Newsletter
Newsletter
SUMITOMO CARBIDE - CBN - DIAMOND
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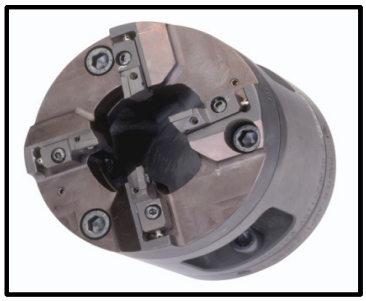

Fig. 1

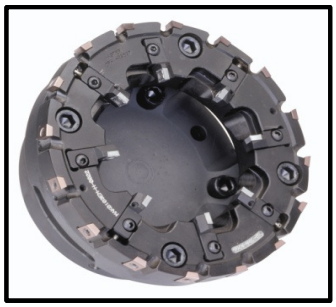

Fig. 2

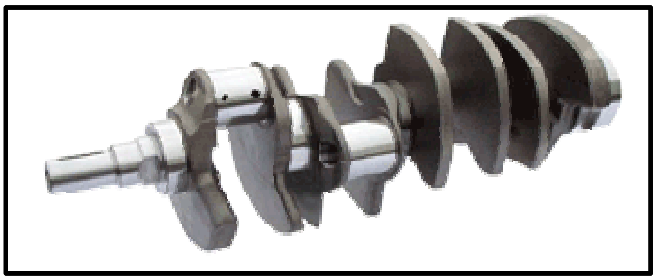

Fig. 3

A few years ago Master Tool was asked to review some competitor's hollow mills being used on the pin and flange end of a crank shaft **(See Fig. 3)**. The crank shaft machine was from Germany and the original tools where from a German cutting tool company. The main problem was low tool life (approximately 600 parts per corner on the insert) and the fact that the insert was proprietary to the cutting tool manufacturer.

The purpose of this newsletter is not so much the success of the hollow mills that we designed (See **Fig. 1** for the post end and **Fig. 2** for the flange end) except to say that we were able to increase the tool life from 600 parts per corner to 2600 parts per corner using a standard ISO insert. The real purpose of this newsletter is to discuss what happened after the new tools were installed and some things that, as a manufacturer, we sometimes forget to tell our sales force and our customers.

A few years after we installed the tools we received an emergency (and angry) phone call from the end user. He was very upset that his tool life had dropped from 2600 parts to 350 parts - still using the same insert and grade that was given to him originally. He further said that they were breaking cartridges almost daily and that our deliveries on the replacement cartridges was very long.

We made an immediate appointment to visit the customer and before we went we checked with our office to find out about the delivery problems. It turns out that in the two years since we installed the tools the customer had not purchased a single replacement cartridge from Master Tool. Therefore, it was obvious that the customer was buying the cartridges from someone else.

The first thing we did when we visited the customer was to look at the cartridges. Visually they looked fine and fit into the hollow mills very well. Further inspection showed something completely different. The inserts we used in the tools were standard TCMT and SCMT style inserts using standard Torx screws. When an insert was screwed into the competitor's cartridge it felt like it was tight - but it was not.

This competitor was a small shop in Michigan and made their living reverse engineering other people's designs. They did not know the design standards required to manufacture a Torx insert pocket - particularly as related to **"lock reserve"**. A correctly manufactured Torx insert pocket is designed to feel "tight" and then turn an additional quarter turn on the Torx wrench (**See Fig. 4 on Page 2**). This additional quarter turn **"locks"** the insert into the pocket. This reserve is accomplished by using the correct end mill to machine the insert pocket and the exact location of the tapped hole for the Torx screw.

