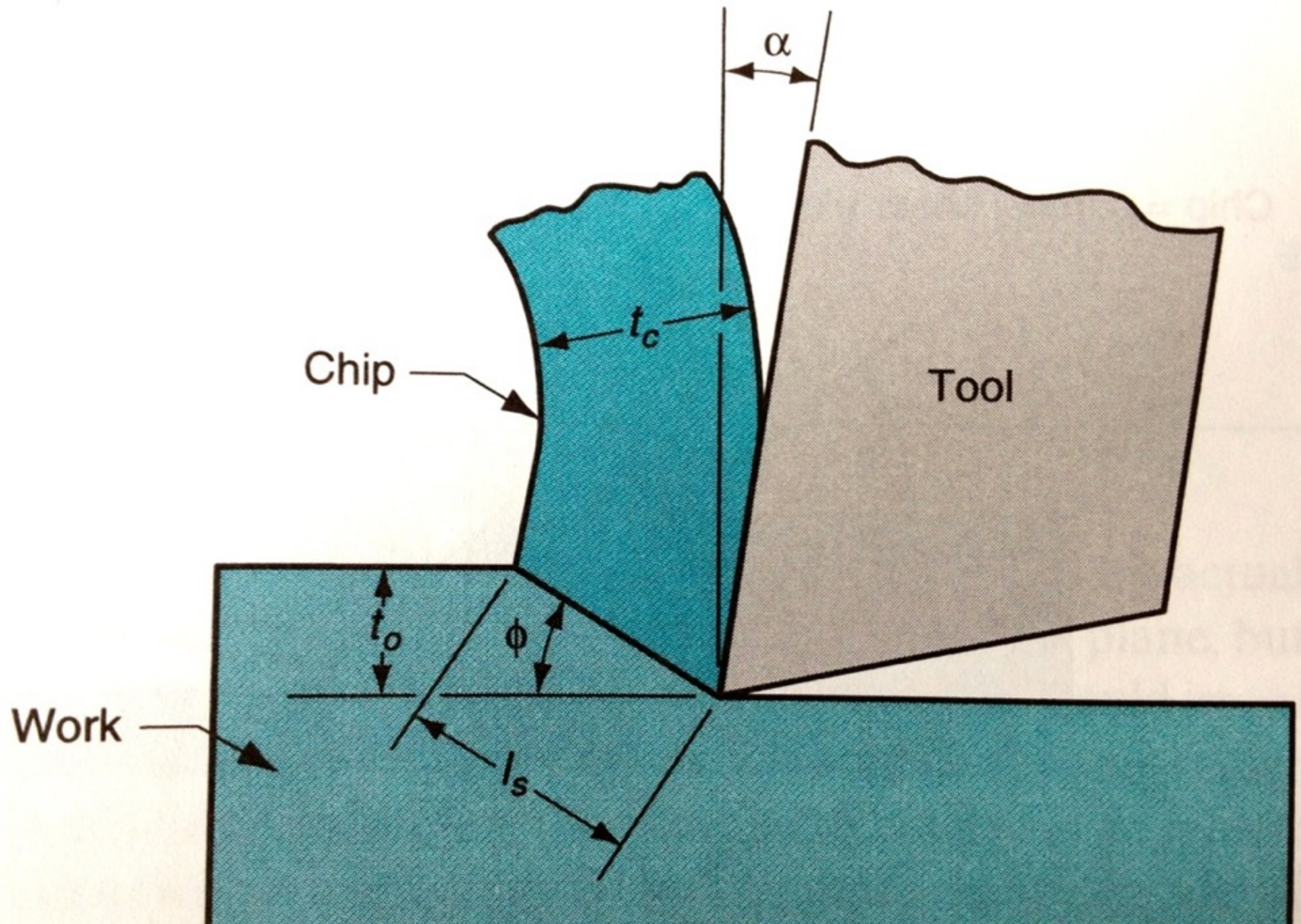
