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Broaching, the best solution for part production

Splines and keyways are just two part features that are best done by broaching, other methods either can't cut them or are comparatively too slow or expensive. Broaching machines are typically dedicated to high volume production and are often engineering intensive which makes them relatively expensive compared to other machining methods. However, there are few faster metal removal processes in the world today.

[Broaching Machine Specialties](#) (BMS) in Novi, MI specializes in broaching machines that are designed for robustness and long service life with minimal maintenance. The company also demands ancillary equipment that enhances broaching productivity, like chip conveyors or part automation, must also be reliable and well engineered. BMS offers both new and used broaching machines, turnkey systems, parts and part automation for broaching equipment. They also handle part production for companies that can't afford or don't desire to invest in a turnkey broaching system.

President Matt Egrin says, "BMS was incorporated as a machinery and equipment exchange in 1946. It was essentially a used machinery dealer with no real specialty." The company supplied equipment to the domestic automakers and went into broaching when these companies needed equipment. Egrin's father named the company Broaching Machine Specialties, and grew the business from a dealer in used broaching machines to an internationally recognized machine tool manufacturer specializing in new and remanufactured broaching systems.

Egrin noted that for many machined products, broaching is the fastest and often most accurate way to machine certain features. Today 80 to 85% of broaching remains automotive related, with the remainder used in off-highway, heavy machinery, earth-moving equipment, arms manufacturing, hand tools, aerospace, alternative energy, and even the medical industry where parts for hip, elbow and knee replacements are broached.

BMS ships worldwide, having machines in Australia, Argentina, Brazil, China, India, Israel, Korea, and other countries. The company's product lines include machines with capacities of one ton with an 18" stroke and 50-ton machines with 72" strokes along with used machines up to 75 tons with 110" strokes used to broach large internal gears for wind-powered turbine generators.

Egrin mentions, "For awhile it was my impression that some of the surface broaching operations, not the internal splines or features that are done on the inside of a hole, were going away. These could be done on a CNC machine and a company wouldn't have to buy a broach just to do one operation. You'd take the part and put it in a CNC machine and it would do every operation, including what was previously broached. I thought we were losing some of that market share. I've been seeing these machined features coming back to broaches due to the relatively high production quantities you can achieve with a broach as compared with a CNC machining center. You can make the same quantity on a broach that it might take 10 machining centers to produce."

"Right now", Egrin continued, "the auto companies are doing more assembly work and producing fewer parts themselves, because they're buying from first tier suppliers like American Axle, Delphi, and others. It's causing those companies to tool up. So Tier-one and two automotive suppliers are buying and investing more in equipment, making these companies our largest customer base.. What we're also finding is these first-tier companies are farming out some of their part production to even lower tiers. This has allowed us to weather the downturn in the automotive business over the last three to five years. Because of the used machine side of our business, we're able to serve these lower tier customers. They might not be making half million or million piece production rates, but they're making a hundred thousand, and they still need to broach it."

When BMS rebuilds a broaching machine, Egrin says that the only thing that's really old on the machine is the iron base (either a casting or weldment), which comprises the frame and slides. Everything else is either new or completely remanufactured. The mechanical portions are re-ground and re-fitted to new machine specifications. The electronic controls are all updated to the latest Programmable Logic Controller (PLC) controls and hydraulic systems are retrofitted with the latest components. BMS will not remanufacture a component that is no longer available or supported, and the buyer will have the same warranty that a new machine offers.

Rebuilt or new?

What should a company consider when looking at buying a new or rebuilt machine? Egrin says, "Typically it's driven by the budget, which for our customers is dictated by their production requirements. Because we provide quality new and used and machines, Bob at XYZ Machining Company who might be making 50,000 parts per year can come to us and buy a used horizontal broach for \$20,000 or \$30,000 tooled up, and still make it economical for him to broach the part internally rather than farming it out."

"Whereas if that person went to one of my competitors, and the only thing they had to offer him is a new \$250,000 machine, he couldn't afford it. He wouldn't be getting into the broaching business. So again, it's driven by the budget. Bob at XYZ Machining Company might be making 50,000 pieces of the same exact part that maybe American Axle or Delphi is making 500,000 of. Delphi and American Axle can afford that brand new, automated machining system, but the guy making 50,000 parts probably can't. That is why BMS is uniquely suited to serve both levels of business."

Robust construction

BMS machines are most often prepared as turnkey systems and designed to be robust and durable for long service life with minimal maintenance. The turnkey systems provided usually include ancillary equipment that the company holds to the same standards of reliability as its own equipment. Ancillary equipment can include filtration systems, material handling and chip removal systems. One of these pieces of equipment that is vital to the broaching process is a high-volume magnetic chip conveyor. BMS uses [Storch Magnetics](#) (Livonia, MI) for this equipment.

Egrin says, "There's a requirement for chip removal with broaching machines, obviously you accumulate a lot of chips, because they're removing vast amounts of metal. There are a number of different ways to do it. In the old days I think it was primarily done with just a drag-type conveyor before they had magnetic technology. Now, primarily what we're broaching is ferrous in nature, it's magnetic. A magnetic chip conveyor is a logical way to take the chips out of the chip collection sump, and also provides safety, efficiency, and extended service life. It allows the liquid coolant to flow back into the machine, and it also has the advantage of being able to filter or separate out some of the fine shavings that would otherwise be floating in there. The magnets draw the shavings and chips onto the conveyor and then take them out. We've been working with Storch now for almost 20 years. They have been our number one provider of magnetic chip conveyors."

Egrin mentions, "Storch delivers a great product, on time, at a very competitive price. They service their product well. Whenever we need them, they're here immediately. They've also gone out to our customers in the field. Whether the machine or conveyor is under warranty or not, Storch is always there to service the product." "We've thought about using conveyors from other companies. So we have gone to some of Storch's competitors. However, their prices and delivery don't match Storch's."

Asked about the construction of Storch conveyors, Egrin says, "They're the experts, and we trust them. I know the functionality is there and the reliability. Just turn it on and forget it, it's virtually problem and maintenance free."

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