(See Page 2)

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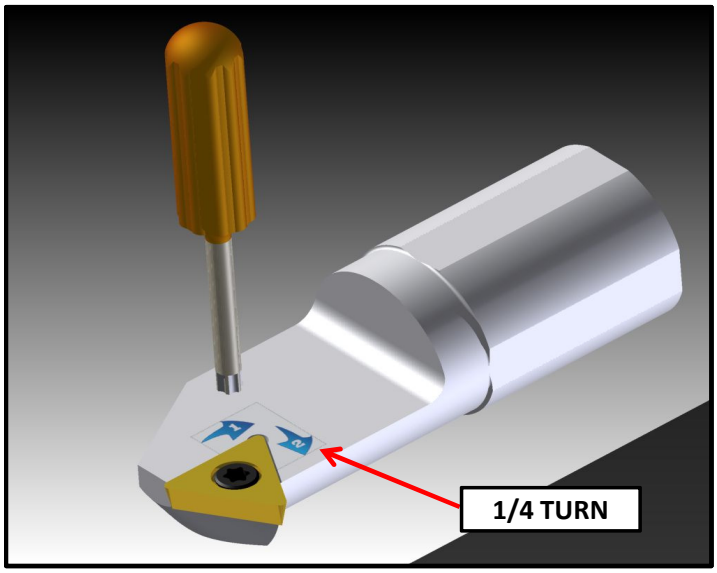

Fig. 4

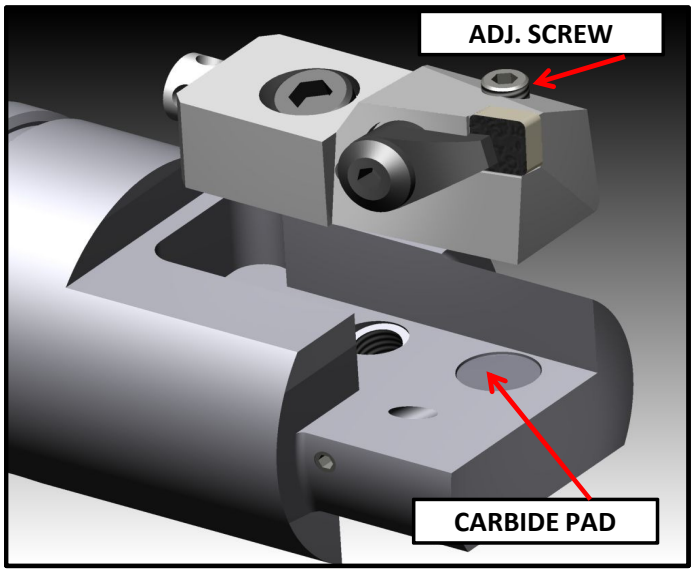

Fig. 5

Because this particular special cutting tool manufacturer did not understand the design - he made what he thought was correct. When the insert was tightened in his cartridge pocket the Torx screw came to a **"dead"** stop and went no farther. The set up personnel thought the insert was tight and sent the tools to the floor.

A Torx insert pocket machined improperly (without lock reserve) will feel tight. Unfortunately after machining a few hundred parts with the vibrations that are inherent to machining, the insert will slowly work lose. Once the insert starts to work lose the tool life will deteriorate very quickly - sometimes to the point of breaking the insert and, in this case, the cartridge too.

Once we established the problem we shipped the customer cartridges manufactured correctly and his tool life went back to 2600 parts per corner. By the way, the competitor's cartridges were 10% less expensive than Master Tool's.

One additional feature for tools manufactured by Sumitomo / Master Tool Division is the **"carbide pad"** that we use in the tool body - located behind the cartridge radial adjusting screw **(See Fig. 5)**. This feature is a **"standard"** for Master Tool and we sometimes neglect to point this benefit out to our customers. Many of our competitors build special cartridge tooling without this feature. They have the radial adjusting screw located directly against the steel tool body. The long term fallacy of this design is that the radial adjusting screw will **"indent"** the tool body with the screw point making future adjustment difficult and the preload that is necessary for the cartridge to function unpredictable.

We forget to mention this **"design standard"** but it is one of many features that separate us from our competition.