

Assignments

① Rolling:

A 600 mm wide and 12 mm thick strip is hot rolled to 9 mm thickness at 1000°C by using 500 mm dia of rolls at a speed of 5 m/sec. Determine the height at neutral section. Consider $n = 0.1$, mean yield stress is 25 kgf/mm^2 .

② Drawing:

A wire of 4 mm diameter is drawn to 3 mm diameter through a die of 8° semi-die angle. Determine the drawing stress. Consider, $n = 0.06$, mean yield stress is 250 N/mm^2 and the length of land portion in conical die is 2.4 mm.

③ Tube drawing:

In a tube sinking process a steel tube of 20 mm outer diameter and 2 mm thick is reduced to 16 mm outer diameter. There is no change in thickness. The semi-die angle is 8° , $n = 0.1$, and average yield strength is 300 N/mm^2 . Determine drawing stress.

④ Forging:

A circular disc of 120 mm diameter and 64 mm height is forged at room temperature between two flat dies to 36 mm height. Determine the die-load at the end of compression using slab analysis. The yield stress is given as, $\sigma = 15(0.01 + \epsilon) \text{ kgf/mm}^2$, $n = 0.05$. ~~Determine~~

$$\text{Sigma} = 15(0.01 + \text{Epsilon})^{0.41}$$

⑤ Deep Drawing:

A cold rolled steel cup with an inside radius 30 mm and a thickness 3 mm is to be drawn from a blank of radius 40 mm. The shear yield stress and the maximum allowable stress of the material can be taken as 210 N/mm^2 , and 600 N/mm^2 , respectively. Determine drawing force. Assume $n = 0.1$, blank holding force = 52 kN.