



# SWITCHGEAR OPERATION & MAINTENANCE

An update on current industry best practices in switchgear O & M

HRDF

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

## COURSE CODE: H-EE-03

LEVEL: Basic to Intermediate

LANGUAGE: Bahasa & English

## OVERVIEW

In an electrical power system, switchgear is the combination of electrical disconnect switches, fuses or circuit breakers used to control, protect and isolate electrical equipment. Switchgear is used both to de-energize equipment to allow work to be done and to clear faults downstream. This type of equipment is directly linked to the reliability of the electricity supply. Switchgears in substations are located on both the high-voltage and low-voltage side of large power transformers. The switchgear on the low-voltage side of the transformers may be located in a building, with medium-voltage circuit breakers for distribution circuits, along with metering, control, and protection equipment. In this two-day course the participants will be taught on the fundamentals of the switchgears and also on the maintenance aspect.

## OBJECTIVES & LEARNING OUTCOMES

After attending this course:

- ⇒ The participant should be able to understand and able to explain theoretically and practically the operations and maintenances of various type of circuit breakers, isolators following the TNB Transmission guidelines correctly;
- ⇒ Able to gain extra knowledge on the operation, maintenance and troubleshooting of switchgears;
- ⇒ Able to perform using the right approach on the operation, maintenance and troubleshooting; and
- ⇒ Able to reduce downtime due to failures of switchgears.

## 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
- Discussions | Practical Exercise
- Role Play | Case Study

## TARGET AUDIENCE

- The course is designed for those wanting to achieve a level of awareness of how switchgear operates within manufacturing industries, service industries, education, hospital, security, commercial buildings, etc.
- Technical personnel who are directly/indirectly involve in the operation, maintenance of electrical installation system such as:
  - ◊ Manager, Engineer, Technician, Chargeman, etc.

## LOCATION

Mindset Discovery Center™@ZOHL, M2-6-08, Level 6, 8trium Tower 2, Bandar Sri Damansara, Kuala Lumpur (other Regions please contact our office)

## COURSE CONTENT

### **Module 1 : Introduction**

- Definition of switchgear
- Components of switchgear and their functionalities

### **Module 2 : Type of switchgears**

- Isolator | Switch Fuse | Fuse Switch
- Molded Case Circuit Breaker (MCCB)
- Air Break Circuit Breaker (ACB)
- Mineral Oil Circuit Breaker (MOCB)
- Vacuum Circuit Breaker (VCB)
- Hexafluoride Circuit Breaker (SF6)

### **Module 3 : Application and ratings of switchgears (High and Low Voltages)**

- Three-phase electrical switchgear with voltage ratings from 1050-33000 volts alternating current (ac).
- Circuit breakers, switches, switch fuses, isolators and contactors operating at voltages above 1050 volts ac.
- Direct Current (DC) switchgear, low voltage switchgear (voltage up to 1050 volts ac.)

### **Module 4 : Handling and Managing Switchgear**

- Control the risk in your workplace.
- Asses the risks on your switchgear and manage them to ensure safe operation and minimize risk of injury.
- Identifying hazards on switchgears.

### **Module 5 : Operating Procedures**

- Developing operating procedures.
- Have the appropriate knowledge of the safety rules.
- Know how to apply the safety document.
- Know their responsibilities to ensure safety and for safe working.

### **Module 6 : Maintenance of switchgear**

- Definition of maintenance | Purpose of maintenance

### **Module 7 : Types of maintenance**

- Schedule maintenance | Breakdown maintenance
- Corrective maintenance | Preventive maintenance

### **Module 8 : Conditional base monitoring maintenance**

- Check and inspect the status of performance (predictive maintenance).
- Installation record (diagrams of electrical network, types of equipment, details of operational limitations due, a maintenance record of each switchgear, number of fault clearance, and details of any modification done).

### **Module 9 : Testing of switchgear**

- Mechanical test (operational test)
- Electrical test (insulation test/pressure test if necessary for high voltage switchgear).

### **Module 10 : Types of switchgear fault**

- Mechanical fault | Electrical fault

### **Module 11 : Maintenance record keeping and analysis**

- Monitoring and review arrangements, helps to keep records.
- Subsequent maintenance record of each switchgear.
- Number of faults clearance operations since the circuit-breakers were last maintained.
- Details of ant modification carried out.
- Periodic inspections of the low voltage installation.
- Regularly inspected and tested in accordance with the man-

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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Sebarang pertanyaan sila hubungi Cik Niesa

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

M2-15-02, Level 15, 8trium Tower 2, Jalan Cempaka SD 12/5

Bandar Sri Damansara, 52200 Kuala Lumpur

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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 SBL KHAS

Claimable under HRDF SBL KHAS Scheme (for Companies contributing to HRDF)

## REGISTRATION METHOD

1. **Online:** [http://zohlgroupp.com/hrdf\\_registration/](http://zohlgroupp.com/hrdf_registration/) **OR**
2. Download this brochure at: <http://zohlgroupp.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
- ◇ 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@zohlgroupp.com](mailto:plbk@zohlgroupp.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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