

# 技術系問題演習講座 記述 総合職C

2019年 国家総合職 2次記述 No.18

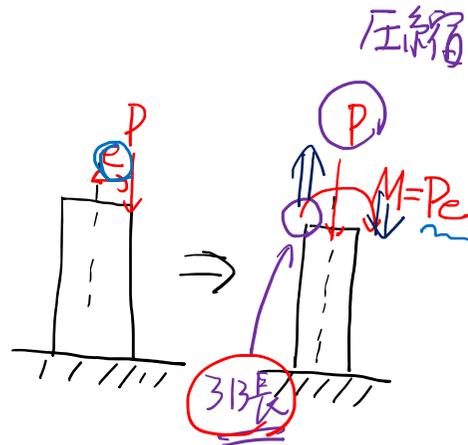
構造力学 (土木)

(1)(b)~(d)

(1)(b) 断面の核

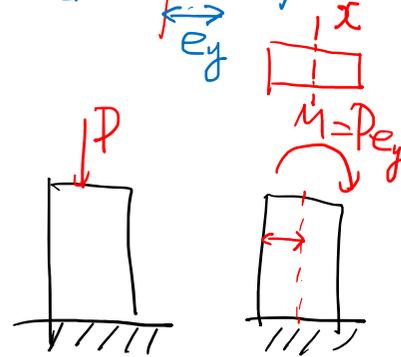
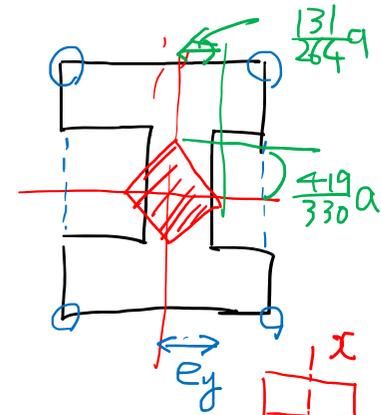
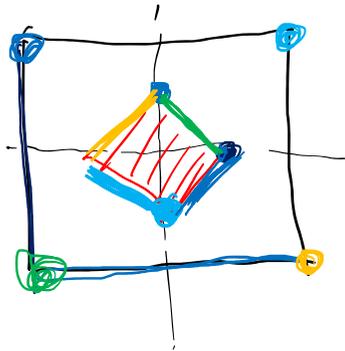
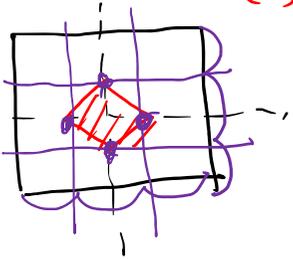
偏心荷重

、31張応力が発生  
より荷重範囲

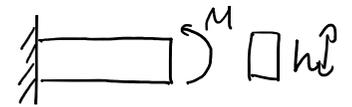


<長方形> → ニカサード

(of 新入過去問P.126)



$$A = 20a^2 - 9a^2 = 11a^2$$



$$\sigma_{II} = \frac{P}{11a^2} \quad \sigma = \frac{M}{I_x} \times 2a = \frac{Pe_y}{\frac{131}{12}a^4} \times 2a$$

$$\frac{P}{11a^2} = \frac{2Pe_y}{131a^3} \rightarrow e_y = \frac{131}{264}a$$

$$e_x = \frac{419}{330}a$$

(c) 圧縮 P

$\sigma_{31, \max} = 0$   
 $\sigma_{12, \max} = \frac{P}{11a^2} \times 2 = \frac{2P}{11a^2}$

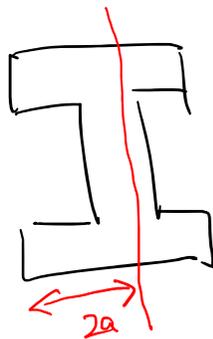
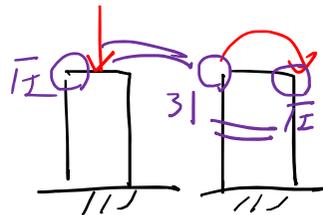
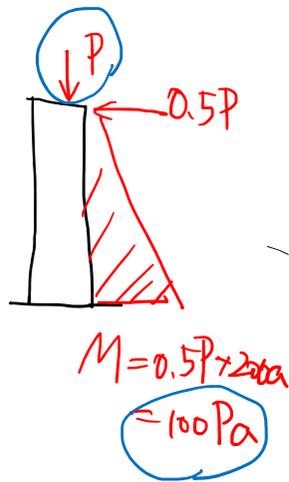
$\sigma > 100Pa$

$\sigma = \frac{M}{I} y = \frac{M}{W}$

← 断面係数

$W_x = \frac{I_x}{2a} = \frac{131}{24} a^3$

$W_y = \frac{I_y}{\frac{5}{2} a} = \frac{419}{30} a^3$



$\sigma_{31, \max} = \sigma_{12, \max} = \frac{100Pa}{\frac{131a^3}{24}} = \frac{2400P}{131a^2}$

313 Pa

$\sigma = \frac{2400P}{131a^2} > 15 \frac{P}{a^2}$

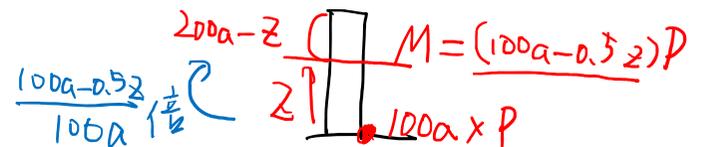
圧縮 P

$\sigma = \frac{2P}{11a^2} + \frac{2400P}{131a^2} = \frac{2662P}{1441a^2} < 150 \frac{P}{a^2}$

(d)  $\sigma$  は  $\sigma = 0$   $\sigma_{\max}$

↑  $\sigma$  は圧縮  $\sigma = 0$  安全 → 補強要

$\sigma \propto M$



$$\frac{2400P}{131a^2} \times \frac{100a - 0.5z}{100a} \geq 15 \frac{P}{a^2}$$

$$\therefore z \leq \frac{145}{4}a = 36.25a //$$