

Technology

How to Reduce Production Costs in the Automotive Industry

Kip Hanson | Apr 06, 2021

As the automotive industry shifts to new technologies and manufacturing processes, industry suppliers must adapt to serve these needs. Here's advice from six leading companies on ways to optimize operations and reduce overall vehicle production costs for automotive OEMs and their tier suppliers.

Automakers have long been a primary driver of change in the manufacturing industry, but the pace of that change is about to become much faster.

Between battery-powered cars and trucks, increasingly lightweight components and the inevitable rise of autonomous vehicles, it's clear that original equipment manufacturers and tier suppliers alike must become even more adaptable if they're going to grow and compete over the coming years.

Here's some advice from six leading industrial suppliers on how shops can accomplish exactly that:

Haimer USA



Haimer says its shrink-fit toolholders offer a combination of rigidity, accuracy, security and balance. (Image courtesy of Haimer USA)

What About Everyone Else?

The recommendations provided here aren't limited to automakers, applying equally well to the aerospace, medical, and oil and gas industries, and indeed any industry that manufactures precision components.

All share an overwhelming need for robotics and automated material handling, as well as training for employees on these and other advanced technologies.

Here, too, the landscape is changing rapidly with increased use of online resources, augmented and virtual reality training, and simulation.

So, whether you spend your days stamping out car bumpers by the gazillions or 3D-printing prototypes for deep-sea submersibles, you can be sure of one thing: Everything is changing, big time.

Brendt Holden, president of Haimer USA, stresses "consistency of the setup" for automotive accounts. This starts by balancing toolholder assemblies for spindle speeds greater than 10,000 RPM, although Holden and others have seen improvements in tool life and part quality at speeds well below this. Similarly, shrink-fit toolholders provide easy and consistent setup of the cutting tool, leading to repeatable and measurable machining results with minimal maintenance.

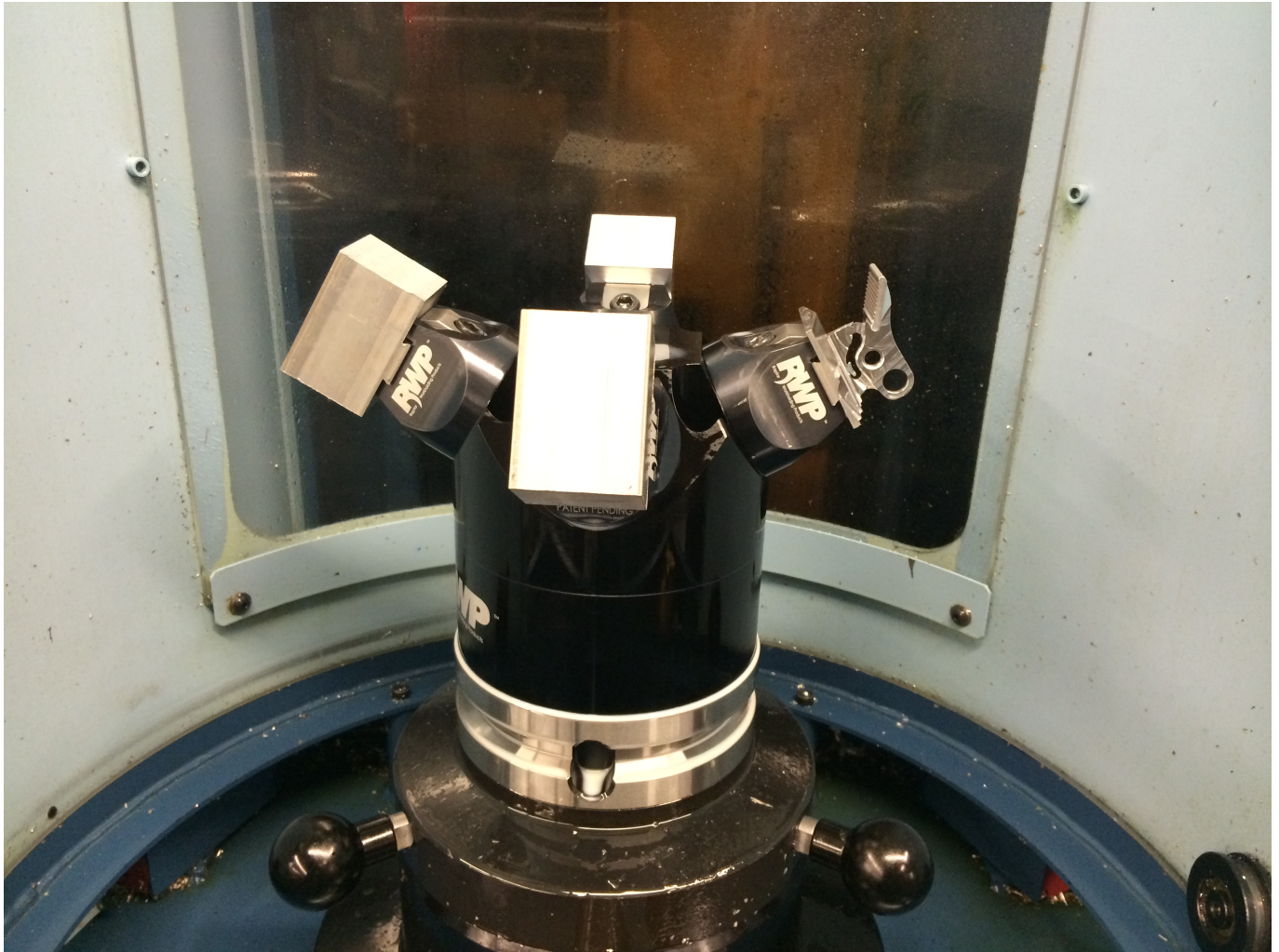
The same can be said for offline tool presetting, which generates additional time savings, higher productivity and less part scrap.

