

Digital manufacturing: The green path to growth

Patrick Michel, vice president, DELMIA Solutions and Marketing, Dassault Systèmes

Everyone is looking for a magic bullet that would make their company more productive and retain costs, but thus far – unless you have a sixth sense – it hasn't been found. Until it is, one practice that has been tremendously successful on both fronts is “digital manufacturing.”

The term has been bandied about for quite some time now, advertised as an example of corporate social responsibility, an eco-conscious way to do business, the manufacturing buzzword du jour. And undoubtedly, digital manufacturing encompasses all of those things and it is a step in the right direction for saving our planet, but let's examine some equally pressing issues. The economy is in dire straits, and highly respected global manufacturing companies are laying off plant workers by the thousands. Suppliers are shutting their doors due to devastating decreases in consumer and OEM demand. Right now, the question on every manufacturer's mind is, “How do we stay competitive?”

The answer to that question is also digital manufacturing. It turns out that in this case, helping the environment can dramatically help the bottom line. By delivering a high return on investment and contributing to revenue increases, digital manufacturing can save companies money, time and make them even more attractive as a potential business partner ... and it doesn't require putting solar panels on plant stacks.

Digital manufacturing is becoming a major element of product life-cycle management (PLM). It's the process by which companies can define and optimize manufacturing processes, manage manufacturing data, and encourage collaboration between different types of engineers by incorporating both digital and plant product definitions. Digital manufacturing presents a view of product and process design holistically, as part of the product life cycle, and allows products to be designed in a way that adjusts for process capabilities or limitations.

According to a CIMdata report entitled “The Benefits of Digital Manufacturing,” organizations using digital manufacturing technologies can realize tremendous production improvements and reductions in resource waste, including a 30 percent reduction in time-to-market; a 40 percent reduction in process planning; a 15 percent increase in production throughput; a 13 percent decrease in overall production cost; and a 40 percent reduction in equipment costs.

By supporting visualization, process planning, factory modeling, simulation, collaboration and taking into account human reaction and comfort, digital manufacturing optimizes the design process. It didn't start out as an eco-social initiative and that's still not its main focus today. Companies who deploy digital manufacturing solutions enterprise-wide do so because they want to take virtual plant tours, mitigate the risks inherent in design planning, identify how plant designs will impact the workers who will one day be in them, reduce the need to redesign equipment, utilize resources more efficiently and eliminate prototypes. Digital manufacturing takes a slow, manual, resource-intensive process and brings it into the 21st century.

With digital manufacturing applications, especially those hosted on the Internet (and, therefore, readily available at all times), designers and engineers can make alterations to plant designs in seconds, collaboratively, and see how every minute change will affect the entire supply chain. They can experiment with layout and positioning; test plant features virtually to see if they function properly and ensure ergonomic comfort for workers. After all, it's much easier to see how a worker will have to stand or interact with equipment using animated simulations as opposed to paper designs.

That being said, adopting digital manufacturing isn't an attack against human capabilities; on the contrary, it makes the entire workforce more productive and work in a better environment. Huge

quantities of money have been wasted in improving worker conditions after the plant built and operating. Incidences like this not only cost companies money and manpower hours, they also result in excess energy emissions, misuse of natural resources, and enormous amounts of physical waste – unfair to the environment and counterproductive to project success. If designers and engineers can properly address all potential problems within a plan before construction begins, they'll save time, money, physical resources and maximize the efficiency of their team.

The practical reasons for adopting digital manufacturing are fairly obvious – no paper revisions, no prototypes, more collaboration, and more output. However, consider the effects that it can have on the scale and reach of projects. With digital manufacturing designers are no longer constrained by space or volume limitations. They can build greener, smaller plants and experiment with all types of new materials, layouts and equipment. What would've seemed extremely tedious and time-consuming a year ago (such as designing a production line) can now be done in a fraction of the time. Being able to simulate the designs online, collaboratively, provides unlimited potential.

Based on the results of the aforementioned CIMdata study, organizations who deployed digital manufacturing realized an exceptional return on investment in a matter of months. Companies that adopt Digital Manufacturing can expect their annual returns to be anywhere from five to ten times the amount of their initial investment. One company saw \$370 million in savings from using digital manufacturing for a surface ship program.

With those kinds of numbers, adopting digital manufacturing isn't just a good idea – it's a necessity for any organization committed to retaining (or creating) competitive advantage within the highly crowded global manufacturing industry.

In this economy especially, “going green” will save you greenbacks.

About the author:

Patrick Michel was appointed vice president of DELMIA solutions and marketing in 2005. Patrick joined Dassault Systèmes in 1996 after graduating in electrical engineering at the University of Grenoble in France and having completed a masters of engineering degree at the Thayer School of Engineering, Dartmouth College.

In his current position, he leads the industry solutions and marketing organization for DELMIA, Dassault Systèmes' brand for Digital Manufacturing, defining solutions for the different industries including automotive, aerospace & shipbuilding industries.