Expansion Joints**

**Pipe Restraints and Anchors**

**Criteria for Flexibility Analysis**

**Level of Piping Flexibility Analysis**

**Simplified Flexibility Analysis Methods**

**Computerized Piping Flexibility Analysis**

**Special Considerations for Specific Piping Systems**

### **Ch 4 Piping Vibration**

**Introduction**

**Basic Concepts**

**Fatigue Stress and Other Failure Considerations**

**Types of Vibration Analysis**

**Common Causes of Piping Vibration**

**Vibration Measurement**

**Screening Vibration Problems**

**Vibration Control**

**Overall Design Considerations**

### **Ch 5 Piping Support Systems for Process Piping**

**Spring Supports**

**Variable Springs**

**Constant Springs**

**Piping Nozzle Loads on Rotating Equipment**

**Pump Nozzle Loads**

**Compressor Nozzle Loads**

**Piping System without Springs**

**Fluid Forces Acting on Piping Systems**

**Nozzle Movements and Thermal Displacement**

**Case Studies**

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**All the above concepts and methods will be examined through pipe modeling using a Piping Stress Analysis Program. (CAESAR II Application)**

**NOTE:**

**Pre & Post Tests will be conducted**

**Case Studies, Group Exercises, Group Discussions, Last Day Review & Assessments will be carried out.**

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