



INTEGRATING MANUFACTURING EXECUTION SYSTEMS (MES) IN A CYBER-PHYSICAL LANDSCAPE

- An evolving perspective

Abstract

From an industry perspective, the manufacturing landscape is transforming into an intricate web of cyber-physical (CP) structures where bottlenecks and production backlogs are no longer challenges but merely parameters in an algorithm. Recent digital solutions are resolving complex process constraints through mature ERP-MES-shop floor product solutions that balance the cyber with the physical. This paper looks at how an integrated MES solution can help companies increase operational efficiency through a cyber-physical environment that drives greater business success.



Agility versus cost

In today's brave new world, manufacturing capabilities have evolved radically from the first steam-powered industrial revolution to the connected world of manufacturing brought on by Industry 4.0. While many companies want to leverage the disruptive potential of Industry 4.0, the path towards stable growth remains uncertain.

For instance, the aerospace industry has always had a strict focus on improving critical processes in discrete manufacturing. However, despite multiple constraints, the demand for latest processes like additive manufacturing makes aerospace an ideal playground for pilot projects in Industry 4.0 and cyber-physical systems. Nowadays, automating production lines and enabling robotic interactions with end products are mandatory for many leading aircraft original equipment manufacturers (OEMs). However, this can be a tremendous challenge for IT as existing systems must interact with multiple IT applications in a complex environment with extensive control system architecture. Thus, the key question is: How do companies balance the need for lean operations with escalating implementation costs?

Solving the problem through cyber-physical MES

This is where a mature and process-driven manufacturing execution system (MES) solution can help. Known nowadays as manufacturing operations management (MOM), MES solutions are the nerve center of automated manufacturing operations. By streamlining data and using targeted processes, these solutions provide clear visibility into all manufacturing activities from the shop floor to the top floor including ERP and PLM systems. When MES is aligned with data analytics and automation algorithms, the scope for cyber-physical system implementation becomes ideal and real-time.

Challenges

Consider a scenario where a numeric controlled (NC) robotic process is being carried out at a workstation. While the

process is discretely managed, every single sub-assembly is critical for the profitability of the operation. Further, the accuracy of these processes cannot be compromised. Since custom IT applications are already used to program and control the robot, appending the NC programming, tooling and maintenance constraints and their applications is challenging. This is a common issue in all CP implementations. Thus, achieving high overall equipment effectiveness (OEE) depends on the supporting applications functioning flawlessly apart from ensuring optimal equipment efficiency. This puts significant pressure on station leaders who are tasked with streamlining application usage and increasing the production rate.

The way forward

In such an environment, integration is key. MES solutions that integrate with modules such as production (for process constraints

handling), warehouse (for tooling and consumable management) and quality can eliminate dependencies on different standalone applications. Further, engaging process experts for an effective feedback loop will improve the CP architecture. This can reduce the maintenance cost of all standalone vendor applications while enabling end-to-end cost-effective processes.

A strategic and granular implementation of MES can solve multiple production issues and enhance resource utilization. However, to implement such critical and complex processes, companies must also deploy out-of-the-box functionalities and custom suites under a single umbrella of the MES product. While there are various products such as Delmia Apriso®, Siemens CAMSTAR®, etc., that are capable rolling out such solutions, the challenge is implementing these seamlessly across the complex IT landscape without business disruption.



Choose the right partner

An ideal MES implementation partner is one that understands the complete manufacturing IT landscape right from PLM implementation to the shop floor PLC-SCADA based control system commissioning, serving the purpose of

flexible Automation solution to demanding production needs.

Infosys believes in understanding and solving business-critical issues to enhance operational excellence. With its deep understanding of the manufacturing industry, its challenges and success drivers,

Infosys has successfully implemented several custom MES solutions for manufacturing clients. It does this by aligning its innovative 'Navigate your next' digital milestone-based approach with cutting-edge technologies to deliver a simple and holistic IIoT and CP environment designed for success.

About the Author



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