

Succeed with Automation: Invest in Human Resources



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As engineers, we might be tempted to describe manufacturing as the process of making something from nothing in a series of production steps. But in the bigger picture, manufacturing is the engine for global prosperity. Manufactured goods are critical to every economy, for generating jobs and wealth, and improving quality of life. When I think about my colleagues, customers, suppliers, and friends, I see that all of our livelihoods are tied to manufacturing in one way or another. Viewed in this light, it's critical that manufacturing, as a whole, succeed. Automation can play a large role in that success.

Today's manufacturers face significant challenges—rising material and energy costs, decreasing customer price expectations, intense global competition, piracy of intellectual property, shorter product life cycles, and tightening regulatory influences, to name a few. The headlines are filled with reports of major manufacturing companies struggling to cope.

Innovative, high-value products are a hallmark of the companies who succeed in this environment. But great products often aren't enough. Manufacturing those products in a customer-responsive, lean operation is another essential piece of the puzzle.

Studies have shown the global playing field to be surprisingly level with regards to manufacturers' access to technology, materials, and financial resources. So where can manufacturers find that competitive edge? The

difference makers are the people who supply creativity and technological know-how. When they are well combined, available resources become world-class processes.

Advances in technology have helped manufacturers maintain or improve their competitiveness. Automation technologies, in particular, have been proven to help them increase productivity, reduce costs, improve quality and enhance production flexibility. It takes people, though, to implement the right automation solution, and support it on the factory floor. The term *autonomation*, borrowed from the Toyota Production System, and translated as automation with a human touch, takes on a whole new meaning in this context.

It's estimated that 76 million baby boomers will retire over the next three decades and that only 46 million new workers will enter the workforce in that same period. This 40% reduction in the labor pool means that automation will become increasingly essential for survival, and that building a culture of automation will be critical. In this culture, the benefits of the technology are understood and embraced, barriers of intimidation and resistance are eliminated, and employees are trained in the skills necessary to support the investment and maximize its benefits. If this sounds like an ambitious goal, there are encouraging precedents in other industries: in agriculture, modern farmers are more than 20 times more productive than their turn-of-the-cen-

tury predecessors; in the steel industry, productivity gains of more than 400% have been achieved.

If you have a manual process today, automate to improve your process. Assess the impact of a consistent, repeatable, mistake-proof automated system on your product quality and production yields. Understand clearly the real value of eliminating ergonomic problems. If you have an older automated process, consider the advantages of newer technology to improve your process control, reduce operating costs, and deliver superior changeover flexibility. Many examples exist of modern intelligent automation capable of producing multiple models or part styles in batch sizes of one! Ask what would happen if the availability/uptime of that automated process suddenly increased 10, 20, 30% or more.

Selecting the right automation approach requires a strong, integrated team, because the technology often includes some combination of electrical, electronic, mechanical, pneumatic, hydraulic, and even chemical disciplines, and always requires the creativity of your company's and industry's innovators. After automation has been put in place, the equipment must be operated, maintained, programmed, controlled, and incrementally enhanced to meet customers' needs with the highest level of quality. Smart companies take steps to ensure that their personnel supports the technology, and they constantly work to ensure their company achieves peak manufacturing performance. Investing

in skills development on an ongoing basis helps them get the best from their people.

In the robotics business, we consistently see that the most successful

automation cells are surrounded by well-trained employees who feel a sense of ownership. Building this culture of commitment is among the most critical roles of manufacturing

management when it comes to automation. It requires openness, honesty, and skills development on an ongoing basis—kaizen applied to your most valuable resource!

Manufacturing for Performance Pays Off

When compared with the standard vehicles on which they are based, the highly specialized high-performance vehicles used in races all over the world clearly require many custom parts and refinements. Used on everything from racecars, to speedboats, to snowmobiles and motorcycles, high-performance parts and modules employ a wide variety of manufacturing technologies, and demand the highest degree of engineering prowess.

Thousands of manufacturers, of all sizes and specialties, are involved in motorsports today. And they benefit handsomely—with the visibility they achieve, the skills development demanded and passionately sought after by their workforce, and the transfer of the most advanced technologies. Many consider their participation in motorsports an invaluable force driving their continuous improvement. The high requirements for durability, safety and speed make them work hard to develop better, faster, and more agile technologies, techniques, and personnel.

These requirements apply to every area within the manufacturing enterprise. For instance, rapid prototyping and advanced materials technologies have been used to build metal and plastic components for NASCAR and Formula One cars. Technologies such as fused deposition modeling and stereolithography allow manufacturing engineers to produce parts that improve performance by reducing weight, and to create test parts without ever doing a casting.

Eloisa Garza, an SME member helping coordinate the Society's first

Manufacturing for Performance event, which will take place in Indianapolis from January 23–25, is the president and owner of EG Composites in Indianapolis. The shop has been involved in the creation of composite race car components including engine covers, noses, splitters, and parts that support "ground effects," creating the suction that keeps these fast, light cars grounded.

The parts are made using assorted resin systems, and integrate various construction techniques—mainly carbon fiber and honeycomb construction—to create high-performance composite products that help the racing industry increase component durability, reduce weight, increase speed and improve driver safety and comfort. The materials improve safety because they absorb energy upon impact, and do not transfer it to the driver. They increase comfort by reducing heat transfer from the engine to the driver's cockpit.

The high-performance aftermarket product marketplace is poised to generate about \$40 billion annually. According to Jack Halenkamp, manager of promotions and exhibitions for Mazak Corp., and a member of SME's Manufacturing for Performance Steering Committee, Mazak wants to continue to support manufacturers in this industry with the latest-technology machine tools. Mazak machine tools are already widely used in racing, where they have helped lower costs, increase efficiencies and improve safety and performance of parts like steering/chassis components, wheels, and various engine components. In search of growing market opportunities,

many other machine tool companies are following this lead.

Components manufacturers are also interested in getting their piece of this exciting industry. For instance, Chris Alston's Chassis Works, in California, builds components for drag-strip applications. Alston machines most of his products on Mazak machines, each helping him address a specific need. For instance, his quick-release steering hubs feature polygonal drive shafts for positive locking in only one position. The hubs make driver entry and exit easy, reduce play, and prevent the steering wheel from slipping off. The piece is turned, milled, drilled, and tapped on one multitasking machine. This "done-in-one" style of manufacturing provides Alston with financial advantages and efficiencies that he can pass on to the end user, and it contributes to quality by allowing better accuracy in the creation of each part. Alston doesn't have to re-establish datums or worry about tolerance stack-up, and he keeps his work-in-progress inventories low.

If you're interested in exploring the advanced technologies and processes used in high-performance manufacturing, register now to attend Manufacturing for Performance, will take place in Indianapolis January 23–25. This new SME event includes a conference and an exposition, both focused on manufacturing technologies, processes, and equipment that enhance speed, safety and overall performance. For more information, go to the event Web site (www.sme.org/motorsports) or call the SME Resource Center at 800-733-4763, 8 am–5 pm Eastern Time, Monday–Friday.

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THE SOCIETY of Manufacturing Engineers (SME) is the world's leading professional society serving the manufacturing industries. Through its publications, expositions, professional development resources, and member programs, SME influences more than half a million engineers, manufacturing professionals and students.

Innovation, change and advancement are key ingredients to success in the constantly evolving world of manufacturing. At the core of everything SME does is a belief that continuous learning is the most effective way to gain a competitive manufacturing advantage.

Since it was founded in 1932, SME has worked to make manufacturing professionals and companies more effective in their quest for success by providing resources and opportunities to develop and utilize new knowledge, improved skills, and manufacturing solutions.

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