

Digital Tools for the Future Factory

written by Lauri Moon | December 7, 2016

(advancedmanufacturing.org - Patrick Waurzyniak: 11-11-16) Transforming manufacturing with advanced digital tools is well underway, but manufacturers who haven't adopted Industrial Internet of Things (IIoT) or Industrial 4.0 strategies are best advised to take a long look at the digital future of manufacturing.

At SME's *Smart Manufacturing Series' Digital Transformation* seminar held Wednesday at the Digital Manufacturing and Design Innovation Institute (DMDII) at UI Labs in Chicago, many key players in the smart manufacturing world offered a glimpse of where manufacturers' efforts stand in their digitizing efforts, and how far they have to go in adapting to a fully digital manufacturing world.

Not every company has the size and breadth of GE, which has made massive investments in the digital arena. But manufacturing operations managers can learn a lot from lessons learned by the pioneers in digital manufacturing. At GE, this has included a huge cultural change, noted Robert Borchelt, Industrial Solutions - Brilliant Factory IT Leader, CIO - Advanced Manufacturing Deployment, General Electric (Boston). GE's numbers are big, Borchelt noted, with more than 300,000 people in 180 countries.

"Many of the jobs we go after are not small. I'm not here to sell you—most of my focus at GE is internal," said Borchelt, who noted that GE had 2700 patents in 2014-15. With the Digital Thread "innovation comes from everywhere," Borchelt said. "Additive, drones, predictive analytics and Big Data—that's not that out there." Such technologies with manufacturing and digital analytics that give manufacturers a full Digital Twin of the factory floor will give adopting manufacturers a huge edge in the future.

"Additive manufacturing gives you the ability to make a difference—there's just no other way to make some parts," Borchelt said. New methods, like crowdsourcing of parts, can also give companies an entrée into this world, he noted, noting the efforts of Fuse, a new Chicago-based crowdsourcing venture where GE is opening a "microfactory" located in the mHub technology incubator.

With factory automation, cloud-based systems, fog computing, predictive analytics, prognostics and condition-based monitoring, manufacturers have many new tools for the future digital factory, he said. “Machines can’t tell us everything. We use predictive analytics to filter out the noise,” Borchelt added. “We have some factories that are doing this now, but we’re not there yet—it’s a journey.”

Digital Technologies

Manufacturers should brace for major changes in automotive, as the industry and others will be substantially transformed by digital technologies, noted Tom Apostolos, senior vice president, Global Exteriors, Magna International (Aurora, ON, Canada). With the fast pace of change in the fully connected digital world, more than 50 billion devices will be connected to the Internet by 2020, and some 2-3 billion people will be on the Internet by 2025, and as many as 10 million self-driving cars will be on the road by 2020, Apostolos said.

“The CNC 7600, one of the fastest supercomputers in the world in 1969-75, had the same computing power as the iPhone 4,” he added. “How does this affect the shop floor? Automation, artificial intelligence and other technologies are all converging. Where is industrial production going? A lot more embedded intelligence is going to be really integrated into your supply chain.”

Manufacturing companies are going to need different skills from their employees to compete in the future, Apostolos said. “You don’t have to go to Silicon Valley to change the world—you can do it right here.”

Several other manufacturers, including much smaller organizations, described their efforts to digitize their manufacturing operations. Bill Metz, vice president, Operations, Richards Industries (Cincinnati) and Mohamed Abuali, CEO of Forcam Inc. (Cincinnati), talked about the steps shops need to take in adopting a Smart Factory approach.

“If you cannot measure it, you cannot improve it,” Abuali noted. “*With Smart Manufacturing, training is essential.* You have to understand how and why you are collecting the data.” Metz, whose company manufactures a variety of valves and other industrial products, described Richards Industries’ Smart Manufacturing

journey, where the company started a 10-machine pilot in August 2015, first by collecting machine data and moving to later phases including Order Data Management (ODM) and later paperless manufacturing with DNC.

“You really need to understand what data’s needed,” Metz said, noting the benefits and ROI of the systems are substantial—as much as 30-40% improvement in Overall Equipment Effectiveness (OEE), the factory-floor metric that is key to digital manufacturing operations. “That’s about four times more than we originally estimated.”

Smart Strategies

In a panel discussion, *Thrive or Die—Why Smart Manufacturing is Critically Important to the 21st Century*,” Jim Carr, president and CEO, Carr Machine & Tool (Elk Grove Village, IL); Bill Fienup, founder and managing director, mHub (Chicago); and Fernando Ortiz, VP and GM of Roberts Swiss Inc. (Itasca, IL) gave their insights on making the move into smart digital manufacturing.

Collaboration will be a major key to manufacturers surviving, and thriving, in this new digital age. “We’re excited about Bill’s startup manufacturing [mHub] here. This is going to bring new opportunities for collaboration for small manufacturers,” Ortiz said. “We partner with the OEMs, we train, and we give ownership to them. Collaboration is important—we call it the ‘supplier alliance,’ where we apply our manufacturing expertise and we learn from their design skills. In the early ’90s, everything was a secret.”

Additive manufacturing will be a key part of things in the future, Carr noted. But additive’s not there yet, added Fienup. “I think it’s the software that’s lacking.” Ortiz said that precision in additive manufacturing processes must improve. “We work in the fourth, fifth or sixth decimal place to the right. It’s becoming something that’s more attainable, but the precision’s not there yet.”

(Patrick Waurzyniak is Senior Editor of *advancedmanufacturing.org*)