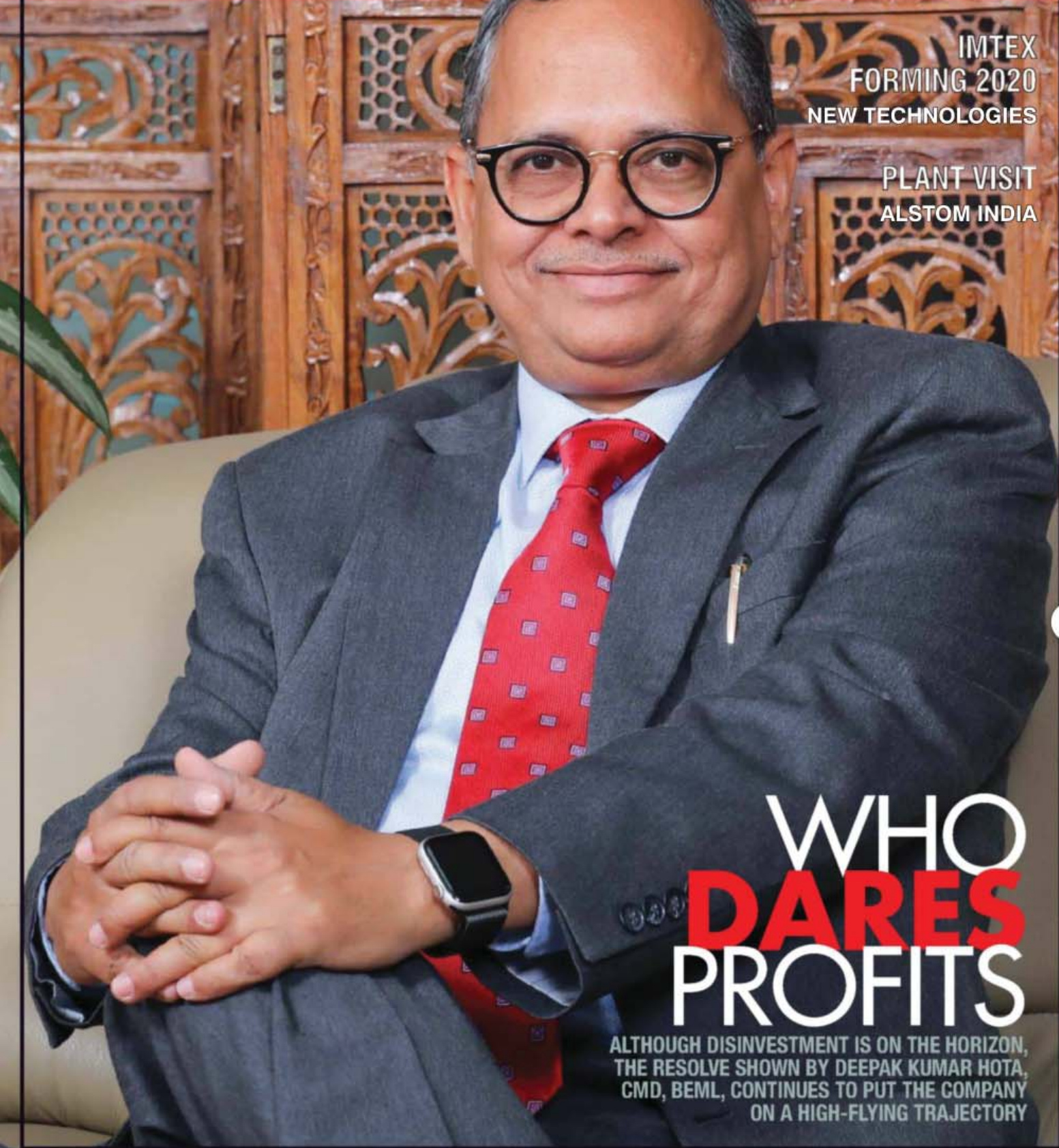


# Manufacturing Today

DECISIVE TOOL FOR MANUFACTURING

IMTEX  
FORMING 2020  
NEW TECHNOLOGIES

PLANT VISIT  
ALSTOM INDIA



## WHO DARES PROFITS

ALTHOUGH DISINVESTMENT IS ON THE HORIZON,  
THE RESOLVE SHOWN BY DEEPAK KUMAR HOTA,  
CMD, BEML, CONTINUES TO PUT THE COMPANY  
ON A HIGH-FLYING TRAJECTORY



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DECISIVE TOOL FOR MANUFACTURING EXCELLENCE

## TOWARDS DIGITALISATION

ACADEMIA CONNECTS TO THE INDUSTRY

### IIT INDORE IN COLLABORATION WITH IIT

Bombay and University of Cambridge, UK, conducted a one-day workshop on Smart Manufacturing under the Industry Academia Consortium on Smart Manufacturing (IndAC-SM). It was funded by Royal Academy of Engineering, London under their Industry Academia Partnership Program (IAPP) and third phase of Technical Education Quality Improvement Programme (TEQIP 3) scheme of MHRD. The workshop was attended by 40 industry participants representing 16 companies across different sectors including defence, automotive, agriculture, food processing and heavy machinery. In addition, 30 participants from academic institutes also attended the workshop. The workshop exposed the participants to various aspects of Industry 4.0 through lectures, case studies, hands-on exercises and prototype demonstrations.

