

Back to Drilling Basics

As manufacturing facilities move from conventional drilling methods to CNC and "high performance", we shouldn't forget drilling basics. They still apply in the high tech drilling environment. This is a review of some drilling basics:

- Use the shortest drill possible for the specific application. Longer drills are (1) more costly, (2) break easier and (3) drill bellmouthed holes.
- Avoid the tendency to over speed and under feed. Excessive speed causes (1) premature outer corner drill wear, (2) material work hardening, (3) long, stringy chips, (4) reduced drill life and (5) increased cost per hole.
- Emphasizing feed rate: (1) helps break up chips (2) reduces premature outer corner drill wear, (3) reduces material work hardening, (4) extends drill life and (5) reduces cost per hole.
- Use split point drills for drilling alloy materials; benefits include: (1) start at the point of contact (self-centering), (2) drill with less torque and thrust and (3) break up chips.
- A hole of three drill diameters or deeper should be considered a deep hole. Therefore, you should peck drill just enough to prevent chips from packing in the flutes, because chip clogging is the major cause of drill breakage. You should decrease speeds and feeds as follows:

Speed and feed Reduction (Based upon hole depth)		
<i>Hole Depth to Diameter Ratio</i> (times drill diameter)	<i>Speed Reduction</i>	<i>Feed Reduction</i>
3	10%	10%
4	20%	10%
5	30%	20%
6	35-40%	20%

- Parabolic drills should be reduced as follows:

Speed Reduction -- Parabolic Drills (Based upon hole depth)	
<i>Hole Depth to Diameter Ratio</i> (times drill diameter)	<i>Speed Reduction</i>
3	0
4	0
5	5%
6 to 8	10%
8 to 11	20%
11 to 14	30%
14 to 17	50%
17 to 20	50%

- When drilling harder materials (i.e. above R/c 35); (1) reduce speeds and feeds to prevent points from burning and drilling breakage and (2) use cobalt drills as their higher hardness and heavy-duty construction are designed from drilling harder-materials
- Use drills with a black oxide surface treatment when drilling ferrous materials. The black oxide treatment holds the coolants and lubricants to the surface of the drill retarding material build-up. This treatment

also improves toughness.

"...we shouldn't forget drilling basics. They still apply in the high tech drill environment."

There are more drills that could be added to this list. The important thing to remember is to use good drilling techniques in your present operations. This will maximize productivity and reduce your cost per hole. Then when you begin to use high performance tooling, you will realize its full benefits.

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