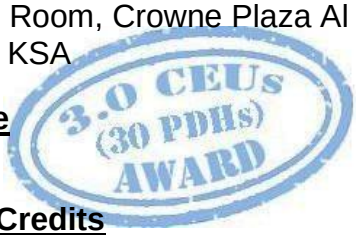
COURSE OVERVIEW ME0656

Advanced Steel Making Process

Course Title
Advanced Steelmaking Process

Course Date/Venue
Session 1: May 11-15, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
Session 2: October 26-30, 2025/Crowne Meeting Room, Crowne Plaza Al Khobar, KSA



Course Reference
ME0656

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

Course Description

This hands-on, highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using the simulators "Electrical Arc Furnace" and "Hydraulic Operations Software".

This course covers systematic techniques, methodologies and procedures on advanced process of steel making. It covers all aspects of the electric arc furnace process specifically the equipment used in furnace design, roof and panels, furnace tilt, charging, melting and fluxing, oxygen and burners, refining and heating, tapping, inspection and repair.

The course will discuss the steelmaking process chemistry and scarp usage to identify the energy inputs within the electric arc furnace as well as the process of steel melting, refining and tapping including the refractory maintenance during furnace turn around, hydraulics and cooling systems.

Participants will be able to recognize the electrodes handling, assembly, consumption, spraying systems and off gas evacuation system, electrical systems, transformer, tap charger, delta closure, vacuum, motorized switches and furnace power cables.

Moreover, participants will be able to demonstrate the use of electric arc furnace simulation and complete the analysis of all hydraulic operations including roof lower/raise, roof swing, electrode arms up/down, furnace tilt and slag door raise/lower.

Course Objectives

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

- Apply and gain an advanced knowledge on steel making process
- Employ all aspects of the electric arc furnace process specifically the equipment used in the process and recognize the fundamental concepts related to sub-processes
- Discuss the overview of electric arc furnace and identify scrap usage within the electric furnace and the steelmaking process chemistry
- Explain the energy inputs within the electric arc furnace and describe the process of steel melting, refining and tapping
- Describe the refractory maintenance during furnace turn around, hydraulics and cooling systems maintenance
- Identify the electrodes and analyze the future development within the electric arc furnace
- Recognize the main electrical systems, transformer, tap charger, delta closure, vacuum, motorized switches and furnace power cables
- Conduct workshop with the use of electric arc furnace simulation and complete analysis of all hydraulic operations including roof lower/raise, roof swing, electrode arms up/down, furnace tilt and slag door raise/lower

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 steelmaking process for operations, technical, quality, engineering and managerial personnel who wish to gain a specific introduction to the practical, technical and metallurgical operation of steelmaking processes. Further, the course is designed to meet the requirements of personnel, at all levels, within the environment of steelmaking processes.

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 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 accreditation 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. Ben Van, PGDip, BSc, BIng is an **International Expert** in **Rolling Mill & Steel Manufacturing** with over **30 years** of extensive experience in the industry. His expertise mainly covers **steel manufacturing** & the **operation** of **rolling mills**. He is also well-versed in **steel works**, **hot strip mills**, **plate mill**, **cold rolling division**, **galvanising**, **tinning** as well as **health & safety**, **materials handling**, water management, logistics, financial budgeting, human resource, general management, project & strategic management, team building and communication skills. Further, his specialization includes various certifications like **ISO 9001**, **ISO 14001** and **OHSAS 18001**.Currently, he is the **Corporate Manager** of **Arcelormittal** wherein he is responsible in Safety Auditing and the improvement of Health & Safety Systems and delivering personal development programs for employees.

During his career life, Mr. Van worked as a **Managing Consultant**, **Training Manager**, **Lecturer/Trainer**, **Technical Consultant**, **Director**, **Project Manager**, **Divisional Manager**, **Project Leader**, **Business Unit Manager**, **Engineer** and **Manager** from **Arcelormittal** and **Vanderbijlpark Steel Works**. Prior to this, he has been the **Lecturer** of the **North West University** and **Vaal University of Technology**.

