

• Tool Material :

- most common {
- high speed steel. → lower cost
 - tungsten Carbide → higher speeds
 - longer life
 - higher hardness

- PCD : poly-crystalline diamond.
 - long life
 - expensive
 - only tip (cutting edge)

- Ceramic :
 - no cooling
 - sparks

- CBN : boron nitrate

- TCT : tungsten carbide tipped
 - HST body
 - brazed carbide tip

- Drills: → axial cutting
- two cutting edges

↓
cutting diameter








↓
shank diameter

• tools can be coated.

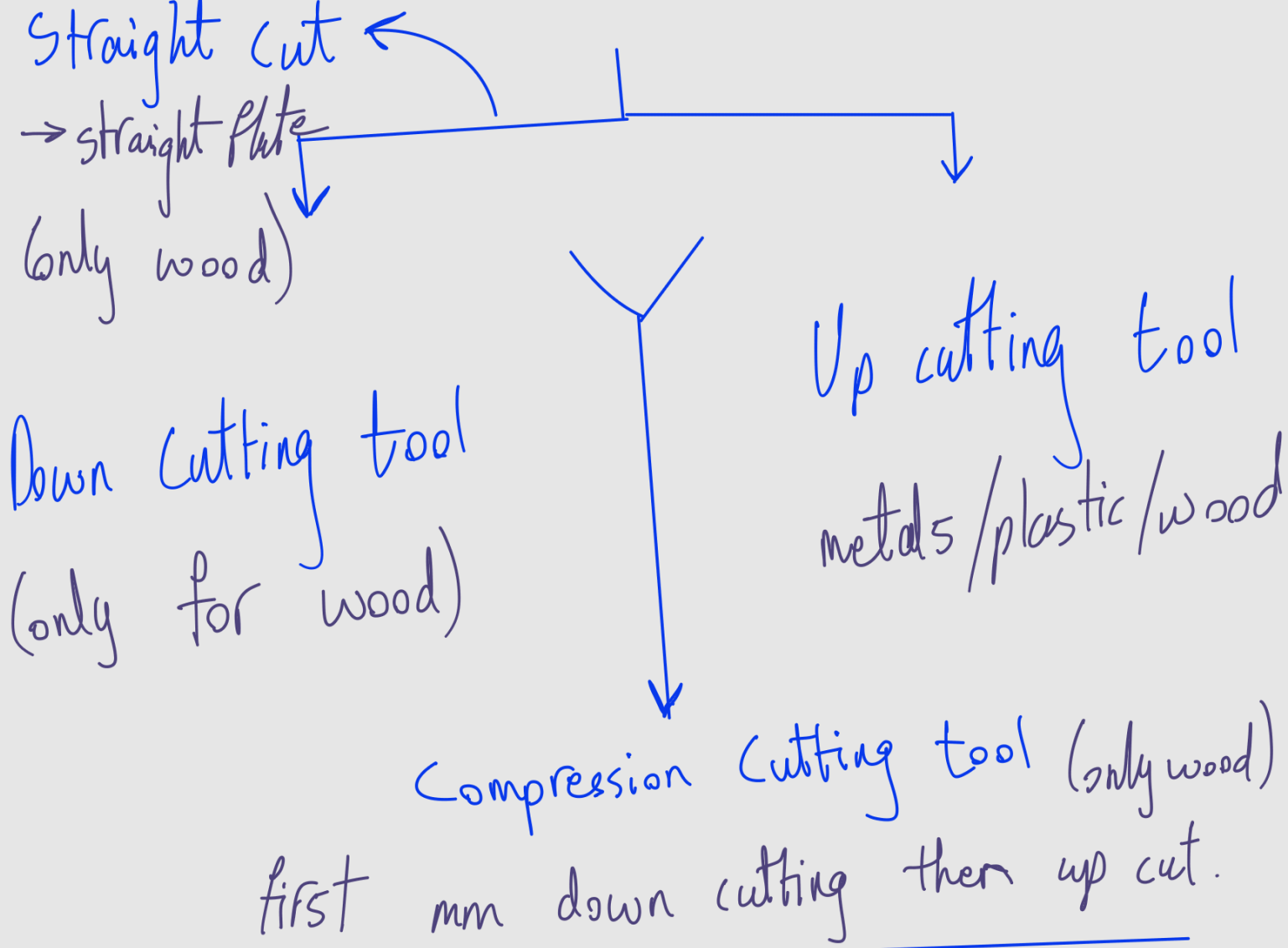
• End Mill:

(usually carbide)

