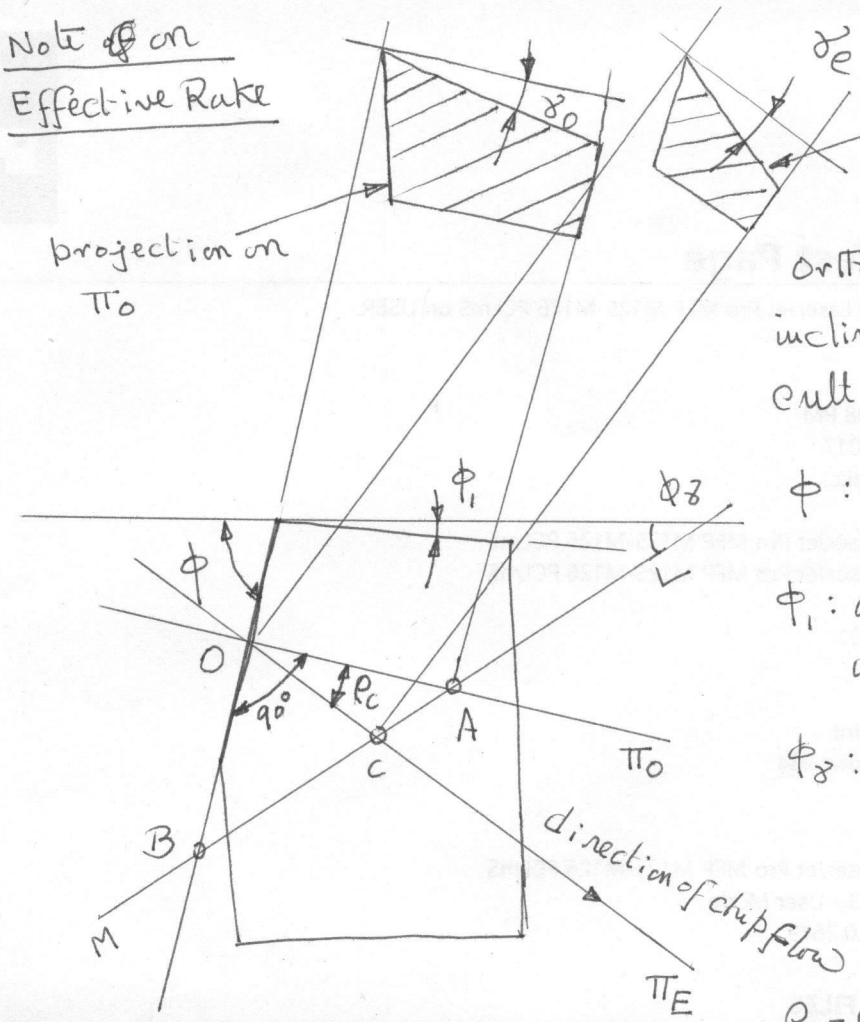
Date 13-03-2017

Note on Effective Rake



orthogonal rake = γ_0

inclination angle of principal cutting edge = λ

ϕ : principal cutting edge angle

ϕ_1 : auxiliary cutting edge angle

ϕ_γ : orientation angle of master line for rake

γ_e = effective rake.

ρ_c = chip deviation from orthogonal direction.

π_0 : orthogonal plane.

π_E : effective plane perpendicular to π_R and contains the direction of chip flow

ML is the master line

$\therefore OA = \cot\gamma_0,\ OB = \cot\lambda,\ OC = \cot\gamma_e,\ \angle AOC = \rho_c,\ \angle AOB = 90°$

$\Delta AOB = \frac{1}{2} OA \cdot OB = \frac{1}{2} \cot\gamma_0 \cot\lambda$

$\Delta AOC = \frac{1}{2} OA \cdot OC \cdot \sin\rho_c = \frac{1}{2} \cot\gamma_0 \cot\gamma_e \sin\rho_c$

also $\Delta COB = \frac{1}{2} OC \cdot OB \sin(\pi/2 - \rho_c) = \frac{1}{2} \cot\gamma_e \cot\lambda \cos\rho_c$.

$\Delta AOB = \Delta AOB + \Delta AOC$

$\therefore \frac{1}{2}\cot\gamma_0 \cot\lambda = \frac{1}{2}\cot\gamma_0 \cot\gamma_e \sin\rho_c + \frac{1}{2}\cot\gamma_e \cot\lambda \cos\rho_c$.

or, $\tan\gamma_e = \tan\lambda \sin\rho_c + \tan\gamma_0 \cos\rho_c$

Effective rake: Rake in the direction of chip flow measured on the effective plane.
Effective plane: It is perpendicular to reference plane and contains the direction of chip flow.

Please note the following correction in the note on effective rake

The 3rd line from the bottom should be read as

triangle AOB= triangle AOC + triangle COB