COURSE OVERVIEW ME0654
Basic Steel Making Process

Course Title
Basic Steel Making Process

Course Date/Venue
Session 1: May 04-08, 2025/Crowne Meeting Room, Crowne Plaza Al Khobar, KSA
Session 2: December 07-11 07-11, 2025/ Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

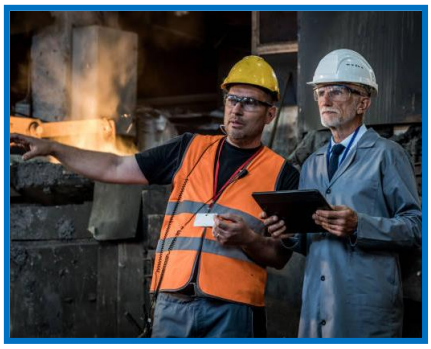
Course Reference
ME0654

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

Course Description

This practical and highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.

This course is designed to provide participants with the operational aspects of basic steel making processes and procedures. Topics covered include the history modern steel making and types of steel covering the attributes, effect of impurity elements, historical perspectives and present status of steel industry.



Th e course will discuss the modern steel making along with its concepts in terms of primary steelmaking, secondary steel making, continuous casting and thin strip casting as well as the final finishing operation. Equilibrium between phases which are activity solution-Raoult's Law and Henry's Law-Interaction parameter as the science based of steel making will all also be discussed.

Participants will be able to identify the role of slag in steelmaking; the physico-chemical properties of slag; the steel making reactions like oxidation reactions, iron oxidation and oxidation of silicon; the oxidation of manganese and carbon; dephoshorization reaction; the refractory materials; the converter steelmaking; availability of oxygen and ladle metallurgy.

Further, participants will be able to perform the top blowing steelmaking; distinguish BOF steelmaking, EAF steelmaking and strainless steelmaking; employ solidification casting and finishing operations and design a physical model for fluid flow in steel melt.

Course Objectives

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

- Apply and gain a fundamental knowledge on steel making process
- Discuss the history of modern steelmaking including the types of steel, attributes, effect of impurity elements, historical perspectives and present status of steel industry
- Illustrate how to make modern steel making and identify what is it science base and role of slag
- Identify the physico-chemical properties of slag, steel making reactions and oxidation of manganese and carbon
- Determine the dephoshorization reaction, refractory materials and steelmaking converter
- Perform top blowing steelmaking practice
- Distinguish the availability of oxygen, BOF steelmaking, EAF steelmaking
- Acquire understanding on ladle metallurgy, strainless steelmaking, solidification casting and finishing operations and modeling of steelmaking process

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

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 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.

Accommodation

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

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. Steve Magalios, CEng, PGDip (on-going), MSc, BSc, is a **Senior Welding & Pipeline Engineer** with almost **40 years** of extensive **On-shore/Offshore** experience in the **Oil & Gas**, **Construction**, **Refinery** and **Petrochemical** industries. His expertise widely covers in the areas of **Welding Technology**, **Welding & Fabrication**, **Welding Inspection**, **Pipeline** Operation & Maintenance, **Pipeline** Design & Construction, **Pipeline** Repair Methods, **Pipeline** Engineering, Pipeline Integrity Management System (**PIMS**), **Pipeline** Pigging, Piping & Pipe Support Systems, **Piping** Systems & Process Equipment, **Piping** System Repair & Maintenance, **Piping** Integrity Management, Computer Aided Design (**CAD**), **Building & Road** Design Skills, **Civil Engineering Design**, **Structural Reliability** Engineering, **Road** Construction & Maintenance, **Concrete Structures & Building Rehabilitation**, **Reinforced Concrete Structures Protection**, **Geosynthetics & Ground Improvement Methods**, **Blueprint** Reading & Interpretation, **Blue Print** Documentation, Mechanical **Drawings**, **P&ID**, **Flow Diagram** Symbols and **Land Surveying** & Property Evaluation. He is also well-versed in Lean & Sour Gas, Condensate, **Compressors**, **Pumps**, Flare Knockout Drum, Block **Valve** Stations, New Slug Catcher, Natural **Gas Pipeline** & Network, Scraper Traps, Burn Pits, Risk Assessment, HSE Plan & Procedures, Quality Plan & Procedures, Safety & Compliance Management, Permit-to-Work Issuer, ASME, API, ANSI, ASTM, BS, NACE, ARAMCO & KOC Standards, MS Office tools, **AutoCAD**, **STAAD-PRO**, GIS, ArcInfo, ArcView, Autodesk Map and various programming languages such as FORTRAN, BASIC and AUTOLISP. Currently, he is the **Chartered Professional Surveyor Engineer & Urban-Regional Planner** wherein he is deeply involved in providing exact data, measurements and determining properly boundaries. He is also responsible in preparing and maintaining sketches, maps, reports and legal description of surveys.

