



Training Program:
Control valve Repair & Maintenance

INTRODUCTION

In most of oil and gas industries, petrochemical refineries, chemical, food industries the control valve play the most important part in controlling fluid flow and safety of process.

WHO SHOULD ATTEND?

This is designed to train new and limited experience technicians, and limited experience engineer. The program is useful for mechanical, instrument, electrical, chemical and also senior supervisor.

METHODOLOGY

This interactive Training will be highly interactive, with opportunities to advance your opinions and ideas and will include;

- Lectures
- Workshop & Work Presentation
- Case Studies and Practical Exercise
- Videos and General Discussions

CERTIFICATE

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



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COURSE OBJECTIVES:

- The purpose of this course is to introduce the fundamental principles of the selection and installation the correct valve and to perform all kind of preventive, predicative, and primitive maintenance because it is very critical for the safety of process.
- The valves are considered the most expensive element in control loop so you can save millions of Dollars if you have the right knowledge and skills to choose best selection, construction, and engineering and to know how to determine static and dynamic parameter by on line diagnostic without shutdown to any process.

COURSE OUTLINE

Day 1:

The purpose of final control elements

❖ Control valves & actuators

- Introduction
- Control valve functions
- Dead band
- Speed of response
- Flow characteristic
- Rangeability

❖ Actuator

❖ Type of Actuator

- ❖ Actuator selection
- ❖ Actuator sizing
- ❖ Control valve installation
- ❖ Clearance and attachment
- ❖ Adjacent pipe fittings
- ❖ Steam and condensate
- ❖ Control valve selection
- ❖ Valve body designs

- Globe valves
- Single -port valves
- Double -port valves
- Three -way valves
- Split - body valve
- Angle valves
- Needle valves
- Ball valves
- Eccentric disc valves
- Butterfly valves
- Sunders diaphragm valve
- Pinch valves
- Gate valves

Day 2

- ❖ How to prevent valve failure (maintenance program)
- ❖ Reactive valve maintenance
- ❖ Preventive valve maintenance
- ❖ Predictive valve maintenance
- ❖ Preemitive valve maintenance

- ❖ Surrey of common control valve problem
- ❖ Air leakage
- ❖ Incorrect bench set
- ❖ Back lash (dead band)
- ❖ Hysteresis
- ❖ Stick slip
- ❖ Packing friction
- ❖ Effects of cavitation
- ❖ Control Valve dynamics
- ❖ Backlash , hysteresis , stickslip
- ❖ Combined Backlash - stiction
- ❖ Speed of response
- ❖ over shoot
- ❖ Valve selection
- ❖ Flow characteristic
 - Inherent
 - Installed
- ❖ Fail safe mode
- ❖ Valve body
- ❖ Cavitation
- ❖ Corrosion

Day3 :

Control valve sizing

- ❖ CV factor
- ❖ Critical flow
- ❖ Cavitation

- Effect of pipe reducers
- Effect of viscosity

- ❖ Liquid sizing
- ❖ Gas sizing
- ❖ Steam sizing
- ❖ Valve noise calculations and reductions

- Control valve noise

- ❖ Types of noise and recommended solutions

- Mechanical vibrations
- Hydrodynamic noise
- Aerodynamic noise
- Trim selection
- Material selection
- Pressure and temperature rating
- Flashing
- High pressure drop
- High temperature
- Leakage classes
- Noise , Aerodynamic
- Anti cavation

- ❖ Control valve Auxiliaries
- ❖ Hand wheel , By Bases and limit stops
- ❖ Snubbers
- ❖ Valve positioned
- ❖ I/P transducer
- ❖ Relays and other accessories

❖ Actuators

- Pneumatic actuators types
- Fail-safe position
- Actuators sizing
- Electric actuators

Valve positioners & accessories

❖ Positioners

- Function
- Split-range operation
- Conventional
- Double acting
- Profibus and smart Positioner

❖ Handwheels

❖ Limit switches

❖ Limit stops

❖ Stem position indicators

❖ Airsets

❖ Boosters

Day 4 :

Electric motor drive control

Regulators, relief valves, and other control elements regulators

- ❖ Regulator types
- ❖ Level
- ❖ Pressure
- ❖ Flow

- ❖ Temperature

Safety relief valves

- ❖ Safety valve component
- ❖ Kind of safety valve
- ❖ Operation of safety valve
- ❖ Safety valves - design
- ❖ Safety valves – sizing
- ❖ Rupture discs

Day 5 :

- ❖ Actuators forces and torques requirement for balance condition of control valve.
 - Thrust (buoyancy force)
 - Friction force of backing
 - Seat load force
 - Initial spring force
 - Air force

On line valve testing to determine static and dynamic parameter

- ❖ Full stroking ramp test
- ❖ Partial stroking ramp test
- ❖ Step change test