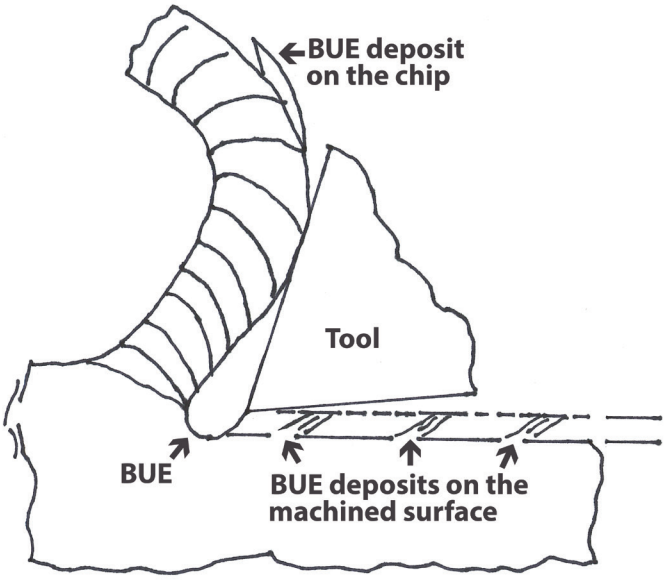
CRAFTSMAN CRIBSHEET

Built Up Edge — What It Is and What To Do

Built Up Edge (BUE) is the accumulation of workpiece material onto the rake face of the tool. This material welds under pressure and is separate from the chip. Schools teach that this is because the first material to contact the tool work-hardens, and hardness tests to confirmed this. Because BUE changes the effective geometry of the tool, it can have either positive or negative effects.



Positive Effects

- Less tool wear
- Lower power requirements
- Less contact of the workpiece with the tool (It contacts the BUE instead)
- Better surface finish and improved process capability

These effects are only beneficial if the BUE is thin and stable. Machining additives such as sulfur combine with manganese to form manganese sulfides. Manganese sulfide helps to control BUE because of its anti-weld properties. On resulfurized steels, BUE is usually stable and not a problem.

Negative Effects

- Poor tool life
- Poor and variable surface finish (As the BUE sloughs off the tool, it can weld to the workpiece)
- Loss of statistical capability on dimensional control
- Loss of uptime trying to troubleshoot the process

BUE is more likely on alloys that work harden. In order to get BUE under control, the steps that you take depend on the tool material.

For Carbide

- Decrease the feed. (Pressure welding usually is the culprit)
- Increase the speed
- Increase the rake angle or “hook”
- Get a better metalworking fluid (including get the fines out of your existing MWF!)
- Get a different coating

For High Speed Steel (HSS)

- Reduce speed

If the tool is High Speed Steel (HSS) you may think you are in “oppositeland” when you discover that slowing down the speed reduces the build up. On HSS, as speed (heat increases) so does the tendency to form BUE.