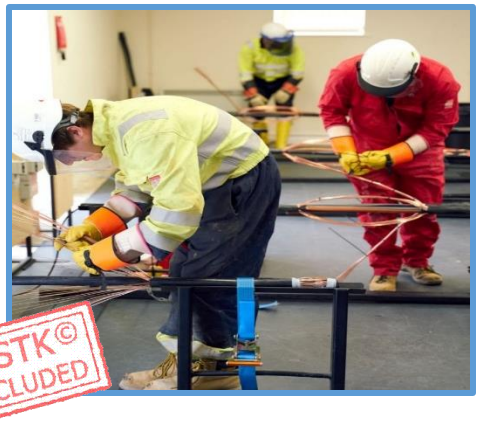
COURSE OVERVIEW EE0002
MV Cable Splicing, Jointing & Termination (Up to 35kV)

Course Title
MV Cable Splicing, Jointing & Termination (Up to 35kV)



Course Date/Venue
February 02-06, 2025/Crowne Meeting Room, Crowne Plaza Al Khobar, Al Khobar, KSA

Course Reference
EE0002

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

Course Description

This practical and highly-interactive course includes practical sessions and exercises where participants carryout HV/MV cable jointing, termination, splicing and testing. Theory learnt in the class will be applied using the latest heat-shrink jointing and termination methods suitable for in-class training.

This course is designed to provide participants with a detailed and up-to-date overview of MV Cable Splicing, Jointing and Termination (Up to 35kV). It covers the purpose, applications and different types of MV cables; the cable construction, design, electrical properties, cable faults and failure mechanisms of MV cables; the safety protocols for working on live and de-energized systems; the proper cable splicing, jointing and termination; the cable preparation techniques covering cutting and stripping MV cables; cleaning and preparing insulation layers, handling shielding and semiconductive layers and ensuring precise measurements; the splicing methods and techniques and stress control in splicing; and inspecting and testing splices, identifying typical splicing errors and proper troubleshooting.

Further, the course will also discuss the purpose of cable joints in MV systems; the types of joints, selection criteria for joint kits and materials and key consideration for high-reliability joints; the straight-through jointing techniques, branch and transition joints, advanced joints techniques and cable joints testing; the purpose, types and key components of terminations; the importance of maintaining dielectric strength; cleaning and preparing cables for termination; removing insulation and semiconductive layers; and ensuring proper alignment and orientation.

During this interactive course, participants will learn the heat shrink, cold shrink and plug-in terminations and advanced techniques for MV cables; testing splices, joints and terminations; identifying cable faults using diagnostic tools and reporting and interpreting test results; the quality assurance in MV cable installations and routine maintenance checks; and diagnosing and repairing common issues and upgrading or replacing aging installation.

Course Objectives

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

- Apply and gain an in-depth knowledge on MV cable splicing, jointing and termination (up to 35kV)
- Discuss the purpose, applications and different types of MV cables
- Illustrate cable construction and design and recognize electrical properties, cable faults and failure mechanisms of MV cables
- Employ safety protocols for working on live and de-energized systems including proper cable splicing, jointing and termination
- Carryout cable preparation techniques covering cutting and stripping MV cables as well as clean and prepare insulation layers, handle shielding and semiconductive layers and ensure precise measurements
- Apply splicing methods and techniques, stress control in splicing and sealing and environmental protection
- Inspect and test splices, idenitfy typical splicing errors and apply proper troubleshooting
- Discuss the purpose of cable joints in MV systems and identify the types of joints, selection criteria for joint kits and materials and key consideration for high-reliability joints
- Illustrate straight-through jointing techniques, branch and transition joints, advanced joints techniques and cable joints testing
- Discuss the purpose, types and key components of terminations as well as the importance of maintaining dielectric strength
- Clean and prepare cables for termination, remove insulation and semiconductive layers and ensure proper alignment and orientation
- Carryout heat shrink, cold shrink and plug-in terminations and advanced techniques for MV cables
- Test splices, joints and terminations, identify cable faults using diagnostic tools and report and interpret test results
- Implement quality assurance in MV cable installations, routine maintenance checks, diagnosing and repairing common issues and upgrading or replacing aging installations

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 job electrical engineers electrical technicians and electricians maintenance personnel utility and power company worker project managers and supervisors cable manufacturers and installers safety and compliance officers engineers in industrial and commercial facilities consultants and contractors.

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$ 6,250 per Delegate + **VAT**. This 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.

