# COURSE OVERVIEW EE0071
# Switchgear Life Assessment

**Course Title**
Switchgear life assessment



**Course Date/Venue**
Session 1: January 03-07, 2027/Meeting Plus 9, City Centre Rotana Doha Hotel, Doha, Qatar
Session 2: December 05-09, 2026/Meeting Plus 9, City Centre Rotana Doha Hotel, Doha, Qatar




**Course Reference**
EE0071

**Course Duration/Credits**
Five days/3.0 CEUs/30 PDHs




**Course Description**



***This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.***

Switchgear represents a significant capital investment in the electric power grid. The reliable performance of low & medium voltage distribution switchgear within industries is a basic requirement for overall reliability of the plant.



A traditional equipment management strategy, which is often followed by plant management, is to replace switchgear when it has reached the end of its economic life. This choice provides maximum equipment lifespan whilst incorporating the latest technology and safety features upon replacement; however, it usually requires high economic investment. Conscious end of life decisions often mean a struggle to balance both a minimum investment and economic life cycle costs. The traditional replacement strategy does not necessarily fit with the overall needs of a particular plant.



Asset managers are fully assisted in moving from conventional approaches such as corrective maintenance and preventive maintenance to advanced strategies as well as risk-based maintenance and condition-based maintenance. This way, the service activity is no longer driven by predefined timeframes, observations and past experiences, but takes the actual condition of the equipment, the required reliability level and the life time extension expectation into account.

This course is designed to provide participants with a detailed and an up-to-date knowledge on switchgear life assessment. It covers the switching phenomena, switchgear components, system configurations, switch gear mechanisms, switchgear fundamentals, switchgear specifications and switchgear life span.

At the completion of the course participants will be able to employ switchgear lifespan practice; assess switchgear lifespan; carryout switchgear lifecycle management, apply various tips to optimize the life of electrical switchgear and consider the right decision for renewal or upgrading switchgear that includes budget limitations, risk limitations, risk limitations, operational limitations and safety limitations.

## Course Objectives/Outcomes & Benefits for the Participants

Upon the successful completion of this course, each participant will be able to:-

- Apply and gain an in-depth knowledge on switchgear life assessment
- Discuss switchgear covering switching phenomena, switchgear components, system configurations (LV, MV, HV) and switchgear mechanisms
- Explain the fundamentals of switchgear that includes bulk oil switchgears, minimum oil switchgears, air blast switchgears, vaccum switchgears, SF6 switchgears, indoor and outdoor switchgears
- Specify switchgear comprising of full load rated current, fault capacity, make and break operations, impulse withstand voltage, switch gear KA ratings, switchgear auxiliaries, related insulation level, switchgear cable terminations, auxiliary contacts and electrical interlocks
- Identify the switchgear lifespan pertaining to its load effects, number of switching cycles, mechanical lifespan, electrical lifespan and ageing
- Employ switchgear lifespan practice that includes electrical lifespan calculation as well as switchgear diagnostics and maintenance
- Assess switchgear lifespan and apply switchgear cost/benefit practice
- Carryout switchgear lifecycle management and describe its active phase, classic phase, limited phase, obsolete phase, effects of environment, rationalization and customer support agreements
- Comply with the NFPA 70E, upgrade switchgear and apply tips to optimize the life of electrical switchgear
- Enumerate the reasons that force to upgrade or renew the switchgear including effects of aging and distribution, technical efficiency and lack of maintenance
- Consider the right decision for renewal or upgrading switchgear that includes the budget limitations, risk limitations, operational limitations and safety limitations

## Exclusive Smart Training Kit - H-STK®




*Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK®**). The **H-STK®** consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.*

## Who Should Attend

This course provides all significant aspects and considerations of switchgear life assessment for asset managers, operational managers, maintenance managers, asset integrity engineers, project engineers, maintenance engineers and other plant/grid technical staff.

## Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

## Certificate Accreditations

Haward's certificates are accredited by the following international accreditation organizations: -

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

- The International Accreditors for Continuing Education and Training (IACET - USA)

Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

**Course Instructor(s)**

This course will be conducted by the following instructor(s). However, Haward Technology has the right to change the course instructor(s) prior to the course date and inform participants accordingly:



