Manufacturing Technology Training
An IMTMA initiative

Servicing, Maintenance and Trouble shooting of CNC Machine Tools – Mechanical, Electrical and Electronics Aspects
Date : 10 to 15 April, 2023
Venue : IMTMA Technology Centre, Bengaluru

INTRODUCTION

CNC machines are real Mechatronic systems, having electrical and electronic circuits interacting with mechanical actuators/sub-systems. Diagnostics and root cause analysis is an important aspect of maintenance, which is most often ignored. Often the roots of a mechanical problem is in the electronics area and that of an electronic problem lies elsewhere. Thorough understanding of the various sub-systems, CNC machine circuit diagram, Ladder diagram, and CNC parameters is needed to find and fix the root cause to minimize MTTR (Mean Time To Repair) and effective planning of PMBF (Preventive Maintenance Before Failure) towards zero downtime.

Keeping this in view, **Indian Machine Tool Manufacturers' Association (IMTMA) is organizing 6 days workshop on "Servicing, Maintenance and Troubleshooting of CNC Machine Tools – Mechanical, Electrical and Electronics Aspects" in Bangalore.** The training will be based on a hybrid approach with group exercises on circuit diagram study and practical demonstrations in CNC machines and subsystems maintenance and troubleshooting.

FOCUS AREAS

- **Anatomy of CNC machines – Overview of various sub-systems of CNC Turning and Machining Centres.**
- A systematic approach to diagnostics and problem-solving.
- **Circuit Diagram study – Electrical and electronic circuits**
- Circuit Diagram study – Hydraulic, Lubrication, and Pneumatic subsystems
- **Maintenance aspects in CNC controllers**
- Typical problems in Electrical and Electronic sub-systems; Safety aspects; Alarm messages, Alarm History, and Operations History
- **Maintenance aspects of drives and encoder**
- CNC Parameters setting
- **Demo and Group exercises in electrical circuit diagram study**
- Demo of Do's and Don'ts in CNC controllers
- **Types and applications of Linear Motion guide ways – Mounting and alignment method**
- Types and applications of Ball screw – Mounting and alignment method
- **Assembly procedure of Ball screw and LM Guides**
- Ball screw alignment w.r.t LM Guides
- **Troubleshooting of ball screws & LM Guides**
- Bearing types & their application in Machine Tools
- **Spindle failure & reconditioning**
- Spindle bearing preloading
- **Preventive maintenance of spindles**
- Live demo of Spindle dismantling, testing, and assembly
- **National and International standards for determining Positional accuracy and Repeatability of machine tools**
- Test code for machine tools and test parameters for machine tool qualification
- **Accuracy aspects:**
- Measurement of Geometrical accuracies as per test chart
- **Measurement of Positioning Accuracy and Repeatability of axes**
- Measurement of Interpolation accuracy (ball bar)
- **Finish machining accuracy on IS/ISO test piece**
- **Live Demo on**:
  - Laser Calibration
  - Ball bar testing

KEY TAKE AWAYS

After undergoing the program, the participants will be able to learn

- **How to carry out preventive and break-down maintenance of CNC machines**
- Identifying faults in various components of CNC machines
- **How to report faults correctly to the manufacturer**
- Subsystems and circuits of CNC machines
- **Alignment of Ball screw and LM guides**
- Assembly process of Spindle and other critical components
- **Troubleshooting of mechanical and electronics typical issues**
- Accuracy measurements
- **Axis calibration methods**
- Troubleshooting of hydraulics and pneumatics

PARTICIPATION FEE

Rs. 17500/-
+18% GST
IMTMA Members/ Micro Companies/ Individuals/ Educational Institutions / Students/ IMTMA Non Members/ Others

USD 215/-
Overseas Participants

Group Concession : 10% for 3 to 5 and 20% for 6 and more delegates being nominated from the same company

PARTICIPANT PROFILE

Minimum one-year experience from the various functions mentioned below:

- Service engineers
- Maintenance engineers
- Production engineers
- Quality engineers
- Project engineers
- Assembly engineers
- Testing engineers
- Application engineers

FACULTY

This program will be conducted by **Mr. Ramadas Nambi, Mr. Rajashekhara H V, Mr. Rajendra M, & Mr. T. R. Kumaraswamy**

Mr. Ramadas R Nambi is an industry expert with over 30 years of experience in the area of CNC control systems, CNC machines, Industrial robots & Unmanned operations. Presentations will be accompanied by practical demonstrations and case studies. The workshop will be highly interactive where participants will be able to discuss specific problems in maintenance and solicit feedback from the expert faculty.

Mr. Rajashekara HV, Advisor IMTMA has 28 years of experience in the Design and Development of Metal cutting machines from various industries like M/s HMT Machine Tools, M/s Johnson Electric International Limited, Hong Kong, and 7 years as Senior Director, IMTMA Design Institute. He has an overall experience of 35 Years from both shop floor and training.

Mr. Rajendra M has served in ITC Ltd. as a maintenance engineer for 5 years and in HMT Machine Tools Division, Bangalore as a maintenance engineer for 33 years and retired in the year 2019 as a Deputy General Manager. After retirement doing servicing metal cutting M/Cs, Metal forming machines throughout India as a freelancer. He did service abroad also.

Mr. Kumaraswamy holds B.E, M.Sc. in Machine Tool Engineering and is a specialist with over 35 years of experience in Design, Manufacturing, and Assembly of CNC Machines. He was Former Dy. General Manager, HMT Ltd. and has indepth knowledge of Prototype evaluation, Assembly, and calibration of Machining Centres, Turning Centres, WireEDMs, and Commissioning of Robots. Presentations will be accompanied by practical demonstrations and case studies.

The faculty will share his rich experience in calibration of different types of CNC machine tools in industries.

For Registration Contact
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REGISTRATION : Prior registration for participation is necessary. Number of participants is limited and will be accepted on 'First Come First Serve' basis. A Certificate of participation will be issued to participants.
Important Information : Participation fee includes, course material, working lunch and tea / coffee. Interested companies are requested to register online by clicking on 'REGISTER' button and by filling up the nomination authority and participant's details in specified form.