

PUMP TECHNOLOGY – DESIGN, SELECTION, OPERATION AND MAINTENANCE COURSE

Training Date: 02nd – 06th July 2012 (5 Days)

Training Venue: Kuala Lumpur, MALAYSIA

Training Time: 0900 – 1600 hours

Training Fee: USD3,500 per participant

Learning Objectives

- To provide a wide range of information and technical knowledge on pump technology and its associated equipments.
- To acquire knowledge on the design, practice and application of pump and pumping systems.
- To enhance skill and competency in handling and maintaining of pumps.
- To develop self confidence towards the correct decision making in pump troubleshooting.

Who Should Attend?

- Plant and facilities engineers
- Process and production engineers
- Technical services engineer and officer
- Maintenance and production staff – supervisors, foreman and technician
- Procurement and inventory executives
- Senior plant and control room operators
- Contractor and pump supplier
- Sale and application engineers

Course Program

DAY 1

MODULE 1 : FUNDAMENTAL OF PUMPS

- Duty, function and types of applications
- Terms and interpretation in pump and pumping systems
- Pump family and their working principle
- Hydrokinetic – centrifugal, axial and mixed flow pumps
- Hydrostatic (positive displacement pumps) - gear, vane and piston pumps
- Special duty pumps
- Split casing, double suction pump
- Multistage pump – vertical and horizontal installation

MODULE 2 : COMPONENTS OF CENTRIFUGAL PUMPS AND THEIR TECHNOLOGY

- Casing: volute and vortex
- Impeller: types and constructions
- Seal and packing
- Bearing
- Wear ring
- Balancing piston
- Shaft, sleeve and eye ring

SELECTED CUSTOMERS



MALAYSIA LNG SDN. BHD.



Course Program... Cont'd

MODULE 3 : PERFORMANCE AND TESTING OF HYDROKINETIC PUMPS

- Testing requirements (factory and on-site) and procedures
- Pump performance (curves):-
 - Head (H),
 - Efficiency (η),
 - BHP vs Flowrate (Q)
- Understanding of industrial pump performance and charts
- The effect of impeller dimension (diameter and blade height)
- The effect of pump rotational speed (RPM)
- Interpretation of impeller envelopes and their selection
- Testing and determination of Net Positive Suction Head (NPSH)
- Requirement of **NPSH_R** and **NPSH_A**
- Pump performance in series and parallel connections
- Study Case # 1: Basic pump calculation

DAY 2

MODULE 4 : PUMP COMMISSIONING AND START-UP

- Preparation for commissioning
- Start-up approach and procedures
- Requirement and procedure for pump priming and venting
- Observation and monitoring of pump operation

MODULE 5 : CAVITATION, AIR POCKET AND VAPOUR LOCK

- Cavitation phenomena and the effect
- Effect of cavitation to the pump performance
- Effect of **NPSH_R** and **NPSH_A** to pump cavitation
- Prediction of pump cavitation
- Cavitation damages in pump
- Air pocket and vapour lock
- Releasing vapour and air locks

MODULE 6 : CENTRIFUGAL PUMP DESIGN AND APPLICATIONS

- Application of affinity laws in pumps
- Specific speed and its application
- Impeller design and specifications
- Matching of pump and piping system (operating point)
- Application of energy equation in pumping system
- Friction losses in piping system
- Application table and chart to determine k factor for fittings
- Study Case # 2: Basic design calculation

DAY 3

MODULE 7 : CENTRIFUGAL PUMP MAINTENANCE AND TROUBLESHOOTING

- Maintenance programme:-
 - breakdown,
 - predictive,
 - preventive and
 - TPM
- Suction system and its effects
- Wear inspection and monitoring
- Installation and servicing of seal and packing
- Bearing and lubrication
- Pump failure and repair
- Pump malfunction and troubleshooting

MODULE 8 : POSITIVE DISPLACEMENT PUMPS, THEIR TECHNOLOGY AND APPLICATIONS

- Fundamental and principles of hydrostatic pumps
- Types, constructions and components: Gear, vane and piston assemblies
- Important parameters and control of pumps
- Installation, selection and application of pumping systems
- Energy saving and safety aspects
- Operational aspects in relation to optimum life of pumps

Course Program... Cont'd

MODULE 9 : POSITIVE DISPLACEMENT PUMPS: PERFORMANCE AND ANALYSIS

- Working parameter of hydrostatic pumps
- Working parameters and variable control of pumps
- Testing and performance of positive displacement pumps
- Efficiency, volumetric and energy losses in pumps
- Analysis of positive displacement pumps
- Study Case # 3: Basic pump analysis

DAY 4

MODULE 10 : POSITIVE DISPLACEMENT PUMPS: MAINTENANCE AND TROUBLESHOOTING

- Maintenance programme:-
 - breakdown,
 - predictive,
 - preventive and TPM
- Wear inspection and monitoring
- Installation and servicing of seal and packing
- Bearing and lubrication
- The effect of fluid viscosity
- Pump failure and repair
- Pump malfunction and troubleshooting

MODULE 11 : OPERATION AND MAINTENANCE OF PIPING SYSTEMS

- Installation of pumping stations
- Piping and fitting for hydrokinetic and hydrostatic pumps
- Pressure and energy losses in piping and pipeline
- Type, operation and maintenance of valves
- Pressure and flow control devices
- Selection of piping and fitting materials
- Bracket, support, suspension and pipe rack
- Vibration isolator, expansion joint, condensate collector, filters
- Pressure and leakage tests
- Pipe cleaning, coating, painting and colour coding (identification)
- Inspection and maintenance of piping systems

MODULE 12 : VALVES TECHNOLOGY: OPERATION AND MAINTENANCE

- Fundamental, function and specific duty of valves
- Design aspects, performance and range of selection
- Types, parts, construction and application
- Installation and inspection of valves
- Operation and proper handling of valves
- Failure, repair work and method of testing
- Maintenance and troubleshooting
- Case study – calculation and selection of valves

DAY 5

MODULE 13 : PRESSURE LOSSES IN PIPING AND PIPELINE SYSTEMS

- Types and installation of piping for pumping systems
- Fundamental and consideration of energy (pressure) losses in piping systems
- Types of pressure loss in piping systems
- Determination of friction loss and fitting loss in piping
- Use of associated graphs, tables and charts for pressure losses in fluid flow
- Criteria for minimizing pressure losses and promote energy saving
- Case study – determination of pressure losses in pumping system

MODULE 14 : SEAL AND PACKING TECHNOLOGY FOR PUMPS

- Types of seal and packing for pumps
- Leakage joints and its control
- Installation and operation of mechanical seal
- Maintenance and troubleshooting of seal and packing
- Failure and repair of mechanical seals
- Case study



Course Program... Cont'd

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About the Course Instructor

Engr. 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.



Registration Form

Please Send Your Registration To:

Tel:	006.013.208.2143	Fax:	006.09.617.8443	E-mail	info@cfpets.com
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Course Details

Course Name:	Pump Technology – Design, Selection, Operation and Maintenance Course	Course Date:	02 - 06 July, 2012
Venue:	Kuala Lumpur, MALAYSIA	Fee:	USD3,500.00

Company Information

Organization	
Address	

HR / Training Manager

Invoice to be sent to

Name :		
Tel no.:		
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E-mail :		

Participant Information

	Participant # 1	Participant # 2	Participant # 3
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Department :			
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