

Common Drilling Problems

Problem	Solution
Built up edge	Increase cutting speed, Reduce cutting lip honing, Coat tool
Heavy burrs on breakthrough	Decrease feed, consider racon point, Reduce tool change intervals
Wear on chisel edge	Increase cutting speed, Decrease feed
Poor surface finish	Rigid clamping of workpiece, Increase coolant
Flank wear	Decrease cutting speed, Increase feed, Increase clearance angle
Land wear	Rigid clamping of workpiece, Thicken soluble oil or use neat oil
Scoring on tool body	Rigid clamping of workpiece, Reduce feed, Thicken soluble oil or use neat oil
Plastic deformation of tool	Decrease cutting speed

Common causes of Tool Wear

There are several mechanisms of tool wear:

- Abrasion
- Adhesion
- Chemical
- Diffusion
- Thermal Degradation
- Vibration and Rigidity

Abrasion

Abrasion wear is caused by friction between the cutting tool and the work piece.

Adhesion

When particles of the work piece become welded to a cutting tool, they form a built up edge. Eventually the built up edge is broken off the cutting tool and some times a part of the tool is also broken off.

Chemical

Sometimes chemical reaction can occur between the cutting fluid and the cutting tool. The cutting fluids can cause oxidation of the cutting tool, which may result in premature tool failure.

Diffusion

This occurs when particles of material form a built up edge on the work piece. The material in the built up edge and the cutting tool material start to alloys which can result in the tool being weakened.

Thermal Degradation

This is caused by severe temperature gradients during machining operations. The dramatic changes in temperature can cause cracks to form near the cutting edge which ultimately leads to tool failure.

Vibration and Rigidity

The machine condition and rigidity will affect the quality of the surface texture produced. Excessive wear of the spindle bearing's feed mechanism can result in poor surface texture. Without proper adjustment and maintenance of the machine, vibrations can develop causing poor tool-life and surfaces. Vibrations can also be affected by other variables such as:

Spindle Overhang

The distance between the work piece and the spindle head should be kept to a minimum for maximum rigidity.

Work Piece Support

For best results, the work piece should be properly supported in relation to the cutting forces developed by the machining process. Unsupported overhanging cut should be avoided.