Shops should also implement a tool management strategy, Holden suggests, creating an organized starting point for the toolroom and less disruption on the shop floor.

"Automotive or not, shops that utilize modern technologies both in and out of the machine tool greatly increase their productivity potential, thus saving time and money," Holden says.

Read more: [The Latest Toolholding and Workholding Innovations That Help You Increase Productivity](#)

Raptor Workholding Products



Fitting as many parts as possible into the machine tool requires the right workholding, as shown in the example from Raptor. (Image courtesy of Raptor Workholding)

Ray Strickland, Raptor's vice president of sales and marketing, notes that the need for modern technologies applies to workholding as well. Long known for its high-quality five-axis vises and dovetail-style fixtures, Raptor has begun to see increased demand for quick-change workholding, leading to a recent collaboration with Piranha Clamp of Switzerland.

As a result, any of Raptor's current fixtures will soon be compatible with Piranha's zero-point clamping system, mounting directly to the riser plates or a zero-point plate using a four-bolt kit. This meets automotive suppliers' demands for reduced setup times and the ability to quickly squeeze in a drop-in order without tearing down.

Raptor is also adding pneumatic vises to its lineup, addressing the need that Holden mentioned earlier: consistency.

"Success is all about keeping the machine tools running around-the-clock," Strickland says. "If you're to achieve that and therefore maximize shop floor productivity, you need to adopt new technologies like those discussed here."

Read more: Additive Manufacturing: 5 Things You Need to Know About 3D Printing

Kennametal



This 3D-printed indexable tool is used to machine several features in a single pass. (Image courtesy of Kennametal)

Kennametal sees big changes coming as well. As product manager Michael Hacker points out, vehicle lightweighting continues apace, and this means increased use of aluminum alloys, many of them high in silicon and therefore quite abrasive. For these applications, polycrystalline diamond tooling like that offered by Kennametal delivers up to 10 times higher productivity than carbide tooling, and surface finishes down to Ra 0,1–0,8 μm (0.0025–0.02 μin) in finishing operations.

Kennametal is also active in applications of additive manufacturing in the automotive industry. In one recent example, company engineers built 3D-printed indexable “stator bore tools” to meet growing customer demand for lighter-weight tooling solutions to machine components for hybrid and electric vehicles.

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Brendt Holden
Haimer USA

“It is an excellent example of how Kennametal is using advanced manufacturing technology to help meet our customers’ unique challenges,” says Werner Penkert, manager of global future solutions engineering.

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OSG USA Inc.



High-quality tools like the three-flute TRS drill shown here will help to reduce cycle time and increase throughput. (Image courtesy of OSG USA)