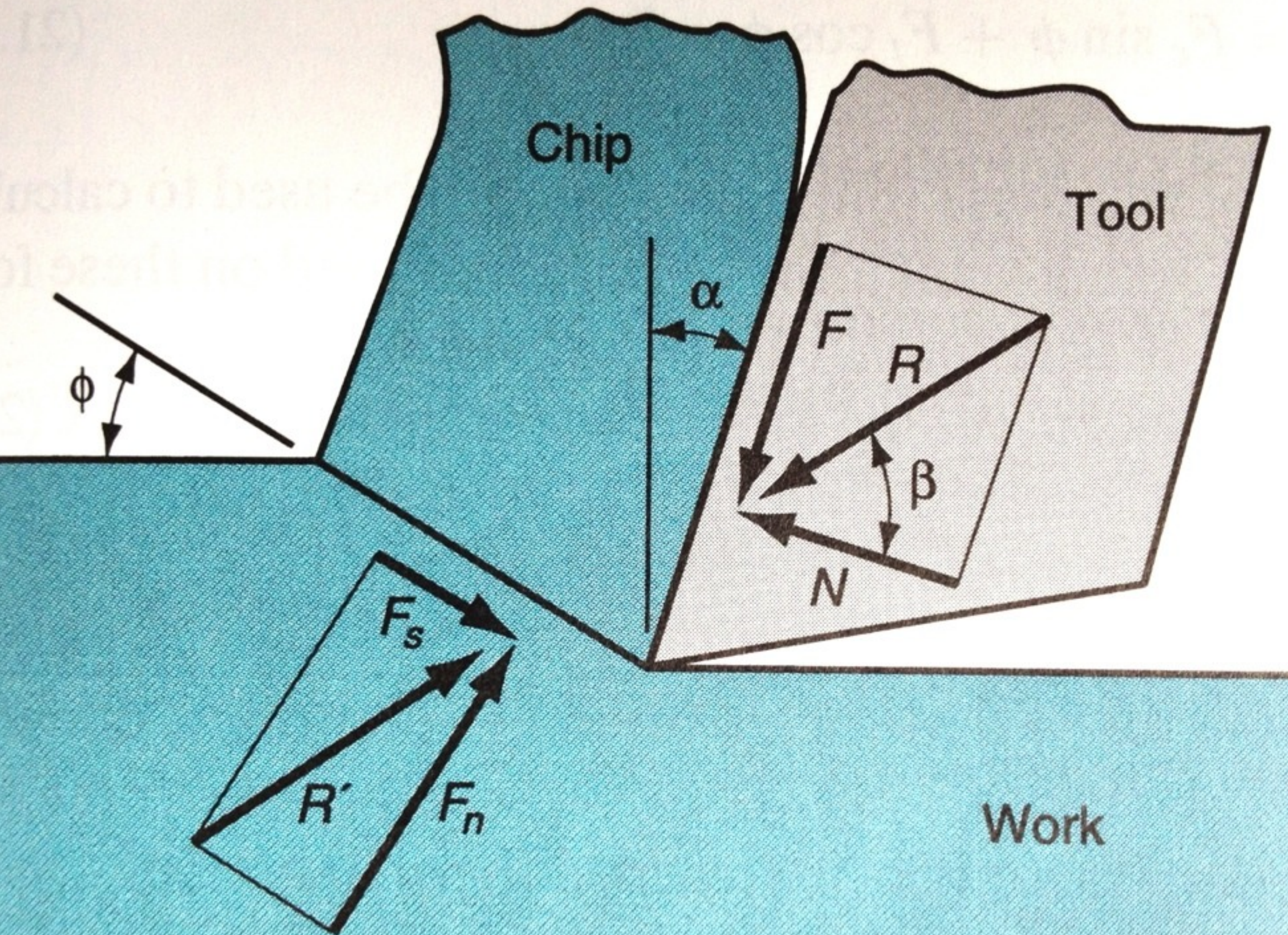