### SESSION 1: INDUSTRY 4.0 OVERVIEW BY PROF MAKARAND S. KULKARNI, IIT BOMBAY

The session provided an overview of Industry 4.0. While narrating the concept of smart product, process & systems, he emphasised on the role of analytics. Also, he highlighted that working of any intelligent factory lies in the fact that any entity in smart factory can generate and consume information. In other words, 'what information to generate' and 'who will consume this information' needs to be linked with the technology roadmap for digitalisation. He also marked his observation by saying fundamental framework to evaluate

applicability of Smart Manufacturing or Industry 4.0 concept for the business is lacking amongst Indian manufacturers.

### SESSION 2: DIGITAL MANUFACTURING ON A SHOESTRING – REQUIREMENTS WORKSHOP BY DR. AJITH KUMAR PARLIKAD, UNIVERSITY OF CAMBRIDGE, UK

SMEs have been slow in adopting digital solutions within their organisations due to high cost and complexity of deploying and maintaining such solutions, and the lack of digital skills in the industry. "Digital Manufacturing on a Shoestring" is a collaborative project based at the University of Cambridge harnessing low-cost technology solutions to support growth and productivity. The aim of the project is to examine how low-cost, off-the-shelf digital solutions can be adapted to meet SME business needs. One of the critical activities of the project is to identify digital solution requirements of SMEs.

### SESSION 3: PROTOTYPE DEMONSTRATION

IIT Indore & IIT Bombay jointly developed & demonstrated 12 prototypes covering following aspects of industry 4.0: digital twin development, machine to machine communication, machine health monitoring, diagnostics & prognostics, prognostics data simulator, use of augmented reality in machine analytics, use of virtual reality in automobile assembly training, distributed decision making at the shopfloor, online schedul-

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1. Glimpses of the day long workshop





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ing tool, analytics & maintenance planning tool.

All these demonstrators were highlighted well during the talks and hands-on session.

#### SESSION 4: DIGITALISATION IN SME BY DR. BHUPESH KUMAR LAD, IIT INDORE, INDIA

IIT Indore and IIT Bombay presented a case study on MP Engineering & Machine Tools (MPEMT), Indore who has initiated its journey towards digitalisation. It began with digitalisation assessment. A thorough assessment revealed few of the key areas for immediate focus for digitalisation. The areas identified were in line with the priority of the industry. Participants mentioned that the assessment tool developed by consortium was highly effective in identifying the priority areas for the industry. The tool follows a top down approach and identifies the priority areas and technology roadmap for digitalisation based on the organisation's goal.

One of the solutions proposed by the consortium for traceability for the MPEMT was presented in details. Proposed solution can be implemented in stage-wise manner in the industry. Expected improvements in the digitalisation ranking at each stage, along with benefits to the company was discussed. The solution is currently in the implementation stage in MPEMT.

2. Participants had a lot to take away from the workshop.

3. Prototype demonstration.

#### SESSION 5: PROGNOSTICS BY PROF. MAKARAND S. KULKARNI, IIT BOMBAY, INDIA

Prognostics is one of the most challenging areas in smart manufacturing. It requires an understanding of the domain as well as the analysis. The focus of this session was on explaining the basis of prognosis & understand how it can be applied to various problems in industrial applications related to health monitoring. During the session, the concept of multiple state modeling was explained and examples were taken up to illustrate how system states can be used for creating prognostic models. Subsequently, continuous degradation models were also discussed and the importance of optimal interventions as emphasised.

#### SESSION 6: HANDS ON SESSION BY SUNIL CHORE, COUNTRY HEAD AND SURAJ VAISHNAV, ENGINEER, INDIASOFT TECHNOLOGIES

The session revolved around functionality and features of WITNESS software. Participants got hands-on exercises to model a machines and flow of materials in the manufacturing system. Additionally, what-if functionality was also explained and practiced using simple examples.

#### SESSION 7: ANALYSING A COMPLEX MANUFACTURING SYSTEM BY DR. SANDEEP KUMAR, POST-DOCTORAL FELLOW, IIT BOMBAY AND SHRIPRASAD CHORGHE, RESEARCH SCHOLAR, IIT INDORE.

In this session, a prebuilt model of a realistic complex manufacturing system on WITNESS platform was given to the participants for further analysis. Participants were asked to vary various key parameters like batch size, demand, job sequence, etc. and observe the key performance measures (throughput and makespan) and answer few questions. Questions were designed to give them clear understanding of bottlenecks & ways to deal with them. With this, participants could see the importance of optimising job sequencing, batch sizing and maintenance scheduling and consequences of suboptimal decisions. ■