During his career, Mr. Magalios has gained his expertise and thorough practical experience through challenging positions such as a **Project Site Construction Manager**, **Construction Site Manager**, **Project Manager**, **Deputy PMS Manager**, **Head of the Public Project Inspection Field Team**, **Technical Consultant**, **Senior Consultant**, **Consultant/Lecturer**, **Construction Team Leader**, **Lead Pipeline Engineer**, **Project Construction Lead Supervising Engineer**, **Lead Site Engineer**, **Senior Site Engineer, Welding Engineer, Lead Engineer**, **Senior Site Engineer**, **R.O.W. Coordinator**, **Site Representative**, **Supervision Head** and **Contractor** for international Companies such as the Penspen International Limited, Eptista Servicios de Ingeneria S.I., J/V ILF Pantec TH. Papaioannou & Co. – Emenergy Engineering, J/V Karaylannis S.A. – Intracom Constructions S.A., Ergaz Ltd., Alkyonis 7, Palaeo Faliro, Piraeus, Elpet Valkaniki S.A., Asprofos S.A., J/V Depa S.A. just to name a few.

Mr. Magalios is a **Registered Chartered Engineer** and has **Master** and **Bachelor** degrees in **Surveying Engineering** from the **University of New Brunswick**, **Canada** and the **National Technical University of Athens**, **Greece**, respectively. Further, he is currently enrolled for **Post-graduate** in **Quality Assurance** from the **Hellenic Open University**, **Greece**. He has further obtained a Level 4B Certificates in Project Management from the National & Kapodistrian University of Athens, Greece and Environmental Auditing from the Environmental Auditors Registration Association (EARA). Moreover, he is a **Certified Instructor/Trainer**, a **Chartered Engineer** of Technical Chamber of Greece and has delivered numerous trainings, workshops, seminars, courses and conferences internationally.

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.

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	***History of Modern Steelmaking*** *Types of Steel ● Attributes ● Effect of Impurity Elements ● Historical Perspectives ● Present Status of Steel Industry*
0930 – 0945	*Break*
0945 – 1100	***Modern Steel Making*** *Concept ● Primary Steelmaking ● Secondary Steel making ● Continuous Casting and Thin Strip Casting ● Final Finishing Operations*
1100 – 1230	***Science Base of Steel making*** *Equilibrium between phases ● Activity Solution ● Raoult's Law ● Henry's Law ● Interaction Parameter*
1230 – 1245	*Break*
1245 – 1420	***Slag in Steelmaking*** *The Role of Slag in Steelmaking ● Structure of Pure Oxides ● Structure of Pure Silica-Network Former and Breaker Oxides ● Structure of Slag*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0930	***Physico-Chemical Properties of Slag*** *Viscocity ● Basicity ● Oxidation and Reduction Potential of Slag*
0930 – 0945	*Break*
0945 – 1100	***Physico-Chemical Properties of Slag (cont'd)*** *Slag Foaming ● Operational Advantages ● Quantification of Slag Foaming*
1100 – 1230	***Steel Making Reactions*** *Oxidation Reactions ● Iron Oxidation ● Oxidation of Silicon*
1230 – 1245	*Break*
1245 – 1420	***Oxidation of Manganese & Carbon*** *Behaviour of Manganese ● Oxidation of Managnese*
1420 – 1430	*Recap*
1430	*Lunch & End of Day Two*

Day 3

0730 – 0930	***Oxidation of Manganese & Carbon (cont'd)*** *Reduction of Manganese ● Rimminh Reaction*
0930 – 0945	*Break*
0945 – 1100	***Dephoshorization Reaction*** *Equilibrium Considerations ● How Low YP205 should be*

1100 – 1230	***Refractory Materials*** *BOF Refractories ● Refractories for Secondary Steelmaking ● refractory for Circulating Degassing ● Refractory for High Temperature Furnace ● Maintenance of Refractories*
1230 – 1245	*Break*
1245 – 1420	***Converter Steelmaking*** *Pretreatment of Hot Metal ● Removal of Sulphur ●Lance ● Feed Materials*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 – 0930	***Top Blowing Steelmaking Practice*** *Bottom Stiring in Top Blowing ● Physico-Chemical Interactions*
0930 – 0945	*Break*
0945 – 1100	***Availability of Oxygen*** *Free Gas Jet Penetrability*
1100 – 1230	***BOF Steelmaking*** *Technology of Post Combustion ● Slag Splashing ● Liquidus Temperature ● Slag Free Tapping*
1230 – 1245	*Break*
1245 – 1420	***EAF Steelmaking*** *AC Electrical Arc Furnace ● Transformer Power ● Plant Layout ● Arc Furnace Operation ● Comparison with Oxygen Steelmaking*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 – 0930	***Ladle Metallurgy*** *Ladle Treatment and Requirements ● Synthetic Slag ● Injection Ladle ● Principles of Deoxidation and Degassing*
0930 – 0945	*Break*
0945 – 1100	***Strainless Steelmaking*** *Thermodynamics of Decarburisation of Chromiuim Melt ● AOD Process*
1100 – 1200	***Solidification Casting and Finishing Operations*** *Ingot Casting ● Continuous Casting ● Heat Treatment ● Deformation Processing*
1200 – 1215	*Break*
1215 – 1345	***Modelling of Steelmaking Process*** *Design of a Physical Model for Fluid Flow in Steel Melt*
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-

Course Coordinator

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