Assignment 120317 Pag1

Prob 1. Draw velocity diagram to show V_c, V_f, V_s, β and γ_0 and show that $\varepsilon = V_s / V_c \sin\beta$

Prob 2. Cutting mode: Orthogonal

Given $V_c = 240$ m/min, $V_f = 180$ m/min and $V_s = 300$ m/min

Find Cutting angle and cutting strain. Ans. $90°$, 2.08

Prob 3. Cutting mode: Orthogonal

Given $V_c = 60$ m/min, $V_f = 25$ m/min, chip diversion angle on orthogonal plane $= 90°$

Draw velocity diagram and determine γ_0 and ε_s. Ans. $0°$, 2.816

Prob 4. Cutting mode: Orthogonal Cutting.

Given $V_c = 100$ m/min and $S = 2$

Find ε_s for chip diversion angles i) $90°$, ii) $80°$, iii) $100°$

Prob 5. Cutting mode: Orthogonal, Thickness of Shear Zone $= 100 \mu m$

Given $\dot{\varepsilon}_s = 5 \times 10^3 / S$, $V_c = 24$ m/min, $S = \frac{4}{3}$

Determine ε_s and γ_0 Ans 2.08, $0°$

Prob 6. Cutting mode: Orthogonal

Given $V_c = V_s$, $S = 2$

Determine γ_0 and β Ans. $+14.5°$; $28.94°$

Prob 7. Cutting mode: Orthogonal

Given $V_c = 100$ m/min, $V_s = 80$ m/min, $\beta = 25°$

Determine ε_s Ans. 1.892

Prob 8. Cutting mode: Orthogonal

Given $V_s = 80$ m/min, $V_f = 50$ m/min, $(\beta - \gamma_0) = 35°$

Determine ε_s Ans. $\boxed{1.953}$

Prob 9.   Cutting mode : orthogonal

given $V_c : 150\,m/min$, $V_f = 50\,m/min$, cutting angle $= 110°$,

Thickness of shear zone $= 100\,\mu m$

Determine V_S, β, shear displacement.

Prob 10. Given $\gamma_0 = 0°$, $\alpha_0 = 10°$, radius of edge rounding $(\rho) = 50\,\mu m$

$a_1 = 100\,\mu m$

Draw orthogonal projection showing γ_0, α_0, ρ and a_1

and determine γ_0 average.

Prob 11. Given $\gamma_0 = -10°$, $\alpha_0 = 10°$, $\rho = 50\,\mu m$, $a_1 = 100\,\mu m$

Draw orthogonal projection showing γ_0, α_0, ρ and a_1 and

determine γ_0 average.

Prob 12. Given $\gamma_0 = +10°$, $\alpha_0 = 10°$, $\rho = 50\,\mu m$, $a_1 = 100\,\mu m$.

Draw orthogonal projection showing γ_0, α_0, ρ and a_1 and

determine γ_0 average.

Prob 13. Given $\gamma_0 = -10°$, $\alpha_0 = 10°$, $\rho = 50\,\mu m$, $a_1 = 50\,\mu m$

Draw orthogonal projection showing γ_0, α_0, ρ and a_1 and

determine γ_0 average.

Prob 14. Given $\phi = 75°$, $\phi_1 = 15°$ and $r = 1.2\,mm$

depth of cut $(t) = 1.2\,mm$

Draw top view of the tool to show ϕ, ϕ_1, r and t and determine ϕ_{av}

Prob 15. Given $\phi = 60°$, $\phi_1 = 30°$, $r = 1\,mm$ and $t = 0.5\,mm$.

Determine ϕ_{av}

Prob 16. Given $\phi = 110°$, $\phi_1 = 15°$, $r = 1.2\,mm$ and $t = 2\,mm$

Draw top view of the tool on π_R to show ϕ, ϕ_1, r and t and

determine ϕ_{av}