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NTMA PRECISION

ON THE COVER

F100 fighter-jet engines have accumulated more than 20 million flight hours in service. Photo by courtesy of Pratt & Whitney.

EDITORIAL MISSION: American Machinist empowers self-determined machine shop owners and managers to control their future. It does this by sharing tools, insights and best practices that managers use to embrace technology, innovate and systematically improve operations. American Machinist facilitates the leap from survival to growth for a community of owners and managers who operate metalworking businesses in the context of a global manufacturing economy.

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BRUSHES PLANT THE SEED FOR AUTOMATED FINISHING

In fully automated part finishing processes, proper brush selection plays a critical role in tool performance and longevity.

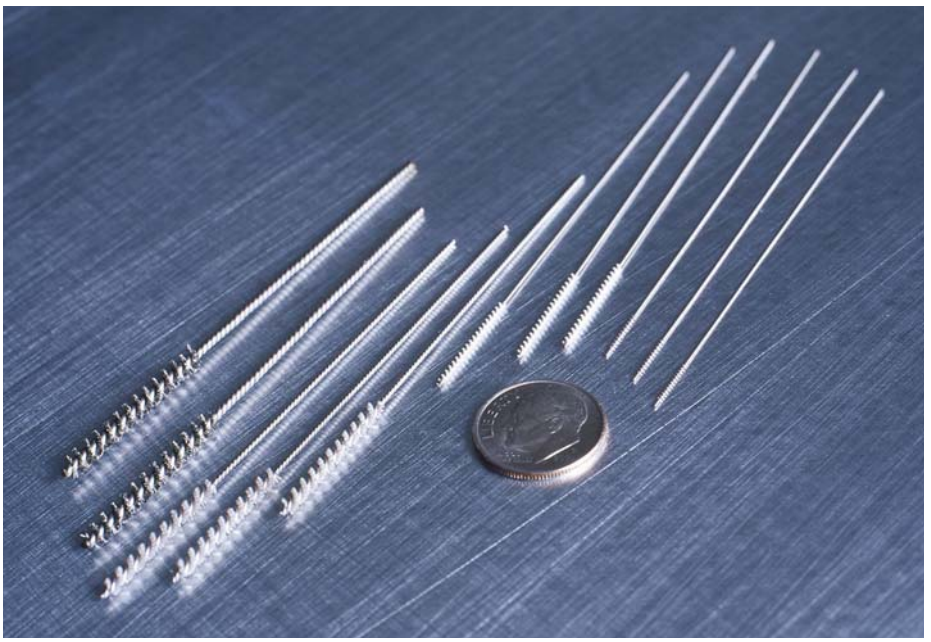
Manufacturers of small parts often face the challenge of deburring, edge blending and surface finishing components. These small components are usually taken out of the production stream to be manually finished with hand-held tools, which reduces productivity and makes for inconsistent product quality.

Miniature deburring brushes can solve both the productivity and quality challenges involved when manufacturing parts of various small sizes, contours and materials. However, in instances where the process is fully automated, proper brush selection plays a more integral role in improving the tool's performance and life span.

Miniature brushes are generally best suited to address tight tolerances, edge blending, deburring and other finishing requirements that have a direct impact on overall component functionality. One example of such a component is an injection-molded tube for agricultural seed-ejection systems.

Precision Planting Inc. in Tremont, Ill., manufactures a variety of systems that are designed for exact seed spacing and placement. Because the accuracy of seed placement relies heavily on precise timing, surface finishes of seed-ejection components must be void of even the slightest variations or irregularities that may impede seed travel.

One of the shop's newest systems incorporated injection-molded tubes that ended up having residual flashing created by the molding process. The flashing



measured only 0.002 in. to 0.005-in. thick, but its long ridge was rough and caused problems with part performance.

To remove the flashing, Precision Planting incorporated an abrasive nylon brush from Brush Research Manufacturing.

