

Repeat performance

The manufacturing team at Ryobi Die Casting is not shy about high-speed machining. Tooling technician Brian Murphy's primary goal, however, is repeatable precision over long production runs.

Murphy's responsibilities include designing, testing and selecting tools for high-volume machining of aluminum automotive castings. A typical part is a truck-transmission housing made of aluminum containing 6 to 8 percent silicon. More than 250,000 of the parts are produced a year on big Makino A88, Mori Seiki SH630 and Honsberg Lamb machining centers. Each housing has about 70 holes drilled into it.

For such runs, faster cycle times yield big benefits, so Ryobi doesn't hold back. Often, Murphy said, "we run at 10,000 rpm and a 4,800mm/m feed. We have a saying: We don't drill holes, we punch holes."

But, he pointed out, the company's aim is not entirely fast holemaking. What's also important is how precise the holes are and how long a tool lasts between changeouts. When a tool is changed, a CMM verifies the cutter's location, resulting in machine downtime.

END USER

Ryobi Die Casting (USA) Inc.,
Shelbyville, Ind.

INDUSTRY

Large aluminum castings.

CHALLENGE

Maximize holemaking precision and repeatability.

SOLUTION

Multifunction tools with PCD cutting edges.



B. Murphy

PCD-tipped burnishing reamer from Superion (right), and the solid-carbide burnishing reamer it replaced at Ryobi Die Casting.

To maintain precision and extend tool life, Ryobi exchanged many of the facility's carbide holemaking tools with multifunction PCD-tipped tools. Murphy stated: "Some of our solid-carbide tools were being changed every 10 to 20 days, and the tool life 'hit' counters were set at 30,000. With the PCD-tipped tools, we set the counters at 200,000 to 300,000, depending on the depth of stock being machined, and we change tools at 100- to 200-day intervals."

One PCD-tipped tool, a burnishing reamer from Superion Inc., Xenia, Ohio, improved part quality, precision and repeatability. The PCD tool pre-drills, reams about 300µm of material and chamfers. "Unless it's a formed port, all of my tools incorporate cham-

fers," Murphy noted. "That way, you don't have to worry about burrs, because they are removed."

The solid-carbide burnishing reamer was producing 12,000 to 25,000 holes before wear caused dimensions to exceed the print tolerance of ± 0.0011 ". The PCD-tipped burnishing reamer produced more than 134,000 holes before a machine tool problem ended the run.

Surface finish also improved. Previously, "the hole wall was dull and slightly swirled, and now it's a mirror finish," he said.

The PCD-tipped tools' repeatability and ability to drill more holes per tool, compared to a carbide cutter, is producing significant savings over the long production runs typical at Ryobi.