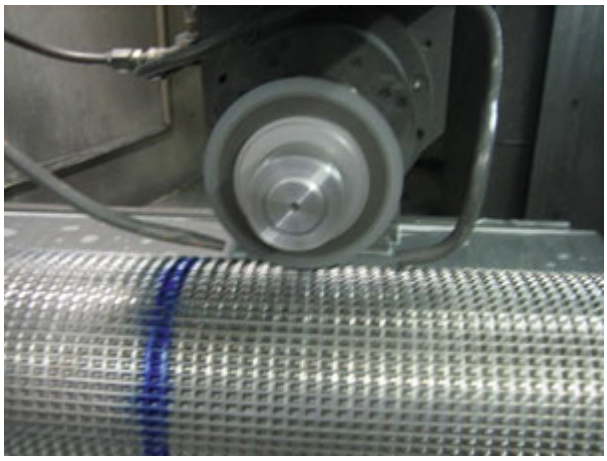
SPOTLIGHT: COOLANTS/LUBRICANTS/FILTERS

'Breaking News' Was Not a Good Thing for a Broach Maker

As coolants broke down, problems with its grinding operation rose



General Broach Co. creates broaches for the automotive, aviation, and off-road industries, but found productivity hindered by the break-down of the coolants it was using in its grinding operations

General Broach Co., Morenci, MI, had coolant-splitting problems with the water-soluble coolants they used: because of the plant's hard water, the emulsion would fall apart.

As a leader in the manufacture of spiral gullet and button gullet broach bars, General Broach – GBC – had to take extra measures to ensure the concentration of coolant remained at the proper level to maintain a tight emulsion.

Beginning as a tooling operation in the 1940s, the company found business in the automotive industry. It was designated as the first in its industry to become a Ford Q1 supplier, and was one of the first to become ISO 9000 certified.

Five years ago, 90 percent of GBC's business was automotive-related. It supplied broaches to cut the internal, external, and blind splines for gears that go into automotive power-train parts. Because of the auto industry climate, GBC diversified. It changed its focus to aerospace customers and OEM manufacturers of off-road equipment, agricultural equipment, firearms, and hand tools. It manufactures broaches with diameters from 0.3" to 8.5" in diameter and up to 96" long.

The company reduced coolant consumption by 30 percent

General Broach grinds three different types of steel alloy material, M4, M2, and T-15. The lathe department trims stock to the required diameter, then the bars are hardened in a salt heat-treat operation that reaches 2,100°F.

The treating process can take up to three weeks. During treatment, the bars' temperature must be slowly increased so that both the inner and outer cores of the broach bar reach a hardness of 64 to 66 R_C. After the bars are hardened, they are ground with vitrified CBN wheels taking off as much as 0.1" per pass.

Coolant Splitting Problems

GBC encountered splitting problems that translated into stress cracking and burn marks on the broach bars it was grinding. Because of these problems, it had to slow its grinding process – grinding at a slower speed and also reducing the amount of stock removed on each pass to insure the integrity of the part.

By switching to mineral oil-based NuSol, GBC reduced coolant consumption by 30 percent in grinding broaches

To worsen matters, the coolants it was using left slime on top of its sumps as the emulsion weakened and clogged its paper filters, causing rapid indexing of the filter paper. The company had to continually add coolant to keep the concentrate at the right level and the emulsion as tight as possible.

Because of the coolant splitting and the problems associated with it – rancidity, corrosion, and poor broach bar finishes – GBC evaluated NuSol from Chemtool Inc., Crystal Lake, IL.

GBC prefers mineral oil coolants because of the increase in lubricity for their part finishes and for increased depth of grind.

Once installed, GBC saw a 20 percent increase in production. The lubricant alleviated burning and stress cracks of the broach bars and increased feed rates, which translated into an additional 15 percent more production.

GBC was able to grind more stock with each pass. An added benefit was NuSol did not go rancid as their previous coolants had.

GBC saw a 20 percent increase in production

NuSol was also less expensive for GBC because operators did not have to continuously add coolant into the systems. The company reduced coolant consumption by 30 percent because it did not dump its sumps as often and it used less make-up coolant concentrate on a daily basis. *Chemtool, Inc.*

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