**Mr. Sherif Bayoumi**, BSc, is a **Senior Electrical Engineer** with over **30 years** of extensive experience within **Oil**, **Gas**, **Petrochemical** and **Power** industries. His expertise widely covers **Electrical Systematics Troubleshooting**, **Electrical Distribution Systems & Control Circuits**, Electrical Parameters, Maintenance of Electrical **Switchgear & Overhead Lines**, **Switchgear and Transformers**, **HV Switchgear Operation & Maintenance**, **Distribution Switchgear & Equipment**, **Symmetrical & Unsymmetrical Faults**, **Electrical Drawings**, **Relay Logic Circuits**, Test Requirements, Component Testing Procedures, Electrical & Control System, Troubleshooting **Transformers**, **Equipment** Troubleshooting, **System Grounding**, **Circuit Breakers**, **Protection Devices & Technology**, **Protection Relay**, **Solid State Relay**, Instrument **Transformers**, Grading & Protection Coordination, Electrical System & Equipment, **Generators**, **Gas Turbine**, Diesel Generators, **Power Transformers**, **AC & DC Motors**, **Substations**, **Switchgears & Distribution**, **Power System** Analysis, **Electrical Equipment Control Systems**, **Cables &** Domestic **Wiring**, **Overhead Transmission Lines**, **Electrical Safety**, **Electrical Protection**, **Batteries**, **Chargers & UPS**, Electrical Projects Handling, Electrical Measurements, Medium Voltage Switchgears (MVSG), Motor Control Centers (**MCC**), **Electrical Submersible Pumps** (**ESP**). He is also well-versed in **Preventive Maintenance**, Health, Safety & Environmental Management System (**HSEMS**), On-Shore & Off-Shore Electrical Installations, Engineering Studies, Water Desalination Units, **Induction Motors**, **Power Supply** Substations, Electro-mechanical Protection **Relays**, **Engineering Drawings**, **Industrial Power System Coordination**, **Machinery Vibration**, **Dynamic Balancing** Analysis, Material & Equipment Standard & Code System, Hazardous Area Classification, Safety Management System, Emergency Response, Permit to Work & Issuing Authority, Defensive Driving and Task Risk Assessment.

During Mr. Sherif's career life, he has occupied various key positions in several companies such as the **Electrical Maintenance Engineer**, **Senior Electrical Support Engineer**, **Lead Maintenance Electrical Engineer**, **Maintenance Electrical Engineer**, **Specialist Electrical Engineer** in **Abu Dhabi Company for Onshore Oil Operations** (**ADCO**), Gulf of Suez Petroleum Company (**GUPCO**) and West Desert Petroleum Company (**WEPCO**).

Mr. Sherif has a **Bachelor's** degree in **Electrical Power Engineering**. Further, he is a **Certified Instructor/Trainer** and has delivered numerous courses, trainings, workshops, seminars and conferences internationally.

**Course Fee**

**US$ 6,000** per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

## Training Methodology

Our courses employ an interactive, learner-centred methodology that integrates theoretical knowledge with practical application. The training is delivered through a suitable combination of some or all of the following methods, selected according to the course content and learning objectives:

- Instructor-led presentations and facilitated discussions
- Practical workshops and participant presentations
- Hands-on exercises and real-world case studies
- Equipment demonstrations and technical drawings
- Hardware- and software-based simulations
- Gamification & Role Play in soft-skills courses only
- Virtual Reality (VR) and Augmented Reality (AR)
- Instructional videos and other relevant training resources

This blended approach encourages active participation, strengthens practical skills and supports the effective application of acquired knowledge in the workplace.

## Learning Design & Customization

This course can be customized to the exact requirements of clients. Haward Technology is so proud of our huge capabilities in tailoring our courses to the training needs of our valued clients.

## Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

## Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

***Day 1***

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|---|---|
| *0730 – 0745* | *Registration & Coffee* |
| *0745 – 0800* | *Welcome & Introduction* |
| *0800 – 0815* | ***PRE-TEST*** |
| *0815 – 0930* | ***Introduction to Switchgear***<br>*Switching Phenomena ● Switchgear Components ● System Configurations (LV, MV, HV) ● Switchgear Mechanisms* |
| *0930 – 0945* | *Break* |
| *0945 – 1215* | ***Switchgear Fundamentals***<br>*Bulk Oil Switchgears ● Minimum Oil Switchgears ● Air Blast Switchgears* |
| *1215 – 1230* | *Break* |
| *1230 – 1330* | ***Switchgear Fundamentals (cont'd)***<br>*Vacuum Switchgears ● SF6 Switchgears ● Indoor & Outdoor Switchgears* |
| *1330 – 1420* | ***Switchgear Specifications***<br>*Full Load Rated Current ● Fault Capacity (Symmetrical & Asymmetrical Short Circuit Withstand Capability) ● Make & Break Operations ● Impulse Withstand Voltage ● Switchgear KA Ratings* |
| *1420 – 1430* | ***Recap*** |
| *1430* | *Lunch & End of Day One* |

