COURSE OVERVIEW EE0763
115KV Cable Splicing Training & Certification

Course Title
115KV Cable Splicing Training & Certification

Course Date/Venue
January 12-16, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Course Reference
EE0763

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 115 KV 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.

The range of voltage and capacity of power transmitted through cables is showing a steady increase over the years. Environmental concerns, aesthetic issues, lack of transmission corridors and difficulty in routing overhead lines in crowded human habitats are some of the reasons for the explosive growth of cable technology well into the new voltage range. Due to physical limits on cable lengths for manufacturing and packaging, joints in cable become inevitable, particularly in the context of the utility sector. The cables need to be also terminated at sending and receiving end equipment, a very wide variety of them, in utility as well as industry applications and these calls for appropriate cable termination accessories.

Cable terminations and joints form the weakest link in any distribution system. Also, a failed joint in an underground distribution system is much more difficult to locate and repair compared to any similar problem in overhead distribution systems. This means that we should do our utmost to achieve a good joint or termination, which can give years of trouble-free service.

The quality of a joint or termination depends to a large extent on the skill of cable jointer/splicer. The aim of a cable jointer/splicer must therefore be to obtain joint which electrical properties are as good as the original cable both in electrical and mechanical terms. The design of cable splicing, jointing and termination accessories is based on this perception. Dependence on operator-skill is sought to be reduced to the extent possible by good choice and quality of jointing materials, though such dependence cannot be totally eliminated.

We will discuss these issues in this course by looking at the fundamental theoretical aspects involved so that the importance of the correct cable splicing, termination and jointing will be brought home to those who attend the course.

Course Objectives

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

- Apply proper techniques in 115 KV cable splicing, jointing, terminating and testing
- Discuss cable jointing and the different types of cables, insulation materials, terminations and joints
- List insulation materials for different application and voltages and use screen in 115KV cables and armor for guard community and mechanical protection
- Discuss special aspects of single core cables, voltage rating, stress distribution, electrical breakdown, 115KV cables using XLPE insulation and need for end sealing of cables
- Analyze cable connections including the basic principles of cable jointing and terminations, its types, current path, methods of connection, comparison and contact resistance
- Illustrate proper joints and terminations and identify the different types of connectors and connection methods of 115 KV cables as well as apply the different methods of cable termination, jointing and choosing an appropriate type of every application
- Calculate stress control and determine the effect of joints and terminations on stress gradients and the areas requiring stress control
- Carryout proper cable jointing, splicing, testing and terminating
- Implement the applicable standards, the types of tests and its limitations
- Find reasons for cable failures and perform analysis of failures with a predictive approach
- Apply new trends and technologies utilized in the industry

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, sample video clips of the instructor's actual lectures & practical sessions during the course conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of 115 KV cables for those who are involved in splicing, jointing and termination of power cables including electrical engineers, instrumentation and control engineers, project engineers, maintenance engineers, power system protection and control engineers, building service designers, data systems planners and managers as well as electrical, instrumentation and control 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$ 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 Wall Competency Certificates and Plastic Wallet Card Certificates 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:-

(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)

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CEU Official Transcript of Records

TOR Issuance Date: 14-Nov-19

HTME No. 8667-2014-9020-2555

Participant Name: Abdulsatar Al Otaibi

Program Ref.	Program Title	Program Date	No. of Contact Hours	CEU's
EE0763	115KV Cable Splicing Training and Certification	November 10-14, 2019	30	3.0

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

TRUE COPY

Maricel De Guzman
Academic Director

Haward Technology has been approved as an Authorized 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 1-2013 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 1-2013 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

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Certificate Accreditations

Certificates are accredited by the following international accreditation organizations: -

- 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.

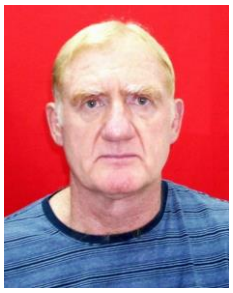
Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation 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.

- 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.

