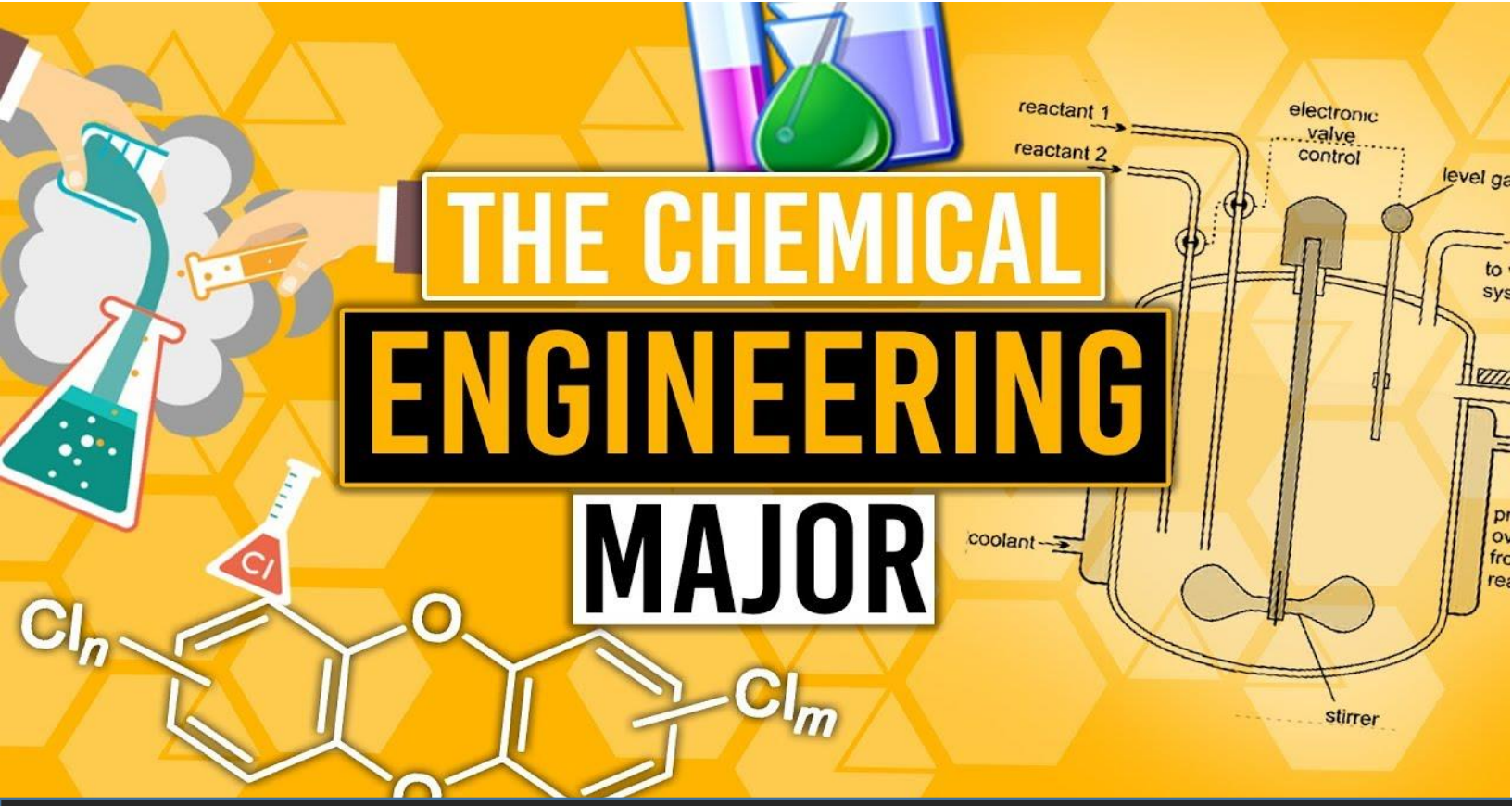

A Practical Understanding of Industrial Piping and Associated Equipment

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BTS
Training & Consultancy

A Practical Understanding of Industrial Piping and Associated Equipment

Description:

Reliable, safe, compliant and economic pipe systems are essential if production requirements of process industries and other facilities are to be achieved. Although the piping system may extend through many plant or facility areas and convey fluids in different forms, pipes are nevertheless as important as any single piece of production related equipment. This fact is often overlooked.

