

CNC Machining Review

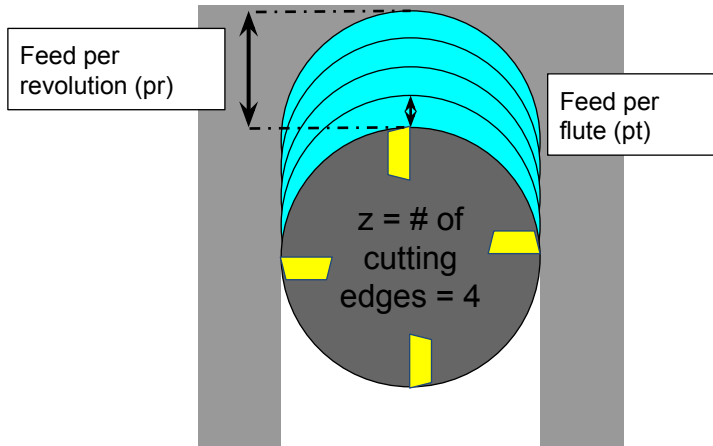
ME 3820

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3 Primary PVs in Machining

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Feedrate calculations (mill)



$$RPM = \frac{SFM \times 12}{\pi \times D}$$

$$f_{pr} = z \times f_{pt}$$

$$f_{pm} = RPM \times z \times f_{pt}$$

Units:

RPM: rev/min

SFM: ft/min

D: inches

f_{pm}: inches/min

f_{pr}: inches/rev

f_{pt}: inches/flute

z: flutes

Feedrate calculations (lathe)

$$RPM = \frac{SFM \times 12}{\pi \times D}$$

$$f_{pm} = RPM \times f_{pr}$$

Units:

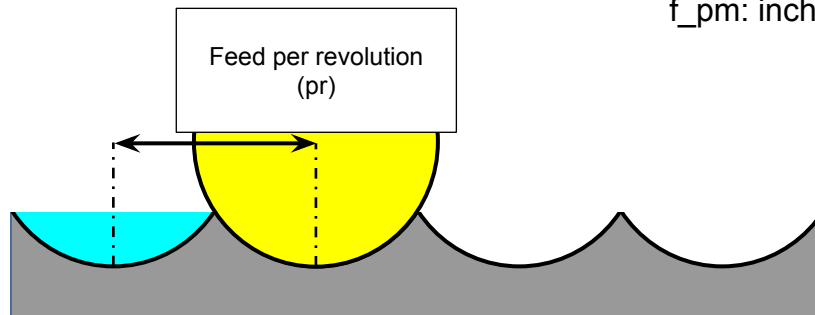
RPM: 1/min

SFM: ft/min

D: inches

f_{pr}: inches/rev

f_{pm}: inches/min



Expectations

- P²C

- Prepare
- Participate
- Communicate
 - No Email

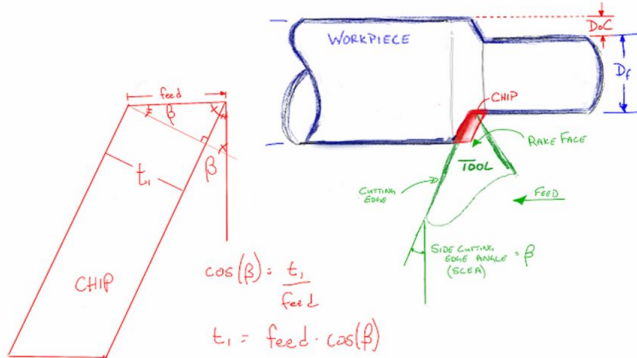
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Power of chip formation

$$P_C = K_p C Q W$$

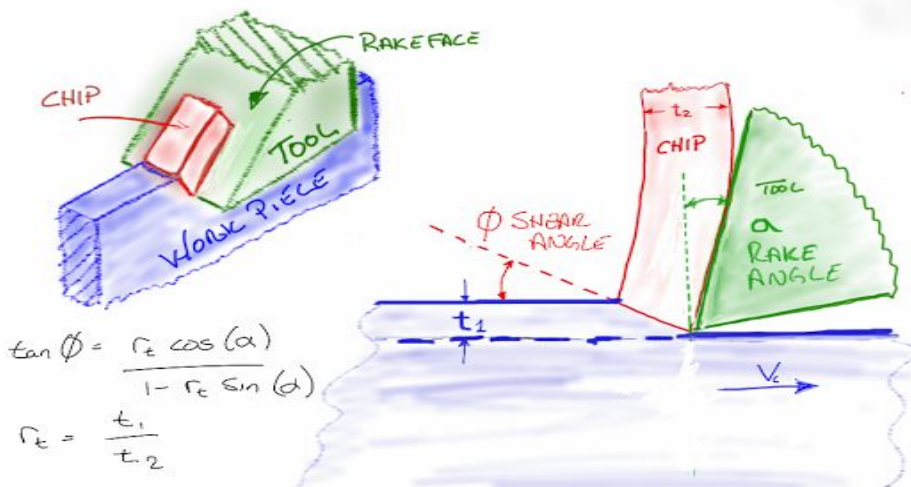
- P_c = power at the cutting tool
- K_p = specific power for cutting
- C = feed factor
- Q = material removal rate MRR $\left(\frac{\text{volume}}{\text{time}}\right)$
- W = tool wear factor

Turning straight down view

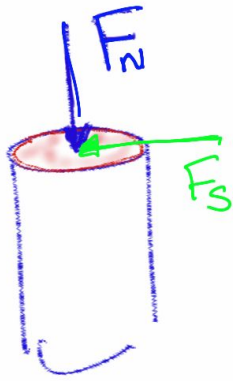


Shear angle

ORTHOGONAL CUTTING



stress in cutting



TENSILE STRESS

$$S = \frac{F_N}{A}$$

SHEAR STRESS

$$S = \frac{F_S}{A}$$

