



## Turning Technologies

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46-mm diameter barstock. Typical applications are close-tolerance machining of difficult-to-machine materials for fuel injection, medical, power train components, high-precision shafts, gear blanks connectors and metal-to-metal sealing components for corrosion-resistant environments.

### **Riding on a Smooth Shifting, Fuel Saving Transmission**

The automotive world is gearing up for an onslaught of fuel-saving eight, nine, and ten-speed transmissions by 2014. "Transmissions that shift within a narrow band of rpms are fuel savers and much desired today," said Bill Gore, regional manager, Fuji Machine America Corp. (Vernon Hills, IL). Fuji Machine is meeting the demand for machining hardened components for power drive trains with its ANS-3100P hard turning machine and integrated in-process and postprocess gaging systems. These hardened components are essential for smaller engines, lighter components and higher performance with emphasis on weight saving and smooth shifting.

Hard turning is challenging traditional grinding processes with simpler and less expensive tooling requirements as well as automated tool change. The ANS-3100-P hard turning machine features in-process gaging built into the machine and postprocess gaging of every part prior to coming out of the machine. "We are able to hard turn drive train components to tight tolerances without losing even one part to scrap using our dedicated in-process gaging system," said Gore. Each gaging system is designed and built to meet the specifications of the customer's specific part.

Here's how the in-process gaging works. "At some point the tool management system is going to indicate that it's time to index to the next redundant tool, because of insert usable life," said Gore. "At that point, we'll index to the next tool station, take the next insert tool and we'll cut the next part automatically allowing extra material for a finish pass. The in-process gage comes in, measures those features that are critical and

the in-process gage signals the CNC control to adjust the tool offset. The part is then recut to size, the result is we don't lose any parts in the in-process gaging. The part in the machine is measured again to confirm meeting tolerance before it exits the machine. From that point on, production continues and all subsequent parts are monitored by the postprocess gage, until it's time to repeat the in-process gaging," said Gore.

"It's important to remember that the in-process gaging enters the machine cutting zone automatically after the spindle stops during the cutting tool change phase. The in-line post-process gaging occurs during production continuously. The robot shuttles the finished part to the postprocess gage, while the next part is being cut," said Gore.

"In some production instances Fuji is holding 2–3  $\mu\text{m}$  of repeatability consistently. We're holding 1.5  $C_{pk}$  on a total tolerance band of 12  $\mu\text{m}$ . These tight tolerances are held day in and day out, in a three-shift production environment," said Gore. Both in-process and postprocess dedicated gaging are designed, built and integrated by Fuji.

The benefits of the hard turning versus grinding can be found in cost of CBN grinding wheels, time to redress wheels in production, and the necessity to have as many different profiles in the wheel as there are profiles that have to be ground. "In this regard, single-point tools of the ANS-3100P provide accuracies and ability to hold the tight tolerances that the hard-turned components require and a significantly high ROI," said Gore. **ME**

### **Want More Information?**

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