COURSE OVERVIEW EE0754
Safe Area Restoration - Electrical Maintenance

Course Title
Safe Area Restoration - Electrical Maintenance

Course Date/Venue
Session 1: July 13-17, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
Session 2: December 15-19, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
EE0754

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.

This course is designed to provide participants with a detailed and up-to-date overview of Power System Restoration. It covers the power system operations, components and key functions; the disturbances and blackouts including their causes and impact on the grid; the common causes of power system disturbances, like the equipment failure, natural disasters and operational errors; the effects of blackouts on power systems and best practices for planning and maintaining a reliable power grid; and the power system stability concepts and transient stability and its role in preventing system collapse during disturbances.

Further, the course will also discuss how to calculate short-circuit currents and analyze fault conditions; the importance of proper grounding in maintaining system stability and safety; the role of current and voltage transformers in system protection and metering; the principles of phase and ground overcurrent protection and their applications; and the directional overcurrent and earth fault protection, transformer protection schemes, distance protection principles and busbar protection systems.

During this interactive course participants will learn the control functions in power system operations; the techniques and resources available for restoring power systems after a blackout; the interconnected power systems, blackout occurrence mechanisms and tools and methods for performing contingency analysis to prevent blackouts; developing a restoration plan and executing system recovery after disturbances; measuring the impact of blackouts on customers and evaluating system reliability; managing thermal and voltage limits during the restoration process to prevent further disturbances; analyzing transfer limits during system restoration, including PV curves and contingency conditions; the application of international practices in restoration; and the future trends in power system restoration including the integration of renewable energy sources and smart grid technologies.

Course Objectives

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

- Apply and gain an in-depth knowledge of power system restoration
- Discuss the power system operations, components and key functions as well as the disturbances and blackouts including their causes and impact on the grid
- Identify the common causes of power system disturbances, like the equipment failure, natural disasters and operational errors
- Recognize the effects of blackouts on power systems and best practices for planning and maintaining a reliable power grid
- Discuss power system stability concepts and transient stability and its role in preventing system collapse during disturbances
- Calculate short-circuit currents and analyze fault conditions and explain the importance of proper grounding in maintaining system stability and safety
- Define the role of current and voltage transformers in system protection and metering and the principles of phase and ground overcurrent protection and their applications
- Explain directional overcurrent and earth fault protection, transformer protection schemes, distance protection principles and busbar protection systems
- Recognize the control functions in power system operations and techniques and resources available for restoring power systems after a blackout
- Identify interconnected power systems, blackout occurrence mechanisms and tools and methods for performing contingency analysis to prevent blackouts
- Develop a restoration plan and execute system recovery after disturbances as well as measure the impact of blackouts on customers and evaluate system reliability
- Employ best practices for restoring a power system after a major blackout including sectionalizing and re-energizing strategies
- Manage thermal and voltage limits during the restoration process to prevent further disturbances
- Analyze transfer limits during system restoration, including PV curves and contingency conditions
- Review the application of international practices in restoration and discuss the technical constraints that may arise during system restoration and how to address them
- Explore the future trends in power system restoration including the integration of renewable energy sources and smart grid technologies

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 an overview of all significant aspects and considerations of power system restoration for power system operators, electrical engineers, maintenance personnel, utility managers, protection and control engineers, emergency response teams, regulatory personnel and other technical staff.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

30% Lectures
20% Practical Workshops & Work Presentations
30% Hands-on Practical Exercises & Case Studies
20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Course Fee

US$ 5,500 per Delegate + **VAT**. The rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Accommodation

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

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

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**. 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 **2.835 CEUs** (Continuing Education Units) or **28.35 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 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

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction to Power System Operation:*** *Overview of Power System Operations, Components & Key Functions*
0930 – 0940	*Break*
0940 – 1015	***Power System Disturbances & Blackouts****: Understanding Disturbances & Blackouts including their Causes & Impact on the Grid*
1015 – 1100	***Causes of Power System Disturbances:*** *Exploring Common Causes of Power System Disturbances, such as Equipment Failure, Natural Disasters & Operational Errors*
1100 - 1230	***Effects of Blackouts on Power Systems:*** *Analyzing the Technical, Economic & Social Impacts of Blackouts*
1230 – 1305	***Case Studies of Famous Blackouts****: Reviewing Major Blackouts (e.g., U S, Europe & Jordan) & their Causes & Consequences*
1320 – 1330	*Break*
1330 - 1350	***Planning for Reliable Power Grid Operations:*** *Best Practices for Planning & Maintaining a Reliable Power Grid*
1350 – 1400	***Recap***
1400	*Lunch & End of Day One*

