

授業科目 _____ 学科 _____ 年次 _____ 学籍番号 _____ 氏名 _____

1.

1) □-200×200×12

$$A = 200^2 - 176^2 = 9024$$

$$I = \frac{1}{12}(200^4 - 176^4) = 53373952$$

断面2次半径 $i = \sqrt{\frac{I}{A}} = 76.9$

細長比 $\lambda = \frac{l}{i} = \frac{10000}{76.9} = 130$ 限界細長比 $\Lambda = \sqrt{\frac{\pi^2 E}{0.604}} = 106.9$

$\lambda > \Lambda$ 故) $\nu = \frac{13}{6}$

$$f_c = \frac{0.2\pi}{(\frac{\lambda}{\Lambda})^2} F = 55 \text{ N/mm}^2$$

$$\sigma = \frac{N}{A} = \frac{700000}{9024} = 77.6 \text{ N/mm}^2 \quad f_c < \sigma \text{ 故) NG}$$

2) 細長比 $\lambda = \frac{l}{i} = \frac{5000}{76.9} = 65$

1) 故) $\lambda < \Lambda$ 故) $\nu = \frac{3}{2} + \frac{2}{3} (\frac{\lambda}{\Lambda})^2 = 1.75$

$$f_c = \left\{ 1.0 - 0.4 \left(\frac{\lambda}{\Lambda} \right)^2 \right\} \frac{F}{\nu}$$

$$= \left\{ 1.0 - 0.4 \times \left(\frac{65}{106.9} \right)^2 \right\} \times 295 \times \frac{1}{1.75} = 143.6 \text{ N/mm}^2$$

$$\sigma = \frac{N}{A} = \frac{1000000}{9024} = 110.8 \text{ N/mm}^2 \quad f_c > \sigma \quad \text{OK}$$

2.

$A = 118.4 \quad I = 6750 \text{ cm}^4 \quad L = 7.55 \text{ cm}$

細長比 $\lambda = \frac{l}{i} = \frac{400}{7.55} = 53$ 限界細長比 $\Lambda = \sqrt{\frac{\pi^2 E}{0.604}} = 101.9$

$\lambda < \Lambda$ 故) $\nu = \frac{3}{2} + \frac{2}{3} (\frac{\lambda}{\Lambda})^2 = 1.68$

$$f_c = \left\{ 1.0 - 0.4 \left(\frac{\lambda}{\Lambda} \right)^2 \right\} \frac{F}{\nu}$$

$$= \left\{ 1.0 - 0.4 \times \left(\frac{53}{101.9} \right)^2 \right\} \times 325 \times \frac{1}{1.68}$$

$$= 17.3 \text{ kN/cm}^2$$

式による短期許容圧縮耐力は

$$P = 1.5 \times f_c \times A$$

$$= 3072 \text{ kN}$$