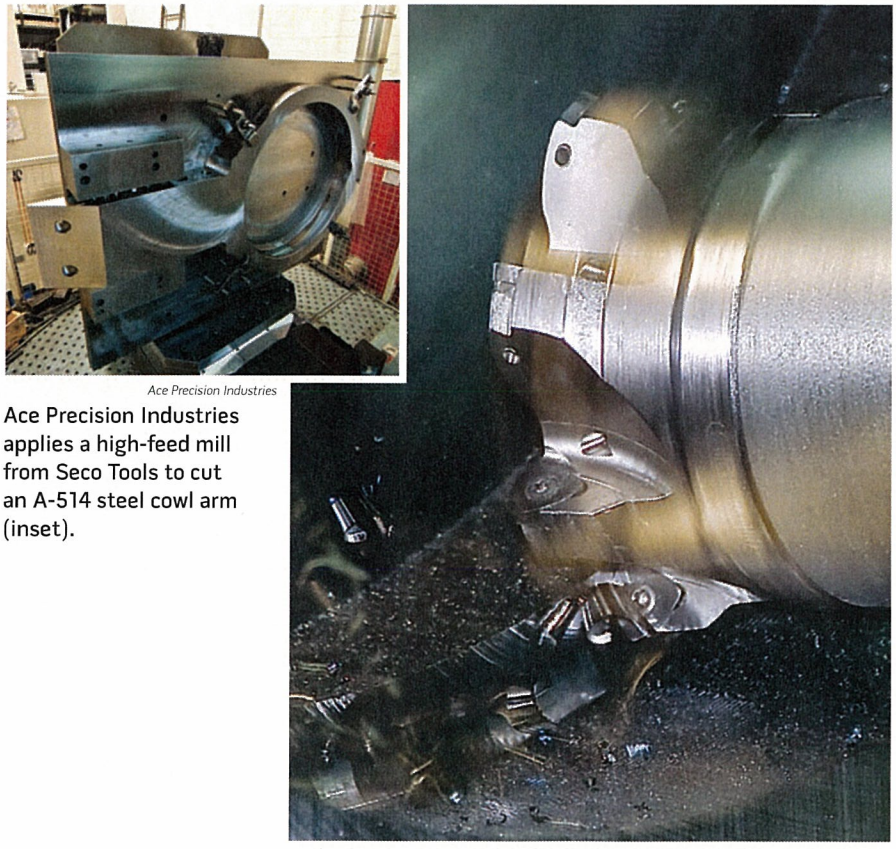
Feeding frenzy

When a parts manufacturer installs a new machine tool, new cutting tools might be required. Ace Precision Industries experienced that need after purchasing a single-spindle Niigata HD80 horizontal machining center with an automatic toolchanger to fill new orders for larger cowl arms, which are components for the mining industry. The A-514 steel parts measure 62" long × 34" wide × 4.5" thick. The Akron, Ohio, company previously machined cowl arms on an HMC built in the early '80s that required tools to be manually loaded.

"The cowl arm units have traditionally been a problem," said Tom Stugmyer, manufacturing manager for Ace Precision. "They are flame cut to shape, and the hardening caused by this process always made these components tough on tooling." He estimated the hardness is about 30 HRC.

Initially, Ace Precision transferred the tooling it could and the methodology it relied on for the past decade or so to the new HMC. The process worked, but Ace found it wasn't optimizing the Niigata's capabilities. Ace turned to industrial distributor The George Whalley Co., Cleveland, for assistance. Larry Wragg, the distributor's representative, working with Tom Batchelor, application expert for toolmaker Seco Tools Inc., Troy, Mich., suggested using Seco's high-feed milling cutter and Power Turbo shoulder mill to boost the metal-removal rate.