Day 2

0730 – 0830	***Power System Stability Concepts:*** *Introduction to Voltage, Frequency & Rotor Angle Stability in Power Systems*
0830 – 0930	***Transient Stability:*** *Understanding Transient Stability & its Role in Preventing System Collapse during Disturbances*
0930 – 0940	*Break*
0940 – 1100	***Short-Circuit Calculation:*** *Methods for Calculating Short-Circuit Currents & Analyzing Fault Conditions*
1100 – 1230	***System Grounding Principles:*** *Importance of Proper Grounding in Maintaining System Stability & Safety*
1230 – 1320	***Instrument Transformers (CTs & VTs):*** *Role of Current & Voltage Transformers in System Protection & Metering*
1320 – 1330	*Break*
1330 - 1350	***Non-Directional Overcurrent (O/C) Protection:*** *Principles of Phase & Ground Overcurrent Protection & their Applications*
1350 – 1400	***Recap***
1400	*Lunch & End of Day Two*

Day 3

0730 – 0830	***Directional Overcurrent & Earth Fault Protection:*** *Exploring Directional Protection for Both Phase & Earth Faults*
0830 – 0930	***Transformer Protection Schemes:*** *Understanding Transformer Protection including Differential & Overcurrent Protection*
0930 – 0940	*Break*
0940 – 1100	***Distance Protection Principles:*** *Introduction to Distance Protection including Zone Protection Schemes & Applications*
1100 – 1230	***Busbar Protection Systems:*** *Techniques & Technologies for Protecting Busbars from Faults*
1230 – 1320	***Control Functions in Power System Operations:*** *Overview of Control Functions including Voltage & Frequency Control During Normal & Emergency Conditions*
1320 – 1330	*Break*
1330 – 1350	***Strategies for System Restoration:*** *Identifying Techniques & Resources Available for Restoring Power Systems After a Blackout*
1350 – 1400	***Recap***
1400	*Lunch & End of Day Three*

Day 4

0730 – 0830	***Interconnected Power Systems:*** *Understanding why Power Systems Are Interconnected & the Benefits of Interconnectivity*
0830 – 0930	***Blackout Occurrence Mechanisms:*** *How Blackouts Occur in Interconnected Systems & their Triggering Conditions*
0930 – 0940	*Break*
0940 – 1100	***Blackout Scenarios & Case Studies:*** *Detailed Review of Blackout Incidents including Causes & Restoration Strategies*
1100 – 1230	***Contingency Analysis & System Restoration:*** *Tools & Methods for Performing Contingency Analysis to Prevent Blackouts*
1230 – 1320	***Restoration Planning & Execution:*** *Developing a Restoration Plan & Executing System Recovery After Disturbances*
1320 – 1330	*Break*
1330 – 1350	***Customer Impact & Reliability Considerations:*** *Measuring the Impact of Blackouts on Customers & Evaluating System Reliability*
1350 – 1400	***Recap***
1400	*Lunch & End of Day Four*

