BAYUBALI LEARNING SOLUTIONS

PUMPS AND COMPRESSORS: OPERATION, MAINTENANCE AND TROUBLESHOOTING COURSE

Training Dates:	As per schedule	**Training Venue:**	Kuala Lumpur
Basic Fee:	RM3,450.00 + SST per participant (this includes course materials, meals, refreshment and attendance certificate)		

COURSE PERIOD

Three (3) Day (21 Hour)

INTRODUCTION

Pumps and compressors are very important rotating equipment in industrial sectors especially oil and gas, and processing plants and manufacturing companies. It is an essential machinery as part of an integral systems. A comprehensive understanding of the basic principles, operation, maintenance and troubleshooting of pump and compressor systems are required to achieve much reliable conditions in handling of those equipment. Even though every individual pump and compressor has its own specific design, but the common operational characteristics are almost applied to all pump and compressor systems. Then, the coverage of the training will feature the importance of proper operation and maintenance of pumps, compressors and their associate equipment. It helps familiarize the engineers, technicians, and operators with the guidelines and best practices employed in handling this equipment, including installation, operation, maintenance, and troubleshooting.

TARGETED GROUPS

- Engineers, construction, maintenance, and operations personnel who are and will be responsible for the selection, signing, specification, installation, testing, operation and maintenance of pumps and compressors used in fluid handling facilities.
- Operation, maintenance, and technical personnel who are working in process plants including board (panel) operators and field technicians.
- Experienced professionals who want to review or broaden their understanding in pumps and compressors.
- Other professionals who would like to enhance their competency in the subject matters.

TARGETED INDUSTRIES

- Oil and gas companies
- Chemical and process as well as petrochemical activity
- Gas production facilities
- Power generation plants
- After-sales and service providers
- Manufacturing and fabrication plants
- Component makers and suppliers
- Other related fields of engineering

COURSE OBJECTIVES

To provide participants with the fundamental, technical knowledge and some practical aspects on pumps and compressors. Participant will be exposed to the basic installation, operation, testing, commissioning, maintenance and troubleshooting of pumps and compressors including its auxiliary equipment and others related accessories. The emphasis will be on the physical understanding of the problems in operation and maintenance, as well as identifying specific causes and the best way to troubleshooting them.

COURSE OUTCOMES

At the end of this course, all participants are able to

- Differentiate between pumps and compressors, their advantages and limitations.
- Describe the overall layout and main parameters for installation of pump and compressor systems.
- Identify every part and component of pumps and compressors, and their integration within a specific machinery.
- Explain the fundamental construction and operation of pumps and compressors.
- Identify types of seal and function sealing in pump and compressor systems.
- Operate pumps and compressors, and recognize normal and abnormal working conditions.
- Propose basic inspection and maintenance on pump and compressor systems.
- Practice safe and healthy working environment.

TRAINING METHODOLY

- Lecture
- Group discussion
- Knowledge sharing
- Brainstorming session

- Consultation and inspection during plant visit and demonstration (In-House Program Only).

COURSE CONTENTS

DAY 1

MODULE 1: Fundamental of Pump

- Function, Duties and Types
- Centrifugal, Axial and Positive Displacement Pumps
- Special Duty Pumps
- Selection, Installation and Pump Components
- Technology and development

MODULE 2: Pump Operation and Performance

- Pump Testing Procedures
- Pump Performance (Head, Flow, Efficiency)
- Envelopes and impeller selections
- Pump series and parallel connection
- Sample calculation

MODULE 3: Pump Commissioning and Start-up

- Preparation for commissioning
- Start-up procedures
- Pump priming and bleeding
- Observation of pump operation and start-up

DAY 2

MODULE 4: Cavitation, Air and Vapour Lock

- Cavitation phenomena and effects
- Cavitation damages
- NPSHA and NPSHR
- Vapour and air lock, their prevention
- Releasing of vapour and air lock
- Sample calculation

MODULE 5: Maintenance and Troubleshooting of Pump

- Preventive maintenance
- Suction system and its effects
- Balancing and alignment
- Wear inspection and monitoring
- Bearing and lubrication
- Seal and packing
- Pump troubleshooting

MODULE 6: Fundamental of Compressors

- Type, construction and duties
- Impeller arrangement and its effects
- Installation and operation
- Oil free and Oil flooded system

DAY 3

MODULE 7: Compressor Operation and Maintenance

- Centrifugal and Reciprocating compressors
- Surge phenomena and anti-surge control
- Operating limits

MODULE 8: Seal and Packing for Pumps and Compressors

- Function, types and installations
- Mechanical packing and gasket
- Mechanical seals

MODULE 9: Pressure Losses in Piping Systems

- Pump and compressor piping system
- Pipeline filters - operation and maintenance
- Types of pressure losses
- Application of Moody chart
- Surface roughness chart
- Application of k values for fitting
- Calculation of power and estimation of pressure losses

Plant Visit and Technical Consultation (In-House Program Only)

- Air compressor plant room
- Chiller plant room
- Thermal oil pump and piping system
- Water treatment pumping and storage
- Boiler feed water and fuel system

ABOUT THE INSTRUCTOR

Ir. Associate Professor Yahaya bin Ramli, graduated with Masters of Science in Fluid Power Systems from University of Bath, United Kingdom and is both a Registered Professional Engineer (Mechanical) with Board of Engineers Malaysia (BEM) and a Corporate Member of The Institution of Engineers, Malaysia (IEM).

He has extensive field experience with several companies such as Felda Berhad (Plant Superintendent), Petronas Gas Berhad (Project Management Executive and Production Supervisor) and Sobena Offshore Inc (Assistant Plant Manager). Currently, he is a senior lecturer in University of Technology Malaysia at Faculty of Mechanical Engineering and he did a lot of research in thermo fluids technology.

He also active delivering the technical courses such as; pump technology, compressor systems, boiler and steam systems, valve maintenance, compressed air system and etc.