**How to Choose the Best Drill Type for the Next Job***Deciding between solid drills or replaceable insert drills*

Holemaking is a common procedure in any machine shop, but selecting the best type of cutting tool for each job is not always clear. It is best to have a drill that caters to the workpiece material, produces the specs required and provides the most profit for the job at hand. When it comes to the variety of jobs manufactured in machine shops, there is no “one-drill-fits-all.” Fortunately, the process can be simplified by considering five criteria when choosing between solid drills and replaceable insert drills.

**Is the next contract long-term or a short run?**

If the answer is running a long-term, *repeatable* process, invest in a replaceable insert drill. Commonly referred to as a spade drill or replaceable tip drill, these drills are engineered so that machine operators have the ability to change out the worn cutting edge quickly. This reduces the overall cost per hole in high production runs. The initial investment of the drill body (insert holder) is compensated quickly by the reduction of cycle time and cost of replacing inserts versus the cost of new solid tooling. Simply put, speed of changeout coupled with a lower long-term cost of ownership makes replaceable insert drills the better choice for high production jobs.

If the next project is a short run or custom prototype, then a solid drill is the better choice due to the *initial* low cost. Since it is not likely that the tool will wear out while machining smaller jobs, the ease of cutting edge replacement is irrelevant. For a short run, the replaceable tool is likely

to have a higher initial cost than a solid drill, so it may not pay dividends to invest. Lead time can

be better for a solid tool as well, depending on the source for these products. With solid carbide drills, efficiency and cost-savings can be maintained when machining a wide range of holemaking applications.

**How much stability is required for this job?**

Consider the dimensional stability of a reground solid tool versus replacing the worn cutting edge with a fresh blade. Unfortunately, with a reground tool, the diameters and lengths of the tool no longer match the original version; it is smaller in diameter, and the overall length is shorter. The reground tool is used more often as a roughing tool, and a new solid tool is needed to meet the required finished dimensions. By using the reground tool, another step is added to the manufacturing process to make use of a tool that no longer satisfies the finished

dimensions, thus increasing the cost per hole in each part.

**How important is performance for this particular job?**

Machine operators know that solid drills can be run at higher feeds than replaceable tools of the same diameter. Solid cutting tools are stronger and more rigid as they have no connection to fail over time. Nevertheless, machinists opt to use uncoated solid drills in order to reduce time invested in regrinds and lead times on reorders. Unfortunately, using uncoated tools *reduces*

the superior speed and feed capabilities of a solid cutting tool. At this point, the performance

gap between solid drills and replaceable insert drills is almost negligible.

**What is the overall cost per hole**?

The job size, initial cost of the tool, downtime for changeouts, regrinds and touch-offs, and number of steps in the application process are all variables in the cost of ownership equation.

Solid drills are a smart choice for short runs due to their lower *initial* cost. Generally, small jobs do not wear a tool out before they are complete, meaning there is no downtime from changeouts, regrinds and touch-offs.

A drill designed with replaceable cutting edges can offer a lower cost of ownership over the life of the tool for long-term contracts and high production runs. The savings start when the cutting edge is worn or damaged because there is no need to order the whole tool—only the insert (a.k.a. blade).

Another cost savings variable is the amount of machine time saved or spent when changing out cutting tools. The replaceable insert drill’s diameter and length are not affected by changing out the cutting edge, but since the solid drill needs reground when it is worn, solid tools should be touched off when replaced. This is a minute that parts are not being produced.

The last variable in the cost of ownership equation is the number of steps in the holemaking process. Replaceable insert drills can usually complete the process to spec in a single

operation. Many applications that incorporate solid drills add a finishing operation after using the

reground tool to meet the job’s requirements, creating an unnecessary step that adds machining cost to the part produced.

Overall, most machine shops need a good selection of drill types. Many industrial tooling suppliers offer expert guidance in selection of the best drill for a particular job, and tooling manufacturers have free resources for determining the cost per hole to help aid in the decision process.

*Information provided by Allied Machine & Engineering Corporation*