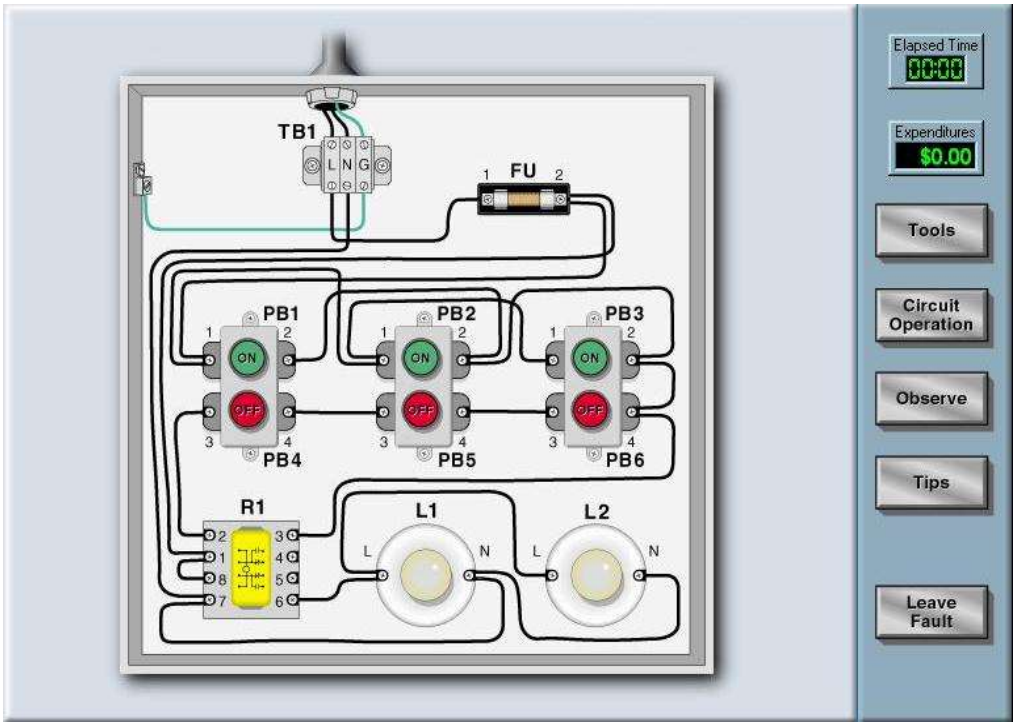
Day 5

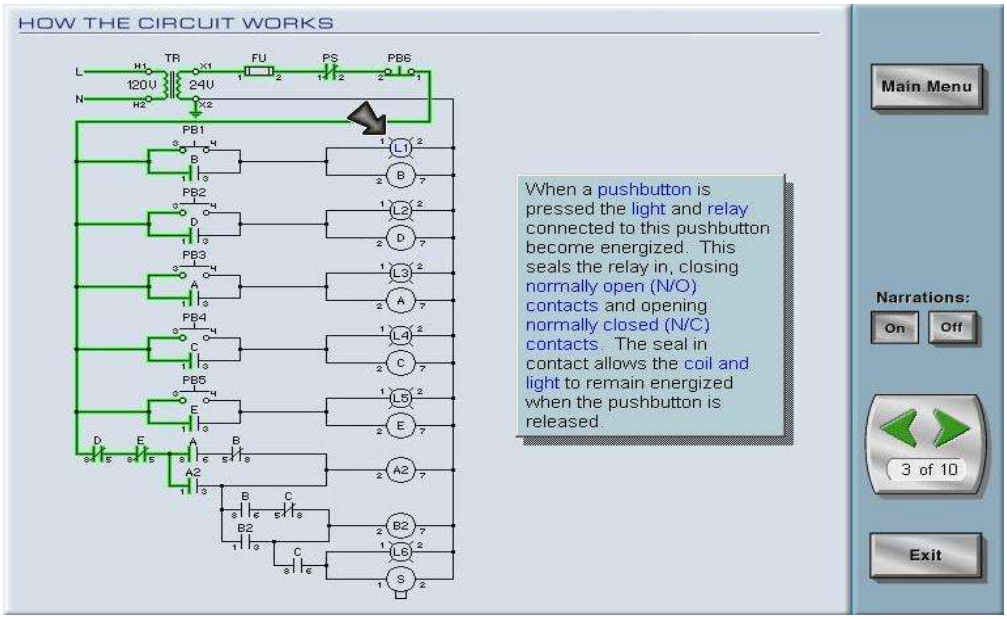
0730 – 0830	***Power System Restoration Strategies:*** *Best Practices for Restoring a Power System After a Major Blackout including Sectionalizing & Re-Energizing Strategies*
0830 – 0930	***Thermal & Voltage Limits in Restoration:*** *Managing Thermal & Voltage Limits During the Restoration Process to Prevent Further Disturbances*
0930 – 0940	*Break*
0940 – 1100	***Transfer Limit Analysis:*** *Techniques for Analyzing Transfer Limits During System Restoration including PV Curves & Contingency Conditions*

1100 – 1230	***Application of International Practices in Restoration:*** *Reviewing International Restoration Practices & Case Studies (e.g., US & European Restoration Processes)*
1230 – 1250	***Restoration Challenges & Technical Constraints:*** *Discussing the Technical Constraints that may Arise During System Restoration & how to Address them*
1250 – 1300	*Break*
1300 – 1315	***System Restoration & Future Trends:*** *Overview of Future Trends in Power System Restoration including the Integration of Renewable Energy Sources & Smart Grid Technologies*
1315 – 1330	*Course Conclusion*
1330 - 1345	***POST-TEST***
1345 - 1400	*Presentation of Course Certificates*
1400	*Lunch & End of Course*

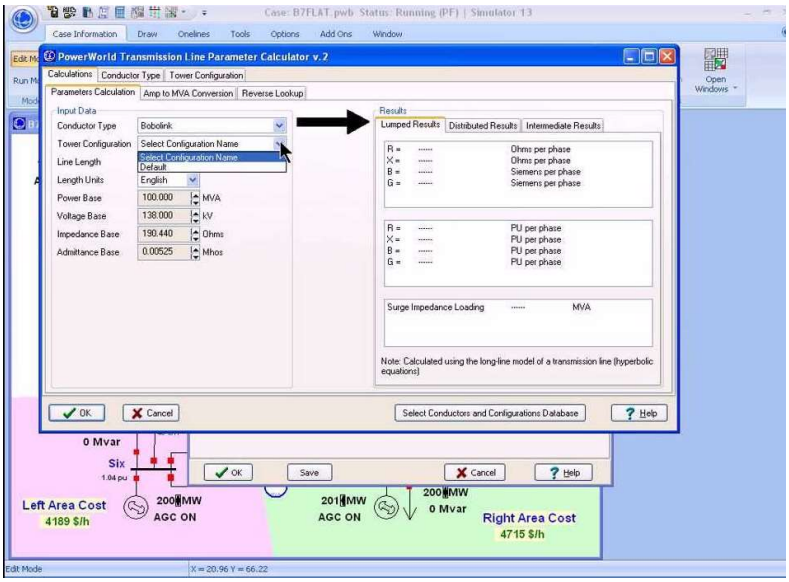
Simulators (Hands-on Practical Sessions)

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 simulators “Troubleshooting Electrical Circuits V4.1 Simulator”, and “Power World”.





Troubleshooting Electrical Circuits V4.1 Simulator



Power World Simulator

Course Coordinator

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