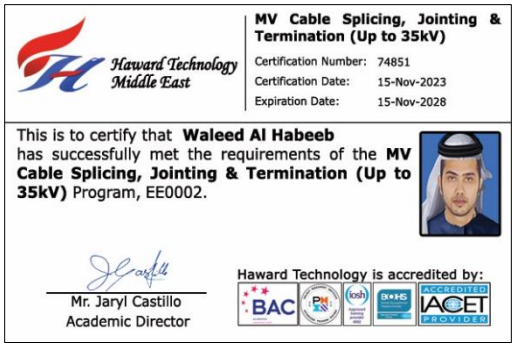
Course Certificate(s)

(1) Internationally recognized Competency Certificates and Plastic Wallet Cards will be issued to participants who completed a minimum of 80% of the total tuition hours and successfully passed the exam at the end of the course. Certificates are valid for 5 years.

Recertification is FOC for a Lifetime.

Sample of Certificates

The following are samples of the certificates that will be awarded to course participants:-


Haward Technology Middle East

MV Cable Splicing, Jointing & Termination (Up to 35kV)

Certification Number: 74851
Certification Date: 15-Nov-2023
Expiration Date: 15-Nov-2028

This is to certify that **Waleed Al Habeeb** has successfully met the requirements of the **MV Cable Splicing, Jointing & Termination (Up to 35kV)** Program, EE0002.

Mr. Jaryl Castillo
Academic Director

Haward Technology is accredited by:


Haward Technology Middle East
P.O. Box 26070
Abu Dhabi, UAE
Tel: +971 2 30 91 714
Http://www.haward.org

74851

MV Cable Splicing, Jointing & Termination (Up to 35kV)

Certification Program

This program is designed to assist companies in identifying professionals who have satisfied the minimum competencies specified in EE0002.

Haward Technology does not warrant or guarantee the performance of any professional certified under this program.

Haward Technology is accredited by:

(2) Official Transcript of Records will be provided to the successful delegates with the equivalent number of ANSI/IACET accredited Continuing Education Units (CEUs) earned during the course.

Haward Technology Middle East
Continuing Professional Development (HTME-CPD)

CEU Official Transcript of Records

TOR Issuance Date: 15-Nov-23

HTME No. 74851

Participant Name: Waleed Al Habeeb

Program Ref.	Program Title	Program Date	No. of Contact Hours	CEU's
EE0002	MV Cable Splicing, Jointing & Termination (Up to 35kV)	November 11-15, 2023	30	3.0

Total No. of CEU's Earned as of TOR Issuance Date **3.0**

TRUE COPY

Jaryl Castillo
Academic Director

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

P.O. Box 26070, Abu Dhabi, United Arab Emirates | Tel.: +971 2 3091 714 | E-mail: info@haward.org | Website: www.haward.org

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 **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, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:

Mr. Ahmed Abozeid is a **Senior Electrical & Instrumentation Engineer** with over **30 years** of **Onshore** & **Offshore** experience within the **Oil** & **Gas** and **Power** industries. His wide expertise covers **HV Cable** Design, **Cable** Splicing & Termination, **Cable** Jointing Techniques, **High Voltage** Electrical Safety, **HV/MV Cable Splicing**, **High Voltage Circuit Breaker** Inspection & Repair, **High Voltage Power System** Safe Operation, High Voltage Safety, **High Voltage Transformers**, Safe Operation of **High Voltage & Low Voltage Power Systems**, **Electric Distribution System Equipment**, **ABB 11KV Distribution Switchgear**, **Rotork Operation & Maintenance**, **Power System Protection and Relaying**, **Electrical Motors & Variable Speed Drives**, **Motor** Speed Control, Power Electronic Converters, Control Valve, **Flowmetering & Custody Transfer**, **Meters Calibration**, Installation & Inspection, **Crude Metering & Measurement Systems**, **Flow Meter Maintenance Troubleshooting**, AC Converters Section, Electromagnetic Compatibility (**EMC**), **Motor** Failure Analysis & Testing, **Machinery** Fault Diagnosis, **Bearing** Failure Analysis **Process Control & Instrumentation**, **Process Control Measurements**, **Control System Commissioning & Start-Up**, **Control System & Monitoring**, **Power Station Control System**, **Instrumentation Devices**, **Process Control & Automation**, **PID Controller**, Distributed Control Systems (**DCS**), Programmable Logic Controllers (**PLC**), **ABB PLC & DCS System**, **Gas Analyzers**, **Simulation Testing**, **Load Flow**, **Short Circuit**, **Smart Grid**, **Vibration Sensors**, **Cable Installation & Commissioning**, **Calibration Commissioning** and **Site Filter Controller**. Further, he is also well-versed in **Fundamentals of Electricity**, **Electrical Standards**, **Electrical Power**, **PLC**, **Electrical Wiring**, Machines, **Transformers**, **Motors**, **Power Stations**, **Electro-Mechanical Systems**, **Automation & Control Systems**, **Voltage Distribution**, **Power Distribution**, **Filters**, **Automation System**, **Electrical Variable Speed Drives**, **Power Systems**, **Power Generation**, **Power Transformers**, **Diesel Generators**, **Power Stations**, **Uninterruptible Power Systems** (**UPS**), **Battery Chargers** and **AC** & **DC Transmission**. He is currently the **Project Manager** wherein he manages, plans and implements projects across different lines of business.