**Day 2**

| | |
|---|---|
| 0730 – 0930 | ***Switchgear Specifications (cont'd)***<br>*Switchgear Auxiliaries (CT's, VT's, Protection Relays) ● Rated Insulation Level ● Switchgear Cable Terminations ● Auxiliary Contacts & Electrical Interlocks* |
| 0930 – 0945 | *Break* |
| 0945 – 1100 | ***Switchgear Lifespan***<br>*Load Effects ● Number of Switching Cycles ● Mechanical Lifespan* |
| 1100 – 1215 | ***Switchgear Lifespan (cont'd)***<br>*Electrical Lifespan ● Ageing* |
| 1215 – 1230 | *Break* |
| 1230 – 1420 | ***Switchgear Lifespan Practice***<br>*Electrical Lifespan Calculation Exercise* |
| 1420 – 1430 | ***Recap*** |
| 1430 | *Lunch & End of Day Two* |

**Day 3**

| | |
|---|---|
| 0730 – 0830 | ***Switchgear Diagnostics & Maintenance***<br>*Switchgear Defects ● Switchgear Inspection ● Routine Testing of Switchgears ● Dielectric Test on the Main Circuit (Oil, Air, Vacuum & SF6 Type Devices) ● Tests on Auxiliary & Control Circuits* |
| 0830 – 0930 | ***Switchgear Diagnostics & Maintenance (cont'd)***<br>*Mechanical Operating Tests ● Tightness Test ● Condition Based Maintenance (CBM) ● Reliability Centred Maintenance (RCM) ● Asset Register* |
| 0930 – 0945 | *Break* |
| 0945 – 1215 | ***Switchgear Lifespan Assesment***<br>*Maintenance Costs ● Spare Parts Availability ● Suitability with Existing Fault Conditions* |
| 1215 – 1230 | *Break* |
| 1230 - 1420 | ***Switchgear Lifespan Assessment (cont'd)***<br>*Risk Assessment ● Cost/Benefit Analysis* |
| 1420 – 1430 | ***Recap*** |
| 1430 | *Lunch & End of Day Three* |

**Day 4**

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|---|---|
| 0730 – 0830 | ***Switchgear Cost/Benefit Practice***<br>*Cost/Benefit Calculation Exercise* |
| 0830 – 0930 | ***Switchgear Lifecycle Management***<br>*Active Phase ● Classic Phase ● Limited Phase ● Obsolete Phase* |
| 0930 – 0945 | *Break* |
| 0945 – 1215 | ***Switchgear Lifecycle Management (cont'd)***<br>*Effects of Environment ● Rationalization* |
| 1215 – 1230 | *Break* |
| 1230 – 1420 | ***Switchgear Lifecycle Management (cont'd)***<br>*Customer Support Agreements ● Comply with NFPA 70E* |
| 1420 - 1430 | ***Recap*** |
| 1430 | *Lunch & End of Day Four* |

***Day 5***

| | |
|---|---|
| *0730 – 0930* | ***Switchgear Lifecycle Management (cont'd)***<br>*Upgrading the Switchgear ● Tips to Optimize the Life of Electrical Switchgear* |
| *0930 – 0945* | *Break* |
| *0945 – 1145* | ***Reasons Force to Upgrade or Renew the Switchgear***<br>*Effects of Aging & Deterioration ● Technical Inefficiency ● Lack of Maintenance* |
| *1145 – 1215* | ***Decision for Renewal or Upgrade***<br>*Budget Limitations ● Risk Limitations* |
| *1215 – 1230* | *Break* |
| *1230 – 1345* | ***Decision for Renewal or Upgrade (cont'd)***<br>*Operational Limitations ● Safety Limitations* |
| *1345 - 1400* | ***Course Conclusion*** |
| *1400 – 1415* | ***POST-TEST*** |
| *1415 – 1430* | *Presentation of Course Certificates* |
| *1430* | *Lunch & End of Course* |

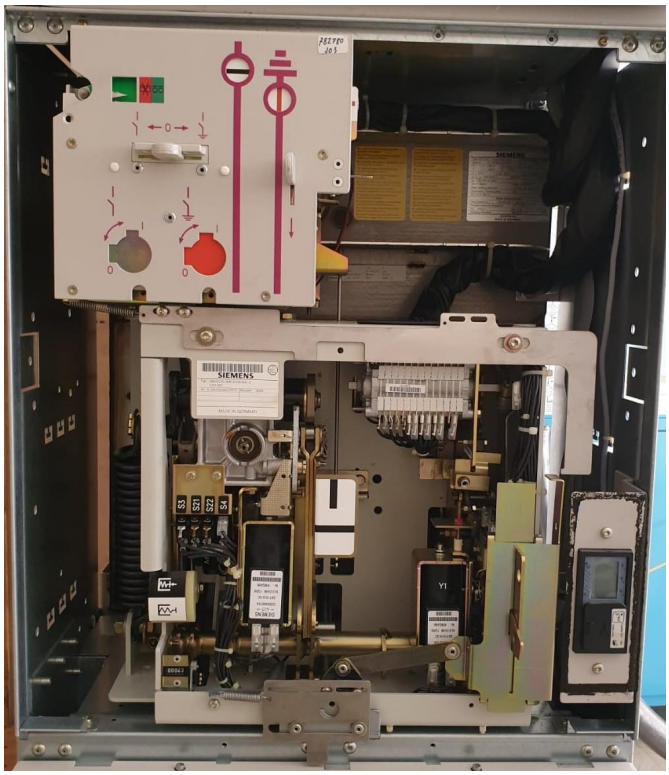
## Simulators (Hands-on Practical Sessions)