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. Raymond Stone is a **Senior Electromechanical Engineer** with over **35 years** of extensive experience within the **Power & Water Utilities** and Other **Energy Sectors**. His wide expertise lies extensively in the areas of **Electrical Safety**, **Electric Power System**, **High Voltage Electrical Safety**, **Low Voltage Electrical Safety**, **Electrical Safety** of Equipment & Personnel, **Electrical Distribution** Systems, Fault Analysis in **Electrical Networks & Distribution Cables**, Variable Frequency Drives (**VFD**), **Electric & Control** System Commissioning, **Circuit Breakers & Switchgears**, **Electrical Power Systems** Quality & Troubleshooting, **Protection & Relay**, **Machinery Installation Design**, **Electrical Engineering & Rotating & Static Equipment**, **Pumps**, **Compressors**, **Motors**, **Generators**, **Gas Turbines**, **Heat Exchangers**, **Blowers**, **Fans**, **Pipe**, **Piping**, **Valves**, **Conveyors**, **Ventilation Fans**, **Flameproof Equipment Maintenance**, **Vibration Analysts**, **Balancing**, **Lubrication**, **Bearings**, **Pumping Systems**, **Boilers**, **Refrigeration Plants**, Mine Winders, Railway Tracker, **Diesel Machine**, **Machining**, **Engineering Maintenance**, Fixed Plants & Mobile Plants, Reliability Centred Maintenance (**RCM**), **Predictive & Pneumatic Maintenance**, Safety Audits and **Risk Analysis**, **Safety Management Systems** and **Project & Construction Management**. Further, he is also well-versed in **HV Distribution**, **Generation**, **Transmission**, **Power Factor Correction**, **Fault Calculation**, Motor Control Centres (**MCC**), **Metering**, **AC & DC Systems**, **AC & DC Motors**, **Variable Speed Drives**, **Closed Loop Controls**, **Thyristor Controls**, **Cooling Towers**, Tailing Dams, Mill Gravity Circuit, Potable Water and Sewerage. He is currently the **Engineering Manager** of Birla Nifty Copper wherein he is responsible in managing the mine engineering and maintenance projects.

During his career life, Mr. Stone gained his practical and thorough experience through his dedication as the **Engineering Manager**, **Engineering & Construction Services Manager**, **Project Manager**, **Acting Mine General Manager**, **Deputy Mine Manager**, **Engineering Superintendent**, **Divisional Engineer**, **Section Engineer**, **Colliery Engineer** and **Electrical Section Engineer** for major international companies like Kahama Mining Corp, Worley Parsons, Agnew Gold, Contractor, WMC (Leinster Nickel Operations) and BCL Ltd.

Mr. Stone has a **Bachelor's** degree in **Mechanical Engineering** and a Government Certificate of Competency (**GCE**) in **Electrical Engineering**. Further, he holds a Diploma in Management Development Program (**MDP**) and **Management & Financial Accounting**. He has further delivered numerous trainings, courses, workshops, seminars and conferences globally.

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, 12th of January 2025

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0900	***Introduction***
0900 – 0930	***Course Overview*** *Need for Cable Joints & Terminations ● Cables- Historic Perspective ● Types of Cables ● Types of Insulation Materials ● Basic Types of Terminations & Joints ● Installation Aspects; Reducing the Number of Joints by Proper Planning ● Standards, Testing & Failures*
0930 – 0945	*Break*
0945 - 1100	***Cables*** *Construction of Electrical Power Cables ● Different Types of Cables for Various Voltage Ratings & Manufacturing Aspects ● Conductor Materials & Configurations ● Insulation Materials for Different Applications & Voltages ● Use of Screen in 115 KV Cables*
1100 – 1200	***Cables (cont'd)*** *Use of Armor for Ground Continuity & Mechanical Protection ● Special Aspects of Single Core Cables ● Voltage Rating of Cables & Impact of System Grounding Method on Voltage Rating ● Stress Distribution in Single Core & Multi-Core Power Cables*
1200 – 1215	*Break*
1215 – 1420	***Cables (cont'd)*** *Electrical Breakdown of Insulating Materials ● 115 KV Cables Using XLPE Insulation ● Treeing in XLPE & Need for End Sealing of Cables in Storage ● Basic Manufacturing Process*
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, 13th of January 2025