CHIP FORMATION



ORTHOGONAL CUTTING MODEL





S H E A R S T R E S S

S H E A R F O R C E



$$\tau = \frac{F_s}{A_s}$$

C U T C H I P
D E P T H W I D T H



P L A N E
A R E A



$$A_s = \frac{t_o \omega}{\sin \phi}$$

S H E A R
S T R E S S



S H E A R P L A N E A N G L E

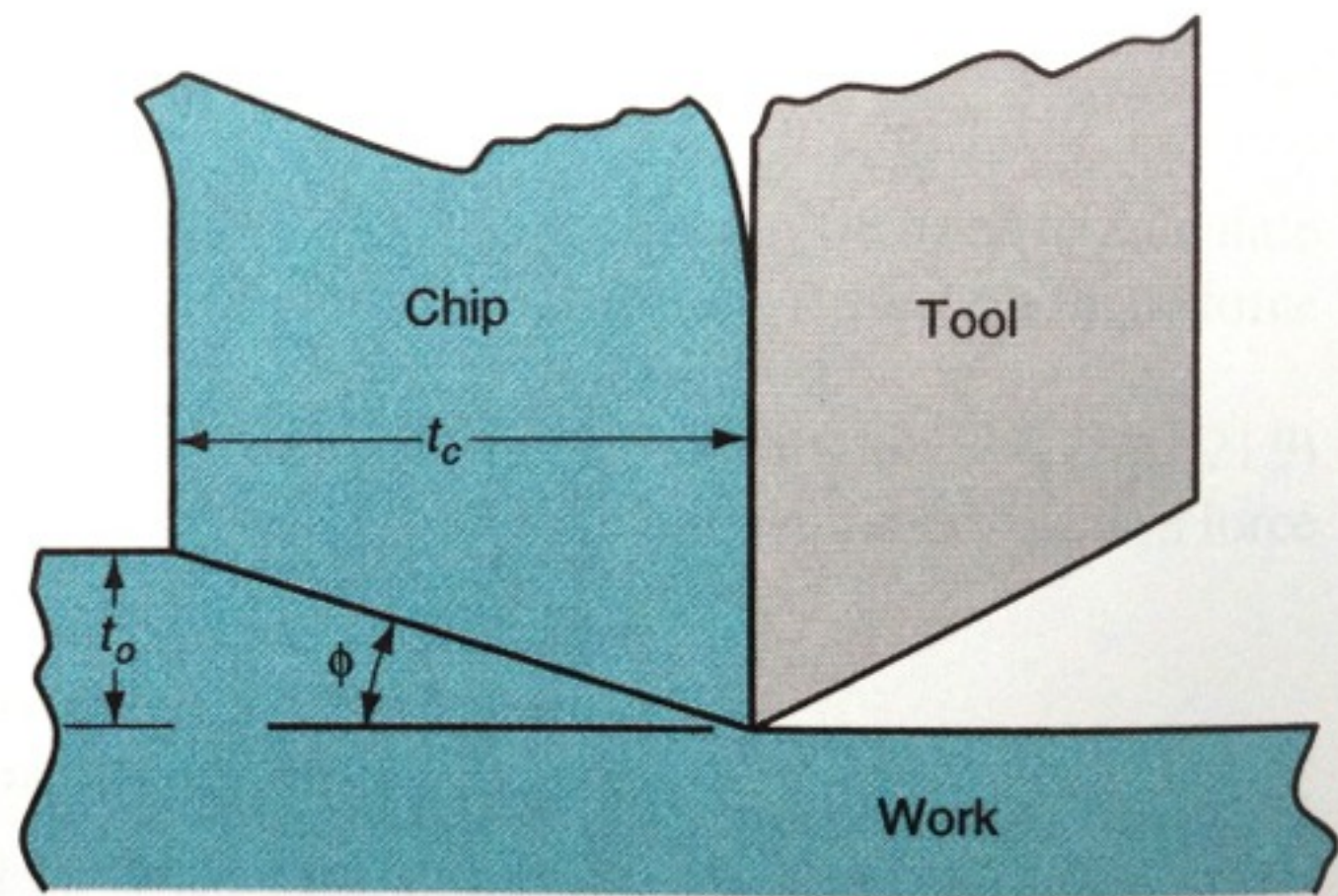