Mr. Ahmed worked as the **Electrical Manager**, **Electrical Power & Machine Expert**, **Electrical Process Leader**, **Team Leader**, **Electrical Team Leader**, **Technical Instructor**, and **Instructor/Trainer** from various companies such as the Lafarge Nigeria, Egyptian Cement Company, ECC Training Center, Alrajhi Construction & Building Company and Ameria Cement Company, just to name a few.

Mr. Ahmed has a **Bachelor's** degree in **Electrical Engineering**. Further, he is a **Certified Instructor/Trainer, Certified TQUK Level 3 Vocational Achievement (RQF) Assessor** and has delivered numerous trainings, seminars, courses, workshops and conferences internationally.

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: ***Sunday, 02nd of February 2025***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Overview of MV Cable Systems*** *Purpose & Applications of MV Cables • Different Types of MV Cables (XLPE, PILC, EPR) • Key Standards Governing MV Cable Systems • Voltage Levels & Classifications*
0930 – 0945	*Break*
0945 – 1045	***Cable Construction & Design*** *Conductor Materials & Configurations • Insulation Types & Properties • Shielding & Semiconducting Layers • Armoring & Outer Sheath Materials*
1045 – 1145	***Electrical Properties of MV Cables*** *Dielectric Strength & Insulation Resistance • Voltage Stress & its Effects • Capacitance & Inductance in MV Cables • Current-Carrying Capacity & Derating Factors*
1145 – 1230	***Cable Faults & Failure Mechanisms*** *Common Causes of Cable Failures • Partial Discharge & its Implications • Thermal & Mechanical Stress Impacts • Moisture Ingress & Environmental Factors*
1230 – 1245	*Break*
1245 – 1330	***Safety in MV Cable Work*** *Personal Protective Equipment (PPE) Requirements • Understanding Arc Flash Hazards • Safety Protocols for Working on Live & De-Energized Systems • Environmental & Health Considerations*
1330 – 1420	***Basics of Splicing, Jointing & Termination*** *Definitions & Key Differences • Importance in System Performance & Reliability • Overview of Required Tools & Materials • Preparation for Practical Exercises*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day One*

Day 2: ***Monday, 03rd of February 2025***

0730 – 0830	***Cable Preparation Techniques*** *Cutting & Stripping MV Cables • Cleaning & Preparing Insulation Layers • Handling Shielding & Semiconductive Layers • Ensuring Precise Measurements*
0830 – 0930	***Splicing Methods & Techniques*** *Overview of Heat Shrink & Cold Shrink Splicing • Step-by-Step Process for Splicing • Aligning & Securing Cable Cores • Best Practices for Maintaining Insulation Integrity*

0930 – 0945	*Break*
0945 – 1100	***Stress Control in Splicing*** *Understanding Stress Concentration Areas • Use of Stress Control Tubing or Tapes • Techniques to Ensure Uniform Stress Distribution • Testing Stress Relief Effectiveness*
1100 – 1230	***Sealing & Environmental Protection*** *Methods to Protect Splices from Moisture & Contaminants • Use of Sealing Mastic & Waterproof Materials • Applying Outer Jackets & Armoring • Evaluating Long-Term Environmental Protection*
1230 – 1245	*Break*
1245 – 1330	***Inspection & Testing of Splices*** *Visual Inspection Techniques • Measuring Insulation Resistance Post-Splicing • Partial Discharge Testing Methods • Documenting & Analyzing Results*
1330 – 1420	***Common Errors & Troubleshooting*** *Identifying Typical Splicing Errors • Techniques to Repair or Redo Faulty Splices • Avoiding Mistakes in Alignment & Stress Control • Case Studies of Splicing Failures*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Two*

Day 3: ***Tuesday, 04th of February 2025***

0730 – 0830	***Cable Jointing*** *Purpose of Cable Joints in MV Systems • Types of Joints (Straight-Through, Branch, Transition) • Selection Criteria for Joint Kits & Materials • Key Considerations for High-Reliability Joints*
0830 – 0930	***Straight-Through Jointing Techniques*** *Preparing Cable Ends for Jointing • Installation of Connectors & Ferrules • Use of Insulation & Semiconducting Materials • Stress Control & Shielding Application*
0930 – 0945	*Break*
0945 – 1100	***Branch & Transition Joints*** *Methods for Branching MV Cables • Handling Cables of Different Types or Sizes • Application of Transition Joint Kits • Ensuring Compatibility & Electrical Continuity*
1100 – 1230	***Advanced Jointing Techniques*** *Introduction to Pre-Molded Joints • Using Specialized Jointing Tools • Benefits of Factory-Tested Joint Components • Challenges in Field Applications*
1230 – 1245	*Break*
1245 – 1330	***Testing of Cable Joints*** *High Voltage (HiPot) Testing Procedures • Measuring Resistance & Continuity • Identifying Partial Discharge in Joints • Ensuring Compliance with Installation Standards*

