

**A Report on One day visit to HMT Machine Tools Ltd., Bengaluru**  
**Organized by Department of Mechanical Engineering**  
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**Purpose of Visit: Expression of Interest for MOU between HMT machine tools, Bengaluru and MITS, Madanapalle.**

**About the company:**

Incorporated as “Hindustan Machine Tools” at Bengaluru on 7th February 1953, and popularly known as “HMT”, HMT Limited, is a Central Public Sector Enterprise of the Government of India, under the Department of Heavy Industry, Ministry of Heavy Industries and Public Enterprises.

HMT Machine Tools, in addition to general purpose and multipurpose CNC Machine Tools, has been providing a host of special purpose and specific technology machines to meet the requirements of the strategic sectors like Defence, Railways, Nuclear, Space, Aerospace, Naval, Automotive etc. several of which are import substitute machines and machines which are under technology denial by developed countries. The Company headquartered at Bengaluru has manufacturing Units at Bengaluru, Pinjore, Kalamassery, Hyderabad and Ajmer.

Strongly supported by excellent R&D prowess, a highly-skilled workforce and as many as nine exclusive machine tool units across the country, HMT contributed enormously to the precision engineering arena.

From simple lathes to multi-station transfer lines, from stand-alone CNC machines to flexible manufacturing systems, leading to factory automation, HMT Machine Tools’ Products cover general purpose machines, special purpose machines and CNC machines to meet the application needs of every engineering industry. To date, over 100,000 machine tools on par with international standards in quality and performance, manufacture by HMT, are in use all over India.

**Visit to HMT:**

The faculty team started the journey at 5.45 AM and reached the HMT machine tools plant located in Jalahalli, Bengaluru at 09.00 AM. At the outset, the faculty team was welcomed and briefed about the company, its vision and the manufacturing facilities of HMT by **Mr. Subramanyam, General Manager and Mr. Atmanand, Dy Manager (Training & Skill Development), HMT Ltd.**

After a brief introduction, a visit to the manufacturing facility of HMT Ltd was done. The faculty team of MITS was accompanied by **Mr. Atmanand, Mr. C. Sekaran, Retd. AGM and training mentor to HMT Ltd. and Mr. Vijay Kumar** for the visit.

The MITS team visited the first section of the facility is foundry. The foundry was deemed the biggest foundry of its time. The furnace consists of a tilting furnace where the cast iron is melted in 1100<sup>o</sup>C. The foundry in-charge, **Mr. Murali Manohar Reddy** explained the process flow for foundry section and functioning of various machines. The conveyor belt system is used for carrying the sand after the knocking off process. The five main shops under the foundry sections are: Pattern shop, melting shop, Moulding shop, Knock Out, and fitting. **Mr. Reddy** explained the processes for pattern making using wood and polystyrene (thermocool) for various components. He explained the various learning opportunities in foundry for the mechanical engineers.

The product from the foundry goes to the machining section for further machining. The faculty team was briefed about various CNC based machines like HMT made floor boring machine, radial drilling machine, vertical and horizontal milling machine, coordinate drilling machine etc. All the machineries are capable of handling heavy equipment part for machining. Many machines were imported from

Germany, Switzerland in the inception of HMT machine tools ltd. The working of indigenously developed 'Hinumeric CNC control system' was demonstrated by the CNC machine handling staff. **Mr. C. Sekaran** informed that the HMT Ltd. developed and introduced mechatronics in the industrial applications back in 90's.

The next section of the manufacturing process is the "assembly shop". The finely machined parts of a machine are assembled in this section. The assembly team showed the assembly process for a conventional high speed lathe machine and indigenously developed the first of its kind three-way manipulator. The three-way manipulator is specially made for nuclear applications where human working is not possible. The slave arm is placed in the radiation prone side and is controlled by the master arm. The connector piece is embedded in a 3-4 feet wide partition wall to prevent radiation. The three-way manipulator is fully patented by HMT Ltd. in India.

As the factory visit concluded, the HMT personal showed the training and classroom facilities of the plant to facilitate internship and training towards faculty, students and industry professionals. The training facility hubs various machines including CNC milling and turning center. Also, the facility has computer lab and CNC simulator for better learning environment.

#### Preliminary discuss on expression of Interest for MOU:

Following the comprehensive tour of the manufacturing facility at HMT Machine Tools, a discussion ensued to deliberate upon the feasibility of establishing a Memorandum of Understanding (MOU) between HMT Machine Tools and MITS.

Various aspects were deliberated upon, including but not limited to:

1. Identifying common areas of interest and expertise where collaboration could be mutually advantageous, such as research and development initiatives, technology transfer, and skill enhancement programs.
2. Assessing the scope for joint projects or initiatives that could leverage the strengths of both institutions to address industry challenges and promote innovation.
3. Exploring avenues for knowledge exchange, including faculty exchange programs, guest lectures, and industrial internships for students, to foster a symbiotic relationship between academia and industry.
4. Considering the establishment of joint training programs or workshops aimed at enhancing the skills and competencies of students and industry professionals in alignment with emerging industry trends and requirements.
5. Discussing the modalities of partnership, including the formulation of a structured MOU outlining the terms, objectives, and responsibilities of both parties, as well as mechanisms for monitoring and evaluating the progress of collaborative endeavors.
6. The certification course and placement assistance towards industry ready students will be primary goal for both the parties.

The discussion concluded on a fruitful note, with both parties expressing optimism and enthusiasm about the prospects of collaboration between HMT Machine Tools and MITS. Key points of agreement and alignment were identified, laying a strong foundation for future partnership endeavors.

Furthermore, both parties expressed their eagerness to formalize the partnership through the signing of a Memorandum of Understanding (MOU), which would serve as a framework for guiding collaborative initiatives and delineating mutual commitments.

#### Visit to I-Hub for Robotics and Autonomous Systems Innovation:

I-Hub for Robotics and Autonomous Systems Innovation is a unique quadrilateral initiative promoted by the Indian Institute of Science (IISc), Department of Science & Technology (DST), Govt. of India, Govt. of Karnataka and HMT Ltd. to foster innovations in AI & Robotics by bringing together the best of the startup, industry, research, and government ecosystems.

The faculty team of MITS accompanied by the team of HMT Ltd visited the I-hub for startup and recent works in the field of autonomous robots, drones, flight simulations etc. The in-charge, **Mr. Bhanu Prakash** provided a comprehensive overview of various critical parameters pertinent to the field.

The visit concluded in fruitful note, where the faculty team members gained valuable knowledges and recent advancements in robotics and drone field.

#### Acknowledgement:

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