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art "Switchgear Simulator", "GE Multilin Relay 469" and "GE Multilin Relay 750".

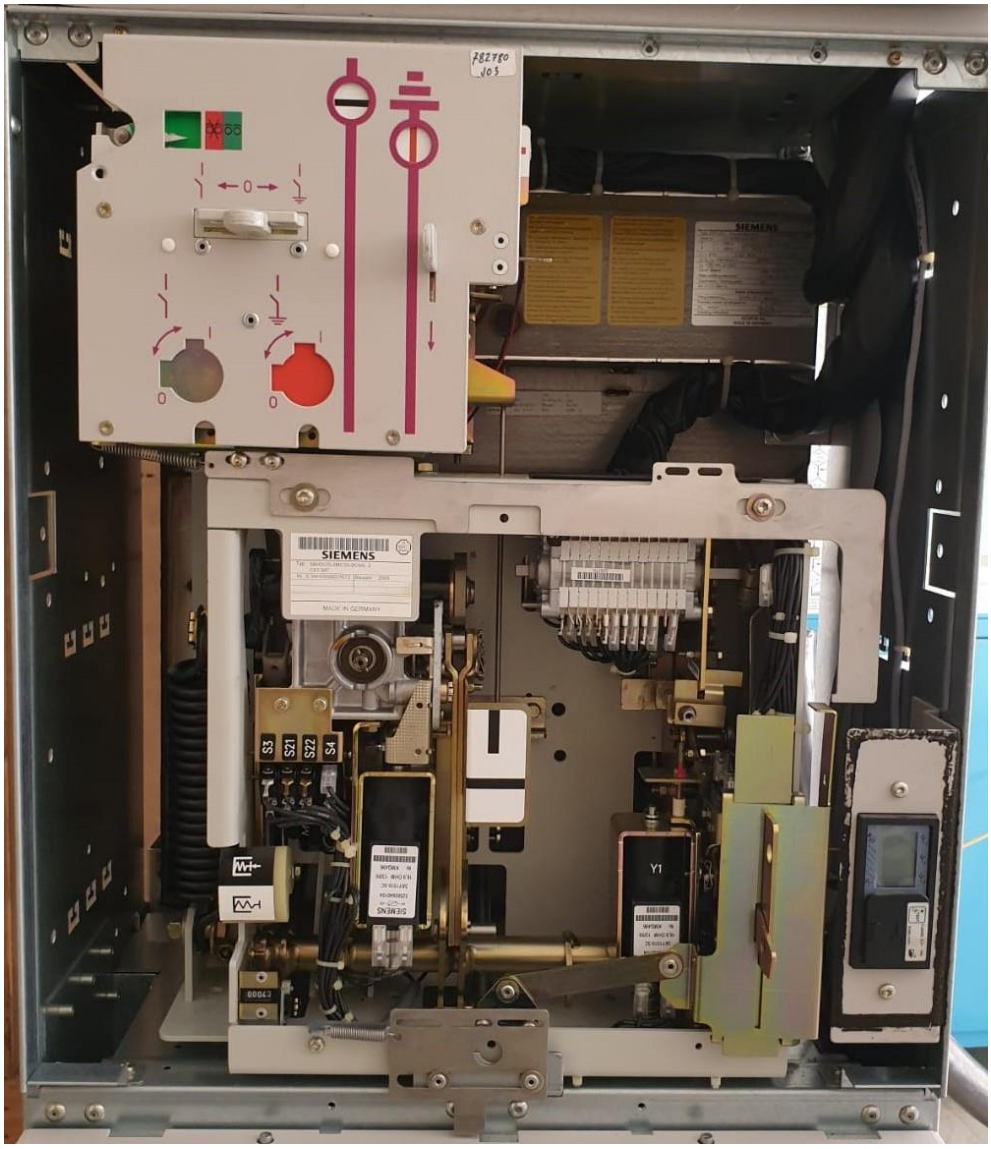






**Switchgear Simulator**




**Switchgear Simulator**






**GE Multilin Relay 469 Simulator**






**GE Multilin Relay 750 Simulator**

**Course Coordinator**

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