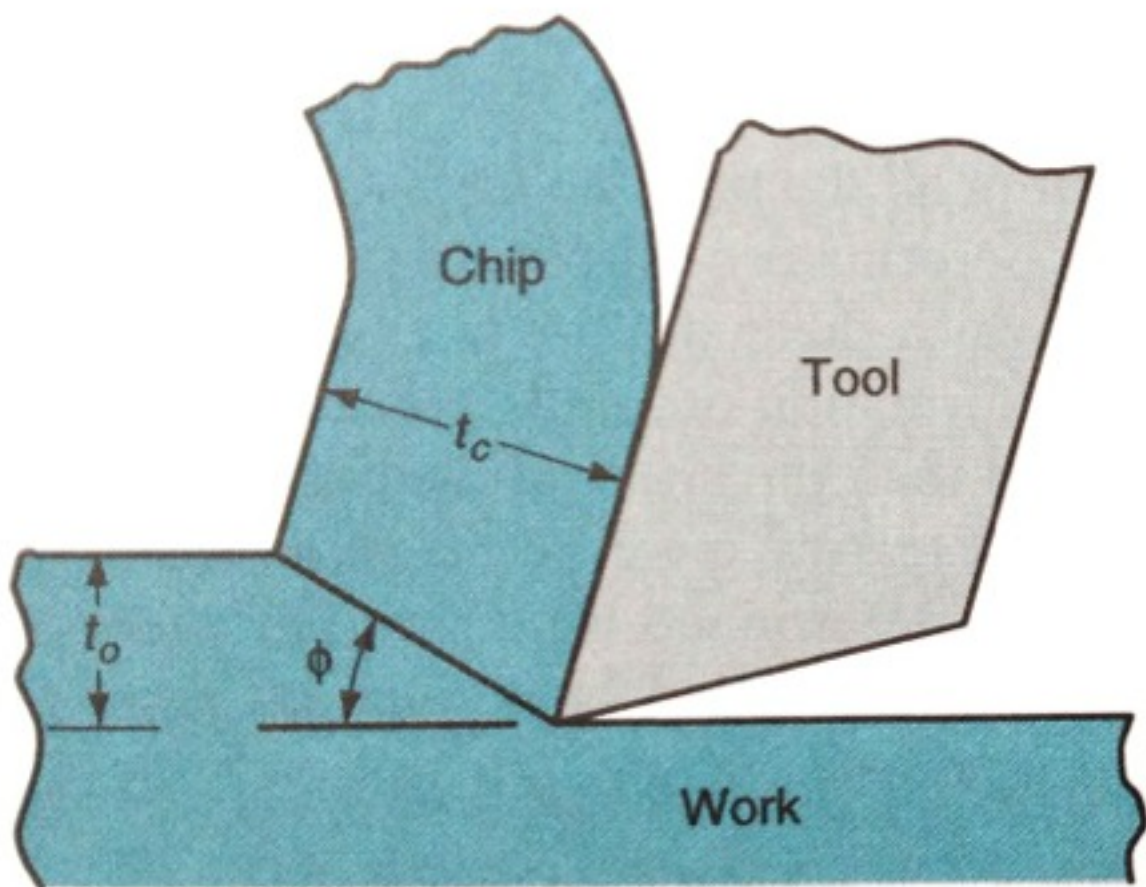
MERCHANT EQUATION

RAKE
ANGLE

CHIP-FRICTION
ANGLE

$$\phi = 45 + \frac{\alpha}{2} - \frac{\beta}{2}$$

SHEAR PLANE
ANGLE



CHIP SHEAR

SHEAR STRESS

$$\tau = \frac{F_s \sin(45 + 0.5\alpha - 0.5\beta)}{t_o \omega}$$

RESULTANT FORCE

$$R = \frac{F_s}{\cos(\phi + \beta - \alpha)}$$