1330 – 1420	***Hands-on Practice*** *Step-by-Step Jointing Practice in a Controlled Environment • Group Feedback & Improvement Discussions • Common Jointing Challenges & Solutions • Supervised Troubleshooting Exercises*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Three*

Day 4: ***Wednesday, 05th of February 2025***

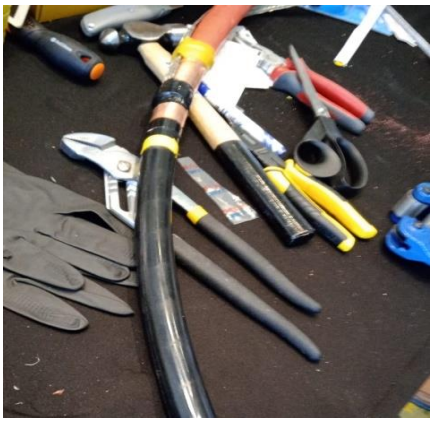
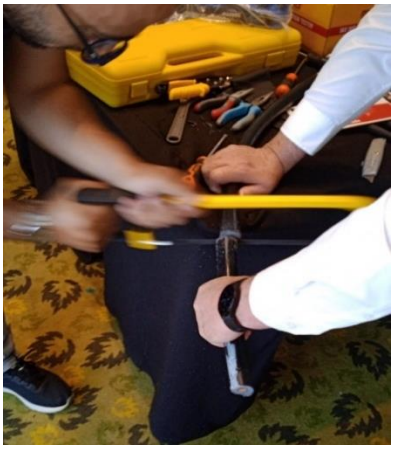
0730 – 0830	***Termination*** *Purpose & Types of Terminations • Indoor versus Outdoor Terminations • Key Components in Termination Kits • Importance of Maintaining Dielectric Strength*
0830 – 0930	***Preparation for Termination*** *Cleaning & Preparing Cable Ends • Removing Insulation & Semiconductive Layers • Stress Control Methods for Terminations • Ensuring Proper Alignment & Orientation*
0930 – 0945	*Break*
0945 – 1100	***Heat Shrink Termination*** *Installation Process for Heat Shrink Terminations • Best Practices for Using Heat Guns & Torches • Sealing & Environmental Protection Techniques • Common Issues & Troubleshooting*
1100 – 1230	***Cold Shrink Termination*** *Step-by-Step Process for Cold Shrink Applications • Benefits of Cold Shrink Over Heat Shrink • Key Challenges & Solutions • Long-Term Performance Considerations*
1230 – 1245	*Break*
1245 – 1330	***Plug-in Terminations*** *Applications in Switchgear & Transformers • Installation Process for Plug-in Connectors • Ensuring Proper Contact & Insulation • Case Studies of Plug-in Termination Failures*
1330 – 1420	***Practical Termination Practice*** *Hands-on Termination Exercises • Individual & Group Feedback • Testing Completed Terminations • Identifying & Correcting Common Mistakes*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Four*

Day 5: **Thursday, 06th of February 2025**

0730 – 0830	***Advanced Techniques for MV Cables*** *High-Voltage Terminations • Specialized Jointing Methods for High-Stress Environments • Emergency Repair Techniques • Use of Advanced Tools & Technologies*
0830 – 0930	***Testing & Diagnostics*** *Overview of Diagnostic Tools (TDR, VLF, Partial Discharge) • Testing Splices, Joints & Terminations • Identifying Cable Faults Using Diagnostic Tools • Reporting & Interpreting Test Results*
0930 – 0945	*Break*
0945 – 1100	***Quality Assurance in MV Cable Installations*** *Inspection Protocols for Splicing, Jointing & Termination • Standards & Certifications for Quality Assurance • Documenting Installation Processes • Continuous Improvement in Installation Practices*
1100 – 1215	***Maintenance & Troubleshooting*** *Routine Maintenance Checks for MV Cables • Diagnosing & Repairing Common Issues • Upgrading or Replacing Aging Installations • Case Studies of Successful Maintenance*
1215 – 1230	*Break*
1230 – 1300	***Hands-on Final Project*** *Participants Complete a Full Splice, Joint & Termination • Testing & Validation of the Completed Installation • Group Presentations & Evaluations • Feedback & Areas for Improvement*
1300 – 1315	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
1315 – 1415	***COMPETENCY EXAM***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

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 splicing and jointing, termination exercises using heat-shrink kits, suitable for classroom training.


Course Coordinator

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