0730 – 0930	***Cable Connectors*** *The Basic Principles of Cable Jointing & Terminations ● Types of Connectors for Cable Terminations & Joints ● Current Path ● Method of Connections ● Comparison ● Contact Resistance ● Preferred Methods in Practice for Different Cable Ratings ● Contact of Dissimilar Materials & Galvanic Effects; Use of Bi-Metal Accessories*
0930 – 0945	*Break*
0945 - 1100	***Joints & Terminations Theory*** *Different Types of Connectors & Connection Methods for 115 KV Cables ● Different Methods of Cable Termination & Jointing & Choosing an Appropriate Type for Every Application*
1100 - 1200	***Joints & Terminations Theory (cont'd)*** *Important Installation Aspects in Cable Joints & Terminations for 115 KV Cables ● Connectivity for Cable Screen & Armor ● Mechanical Protection of Joints & Terminations*

1200 – 1215	*Break*
1215 – 1420	***Practical Session #1***
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, 14th of January 2025***

0730 – 0930	***Stress Control*** *Effect of Joints & Terminations on Stress Gradients ● Areas Requiring Stress Control ● Importance of Stress Control & Methods of Stress Redistribution in Joints & Terminations for 115 KV Cables*
0930 – 0945	*Break*
0945 – 1100	***Jointing & Termination Practice*** *Kits for Joints & Terminations ● Shelf Life Issues ● Importance of Matching Diameter of Insulated Conductor with Kit Specifications in Pre-Fabricated Kits ● Preparation of Cable for Termination & Jointing*
1100 – 1200	***Jointing & Termination Practice (cont'd)*** *Connection ● Reconstitution of Cable Properties ● Continuity & Grounding Aspects ● Sealing ● Healthiness of Joint/Termination ● Installation Aspects for Joints ● Access for Repairs*
1200 – 1215	*Break*
1215 – 1420	***Practical Session #2***
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, 15th of January 2025***

0730 – 0930	***Standards & Testing*** *International/National Standards ● Type Tests ● Limitations*
0930 – 0945	*Break*
0945 – 1100	***Important Installation Aspects in Cable Joints & Terminations***
1100 – 1200	***Terminations to Equipment*** *Terminations to Indoor Switchgear ● Terminations to Electrical Machines ● Termination of Outdoor 115 KV Installations ● Terminations to GIS Installations ● Importance of Correct Orientation of Terminations*
1200 – 1215	*Break*
1215 – 1420	***Practical Session #3***
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*

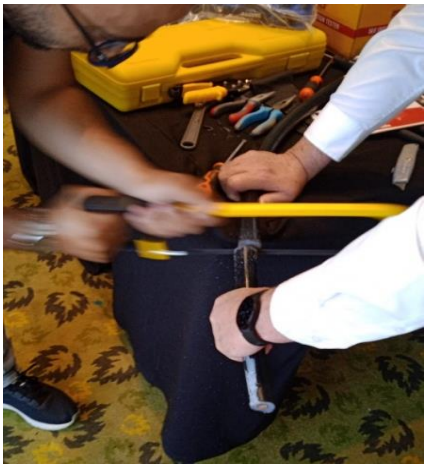
Day 5: Thursday, 16th of January 2025

0730 – 0930	***Failures & Analysis*** *Reasons for Failures ● Documentation of Work ● Documentation of Failures*
0930 – 0945	*Break*
0945 - 1200	***Failures & Analysis (cont'd)*** *Failures, Failure Analysis & Failure Prediction for 115 KV Cables ● Analysis of Failures ● Predictive Approach*
1200 - 1215	*Break*
1215 - 1300	***New Trends*** *Reasons for Increasing Preference to Underground Cables ● New Technologies for Very High Capacities & Voltages ● 115 KV XLPE ● High Temperature Superconductivity in Cables & Likely Impact on Current Practices ● Future Trends in Cable Technology & Cable Accessories for 115 KV Cables*
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, jointing and termination exercises using heat-shrink kits, suitable for classroom training.






Course Coordinator

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