



ENGINEERING STAFF COLLEGE OF INDIA

Autonomous Organ of The Institution of Engineers (India)
(IMS [ISO 9001:2015, ISO 14001:2015, ISO 50001:2018, ISO 45001:2018],
ISO/IEC 17025:2017 Certified, AICTE & CEA Recognized Institution)
Old Bombay Road, Gachibowli, Hyderabad – 500 032. Telangana, India



Management and Technology Division

Continuing Professional Development Programme on

Forging Technology and Heat Treatment of Castings, Forgings and Weldments

for Engineers & Quality Assurance Officers

Dates: 16 – 20 October 2023
at ESCI Campus, Hyderabad

INTRODUCTION

Forging is one of the pivotal process in the manufacturing industry. Forging is a process by which metals are formed with the use of compressive forces. The forging processes are classified based on the temperature that is used to execute the process like hot forging, warm forging and cold forging. According to the requirement of the job, forging process as well as die the process engineer decides design. Proper understanding of the parameters is essential for obtaining defect free forging component.

Heat treatment can be defined as “heating and cooling a solid metal or alloy in a way so as to obtain the specific conditions or properties”. In industries heat treatment practice involves, use of thermal, mechanical, and chemical treatments to impart desired properties to the materials. Heat treatment is an important post processing operation carried out to induce mechanical, electrical, and tribological properties to the manufactured components. All industrial components has to undergo heat treatment process prior to their entry into service. Almost all metals respond to some sort of heat treatment. Correctly performed heat treatment operation can enhance the properties of the materials by optimum modifications in composition, and distribution phases and this result in substantial improvements in physical, chemical, and mechanical properties. There are several heat treatment process variables and among them most prominent include heating rate, peak temperature, holding time, and cooling time. These variable needs to be properly understood, in order to effectively conduct the heat treatment process.

OBJECTIVES

The Primary objective of the course focuses on clear understanding the core concepts of heat treatment and forging technologies as well as advances that are introduced in the recent times in this technology.

COURSE COVERAGE

The following course content will be detailed during the training programme:

Forging:

- Fundamentals of Metal forming processes (Drawing-out, upsetting/jumping, bending, Punching, drifting, hand/machine forge welding, riveting, drop forging, cutting, swaging, setting down, press forging)
- Difference between hot forging, warm forging and cold forging
- Forging Classification: Open Die forging & Closed Die forging
- Forging Die design – Presses and Hammers (including hydraulic and pneumatic)
- Forging load calculation
- Defects, Causes and Remedies
- Furnace repairs and maintenance

Heat Treatment:

- Principles and Processes of Heat treatment – An Overview
 - Hardening, Tempering, Annealing, Normalizing for ferrous metals
 - Surface hardening methods
- Heat treatment of Castings, and Forgings (Ferrous Materials)

- Heat treatment of weldments and Pre and Post weld heat treatment of P91 and P92 weldments
- Basics on furnaces and controls
- Heat Treatment defects and control
- Furnace specifications and Instrumentation requirements
- Calibration of Furnaces and Latest Standards
- Principles of Total Quality Control

METHODOLOGY

Methodology of the programme includes class room Sessions with Lecture/discussion with audio visual aid, benched marked practices if any, video shows, Chalk & Talk sessions, group discussions, case studies, debates, sharing of experiences, etc. All the sessions will be interactive demanding active participation from all the members. Case Method of Instructions will be the main method of knowledge facilitation.

TARGET PARTICIPANTS

Engineers, engineering managers, Supervisors, working in manufacturing & production units (Aerospace, Automobile, Navy, Ordnance factories, Railway, Power plants), process plants, R&D labs Public & Private sector organizations finds this programme extremely useful.

SEXPRT FACULTY

The Faculty consists of experts from the Industry, Research establishments and Academia besides ESCI.

PROGRAMME DIRECTOR

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PROGRAMME DATES & TIMINGS

Dates: 16 – 20 October 2023

Timings : On the first day Registration will commence at **09:00 Hrs**. On all other days the programme timings will be from **09:45-17:15 Hrs** with breaks in between for tea and lunch.

COURSE FEE: Rs.27,000/- (Rupees Twenty Seven Thousand only) per Participant + GST@18% Extra. Fee includes, course material, course kit, twin-sharing/single AC accommodation as per availability, breakfast, lunch, dinner, tea / coffee and snacks during the actual days of training programme.

PAN Card No AAATT3439Q; GST No. 36AAATT3439Q1ZV. H.S. No. 999293 (Under commercial training or coaching services – clause 65(105) (ZZC) of Finance act – 1994).

Programme fee is to be paid in in favor of **“THE INSTITUTION OF ENGINEERS (INDIA) – ENGINEERING STAFF COLLEGE OF INDIA”** in the form of demand draft payable at Hyderabad. Alternatively, the payment may be made by Electronic Fund Transfer (EFT) to ESCI - **SB A/c No.0432104000039631 with The IDBI Bank Ltd., Gachibowli Branch, Plot No. 2-53/2, JNIBF, IIIT Junction, Gachibowli, Hyderabad-500032 by RTG's/ NIFT / IFSC Code No: IBKL0000432**. While using EFT method of payment, please ensure to communicate us your company name, our Invoice reference and programme title.

CERTIFICATION

A Certificate of participation will be awarded to each participant on conclusion of the programme.

GENERAL INSTRUCTIONS:

- ESCI encourages participants to present case studies from their respective organizations.
- ESCI provides complimentary accommodation and boarding to the participants one day before commencement (Check-in 1200 h) and one day after conclusion (Check-out 1200 h) of the programme duration. Overstay charges will be applicable as per ESCI rules (subject to availability of accommodation).
- Well-developed Information Centre and Internet facilities are available to the participants free of cost.