Mr. Van has a **Post Graduate Diploma** in **Senior Management Development Program** and in a **Manufacturing Executive Program** from the **University of South Africa** and **Darden University**, **USA** respectively and a **Bachelor** of **Science** and a **Bachelor** degree in **Mechanical Engineering** from the **University of Stellenbosch**. Further, he is a **Certified Instructor/Trainer**, a **Certified Trainer/Assessor** by the **Institute of Leadership & Management** (**ILM**), a **Director** of Collect a Can Pty, Ltd.; Vantin Pty Ltd; and Vesco; and a **member** of **Institute of Directors** and **Business Council** of Vanderbijlpark. Moreover, he has delivered numerous trainings, courses, workshops and conferences worldwide.

Course Fee

US$ 10,000 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 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	***Overview of the Electric Arc Furnace*** *Furnace Design ● Roof and Panels ● Furnace Tilt ● Charging ● Melting and Fluxing ● Oxygen and Burners ● Refining and Heating ● Tapping ● Inspection and Repair*
0930 – 0945	*Break*
0945 – 1045	***Overview of the Electric Arc Furnace (Cont'd)*** *Refining and Heating ● Tapping ● Inspection and Repair*
1045 – 1200	***Steelmaking Process Chemistry*** *Overview ● Oxidation and Deoxidation ● Removal of Sulphur and Phosphorous ● Hydrogen and Nitrogen Control ● Inclusions ● Slag Control*
1200 – 1215	*Break*
1215 – 1230	***Scrap Usage*** *Types and Quality ● Density, Residuals, and Yield ● Costs ● Charging Bucket ● Workshop ● Scrap Types and Least Cost Charge Mixes*
1230 – 1330	***Video*** *Science in Steel Overview ● Electric Arc Steel an Alternative Route to Steel*
1330 – 1420	***Workshop*** *Electric Arc Process Simulation (Computers and Internet Access Required)*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0930	***Energy Inputs within the Electric Arc Furnace*** *Burners and Oxygen ● Power Systems ● Transformers*
0930 – 0945	*Break*
0945 – 1100	***Energy Inputs within the Electric Arc Furnace (cont'd)*** *Masts and Arms ● Electrodes ● Regulation System ● Power Lockout*
1100 – 1230	***Melting*** *Power On ● Slag Additions ● Foaming Slag ● Fume Extraction ● Key Parameters*
1230 – 1245	*Break*
1245 – 1420	***Workshop*** *Electric Arc Process Simulation (Computers and Internet Access Required)*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0930	***Refining*** *Flat Bath ● Sampling ● Slag Foaming ● Residual Control*
0930 – 0945	*Break*
0945 – 1100	***Tapping*** *Tap Ladle ● Taphole ● Workshop ● Addition Calculation*

1100 – 1230	***Workshop*** *Simulation of Hydraulic Pumps Parameters*
1230 – 1245	*Break*
1245 – 1420	***Workshop (cont'd)*** *Simulation of Hydraulic Pipe Parameters*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

