ICTD
المركز العالمي للتدريب والتطوير
International Centre For Training & Development

MUE137

Hydraulic Systems

Course Introduction:

The course will concentrate on how the participants will learn the basic hydraulic components, how they work, and their function in a hydraulic circuit. They will be able to understand and interpret hydraulic schematics, and implement safe work practices.

Gain the basic skills needed to be a proactive and effective systems troubleshooter. Learn how to make minor, cost saving repairs by seeing and understanding the operation of various components. You will practice preventive maintenance techniques that will reduce premature system failure

Also, it provides participants with full appreciation of the different types of hydraulic systems and their characteristics. Also, provides participants with understanding of hydraulic system design, operation and maintenance.

This comprehensive training program consists of some video clips (Demonstration) that train students to understand the principles of hydraulic system operation, as well as how to operate, maintain, troubleshoot, and repair a variety of hydraulic equipment.

Course Objectives:

Upon successful completion of this course, the delegates will be able to:

- ✓ Read and understand the hydraulic circuit diagrams
- ✓ Understand the Application of hydraulic systems
- ✓ Understand the function, construction and operation of the main hydraulic control components
- ✓ Create and match a variety of hydraulic applications to the work to be performed
- ✓ Properly test and inspect hydraulic systems
- ✓ Diagnose system versus component problems
- ✓ Distinguish problem "symptoms" from the actual "cause"
- ✓ Apply a common-sense, systematic approach to troubleshooting
- ✓ Evaluate the cause and effect of changing or re-sizing system components
- ✓ Recommend and implement change towards fixing problems

Who Should Attend?

The course is designed for engineers and technicians who are working in industries and factories as a responsible for design or maintain hydraulic units to keep them aware with latest technology in those fields and also to improve their skills.

Course Outline:

Day 1:

Introduction to Hydraulic Systems

- Properties of Liquids
- Hydraulic System Components
- Hydraulic Schematic Symbols
- Pressure and Flow
- System Flow and Pressure
- Hydraulic Power Transmission
- Hydraulic System Efficiency
- Hydraulic System Safety

Pressure Controls

- Introduction to Pressure Control Valves
- Unloading and Counterbalance Valves
- Sequence and Pressure Reducing Valves
- Direct-Acting and Pilot-Operated Pressure Control Valves
- External Control of Pilot-Operated Valves
- Spool-Type Pressure Control Valves
- Pressure Reducing Valve Operation

Day 2:

Directional Flow Controls

- Direction Control Valves
- Centering Conditions
- Actuating Directional Control Valves
- Piloting and Draining
- Packed Spool Valves
- Flow Control Valve Designs
- Flow Control Applications

Fluids, Filters, and Reservoirs

- Functions of Hydraulic Fluid
- Characteristics of Hydraulic Fluid
- Fluid Conditioning in the Reservoir
- Draining and Replacing Fluid
- Reducing External Contamination
- Types of Filters
- Filter Maintenance

Day 3:

Hydraulic Pumps, and Accumulators

- Hydraulic Power
- Hydraulic Pumps
- Vane Pumps
- Piston Pumps
- Monitoring Pump Operation
- Hydraulic Accumulators
- Accumulator Maintenance
- Pre-charging an Accumulator

Variable Volume Hydraulic Pumps

- Fixed Volume and Variable Volume Pumps
- Horsepower Reduction
- Variable Volume Vane Pumps
- Variable Volume Piston Pumps
- Volumetric Efficiency
- Case Drain Flow
- Electrical Checks
- Reversible Pumps

Day 4:

Actuators

- Hydraulic Cylinders
- Cylinder Regulation
- Cylinder Repair
- Hydraulic Motors
- Motor Regulation
- Motor Repair

Hydraulic System Troubleshooting

- Introduction to Troubleshooting
- Using Schematic Diagrams
- Flow-Related Problems
- Cylinder Malfunction
- Edge guide Circuit Malfunction
- Down ender Malfunction
- Traversing Circuit Malfunction

Day 5:

Electro-hydraulic Servo Systems

- Signal Transmission
- Servo System Schematic Symbols
- Spool Servo Valves
- Jet Pipe Servo Valves
- Flapper Servo Valves
- Frequency Response Tests

Course Requirement:

"**Hand's on practical sessions, equipment** and **software** will be applied during the course if required and as per the client's request".

Course Certificate:

International Center for Training & Development (**ICTD**) will award an internationally recognized certificate(s) for each delegate on completion of training.

Course Methodology:

A variety of methodologies will be used during the course that includes:

- (30%) Based on Case Studies
- (30%) Techniques
- (30%) Role Play
- (10%) Concepts
- Pre-test and Post-test
- Variety of Learning Methods
- Lectures
- Case Studies and Self Questionaires
- Group Work
- Discussion
- Presentation

Course Fees:

To be advised as per the course location. This rate includes participant's manual, and-Outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Timings:

Daily Course Timings:

08:00 - 08:20	Morning Coffee / Tea
08:20 - 10:00	First Session
10:00 - 10:20	Coffee / Tea / Snacks
10:20 - 12:20	Second Session
12:20 - 13:30	Lunch Break & Prayer Break
13:30 - 15:00	Last Session