



# PUMPS - APPLICATION, OPERATION & MAINTENANCE

TAKE THE MYSTERY OUT OF INDUSTRIAL PUMP APPLICATIONS

HRDF

[www.zohlgroup.com](http://www.zohlgroup.com)

## COURSE CODE: H-ME-01

LEVEL: Basic to Intermediate

LANGUAGE: Bahasa & English

## OVERVIEW

Pumps are essential components in almost all industries and required to meet system demands as well as operate safely, economically and reliably. This course will describe the function of both positive displacement and centrifugal pumps, discuss the operational characteristics, and explain the maintenance requirements.

Additionally, the course will discuss cost efficiency in terms of energy consumption and will provide information on selecting and purchasing the correct pump for a particular application.

## OBJECTIVES & LEARNING OUTCOMES

Main learning outcomes of this course:

- Be aware of the performance characteristics of positive displacement and centrifugal pumps
- Understand the operational and maintenance aspects of various pumps
- Become familiar with the components of positive displacement and centrifugal pumps
- Appreciate the influence of fluid sources and attached piping

## COURSE DURATION

2 days (9am—5pm)

Tea Breaks: 10:30am & 3:30pm

Lunch: 1:00pm-2:00pm

**Note:** Please contact our office for Training Date or visit our website for details ([www.zohlgroup.com](http://www.zohlgroup.com))

## METHODOLOGY

This program will be conducted with:

- Interactive Lecturers
- PowerPoint presentation
- Group Discussions
- Practical Exercise
- Role Play
- Case Study

## TARGET AUDIENCE

- Process Engineers
- Plant & Facilities Engineers
- Technicians
- Project Engineers & Managers
- Maintenance & Operations personnel
- Mechanical Foremen
- Instrumentation Technicians
- Pump Operators

## KEY TAKEAWAYS

*Participants will leave the training with specific knowledge to eliminate mysterious pump failures, improve the running time and service life on a population of industrial pumps.*

## LEARN WHY IMPROPER PUMP SPECIFICATION RESULTS IN:

- Unnecessary capital costs
- Large long-term energy losses
- Reduced pump reliability
- Elevated maintenance costs
- Reduced operation time
- Poor hydraulic performance
- Discover the key elements necessary to avoid these negative effects

## LEARN A TROUBLESHOOTING APPROACH THAT AVOIDS TRIAL AND ERROR

### FIND OUT HOW TO:

- ⇒ Focus on the real problem
- ⇒ Save wasted effort on unnecessary pump & motor repairs
- ⇒ Quickly determine a pump's performance
- ⇒ Correlate pump reliability and hydraulic performance
- ⇒ Visually assess bearing & seal service
- ⇒ Predict time to probable component failure
- ⇒ How to properly install and commission a pump
- ⇒ Optimize mechanical seal service life
- ⇒ Optimize bearing life
- ⇒ Improve power train (motor, coupling, pump) efficiency
- ⇒ Predict pump performance changes with variable speed motors

## LOCATION

Mindset Discovery Center™@ZOHL

M2-6-08, Level 6, 8trium Tower 2

Bandar Sri Damansara, Kuala Lumpur

(other Regions please contact our office)



Customized In-House Training Program is available in the following areas:

**Administrative Skills | Career Development | Human Resources | Personal Development | Sales & Marketing | Leadership & Management | Workplace Essentials | Entrepreneurship | Soft Skills | HSE | Engineering | Telecoms | IT**

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## COURSE CONTENT

### Module 1 - Basic Pump Principles

- How Pumps Work
- Head vs. Pressure
- Absolute and Gauge Pressures
- Work & Efficiency
- Flow & Head, Efficiency, Power

### Module 2 - Pump Classification

- PD, Centrifugal types
- Impellers, Liquids
- ANSI / API
- Specific Speed

### Module 3 - Pump Curves

- Head, Efficiency & Power
- NPSHr
- Family Curves
- The Affinity Laws
- Speed & Diameter
- Practical Application

### Module 4 - System Curves

- Total Dynamic Head
- Elevation, Pressure & Losses
- Static head, friction head curve
- Pumps in Series & Parallel

### Module 5 - NPSH and Cavitation

- NPSH required
- NPSH available
- Vapor Pressure
- Types of Cavitation
- Effects & Prevention

