

VALVES OPERATION, MAINTENANCE & TROUBLESHOOTING



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TRAINING TITLE

VALVES OPERATION, MAINTENANCE & TROUBLESHOOTING

VENUE

Dubai, UAE

DURATION

5 Days

DATES

21 - 25 August 2022

PRICE

US\$4,000 per attendee including training material/handouts, morning/afternoon coffee breaks and Lunch buffet.

TRAINING 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 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.

The reader will be introduced to different types of valves and their different applications. The two most important requirements that determine the valve performance are the valve tightness characteristics, and the flow characteristic of a valve.

Valves can be classified as manual or control valves. When a manual valve is operated via an actuator it becomes a control valve. Valves in general do control the rate of flow in a piping system, the direction of the flow, or act as a relieving device to protect the system from over-pressurization. Valves like check valves would prevent the flow from reversing, thus protecting equipment from reverse flow. Such valves operated automatically without need for any type of actuation. Stop and close valves used mainly to isolate a system in situation of maintenance

and/or putting the standby equipment in services. The function of a valve is what determines its design. The right selection of a valve in terms of its type and size, and its pressure class is what affect most the stability and reliability of the system. The nature of the fluid, the type of the process, the level of temperature and pressures are parameters affecting the valve selection.

The flow through a valve will experience different effects, like cavitation, flashing, and noise. Water hammer is on of the effects that a check valve may cause. Such phenomenon might lead to different kind of problems, some would affect directly the valve itself and other might upset the process as a whole or result in system erosion or corrosion. Vibration and instrumentation false function could also be a result of faulty valve. Some of these problems can be avoided in the stage of selection and sizing of the valve. Others could be eliminated in the process of writing the specifications and through good communications with manufacturer or vendor. Understanding these different types of problems will help troubleshooting the valves and the systems and help curing the problems. Wrong installations could be the reason behind many of valves problem too.

TRAINING OBJECTIVES

This course will address all aspects of Operation, maintenance and Troubleshooting of valves as above, hoping that the participant will benefit a lot from the course and becomes of more understanding concerning the valves.

TRAINING AUDIENCE

Mechanical and Operational Engineers and Technicians who is responsible of Operation, Maintenance and Troubleshooting of Valves of Different types and functions are the most to benefit from this course.

TRAINING OUTLINE

Basics of Valve Technology

Chapter 1

Valves Technology

Types of Valves

Valves characteristics

Sealing performance

Leakage Criterion

Leakage Classifications

Sealing Mechanisms

Valve stem seals

Flow characteristics

Flow through valves

Valve Characterizing Coefficients

Valve flow characteristics

Linear & equal %

Control Valves & Actuators

Chapter 2

Control Valves

Functions of manual valves

Methods of regulation

Types of control valves

Gate Valves

Plug Valves

Ball Valves

Butterfly Valves

Pinch Valves

Diaphragm Valves

Control Valves & Actuators

Control Valves Types

Linear Valve Features

Rotary Valve Features

Control Valve Flow Characteristics

Quick Opening Characteristics

Linear & Equal %

Actuation systems

Types of actuators

Pneumatic Piston Actuator

Electric motors

Electrohydraulic Actuators

Actuator Performance

Valve Positioner

Operation of Positioners

Positioner calibration

Self Operated Valves

Chapter 3

Check Valves

Applications

Types of Check Valves

Lift check valves

Swing check valves

Tilting-disc check valves

Diaphragm check valves

Check Valves Operation

Water Hammer

Selection of Check Valves

Relief and Safety Valves

Relief Valves Types

Pressure-relieving devices

Automatically operated valves

Direct-acting & piloted pressure relief valves

Modulating, full-lift, and ordinary pressure relief valves

Valve Loading

Safety Valves

Operation of Direct-acting pressure relief valves

Blowdown

Relief valves problems

Rupture Valves

Applications of Rupture Discs

Rupture discs vs. Pressure relief valves

Rupture discs in gases and liquid service

Temperature and bursting pressure relationship

Pressure tolerances

Design and performance of ductile metal rupture discs

Types of Rupture discs:

Prebulged rupture discs

Reverse buckling discs

Vent panels

Graphite rupture discs

Double disc assemblies

Rupture disc and pressure relief valve combinations

Selection of rupture discs

Operation of Rupture Discs

Valves Maintenance and Troubleshooting

Chapter 4

Valves Maintenance and Troubleshooting

High Pressure Drop

Pressure Recovery Characteristics

Cavitation in Valves

Incipient and choked cavitation

Flow curve cavitation index

Cavitation-elimination devices

Flashing versus Cavitation

Flow Choking

High Velocities

Water Hammer

What causes water hammer?

Water Hammer Calculations

Solutions for water hammer

Surge Protection

Check valve slamming

Noise problems

Clean air standards

Life loading

Packing for fugitive-emission control

Troubleshooting the Control Valves

TRAINING CERTIFICATE

MAESTRO CONSULTANTS Certificate of Completion for delegates who attend and complete the training course

METHODOLOGY

Our courses are highly interactive, typically taking a case study approach that we have found to be an effective method of fostering discussions and transferring knowledge. Participants will learn by active participation during the program through the use of individual exercises, questionnaires, team exercises, training videos and discussions of “real life” issues in their organizations. The material has been designed to enable delegates to apply all of the material with immediate effect back in the workplace.