Modern Valve Technology

INTRODUCTION

- Power Plant and other petrochemical industries do deal with different types of valves. All piping systems are fitted with valves for controlling purposes or safety requirements. Understanding the function of each valve type will have an important reflection on the process quality, equipment and plant reliability, and the economics of the whole activity. Different application needs to select the appropriate valve type of a particular flow characteristics. Operation of the valve also affects the system and the process. Understanding the problems associated with valves is essential for diagnosis and troubleshooting and the needed maintenance for the particular type of valves.

This five day Modern Valve Technology training course will address topics including:

- Valve Types; Control Valves, Non-Return Valves and Safety Valves
- Valve Operation and Control
- Valve Selection and Sizing
- Valve Maintenance and Troubleshooting

PROGRAMME OBJECTIVES

- An understanding of valve characteristics and different parameters affecting the operation of valves
- Knowledge of the main types of valves and the ability to select the right valve for the particular application including Control Valves, Non-Return Valves and Safety Valves
- The ability to perform the necessary calculation for valve sizing
- Knowledge of valve control systems including actuators and positioners
- An understanding of the problems associated with valves like flashing, slamming and water hammer
- The ability to perform troubleshooting of systems involving valves and making decisions on the right maintenance plan concerning different types of valves

WHO SHOULD ATTEND?

- Engineers and Technicians of Mechanical, Electrical and Chemical Engineering will benefit largely from this training session
- Maintenance, Operation, and People in R&D departments are recommended to attend also

TRAINING METHODOLOGY

- This training course with a highly interactive combination of lectures and discussion sessions will be managed to maximise the amount and quality of information and knowledge transfer. Computer animations will be used to enhance understanding of daily topics.
- Questions, comments and personal experience from every participant will have a chance to be heard and discussed. Questions will be asked on a daily basis to examine the effectiveness of delivering the course. Case studies are encouraged to be brought by the participant. These case studies will be discussed thoroughly and will be shared by all participants.

PROGRAMME SUMMARY

- Participants will acquire sufficient knowledge and skills to independently evaluate possible valve operation, selection and design solutions and intelligently discuss their valve related issues and problems with other engineers. Participants will also have the ability to carry out troubleshooting of valves and systems that valves are connected to. This would have a great impact on the plant reliability, operation stability and overall running cost reduction.

PROGRAM OUTLINE

Basic of the Valve Technology

- Types of Valves and Selection
- Valve Parts and Components
- Valve Flow characteristics – Linear Valve Features
- Control Valve Flow Characteristics – Quick Opening, Linear, Equal Percentage
- Valve-sizing criteria – Valve Coefficient, Cv
- Pressure Recovery

Valve Functions and Types

- Functions of valves and Methods of regulation
- Valve Types – Stopping / starting valves, Control valves
- Valve end connections
- Valve components and trims
- Types of valves, Globe, Gate, Ball, Plug, Butterfly Valves, Pinch, Diaphragm Valves

Check (Non-Return) Valves, Relief and Safety Valves

- Applications and selection of Check (Non-Return) Valves
- Types of Check Valves – Swing, Lift, Tilting-disc, Piston
- Rupture Disk Valves
- Buckling (Shear) Pin Valves
- Relief and Safety Valves Types
- Relief Valves Problems

Control Valve Actuators and Positioners

- Actuation Systems and Forces
- Linear and Rotary Actuators
- Types of Actuators – Pneumatic / Hydraulic, Piston, Diaphragm, Electric motors
- Actuator Performance and Selection
- Valve Positioners and Operation
- Examples of valve installation plans and checklists

Valve Troubleshooting

- High Pressure Drop – Pressure Recovery Characteristics
- Cavitation and Flashing in Valves – Cavitation-elimination devices
- High Velocities – Erosion
- Water Hammer – Causes and Solutions
- Surge Protection
- Noise Attenuation Problems
- Troubleshooting the Control Valves
- Valve Inspection & Testing (API598)