BAYUBALI ENGINEERING SDN BHD

PLANT PIPING – DESIGN, STRUCTURAL INTEGRITY AND MAINTENANCE COURSE

Training Dates:	As per schedule	**Training Venue:**	Kuala Lumpur, Malaysia.
Basic Fee:	The fee is RM4,600.00 + SST per participant (this includes course materials, meals, refreshments, and an attendance certificate)		

DURATION

28 hours (4 days)

TARGET GROUP

- **Process, chemical, and mechanical engineers** working in the petrochemical and process industries, including oil refineries and gas production companies, where the operation and maintenance of piping systems are essential.
- **Operation, technical service, and maintenance professionals** from various processing plants are involved in the daily operation, control, inspection, and maintenance of pipelines.
- **Engineers and consultants** engaged in planning new production lines, retrofitting plants, and introducing new technologies.
- **Technical professionals** responsible for the maintenance and repair of equipment.

TARGETED INDUSTRY/INDUSTRIES

Oil and Gas, Petrochemicals, Power Plant, Renewal Energy Plant, Co-Generation Plant, and other industries that are using steam boilers and steam systems.

CERTIFICATION

Not applicable.

COURSE OVERVIEW

This Plant Piping training course combines various disciplines of pipeline engineering, including design, structural integrity, hydraulic considerations, maintenance, as well as the application of relevant codes such as ASME B31.3 and B31.1. Delegates will be introduced to key aspects of inspection and testing in accordance with relevant standards.

The training course will also include several workshops featuring real-world problems from industrial practice, fostering discussions and the exchange of experiences..

COURSE OBJECTIVE

The objective of a Plant Piping Training Course is to equip participants with the essential knowledge and skills required for the design, installation, inspection, maintenance, and operation of piping systems in industrial plants. These systems are critical for transporting fluids such as water, steam, oil, gas, and chemicals.

COURSE OUTCOMES

At the end of the training course, the participant will be able to: -

- Develop deep understanding & familiarity basic principles of pipeline design for various industrial applications.
- Be familiar with the practical aspects of structural integrity, related to pipeline operation
- Have a knowledge of the various types structural and corrosion failure in relation to process pipes
- Understand aspects of pipe maintenance practices.
- Have the necessary knowledge of relevant piping codes and standards
- Use & follow the guidelines & best industrial practices related to the design and operation of pipelines

TRAINING METHODOLOGY

- Lecture
- Classroom discussions
- Short video presentation
- Case study

COURSE CONTENTS

1) INTRODUCTION TO PLANT PIPING SYSTEMS

- Overview of piping systems in process plants
- Importance of piping in industries (oil & gas, power plants, chemical plants)
- Piping system components and their functions

2) TYPES OF PIPING AND MATERIALS OF CONSTRUCTION

- Common types of piping (steel, copper, plastic, etc.)
- Selection of piping materials based on fluid type, temperature, and pressure
- Corrosion, erosion, and material degradation

3) PIPING DESIGN AND LAYOUT

- Fundamentals of piping design
- Piping layout and isometric drawing basics
- Piping and Instrumentation Diagram (P&ID)
- Stress analysis and flexibility considerations
- Piping supports, anchors, and expansion loops

4) FITTINGS AND VALVES

- Types of pipe fittings (elbows, tees, reducers, etc.)
- Valves: types, uses, and materials (gate, globe, ball, butterfly, check valves)
- Selection criteria for fittings and valves
- Standards and codes for fittings and valves (ASME, API, etc.)

5) FLANGES AND GASKETS

- Flange types (weld neck, slip-on, socket weld, lap joint, etc.)
- Flange ratings and pressure classes
- Types of gaskets and their applications
- Bolting methods and torque application

6) PIPE WELDING AND JOINING METHODS

- Introduction to welding methods (TIG, MIG, arc welding)
- Pipe joining methods: welding, threading, and flanging
- Inspection and testing of welds (visual inspection, NDT methods)
- Pipe weld codes and standards

7) PRESSURE AND FLOW CONTROL IN PIPING

- Basic fluid mechanics: pressure, flow rate, velocity
- Flow control devices (control valves, pressure regulators, flow meters)
- Pressure drops calculations
- Cavitation, water hammer, and surge phenomena

8) PIPING INSULATION AND HEAT TRACING

- Insulation materials and selection
- Purpose of piping insulation (thermal, acoustic, safety)
- Heat tracing methods for preventing freezing or maintaining fluid temperature

9) CODES AND STANDARDS FOR PIPING

- Overview of relevant codes and standards
- Key regulatory requirements
- Safety considerations in piping design and installation

10) TESTING, INSPECTION, AND MAINTENANCE OF PIPING SYSTEMS

- Piping system integrity checks (pressure testing, hydrostatic, pneumatic)
- Non-Destructive Testing (NDT) methods
- Predictive and preventive maintenance practices
- Pipe failure analysis and repair techniques

11) CASE STUDIES AND BEST PRACTICES

- Common issues in plant piping systems (corrosion, leaks, wear)
- Industry case studies on failures and successes
- Best practices in piping design, installation, and maintenance

ABOUT THE INSTRUCTOR



Ir. Ts. Mohd Normarzuki bin Ya'acob**,** has graduated with Bachelor (Honors) in Mechanical Engineering from the University of Malaya.

He is a registered Professional Engineer with Practicing Certificate (Mechanical) with Board of Engineer, Malaysia, a Corporate Member, The Institution of Engineers, Malaysia and a Member of American Society of Mechanical Engineers (ASME). He is a certified First Grade Engineer (Steam Boiler and Internal Combustion Engine) by the Department of Occupational Safety and Health (DOSH).

He had working experiences with several company such as Equator Engineering Sdn Bhd, Tenaga Nasional Berhad, Petronas Gas Berhad (Gas Processing Plant 5/6 and Centralized Utilities Facility), Qatar Petroleum (Head of Short Technical Training) and currently, he is working with Bayubali Engineering Sdn Bhd as a Managing Director.

Throughout his carrier, he has extensive field experiences in steam boiler operation, trouble-shooting, inspection, maintenance and repair. He has also experience in project management, design, selection, specification, installation, maintenance, operation, plant optimization and trouble-shooting of utility facilities in the oil and gas industry.

He is the co-author for "An Introduction to Steam Machinery" book published by University of Malaya Publisher.