

Building U.S. Manufacturing Strength

Douglas K. Woods, President of The Association For Manufacturing Technology, discusses the state of U.S. manufacturing, job development, and what the industry can expect going forward. While today's manufacturing industry is more sophisticated and high tech than ever before, he says, the industry still needs to address some critical issues to be successful in the future.

IMPO: In terms of job numbers and unemployment in the manufacturing sector, how is the state of manufacturing faring today?



Woods: Since the recession, manufacturing has been the driver for recovery and continuing economic growth. The Institute of Supply Management's Purchasing Managers' Index has held steady above 50 since last November, indicating expansion within the manufacturing economy, although April's PMI of 50.7 was the lowest PMI of 2013. Manufacturers have shown a commitment to investing in new technology and equipment, with 2012 seeing the highest technology order total in 13 years, according to the U.S. Manufacturing Technology Orders report.

U.S. manufacturers are still facing great difficulty in finding qualified candidates for their increasingly high-skilled and high-tech job openings. At a time when the unemployment rate in the U.S. has been hovering around 8 percent for more than 40 months in a row, the U.S. Bureau of Labor Statistics reports there are about 300,000-plus unfilled positions in manufacturing at this time. The concern becomes greater as U.S. companies look to bring back more of their manufacturing operations from overseas locations, while foreign companies look to shift production here as well. Couple those statistics with the fact that the average age of highly skilled U.S. manufacturing employees today is 56 and you can see why some

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experts predict the number of unfilled positions could swell to between 2 million to 5 million by the end of the decade.

IMPO: What is the current state of the manufacturing workforce and what do you see for the future?

Woods: Today's manufacturing industry is more sophisticated and high-tech than ever before. Jobs today require critical thinking skills combined with high-tech specialization, such as math, materials science, engineering, and advanced computing skills. Because the job description has changed significantly, the industry is struggling to recruit a sufficient pool of workers to fit the changing demands of the 21st century manufacturing workplace.

Building a manufacturing Smartforce starts with early public education, STEM education specifically. It requires new methods of teaching and a different set of educational priorities. Unfortunately, much of our public education system still places too much emphasis on high standardized test scores, and not enough on creativity and innovation. Changing the educational culture is a significant challenge.

IMPO: What is on the horizon for American manufacturing innovation?

Woods: Additive manufacturing is making its mark as one of the most exciting technologies this industry has seen in decades. The "Maker Movement" has allowed people to see their ideas quite literally come to life—taking designs from somewhere like a sketch pad and turning it into reality. Fab labs and Tech Shops have cropped up around the world, bringing manufacturing to the hands of the masses. While much of the media has focused on the "hobbyist" segment of 3D printing, additive is starting to make great inroads for industrial applications. It is being used for a broader array of materials, and it has an expanded capability to build larger parts.

Some of the real advantages of additive include part complexity, and part customization—especially noteworthy in the medical industry for custom implants, orthotics, and other devices. Prototypes can be built more quickly than ever, and additive machines can run unattended, 24 hours a day—a true "lights-out" manufacturing operation.

In the industrial realm, GE Aviation is setting an example by creating new materials and using additive processes to produce critical jet engine parts. They eventually plan to build 20-30 percent of parts going into their jet engines using additive processes. Lockheed Martin and the Oak Ridge National Laboratory are working on an additive manufacturing system (Big Area Additive Manufacturing, or BAAM) capable of manufacturing components measured not in terms of inches or feet, but multiple yards in all dimension. It has the potential to manufacture parts completely unbounded in size.

Additive is creating plenty of excitement for our industry - and attracting a level of interest never seen before. But it doesn't stop there. Advances in cloud

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manufacturing, the industrial internet, and machine to machine communication are changing the way we make things. We as a nation must continue to encourage the development the manufacturing innovations that will improve our standard of living, create jobs and serve as an example to the rest of the world



IMPO: What are the future challenges

manufacturing faces?

Woods: Our challenge now is to continue the revitalization of U.S. manufacturing through a coordinated policy structure. This is the premise of AMT's [Manufacturing Mandate](#) [1].

Policymakers, industry leaders, and academia agree on the major aspects of a strategy. They are consistent with the Manufacturing Mandate core principles of incentivizing R&D and innovation, increasing global competitiveness, and building a Smartforce that is equipped with the knowledge and skills necessary for careers in manufacturing. Emphasis on utilization of existing resources, greater coordination of government manufacturing programs and services, and increased collaboration among stakeholders are fundamental to its execution. Bold action on tough issues is critical to its success.

AMT's Manufacturing Mandate is a prescription for building manufacturing strength and job creation and is ultimately the key to American economic policy.

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