The Buzz on Manufacturing Technology from IMTS 2016

written by Lauri Moon | October 12, 2016

(American Machinist – Robert Brooks: 9-20-16) IMTS 2016 is in the books now, and having spent the better of the past week browsing, listening, and noting to myself, here is a quick analysis of manufacturing and machining industry developments based on ideas promoted by the experts and developers there.

We have spent the past five months previewing new machinery and devices, preparing to see and learn more on-site: there is still plenty of time to review the details of all that was exhibited at McCormick Place, and some of what was new there will become the basis of future developments in precision manufacturing. But first, …

Manufacturing technology has four general platforms for product development, which IMTS mostly recognizes via its floor plan: machining and cutting equipment; tooling and materials; programming and networking technologies; and automation and handling processes. There is more, of course — ancillary supplies, shop organization and management systems, consumable products and supplies, etc. — but this is all for classification purposes.

What follows here is a summary of ideas, themes — buzz words, if you will — with relevant (but not exclusive) examples from IMTS 2016 that are shaping the current and future understanding of manufacturing technology.

Automation

“Automation” has long been a synonym for “robotics” in manufacturing, but robotics are coming into their own (read on…) and the term automation is growing to encompass much more: networked machines and shared databases, actuators and performance models, all the connected devices and packages that are helping machine shops and other manufacturers realize the high-concept vision of the Industrial Internet of Things / Industry 4.0. IMTS 2016 had numerous examples of such broad-based automation technology — such as the Siemens Digital Enterprise Showcase.

For manufacturers, the value of such platforms that they encourage the operations to develop a

strategy for growing into an IoT-compatible enterprise, rather than having that standard imposed on them from some invisible "partner." IMTS 2016 offered visitors numerous examples of technologies and programs for connecting with suppliers, customers, and data partners, to make manufacturing automation more intuitive and "automatic."

Robotics

Robots have had a place in machine shops and manufacturing for decades now, though it's been a grudging acceptance by the operators. Whether the objections are based on technical complexity, plant safety, or some intangible feeling about human involvement, IMTS 2016 made clear how the future of machine-shop productivity is premised on robotics.

ABB Robotics introduced the FlexMT™, a pre-engineered system designed to load and unload machine tools using vision guided robotics. Designed for both small batch and high volume production, its developers promise to boost spindle utilization by up to 60% over manual machine tending. The system can handle most any size and type of part, and is compatible with a wide range of machine tools, including horizontal and vertical lathes, machining centers, 5-axis machines and grinders.

Robotics are quickly evolving into a separate discipline, with auxiliary devices for gripping, conveying; intuitive interfaces and customized programming software; and variations in reach and payload standards that mean robots will find their functions in a growing number of machining and manufacturing applications.

Multi-tasking

Five-axis machining is widely understood as giving machine shops the flexibility to perform complex tasks with fewer set-ups … but is it widely applied? In other words, shops that have invested in five-axis machining may not need to operate with all those features, and in fact may over-invest to establish the capability. Finding ways to make two- and three-axis machines gain the flexibility of five-axis machining is gaining influence with machine shops — and thus with machine tool developers.

Haas Automation exhibited its new TR200Y dual-axis trunnion rotary table, which it explained "puts five-axis capabilities well within reach of the average job shop, and its compact size provides greater mounting flexibility."

The TR200Y mounts in the Y direction (front to back on the table) of a mid-size VMC. At less than 27 in. (686 mm) wide and 20 in. (508 mm) deep, it fits on one end of the machine's table, freeing up the remainder for additional fixtures or vises. The TR200Y has a 7.87 in. (200-mm) T-slot platter, and will swing parts up to 8.1-in. (206-mm) diameter. The maximum platter capacity is 80 lb (36 kg). The trunnion provides ±120 degrees of tilt and 360 degrees of rotation for full simultaneous 5-axis motion, or to position parts to almost any angle for machining. Still, it can easily be removed when not needed.

They may not need more spindles, but maximizing "spindle time" is an idea that is gaining priority with machine shops.

Precision

Precision is not a hard idea to understand — but it's hard to achieve and maintain. Unfortunately, it's an idea that underpins an increasing number of product designs in high-value industries like aerospace, electronics, and medical/surgical parts, sectors that can be very rewarding to qualified and capable suppliers. Achieving precision invariably depends on the selection of the right machinery, the right controls, the right programming — all of which were emphasized by IMTS 2016 exhibitors. Precision is also the consistent theme from tooling developers.

Switzerland-based Mikron Tool introduced its new CrazyDrill SST-Inox 12 x d for drilling stainless materials in diameters as small as 0.3 m (0.012 in.) — which is possible thanks to highly advanced and specially developed tool geometry for the drill, and an efficient cooling concept for the drill shank.

Precision is not an idea that can be put aside once it has been raised and defined: suppliers of tooling who can maintain their reputation for precision designs and precision performance will have a bright future after IMTS 2016.

Solutions

Machine tool developers (among others) have been promising "solutions" to their customers for a long time now, and there is a sense from IMTS 2016 that customers are turning the idea around on them — demanding better application of design principles to save production time, energy, system flexibility, reliability, and more.

For example, Makino displayed its a40 horizontal machining center, which it emphasized is the first system purpose-built for machining aluminum and nonferrous diecastings. Previous machine tools have been "over-designed" for diecasting producers, who need to maintain high-throughput of near-net-shape parts, with the right parameters for power, energy consumption, and cycle times that will address their productivity and "per-piece costs." The a40 HMC is a solution to over-designed systems.

"Diecast manufacturers are under intense pricing pressure with mandatory cost reductions from OEMs and increasing global competition. The keys to overcoming these challenges lie in the reduction of machining cycle time and elimination of unplanned down time," explained Makino's horizontal product line manager David Ward. "To address the cycle time issue, Makino has re-evaluated each of the major castings using an Intelligent 'Reduction of Inertia' (ROI) design philosophy. The new design provides superior linear and radial agility and acceleration."

The a40 is a customized solution for the diecasting sector, providing those manufacturers with productivity improvements as well as savings in capital investment, labor, floor space, utility consumption, and tooling. It's an example of manufacturing technology buzzword being realized and demonstrated at IMTS 2016.