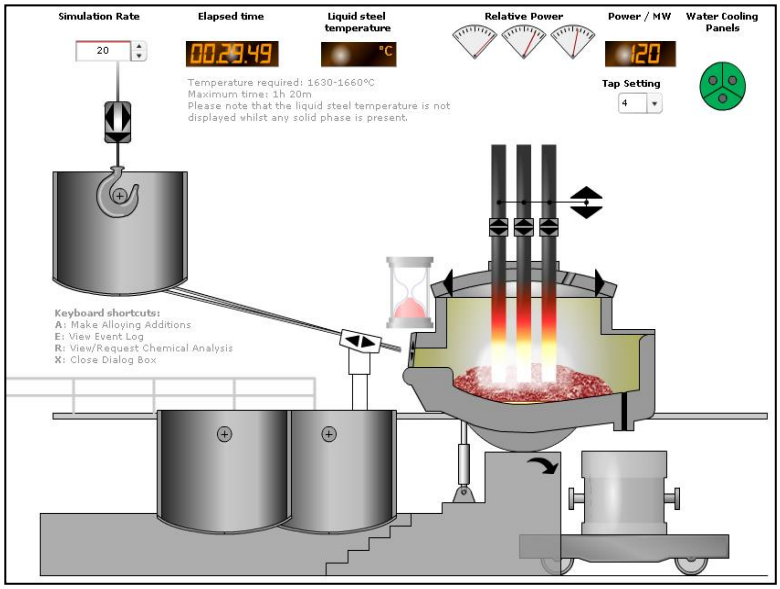
0730 – 0930	***Refractory Maintenance during Furnace Turn Around*** *Design ● Refractory Campaigns ● Gunning*
0930 – 0945	*Break*
0945 – 1100	***Hydraulics*** *Roof ● Electrode Regulation ● Furnace Tilt ● Slag door ● Burner Lance-Complete Analysis of Hydraulic Circuits ● Simulation of Parameters ● Maintenance Guidelines and Troubleshooting*
1100 – 1230	***Cooling Systems Maintenance*** *Furnace Panels ● Roof Panels ● Electrode Holder Cooling ● Pumps ● Filters ● Heat Exchangers ● Cooling Towers*
1230 – 1245	*Break*
1245 – 1420	***Workshop (cont'd)*** *Simulation of Hydraulic Motor and Cylinder Parameters*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

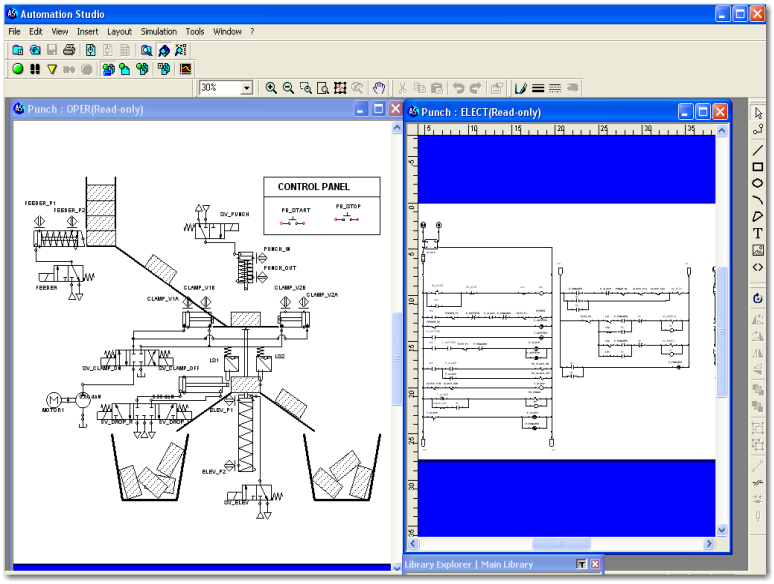
0730 – 0930	***Electrodes*** *Handling ● Assembly ● Consumption, Electrode Spraying Systems ● Offgas Evacuation System*
0930 – 0945	*Break*
0945 – 1100	***Electrical Systems*** *EAF Transformer ● Tap Charger ● Vacuum and Motorized Disconnect Switches ● Delta Closure, Aster Cooled Furnace Power Cables ● Bus Bar/Current Conducting Arm ● Electrode Heads/Contact Pads*
1100 – 1200	***Future Development*** *AC versus DC ● Scrap Preheating ● Iron Sources ● Environmental*
1200 – 1215	*Break*
1215 – 1315	***Workshop*** *Simulation of Accumulators for Safety Design*
1315 – 1345	***Design Workshop / Future Development*** *Use of DRI in Electric Arc Steelmaking*
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulator (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 the "Electrical Arc Furnace" and Hydraulic Operations Software" simulators.



Electrical Arc Furnace



Hydraulic Operations Software

Course Coordinator

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org