

Fig. 1

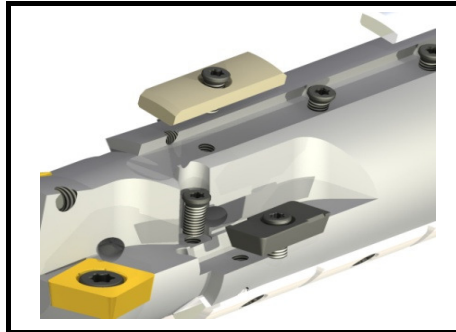


Fig. 2

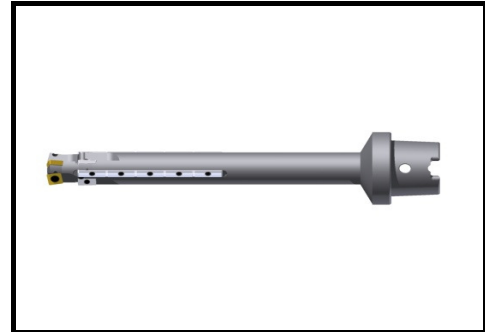


Fig. 3

This past summer, **Al Lugo**, the Sumitomo sales engineer in central Pennsylvania, had a customer that was tooling a new CNC machining center to produce after market drive line parts.

The customer purchased the machining center to replace a series of stand alone special machines producing the same parts. The new machine would dramatically increase his production capacity and add some flexibility to the process.

While most of the "special" tools built for this customer by Master Tool were relatively simple - one presented a unique opportunity. The older, existing machines used a solid carbide core drill to open up a deep hole in the part. They then rough and finish bored this hole with two more tools. The cutting time was very long and the solid carbide core drill required regrinding and was not very stable.

Master Tool design engineers were asked to see if it was possible to combine all of these operations (core drill, rough and finish bore) into one tool (**see Figs. 1 & 3**). The challenge was to stabilize the core drilling inserts in the cut while trailing them with a rough and finish insert.

The designers at Master Tool came up with a very interesting design. Because of the length to diameter ratio carbide guide pads were required to stabilize the cut.

All of our competitors braze the carbide guide pads into the steel body. Brazing carbide to steel presents some unique problems. Because brazing is done under high heat and the expansion and contraction of carbide and steel is different it is very difficult to keep the tool straight. Even if the tool is straight during manufacturing it will bend over time due to the brazing strains between carbide and steel.

A few years ago Master Toll developed a method of attaching the carbide guide pads using torx screws rather than braze and then finish grinding the pads. This eliminated the bending due to the brazing strains (**see Fig. 2**). This method has worked very well in long boring tools but had not been tried in a core drill.

Some prototype tools were built and tried in our shop. After some experimenting a final design was built. Master Tool also added our standard reamer style insert for the rough and finish pockets. This insert is held in with a torx screw and also adjusted on diameter with an additional torx screw. This style insert had built in back taper to allow the tool to be retracted without leaving withdrawal marks on the part.

The final results were excellent. The customer was able to reduce his cycle time on this cut by two thirds. He also eliminated a costly solid carbide core drill along with the regrinding costs.