COURSE OVERVIEW ME0332
Roll Mills Reheating Furnace Walking Hearth Operation & Optimization

Course Title
Roll Mills Reheating Furnace Walking Hearth Operation & Optimization

3.0 CEUs (30 PDHs) AWARD

H-STK© INCLUDED

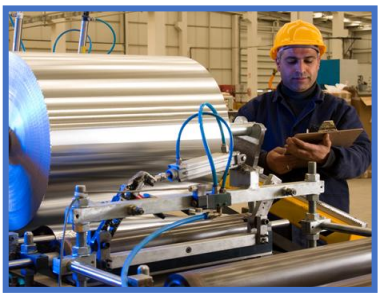
Course Reference
ME0332

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

Course Date/Venue

Session(s)	Course Date	Venue
1	February 08-12, 2026	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai UAE
2	May 31-June 04, 2026	Safir Meeting Room, Divan Istanbul, Turkey
3	August 09-13, 2026	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai UAE
4	December 13-17, 2026	Safir Meeting Room, Divan Istanbul, Turkey

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 delegates with a detailed and up-to-date overview of roll mills reheating furnace (walking hearth) operation and optimization. It covers the mill layout and reheating furnace (walking hearth); the billets/blooms movement through the reheating furnace, cycle time of walking hearth furnaces and positions of billets/blooms; and the heat balance inside furnace, heat transmission, temperature differences between billets/blooms; and estimation of billet/bloom temperature.

Further, the course will also discuss the thermal radiation between billet/bloom and furnace walls; the heat transfer between billets/blooms, the furnace atmosphere and the hearths; the heat transfer coefficient, thermal conduction, thermal properties of materials and specific heat; the emissivity/absorption rate, thermal conductivity and mesh construction; the heat balance modeling in each component, factors from furnace walls, hearths and ceiling to a mesh; the heat transmission between billets/blooms and the hearths;

and the local temperature of the hearths and interaction between billets/blooms.

During this interactive course, participants will learn the reheating during steel rolling; the methods of reducing the fuel cost; the primary causes of non-optimal furnace operation and prior work on reheating furnace control strategies; the effect of thermal conductivity on center temperature and parameters selection for optimization; estimating extraction temperature of billets/blooms; the selection of model and parameters for reheating furnace control; the optimization of furnace operation; the initial solution, unit increment of furnace temperature and schedule matrix and upper limit of temperature change; the effective zone and time period targeting for estimating billet temperature; the classified searching for efficient temperature changes; and the final treatment for the optimal control solution.

Course Objectives

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

- Apply and gain a comprehensive knowledge on roll mills reheating furnace (walking hearth) operation and optimization
- Discuss roll mill reheating furnace, mill layout and reheating furnace (walking hearth)
- Identify billets/blooms movement through the reheating furnace, cycle time of walking hearth furnaces and positions of billets/blooms
- Describe the heat balance inside the furnace, heat transmission, temperature differences between billets/blooms and estimation of billet/bloom temperature
- Differentiate thermal radiation between billet/bloom and furnace walls as well as heat transfer between billets/blooms, the furnace atmosphere and the hearths
- Explain heat transfer coefficient, thermal conduction, thermal properties of materials and specific heat
- Recognize emissivity/absorption rate, thermal conductivity and mesh construction
- Identify heat balance modeling in each component, view factors from furnace walls and hearths and ceiling to a mesh
- Distinguish heat transmission between billets/blooms and the hearths, recognize local temperature of the hearths and interaction between billets/blooms
- Apply reheating during steel rolling and proper methods to reduce the fuel cost
- Examine primary causes of non-optimal furnace operation and prior work on reheating furnace control strategies
- Recognize effect of thermal conductivity on center temperature and parameters selection for optimization
- Estimate extraction temperature of billets/blooms and select model and parameters for reheating furnace control
- Optimize furnace operation, apply optimization method and determine the initial solution
- Identify the unit increment of furnace temperature including the schedule matrix and upper limit of temperature change

- Recognize the effective zone and time period targeting for estimating billet temperature
- Carryout classified searching for efficient temperature changes and final treatment for the optimal control solution

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 roll mills reheating furnace (walking hearth) operation and optimization for furnace operators and supervisors.

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

Dubai	**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.
Istanbul	**US$ 10,000** per Delegate + **VAT**. This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), 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 **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. Karl Thanasis, PEng, MSc, MBA, BSc, is **Senior Mechanical & Maintenance Engineer** with over **45 years** of extensive industrial experience. His wide expertise includes **Roll Mill Reheating Furnace**, **Mesh Construction**, **Steel Rolling**, **Heat Transmission**, **Piping & Pipeline**, Maintenance, Repair, **Shutdown**, **Turnaround & Outages**, **Maintenance & Reliability** Management, **Mechanical Maintenance** Planning, Scheduling & Work Control, Advanced Techniques in **Maintenance** Management, **Predictive & Preventive** Maintenance, **Maintenance & Operation Cost Reduction** Techniques, Reliability Centered Maintenance (**RCM**), **Machinery Failure** Analysis, **Rotating Equipment Reliability** Optimization & Continuous Improvement, **Material Cataloguing**, **Mechanical & Rotating Equipment** Troubleshooting & Maintenance, **Root Cause Analysis & Reliability** Improvement, **Condition** Monitoring, **Root Cause Failure Analysis** (RCFA), **Steam Generation**, **Steam Turbines**, **Power Generator Plants**, **Gas Turbines**, **Combined Cycle Plants**, **Boilers**, **Process Fired Heaters**, Air Preheaters, Induced Draft Fans, All Heaters Piping Work, Refractory Casting, Heater Fabrication, Thermal & Fired Heater Design, **Heat Exchangers**, Heat Transfer, Coolers, **Power Plant** Performance, Efficiency & Optimization, **Storage Tank** Design & Fabrication, **Thermal Power Plant** Management, **Boiler & Steam** System Management, **Pump** Operation & Maintenance, **Chiller & Chiller Plant** Design & Installation, **Pressure Vessel**, **Safety Relief Valve** Sizing & Selection, **Valve** Disassembling & Repair, Pressure Relief Devices (**PSV**), **Hydraulic & Pneumatic** Maintenance, Advanced **Valve** Technology, **Pressure Vessel** Design & Fabrication, **Pumps**, Turbo-Generator, Turbine **Shaft Alignment**, **Lubrication** and Mechanical **Seals**,. Further, he is also versed in **Wastewater Treatment** Technology, **Networking** System, **Water Network Design**, Industrial **Water Treatment** in Refineries & Petrochemical Plants, **Piping** System, Water Movement, Water Filtering, Mud Pumping, **Sludge Treatment** and **Drying**, **Aerobic Process** of **Water Treatment** that includes **Aeration**, **Sedimentation** and **Chlorination Tanks**. His strong background also includes **Design** and **Sizing** of all **Waste Water Treatment Plant Associated Equipment** such as **Sludge Pumps**, **Filters**, **Metering Pumps**, **Aerators** and **Sludge Decanters**.