Overview:

After participating in the seminar, you will be able to:

- increase your awareness of pipe system codes, standards, design and operation
- discover the fundamentals of pipe flow and pressure drop
- appreciate the basic features of pipe system design
- develop a fundamental understanding of the components integral with, and equipment connected to, pipe systems
- appreciate the differences of pipe systems in various types of service
- apply an understanding of the inspection and maintenance practices associated with pipe systems

This course will:

- Look at the standards, codes and regulations associated with pipe system design and operation.
- Outline the load considerations and design aspects of pipe systems.
- Provide information on the various types of fittings, valves, insulation and pipe support methods.
- Examine flow losses associated with both compressible and incompressible fluids.
- Provide an overview of water, steam, hydraulic, gas, refrigeration, chemical & refinery and fire protection pipe systems.
- Provide an overview of associated equipment (pumps, compressors, heat exchangers, storage vessels, instrumentation).
- Discuss inspection and maintenance practices of pipe systems.

Throughout the course consideration will be given to the economic aspects of pipe systems. The course will also contain several exercises that will assist in the understanding of much of the information presented.

Workshop As part of this course, a workshop will be held on the development of justifiable, cost effective preventive maintenance activities for pipe systems. This workshop will enable attendees to develop a list of preventive maintenance activities that can be applied to their own facilities.

Objective to provide an understanding of the fundamentals of a cost efficient pipe systems including pipe flow, pipe fixtures and associated equipment.

Who Should Attend?

Plant and facilities managers, engineers, technicians and supervisors who need to be familiar with the fundamentals associated with pipe system; Plant and facilities operations personnel; Managers, engineers, technicians and supervisors responsible for plants and facilities containing pipe systems. Stationary engineers; Consultants and contractors whose work involves pipe systems.

Certificate:

BTS attendance certificate will be issued to all attendees completing minimum of 80% of the total course duration.

Contents:

Welcome, Introduction, Seminar Preview, Learning Outcomes and the Assessment Method

Preliminary Questions

General Overview

- Pipe uses and designations
- Pipe sizes
- Pipe weights
- Pipe manufacture

- Materials

Pipe Connections

- Fittings
- Joints – welded, bolted and threaded
- Gaskets

Pipes as Structures

- Review of mechanical properties of materials
- Basis of pipe stress code formulas

Regulations, Codes and Standards

Pipe Stresses – Code Formulas

- Sustained loads
- Occasional loads: wind, snow, ice, earthquake, vibration, water hammer, impact loads
- Thermal effects

Piping Systems

- Pipe Supports
- Insulation and heat tracing

Life Cycle Costing

Piping Systems Design Layouts

- P and I D's
- Pipe flexibility
- Layout considerations

Mechanics of Fluids

- Properties of fluids
- Inertia pressure

- Flow of fluids
- Bernoulli’s equation
- Types of flow
- Losses in pipes
- Darcy formula

Fluid Flow in Pipes (Continued)

- Hazen-Williams formula
- Transition losses
- Pipes in series and parallel
- Gravity flow in pipes
- Compressible fluids
- Two phase flow

Valves

- Isolating valves
- Throttling
- Check valves
- Safety and relief valves
- Valve actuators
- Other valve types

Filters and Strainers

Overview of Various Pipe Systems

- Water
- Steam

Overview of Various Pipe Systems continued

- Hydraulic
- Gas
- Refrigeration
- Chemical and Refinery
- Fire protection

Welding

- Welding practice
- Processes
- Welders

Storage Vessels

- Types and applications
- Emissions
- Specifications, codes and standards
- Leaks
- Maintenance
- Foundations

Pumps

- Centrifugal pumps
- Positive displacement pumps

Heat Exchangers

- Components and types
- Shell and tube
- Plate heat exchangers
- Air cooled heat exchangers
- Calculations
- Maintenance

Compressors

- Positive displacement
- Centrifugal
- Axial
- Intercoolers and after coolers

Boilers

- Fuels and combustion
- Industrial boilers
- Packaged fire tube boilers
- Fired process heaters

Instrumentation

- Temperature monitoring
- Pressure monitoring
- Level monitoring
- Flow monitoring

Inspection and Maintenance of Pipe Systems

- Erosion and corrosion
- Thermography
- NDE
- Ice plugs

Workshop Development of preventive maintenance activities associated with piping and all components that may exist in a pipe system. This workshop will enable attendees to select those components specific to their own facilities and apply them according to their own piping systems.