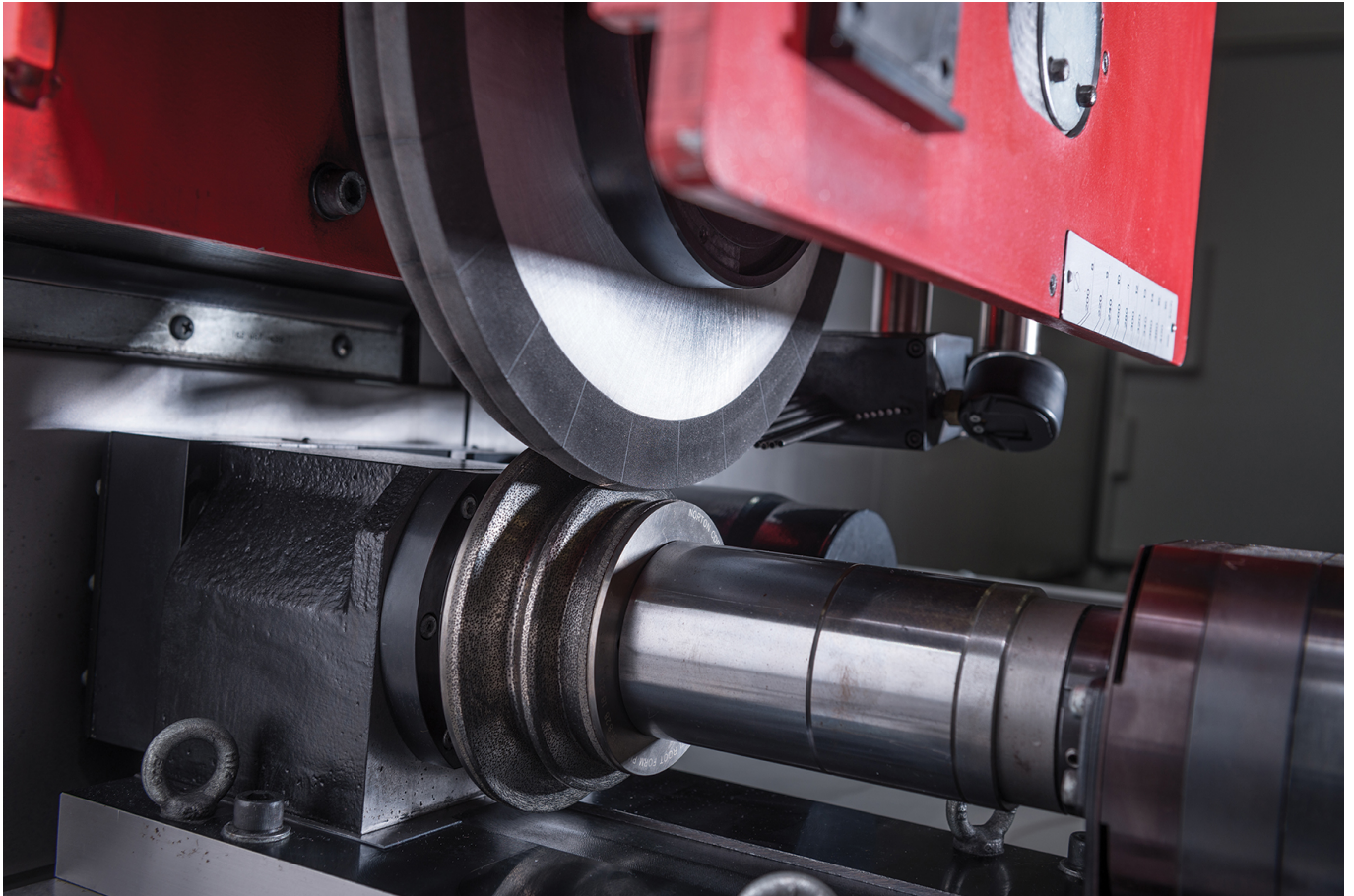
OSG's regional manager for the Great Lakes region, Jeff Dewey, has his own tales to share about machining abrasive materials with multi-function cutting tools.

"Automakers are always machining different materials in an attempt to make vehicles lighter and more fuel-efficient without losing power or strength, and as electric vehicles gain market share, this trend will only continue," he says. "At the same time, they want to reduce cycle times in any way possible, which often means special cutting tools that combine multiple operations into one."

Dewey suggests that it's OSG's job as a cutting tool manufacturer to introduce newer technologies with coatings and geometries that help to compete in this demanding environment, but he is quick to point out that too many manufacturers are focused on tool costs rather than productivity.

"A lot of buyers still push for the lowest-cost tools available, not realizing that spending a bit more for a high-performance drill or end mill will ultimately save the company significant amounts of money," he says.

Norton | Saint-Gobain Abrasives



Using superabrasives can reduce grinding costs significantly, even though they tend to cost much more than traditional wheels. (Image courtesy of Norton | Saint-Gobain)

Dave Goetz, application engineer at Norton, shares similar sentiments, except about grinding wheels. He says the big push continues to be toward superabrasives, such as vitrified CBN (cubic boron nitride) or plated wheels.

“We see this a lot in powertrain components, where they’ll run a plated wheel for a specific number of parts and then just swap it for a new one,” Goetz says. “These not only last much longer than conventional abrasives but eliminate the need for wheel dressing, simplifying the grinding process.”

Although the automotive industry has long been highly automated, he says, it’s become even more so during the pandemic, resulting in the need for fewer people in the plant.

“For example, I know of at least one automaker that has invested in autonomous vehicles for moving material around the production floor,” Goetz says. “Between that and the elimination of wheel dressing due to superabrasives, they’re able to increase production while lowering labor costs.”

Mitutoyo America Corporation



Placing CMMs like the MiSTAR 555 series on the production floor is a great way to reduce inspection room bottlenecks. (Image courtesy of Mitutoyo America)

Mitutoyo wraps up the discussion with some comments from Jeremy Banks, national sales manager of

distributed products. He notes that, as with the setup times on CNC machine tools, automakers are concerned about time lost to first article inspection. One way to reduce this is by placing coordinate measuring machines and vision measuring systems on the shop floor. Digital gauging with preset capabilities further streamlines the setup process and reduces setting errors, while micrometers and other hand tools with high IP (ingress protection) ratings ensure consistent performance in harsh production environments.

“There’s also inline gauging and sensors, which are often part of a production cell,” Banks says. These increase measurement speed and allow the use of less-skilled operators. Automated data collection together with statistical process control software is also quite common, he says. “This not only provides better process control and helps to reduce defects, but since they’re now able to spot trends and anticipate problems that might otherwise go undetected, it also allows shops to optimize their manufacturing processes.”

What steps are you taking to optimize operations and reduce production costs? Share your thoughts and insights in the comments below.

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