Mr. Thanasis has acquired his thorough and practical experience as the **Project Manager**, **Plant Manager**, **Area Manager - Equipment Construction**, **Construction Superintendent**, **Project Engineer** and **Design Engineer**. His duties covered **Plant Preliminary Design**, **Plant Operation**, **Write-up** of **Capital Proposal**, **Investment Approval**, **Bid Evaluation**, **Technical Contract Write-up**, **Construction** and **Sub-contractor Follow up**, **Lab Analysis**, **Sludge Drying** and **Management** of **Sludge Odor** and **Removal**. He has worked in various companies worldwide in the **USA**, **Germany**, **England** and **Greece**.

Mr. Thanasis is a **Registered Professional Engineer** in the **USA** and **Greece** and has a **Master's** and **Bachelor's** degree in **Mechanical Engineering** with **Honours** from the **Purdue University** and **SIU** in **USA** respectively as well as an **MBA** from the **University of Phoenix** in **USA**. Further, he is a **Certified Internal Verifier/Trainer/Assessor** by the **Institute of Leadership & Management** (**ILM**) a **Certified Instructor/Trainer** and has delivered numerous trainings, courses, seminars, workshops and conferences worldwide.

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 – 0845	***Introduction to Roll Mill Reheating Furnace***
0845 - 0900	***Mill Layout***
0900 – 0915	*Break*
0915 – 1030	***Reheating Furnace (Walking Hearth)***
1030 – 1100	***Billets/Blooms Movement through the Reheating Furnace***
1100 - 1200	***Cycle Time of Walking Hearth Furnaces***
1200 – 1215	*Break*
1215 – 1230	***Positions of Billets/Blooms***
1230 - 1300	***Heat Balance Inside the Furnace***
1300 - 1420	***Heat Transmission***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0800	***Temperature Differences Between Billets/Blooms***
0800 - 0830	***Estimation of Billet/Bloom Temperature***
0830 - 0900	***Thermal Radiation Between Billet/Bloom & Furnace Walls***
0900 – 0915	*Break*
0915 – 1030	***Heat Transfer Between Billets/Blooms, The Furnace Atmosphere & the Hearths***
1030 – 1200	***Heat Transfer Coefficient***
1200 – 1215	*Break*
1215 – 1300	***Thermal Conduction***
1300 - 1330	***Thermal Properties of Materials***
1330 - 1420	***Specific Heat***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0800	***Emissivity/Absorption Rate***
0800 - 0830	***Thermal Conductivity***
0830 - 0900	***Mesh Construction***
0900 – 0915	*Break*
0915 – 1030	***Heat Balance Modeling in Each Component***
1030 – 1200	***View Factors from Furnace Walls, Hearths & Ceiling to a Mesh***
1200 – 1215	*Break*
1215 – 1300	***Heat Transmission Between Billets/Blooms & the Hearths***
1300 - 1330	***Local Temperature of the Hearths***
1330 - 1420	***Interaction Between Billets/Blooms***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 – 0800	***Reheating During Steel Rolling***
0800 - 0830	***Methods of Reduce the Fuel Cost***
0830 - 0900	***Primary Causes of Non-optimal Furnace Operation***
0900 – 0915	*Break*
0915 – 1030	***Prior Work on Reheating Furnace Control Strategies***
1030 – 1200	***Effect of Thermal Conductivity on Center Temperature***
1200 – 1215	*Break*
1215 – 1300	***Parameters Selection for Optimization***
1300 - 1330	***Estimating Extraction Temperature of Billets/Blooms***
1330 - 1420	***Selection of Model & Parameters for Reheating Furnace Control***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 – 0815	***Optimization of Furnace Operation***
0815 – 0900	***Outline of the Optimization Method***
0900 – 0915	*Break*
0915 – 1030	***Determining the Initial Solution***
1030 – 1100	***Unit Increment of Furnace Temperature***
1100 – 1130	***Determination of the Schedule Matrix & the Upper Limit of Temperature Change***
1130 - 1200	***Effective Zone & Time Period Targeting for Estimating Billet Temperature***
1200 – 1215	*Break*
1215 – 1230	***Classified Searching for Efficient Temperature Changes***
1230 - 1345	***Final Treatment for the Optimal Control Solution***
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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