

Commentary

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Setting the Record Straight on Industry 4.0

It seems every trade magazine I pick up nowadays has an article on Industry 4.0 or big data or the Internet of Things or the digital factory. These terms are being pitched around like a rugby ball and almost always with a decided lack of clear definitions.

So, as the saying goes, let's set the record straight.

German Chancellor Angela Merkel, along with her ministers of industry and education, ordered a study about the manufacturing environment. In response, the National Academy of Science and Engineering, which represents the interests of German scientific and technological communities at home and abroad, drafted its vision of Industry 4.0, which was to be a coordinated initiative between the IT world, universities, and various manufacturing associations to reshape industry. It would seek to combine the physical, virtual, and IT worlds with cybersystems, thereby creating a new working environment between workers and machines.

The 4.0 part of the name, incidentally, derives from it being the fourth industrial revolution. The predecessors were the mechanization of industry through steam and water power, applying electricity to mass production, and the invention of the computer, which has led us to the modern concepts of IT and automation.

Industry 4.0 has been adopted worldwide as a functional goal in industry, especially the manufacturing world and, specifically to our purposes, the machine-tool market. The metrics of performance and goals will differ by industry and end product. And the information-management jobs it will create will be unlike anything seen so far in industry.

Industry 4.0 represents a high point, where every company—whether a large OEM, major tier supplier, or smaller job shop—can implement and benefit from the technologies and communications platforms available today. One factor holding back Industry 4.0 is the mindset of management. That needs to change—they must be more proactive in supporting the changes among market leaders.

Without question, this vision is less a look into the future and more a vibrant collaboration between IT, machine-tool builders, industrial automation integrators, and especially

motion-control suppliers. They will all benefit when machine control can take information needed to make the final products from the design, CAM, and PLM sides, and then send data on production, metrics, and machine-to-machine comparisons to evaluate the performance of machines, different shifts of technicians, and even entire plants—all at speeds measured in nanoseconds.

To work effectively, this concept requires standardization of both the communications and language used. For example, the MT Connect effort, which focuses on machine tools, has been a good start here in the United States. It strives to standardize the data, so that all types of machines with a host of different control brands on board can seamlessly transmit data up the line for evaluation and adjustment in real time.

The goal is to make the first part or batch faster and better, then improve that performance by using actual production data and feedback control to make the needed adjustments and compensations. This also applies to handling raw materials and components, and the logistics of moving incoming and finished products into and out of the plant.

Although this big-data idea overwhelms most managers, technicians, and operators, the key is to manipulate that data in a hierarchy of need, to borrow a term from the psychology world. Mobile devices, tablets, cell phones, and now CNC screens themselves can be useful tools for transmitting the most important data from the shop floor to the top floor, or just down the hall to the front office.

Small-shop owners would be well advised to heed this trend and respond appropriately. For example, they could use an integrator to tie all of their machine functions and outputs together for the day when demanded by their OEM or upper-tier customer. In many industrial sectors, that day has already arrived.

Lastly, the cybersecurity issue cannot be understated, as data storage in a factory or shop network will shift from the open cloud to the closed cloud. Protecting your intellectual property remains paramount, on a global scale. To overlook that reality is to compromise the stability and security of your company.

Welcome to the future, folks. **md**