### Module 6 - Bearings

- Types & Services
- Lubrication
- Maintenance & Seals

### Module 7 - Pump Packing

- Components
- Packing Procedures
- Failure & Leakage

## COURSE CONTENT (cont)

### Module 8 - Mechanical Seals

- Components
- Single & Double
- Support Systems

### Module 9 - Pump- Motor Alignment

- Types of Misalignment
- Alignment Techniques

### Module 10 - Pump Operation / Pump Reliability

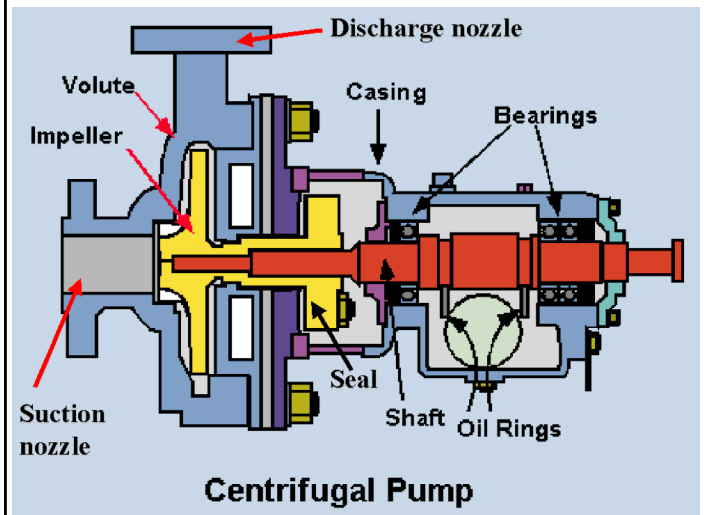
- Definitions
- Operating away from BEP
- Energy savings, Increased MTBF
- Bearing and Seal Life
- Shaft deflection
- Maintenance Operation & Design

### Module 11 - Troubleshooting

- Why duties change
- Identifying problem applications
- Where do your pumps operate
- Instrumentation (reading from gauges)
- Fault finding and Failure Analysis
- Interpreting the Evidence

*Note:* Course Content may change subject to further review

*Image for illustration only*



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## COURSE FEE

**RM1,272** per person incl. 6% SST  
(Fee inclusive of Course Material, Attendance Certificate, and Meals)

## CERTIFICATE

Participants will be issued a Certificate of Attendance/ Accomplishment upon successful completion of this training program. Full attendance is a pre-requisite.

## CIDB CCD Points

20 (for CIDB-Registered Companies) & upon approval from CIDB

## HRDF CLAIMABLE

Yes. SBL Khas. If your company contributes to HRDF Fund

## REGISTRATION METHOD

1. **Online:** [http://zohlgroup.com/mdc/hrdf\\_registration/](http://zohlgroup.com/mdc/hrdf_registration/) OR
2. Download this brochure at: <http://zohlgroup.com/all-brochures/> and fill up the required information. Then please fax to: 03.6279.0663
3. Or contact our office at: 03.6279 9276 / 013.398.1038

## FACILITATOR

**Sathy Vel Naidu** - Sathy has more than 25 years of experience in the Mechanical and Electrical (M&E) industry. Over the span of his career he has gained significant knowledge in project management, electrical systems troubleshooting & maintenance, and systems design & engineering. In addition to managing projects he has also started sharing his knowledge through training services under ZOHL Technical Programs.



### **Education:**

- ◇ Electrical Chergeman License
- ◇ Certificate in Westinghouse Electrical Systems
- ◇ Power Systems Auditor for Procter & Gamble
- ◇ Radiation Safety Training for Honeywell TDC 3000

### **Experience:**

- ◇ Electrical Technician for Hitachi Electronics Devices Singapore
- ◇ Testing & commissioning supervisor for Toyo Engineering
- ◇ Asst Engineer for FPG Oleochemicals Sdn Bhd
- ◇ Maintenance Manager FPG Oleochemicals sdn Bhd
- ◇ Engineering Director at Pakat Perkasa Sdn Bhd
- ◇ Lightning & Earthing Protection Systems Trainer for Celcom
- ◇ Electrical Trainer for Leighton Offshore
- ◇ Senior Technical Trainer @ZOHL

\*Note: Trainer availability is subject to change



## REGISTRATION FORM

**Participant#1:** \_\_\_\_\_

Position: \_\_\_\_\_

IC No: \_\_\_\_\_

**Participant#2:** \_\_\_\_\_

Position: \_\_\_\_\_

IC No: \_\_\_\_\_

**Training Date:** \_\_\_\_\_

**Training Venue:** \_\_\_\_\_

**Organization:** \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Contact Person: \_\_\_\_\_

Position: \_\_\_\_\_

Tel: \_\_\_\_\_

Fax: \_\_\_\_\_

Email: \_\_\_\_\_

Company Website: \_\_\_\_\_

## **PAYMENT**

**CASH:** RM \_\_\_\_\_ **OR**

**CHEQUE** No: \_\_\_\_\_

Please fax your bank-in slip to 03.6279.0663 or scan your bank-in slip and email to [plbk@zohlgroup.com](mailto:plbk@zohlgroup.com)

\*Please make your cheque payable to:

**ZOHL Consultancy Sdn Bhd**



Account No:  
**514392303373**

Signature & Company Stamp

### **Note:**

- Date & venue of seminar subject to changes
- Payment must be made 7 days before the training date
- Registration cancelled 7 days prior to the event is subject to RM100 service charge per participant
- No refunds for notice received less than 7 days prior to the event. A substitution may be made at any time at no extra charge.
- Program content may change subject to revision by our consultants from time to time.
- Full fee is required with your registration. 5% Group discount is available - min 3 pax.

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Sebarang pertanyaan sila hubungi Cik Niesa

**ZOHL Consultancy Sdn Bhd** (332967-D)(SST ID:W10-1810-32000429)

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