Seven operations are required to produce each component, and Seco initially concentrated on the first one, which roughs a 4.5"-deep bore with an ID from 25" to 36". In the old HMC, Ace hogged the metal with a 2"-dia. endmill tooled with 32 inserts and finished the bore with a large boring head. However, roughing consumed more than an hour, on average, and the Niigata's ATC isn't able to handle such a massive boring tool, which can weigh from 30 to 50 lbs. "One boring head we used to put in with a crane because it was awkward to



Ace Precision Industries

Ace Precision Industries applies a high-feed mill from Seco Tools to cut an A-514 steel cowl arm (inset).

END USER:	**Ace Precision Industries** (330) 633-8523 www.acebearings.com
CHALLENGE:	Increase productivity and overcome automatic toolchanger weight limitations.
SOLUTION:	High-feed milling cutters.

SOLUTION PROVIDERS:

The George Whalley Co.
(216) 481-1414
www.georgewhalley.com
IS #300

Seco Tools Inc.
(800) 832-8326
www.secotools.com
IS #301

lift," Stugmyer said.

Ace switched to a Seco 4"-dia. high-feed mill tooled with seven of the toolmaker's 218.19 inserts in Duratomic-grade MP2500. "That milling grade offers both wear resistance and toughness, and that did the trick," Batchelor said. Ace cut machining time more than 50 percent to 28 minutes.

To reduce machining time, Stugmyer said Seco spent a day or two adjusting the DOC, feed and speed to achieve optimal insert life. Although spindle speed was reduced from 785 to 573 rpm, the cutter diameter was doubled to 4" and the feed went from 0.036 to 0.455 ipr.

In addition, the tool helically mills. "We're spiraling all the way around that bore like a big corkscrew," Stugmyer said. "It's kind of a combination of both side milling and plunging."

Another operation Seco thought it could improve was boring two corners for stress relief where a rod connects to the round cowl head. Ace previously machined a 1.1875" radius with a boring bar because a standard cutter with the correct diameter was not available. Ace tested a standard Power Turbo mill and after determining it worked OK, Seco custom made a 2.375"-dia. one tooled with five F40M-grade, M14-geometry inserts.

The Power Turbo mill reduced the operation's machining time from 50 minutes to 5 minutes. Ace employed a plunging methodology, taking multiple 0.100" steps with no more than a 0.05" DOC per pass to produce the corner radius. The spindle speed remained consistent at 804 rpm, but the feed increased from 0.015 to 0.283 ipr.

Ace is now able to manufacture about one cowl arm a day compared to about a day and a half previously. Annual machining time savings is approximately $28,000.

It's a good thing Ace waited until acquiring the new HMC to apply the high-feed cutters. With the older, open HMC "you'd have a problem with everybody running for cover when running it because there would be chips all over," Stugmyer said. "With the Niigata being totally enclosed, you don't have to worry about the aftermath of high-feed cutting."

Seeds of success

Precision Planting Inc. stakes its success on providing farmers with engineered seeding technology to ensure optimal crop yields.

The Tremont, Ill., manufacturer offers planting systems that attach to tractors and incorporate meters calibrated to deposit seeds via tube chutes at precise intervals. In the world of crop planting, spacing is everything. During a 10-year study of more than 350 corn fields in Ohio and Indiana, Purdue University researchers found that four out of five fields had a standard deviation of plant-to-plant spacing of more than 4". Moreover, they determined that for each inch increase in standard deviation, corn yields decreased about 2.2 bushels per acre.

END USER:	**Precision Planting Inc.** (309) 925-5050 www.precisionplanting.com
CHALLENGE:	Remove residual flash in seed tubing.
SOLUTION:	An abrasive nylon brush.

SOLUTION PROVIDER:
Brush Research Manufacturing Co.
(323) 261-2193
www.brushresearch.com
IS #302

Because the accuracy of seed placement is tied to precise timing, it's critical that the plastic surface finish on the seed ejection component be pristine; introduce a variation or irregularity and the entire operation is at risk.

A few years ago, Precision Planting faced such a risk in a new system for planting corn, beans and other seeds. "[It had] tubes that are injection molded, and we had great concern about residual flash that was created by the molding process," said company engineer Derek Sauder. "It was only 0.002" to 0.005" thick. And