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## Digital Manufacturing: How to Take the Guesswork Out of “Green” Product Design

### It’s good to be green.

Why, you ask? Because being green not only demonstrates social responsibility, but it also reduces the amount—and subsequently, the cost—of energy required, avoids wasted resources, and allows companies to run much leaner production operations.

Doing one’s job with a “green” mind-set is no longer the nirvana of idealists. Whether we like it or not, “greening” manufacturing processes has become nothing short of a mandate. In our industry, time is money, and we need to keep moving and keep operations flowing smoothly, uninterrupted, and in a potentially precarious financial situation.

While respecting the environment is paramount, many companies cannot afford to take stereotypically green measures like installing solar panels on the roofs of plants when such a change would require

a highly expensive and time-consuming revamp in infrastructure. But for the manufacturing industry, being green doesn’t have to involve tired stereotypes.

What you may not know is that if you’re currently using any sort of digital manufacturing solutions, you’re already being green.

According to a CIMdata report, The Benefits of Digital Manufacturing, organizations using digital manufacturing technologies can realize tremendous production improvements and reductions in resource waste, including:

- 30-percent reduction in lead time to market;
- 40-percent reduction in manufacturing process planning;
- 15-percent increase in production throughput;
- 13-percent decrease in overall production cost; and
- 40-percent reduction in equipment costs.

We are trained to think mostly about what these results mean for the bottom line, but the green benefits also are fairly evident.

Digital manufacturing is inherently green. It enables manufacturers to digitally plan, create, monitor, and control production and maintenance processes before moving to physical implementation. By leveraging digital manufacturing solutions, manufacturers significantly reduce the materials they use, the energy they consume, and the refuse they generate.

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Huge amounts of time and money have been wasted mocking up plant designs, only to find flaws after construction. Maybe robots on the assembly line don’t have enough space to operate properly, the way

in which controls are positioned causes unnecessary worker fatigue, or pricey materials were pointlessly used for negligible add-ons. Problems like these can require expensive redesigns that adversely affect the bottom line, while needlessly wasting materials and energy.

Until recently, manufacturers had to expect these types of setbacks, knowing full well that designs were rarely—if ever—flawless on the first rendering. In addition, taking a step back further in the process—where plant design occurred within the disorganized “buckets” of engineering and manufacturing—reveals a process that required much iteration. After a plant or factory was designed, the plans were tossed over to engineering. At this stage, engineering would inform designers that some of the design elements would be difficult or impossible to develop. The plans would be tossed back to design to address those issues. Once both design and engineering were appeased, the plans would be given to

manufacturing. After this arduous process, there was still no guarantee that the plans were 100-percent viable.

With digital manufacturing solutions—especially those available via a collaborative, Web-based environment—manufacturers can make alterations to plant designs in seconds, and see how every minute change will affect the entire 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 if a worker’s back will be strained via virtual simulations than using paper designs.

Digital manufacturing completely eliminates the need for physical prototypes by allowing developers to go from digital designs directly to actual production. It allows for the early identification of production issues to avoid costly design and manufacturing changes, in addition to promoting higher-

quality designs that result in less late engineering alterations. In turn, the quantity of electricity, oil, gas, metals, and paper materials consumed throughout the entire manufacturing cycle is significantly reduced.

Capitalizing on what is fast becoming a globally collaborative manufacturing environment, going digital provides a concurrent view of all engineering disciplines and intelligence to all stakeholders throughout the production process, which leads to reduced time-to-market.

Last but not least, digital manufacturing nurtures a more innovative environment where engineers can freely experiment and act on more obtuse, progressive ideas knowing that they won’t have to waste 100 man-hours at the drawing board should they need to adjust anything. ■

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