According to Derek Sauder, engineer at Precision Planting, the nylon brush does not speed part production, per se, because production is already automated and therefore highly efficient. But, he said the brush allows the shop to produce the most accurate planting equipment.

General parameters

Choice of a miniature brush depends on the application at hand and can involve variables such as contours required, type of material and the amount of material to be removed. Other factors that apply when using brushes in automated applications include machine tool rpm, feedrates and optimum wear-life of the brushes.

While most shops know what size brush to use, they aren't always sure of the most suitable style to select for a given application. There are several different types of brushes available that vary not only in size, but also in filament type. The most commonly used are carbon steel, stainless steel, brass, nylon and abrasive-filled nylon. And abrasive-filled ones can contain silicon carbide, aluminum oxide or diamond abrasive. Diamond-filled brushes cut harder materials, deburr faster and last longer.

Ball-style brushes, or "dingleberry" hones, are a popular choice among shops, and the tools can be as small as 0.156 in., such as with Brush Research Manufacturing's Flex-Hone brushes. Flex-Hone brushes feature globules or balls of abrasive grit permanently laminated to the end of nylon filaments.

"For any application with a bore size of 0.156 in. or greater, the ball hone is almost always the preferred tool," said Mike Miller of Brush Research Manufacturing. "One reason is that it is more abrasive at the point of attack, whereas an abrasive nylon brush will have abrasive grit particles interspersed throughout the filament. The ball-style hone is about 95 percent pure grain abrasive right at the point of need, so it really does an effective job."

Miller does not recommend a ball-style hone for working on threads. Instead he said that abrasive nylon does a better job of removing burrs and polishing thread peaks and flank angles, particularly in tapped aluminum holes.

Abrasive nylon brushes have gained popularity because the nylon is non-reactive, so the brush does not impart carbon impurities onto part surfaces. Nylon doesn't oxidize, so it

Ball-style brushes can be as small as 0.156 in., such as Brush Research Manufacturing's Flex-Hone.

Miniature brush types (lower left) vary from those with filament of nylon, wire or stainless steel to those having abrasive grits made of carbon steel, stainless steel, brass, or diamond-filled abrasive nylon.

won't rust or cause rust. And as far as safety is concerned, metal filaments can develop wire fatigue over time, whereas nylon ones won't.

For automated applications, Miller advised that small-diameter brushes – under 0.0625 in. – are not usually rotated under power because the brush stem wires are very fine and may bend. However, there is a series of holders and pin vises that are commercially available to grip the small-diameter brushes.

Grit selection is another important variable and may require technical support from a brush supplier. Shops may be unaware that parts needing very fine finish requirements may benefit from brushes with finer grit material. Or they may not realize that hard materials, such as ceramics and glass, may require a diamond grit.

Help with specs

According to Miller, shops may have several concerns about specifying brushes. A primary concern is whether or not to automate the brush operation. It quickly becomes obvious to most shops that automating a process and avoiding secondary operations delivers significant benefits in terms of both productivity and consistency.

"We encourage customers to get assistance from our engineering department. Also, we have a surface-finishing laboratory, and we encourage customers to send in the parts in question to us – the parts they would like to deburr or finish with our products. We analyze the parts, select the tools we think will provide the best solution, and run tests. We return the part with our best recommendations regarding tool selection, operating parameters and surface finishing measurements, if required," said Miller. <<

Information for this article provided by Brush Research Manufacturing Co. (www.brushresearch.com).

VICE PRESIDENTS APPOINTED

Royal Products (www.royalprod.com), a U.S. manufacturer of machine tool performance accessories, some of which help automate operations, has promoted two former company directors to positions as vice president.

Christopher Jakubowsky is now the vice president of operations and will oversee the company's manufacturing, warehousing, engineering, MIS, purchasing, and finance departments. He has 12 years of experience with the company.

With 18 years service at Royal Products, Thomas Sheridan has been appointed to the new position of vice president of marketing. All domestic and international sales and marketing-related functions of the company will fall under his responsibility. <<