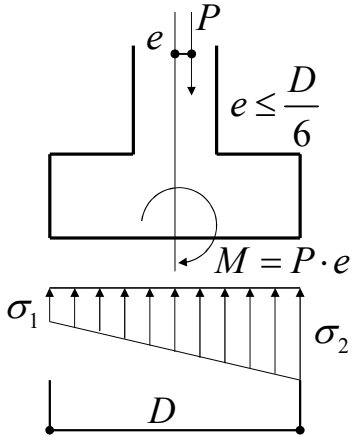
基礎スラブの接地圧

○$e \le \frac{D}{6}$の場合

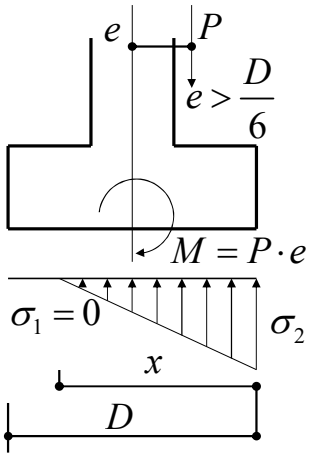
$$\sigma = \frac{P}{A} \pm \frac{M}{Z}$$
$$= \frac{P}{BD} \pm \frac{P \cdot e}{BD^2/6}$$
$$= \frac{P}{BD}\left(1 \pm 6\frac{e}{D}\right)$$



$\sigma_1 = 0$となるのは

$$1 - 6\frac{e}{D} = 0, \qquad e = \frac{D}{6}$$

○$e > \frac{D}{6}$の場合



鉛直方向の釣り合い式　$P = \frac{\sigma_2 x}{2} \cdot B$

モーメントの釣り合い式　$P\left(\frac{D}{2} - e\right) - \frac{\sigma_2 x}{2} \cdot \frac{x}{3} \cdot B = 0$

よって $\left(\frac{\sigma_2 x}{2} \cdot B\right)\left(\frac{D}{2} - e\right) - \frac{\sigma_2 x}{2} \cdot \frac{x}{3} \cdot B = 0$

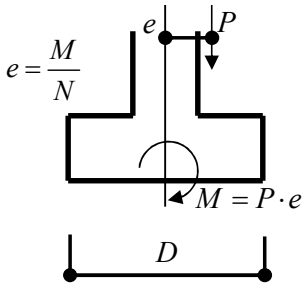
$\sigma_2 xB$で割って　$\frac{1}{2}\left(\frac{D}{2} - e\right) - \frac{x}{6} = 0, \qquad x = 3\left(\frac{D}{2} - e\right)$

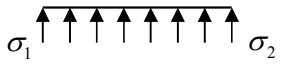
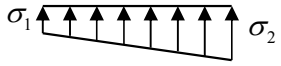
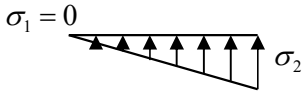
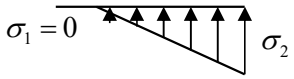
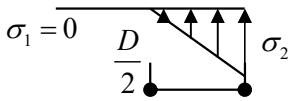
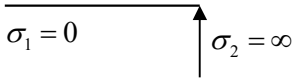
$$\therefore \sigma_2 = \frac{2P}{xB} = \frac{2}{3}\frac{P}{B\left(\frac{D}{2} - e\right)} = \frac{P}{BD}\frac{2}{3\left(\frac{1}{2} - \frac{e}{D}\right)}$$

○転倒する条件

$\sigma_2 \to \infty$になるとき

$$\frac{1}{2} - \frac{e}{D} = 0, \quad \therefore e \ge \frac{D}{2}$$



$e = 0$		$\sigma_1 = \sigma_2 = \frac{P}{BD}$
$\frac{e}{D} < \frac{1}{6}$		$\sigma_1 = \frac{P}{BD}\left(1-6\frac{e}{D}\right),\ \sigma_2 = \frac{P}{BD}\left(1+6\frac{e}{D}\right)$
$\frac{e}{D} = \frac{1}{6}$		$\sigma_1 = 0,\ \sigma_2 = \frac{2P}{BD}$
$\frac{e}{D} > \frac{1}{6}$		$\sigma_1 = 0,\ \sigma_2 = \frac{P}{BD}\frac{2}{3\left(\frac{1}{2}-\frac{e}{D}\right)}$
$\frac{e}{D} = \frac{1}{3}$		$\sigma_1 = 0,\ \sigma_2 = \frac{4P}{BD}$
$\frac{e}{D} = \frac{1}{2}$		$\sigma_1 = 0,\ \sigma_2 = \infty$