

Modern Machine Shop

Selecting Equipment For High Spindle Speeds and CNC

HFI Fluid Power Products has been finding methods of improving service for their worldwide customer base since 1967. The company manufactures hundreds of fluid power components including fittings, adaptors and valves used in hydraulic and pneumatic applications.

While multiple-spindle screw machines produce approximately 80% of the company's output and remain cost effective for production runs in the thousands, CNC equipment plays a steadily increasing role at HFI. In a continuing effort to improve product quality and control costs, they have made a major commitment to CNC turning and machining with three new machines added within the past year.

HFI began trying to select a lathe and related accessories to replace an older CNC and several multi-spindle screw machines during the middle of 1991. The selected equipment was installed in September of 1991 and has been in continuous production for the past year. The system is composed of a Mazak Quick Turn 18N lathe, an automatic hydrodynamic bar feeder and a front-mounted, self-contained Full Bore® Chuck from Production Dynamics of Valparaiso, IN (now Lexair, Inc.)

Which chuck to use became important early in the decision making process. The one chosen eliminated the draw-tube and actuator and made it possible to feed up to 3" round and 2-1/8" square bar through the spindle of a lathe that normally has a bar capacity of 2-3/4" through the draw-tube with a conventional hydraulically powered chuck installation. The Full Bore® Chuck eliminated the need to go to the next larger spindle size machine which would have cost more and also have reduced the maximum spindle speed from 3,600 rpm to 3,000 rpm thus increasing run times and reducing efficiency.

The Full Bore® Chuck features easy front access chuck collet pads with faster setup times allowing quick response to HFI customer's needs. The lathe is used advantageously for short production runs ranging from 100 to 3,000 pieces in order to reduce inventory requirements. Over 150 different parts have been run to date with this system. Many of these parts were previously purchased from outside vendors at very high costs. The savings in bringing these components in-house provides economic justification for the lathe without including other benefits.

The Full Bore® Chuck features concentricity adjustment and fixed-length positioning as well as the ability to run hex, round and square bars. Collet and pad changes can be achieved in less than five minutes allowing fast setup times. The open and close time for the chuck is about one second compared to that of a hydraulically actuated unit which took approximately six seconds. The five second part cycle time reduction generated a payback on the chuck in six months. Full speed operation of the lathe (3,600 rpm) is possible with this chuck as the grip force is constant regardless of the spindle speed. The end results with this system have been productivity increases, improved part quality and an excellent payback timeframe which led to the recent purchase of a second turning system.

The next step in HFI's ongoing effort to improve productivity will be greater machine utilization through an additional work shift and periods of unmanned operation.