5-3 图示销钉连接，$P = 18\text{KN}$，板厚$t_1 = 8\text{mm}$，$t_2 = 5\text{mm}$，销钉与板的材料相同，许用剪应力$[\tau] = 60\text{MPa}$，许用挤压应力$[\sigma_{jy}] = 200\text{MPa}$，销钉直径$d = 16\text{mm}$，试校核销钉强度。

$$A = \pi d^2/4 = 201.06\text{mm}^2$$

$$A_{jy1} = dt_1 = 128\text{mm}^2$$

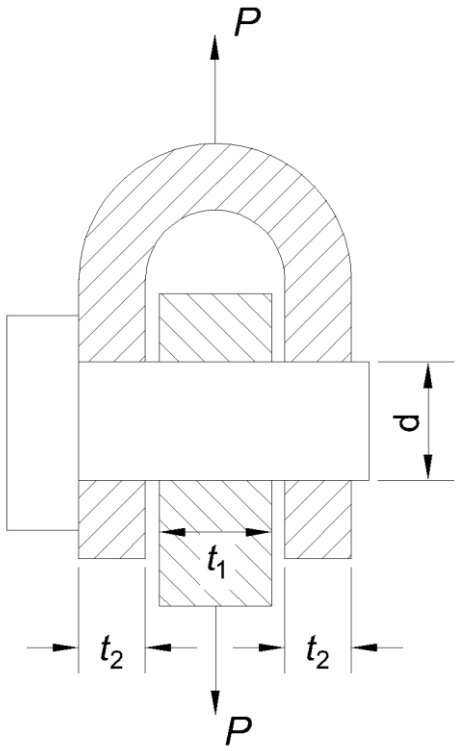
$$A_{jy2} = dt_2 = 80\text{mm}^2$$

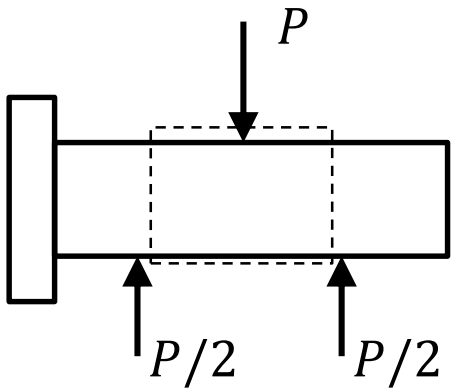
$$\tau = \frac{P}{2}/A = 44.76\text{MPa} < [\tau]$$

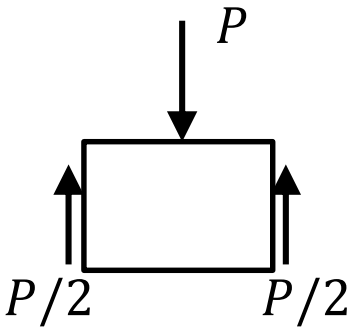
$$\sigma_{jy1} = P/A_{jy1} = 140.625\text{MPa} < [\sigma_{jy}]$$

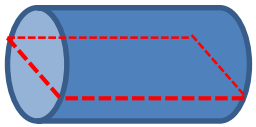
$$\sigma_{jy2} = \frac{P}{2}/A_{jy2} = 112.5\text{MPa} < [\sigma_{jy}]$$

强度合格









5-7 框式搅拌器如图所示，已知带动搅拌轴的电动机功率P=3KW，机械传动效率为85%，搅拌轴转速n=50 r/min，轴的直径d=80mm，材料为45号钢，许用剪应力[τ]=50MPa，$T_B=T_C=2T_D$。试校核搅拌轴的强度，并画出扭矩图并指出最大扭矩。

$$m_A = 9.55 \times \frac{P\eta}{n} = 9.55 \times \frac{3 \times 85\%}{50} = 0.48705\ \text{KN} \cdot \text{m} = 487.05\ \text{N} \cdot \text{m}$$

$$\because T_B = T_C = 2T_D \quad m_A = T_B + T_C + T_D$$

$$\therefore T_B = T_C = 194.82\ \text{N} \cdot \text{m} \qquad T_D = 97.41\ \text{N} \cdot \text{m}$$

最大扭矩发生在AB段

$$T = T_B + T_C + T_D = 487.05\ \text{N} \cdot \text{m}$$

$$\tau_{\max} = \frac{T}{W_\rho} = \frac{T}{\pi d^3/16} = \frac{487.05}{\pi \times 0.08^3/16} = 4.84 \times 10^6 Pa < [\tau]$$

强度合格