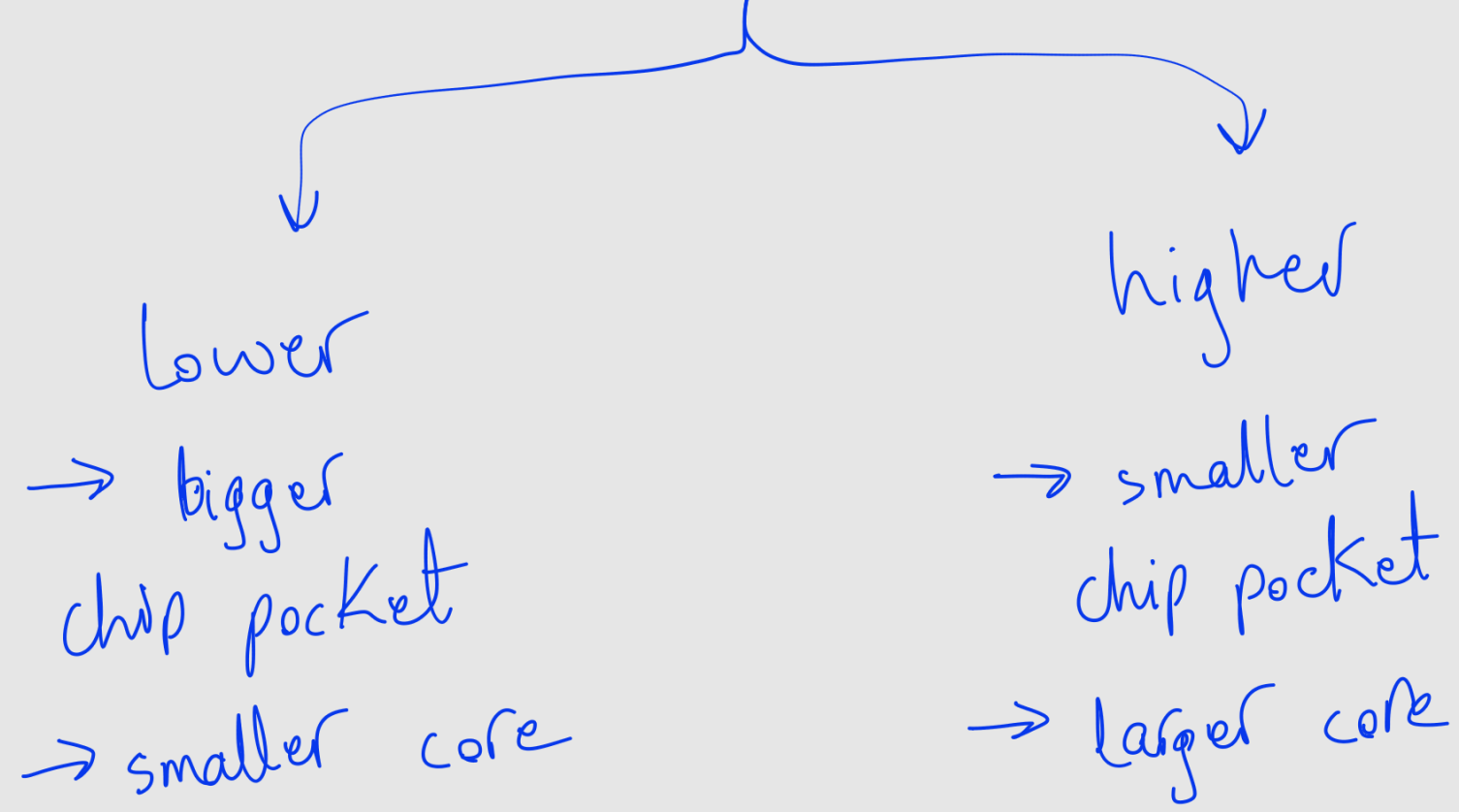
↓
for CNC machines

- flat 
- square 
- V 
- bull nose 
- ball 
- tapered 
- form tool 

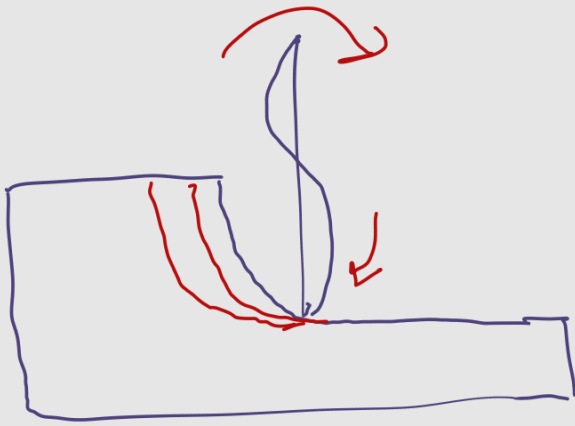
→ axial + radial cutting
└─ must be center cutting



Number of flutes

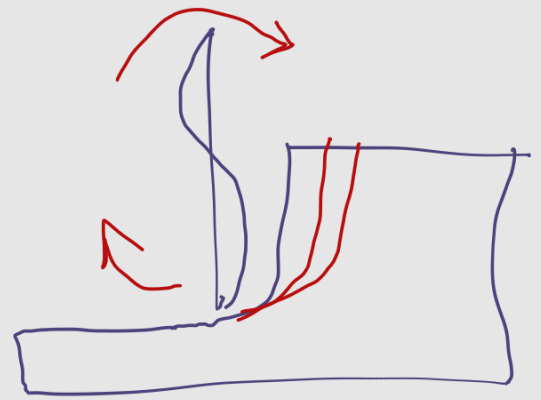


Up Milling (conventional)



- for thin walls
- for foam
- needs less clamping pressure

Down Milling (climb)



- needs higher clamping pressure.

~~##~~ spindle always turns clockwise ~~##~~

CNC Routing VS CNC Milling.

- Routing is milling
- routing is only wood

1) calculate spindle speed (n)

2) calculate feed speed (V_f)

FS Wizard . com

• usually depth of cut is 50% to 100%
of tool diameter.

• usually width of cut is 60% to 70%
of tool diameter.

• tabs \rightarrow 6-8 mm for 19mm
plywood.

• Safety:

→ eye protection

→ hearing protection

→ no accessories

→ no overSize or dangling clothes.

→ closed footwear.