

MAKING TOOLS for TURNING, Spring Retreat, May, 2006

Philosophy: James Krenov; cabinetmaker, (paraphrasing), he compares a fine tool to a musical instrument- it must be well turned before the concert, then **if it is played with masterful talent** real music is made.

It's my contention that a really good tool becomes something that you want to make 'music' with.

Machinist suppliers,

Tool bits, drill rod, flat stock: (local) Bass Tool Supply, WholeSale Tool, Rexx
(e-links) www.msdirect.com, www.littlemachineshop.com

??Harbor Freight?? Anything under the brand name of Cen-Tex, Chicago Electric, or Chicago Pneumatic is a quality tool. Chicago Pneumatics is the industry leader of pneumatic tools.

The Mystic of tool steel tempering:

Tool steel is malleable and if it is to be used for cutting needs the cutting portion of the steel to be heat treated after machining. The process is called tempering. This is done by first heating the steel to high temperature then quenching it. This locks a molecular carbon ring structure change into the steel leaving it at near maximum Rockwell hardness. The second step, the actual tempering, reduces the hardness/brittleness by reheating the steel to a much lower temperature and maintaining that temperature for a period of time then quenching it.

During the first step the steel is heated to critical temperature, (loss of magnetism), about 1450* F, just beyond red and towards an orange color. There is a time dependency on how long the temperature is held.

Note: High Speed Steel, HSS, is a composition of steel and other elements, Tungsten, Molybdenum, Chromium, Vanadium, etc., that withstands very high temperatures and needs no further tempering after machining if proper coolant is used during machining.

In the second step, the actual tempering is directly proportional to the amount reheating done. The less the steel is reheated, the less the hardness is reduced. This effect is utilized to leave a very hard edge and softer more flexible steel in the shaft. To do this the tool is reheated about an inch and a half from the cutting edge and drawing a controlled temperature towards the edge. The shaft portion will be much hotter and more malleable when quenched than the edge. The required temperature at the edge needs to be about 450*F just beyond a straw color.