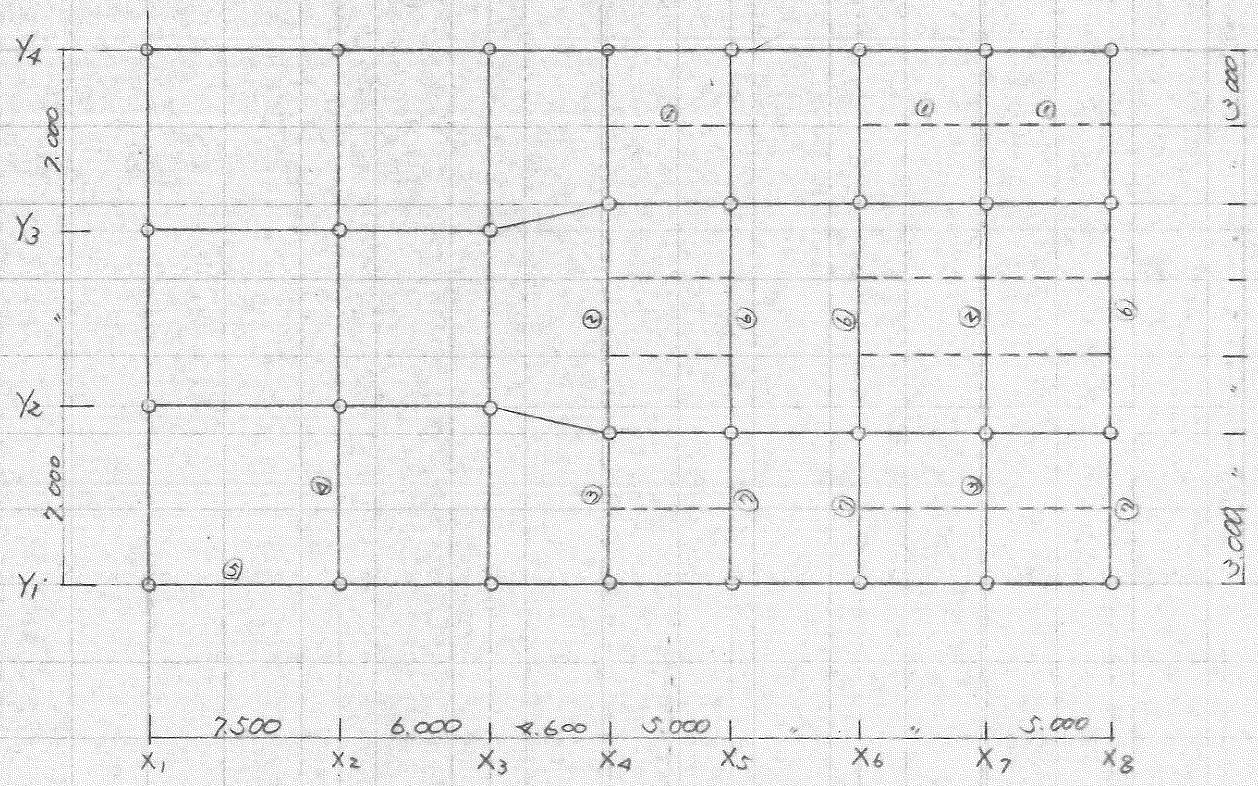
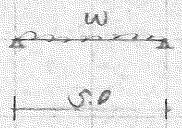
§4. 地中梁設計



——— : 30 × 120

- - - - : 30 × 50

① 30 × 50



w : $0.26\times3.3 + 0.44\times1.2 + \underbrace{2.4\times0.3\times0.5}_{0.36} = 1.75$

$M_0 = 1.75\times5.0^2/8 = 5.47$

$Q = 1.75\times5.0/2 = 4.38$

$b\times D = 30\times50$ $d = 40$ $b\cdot d = 1.2$ $b\cdot d^2 = 0.48$

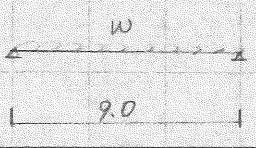
$C = 5.47/0.48 = 11.4$ $P_t = 0.64$ $\alpha_t = 2.7$ 3-D22 (11.61)

$Q/b_d = \dfrac{4380}{30\times7/8\times40} = 4.2 < 7.0$

全断面 3-D22 / 3-

あき D10-200@

② P



$P = (0.26\times3.3 + 0.44\times1.2 + 0.36)\times5.0 = 8.73$

$w = 0.26\times3.3 + 0.44\times1.2 + 0.87 = 2.26$

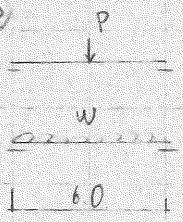
[redacted]

$$C = \frac{2}{9} \times 8.73 \times 9.0 + 2.26 \times 9.0^2/12 = 32.72$$

$$M = 8.73 \times 9.0/3 + 2.26 \times 9.0^2/8 = 49.08$$

$$Q = 8.73 + 2.26 \times 9.0/2 = 18.90$$

③

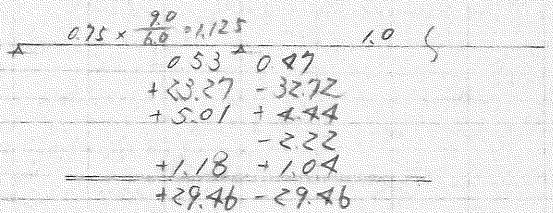


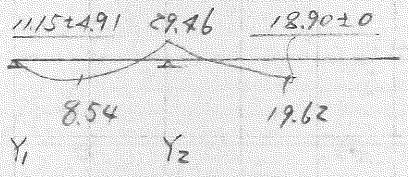
$P = 8.73$ $w = 2.26$

$$C = 8.73 \times 6.0/8 + 2.26 \times 6.0^2/12 = 13.33$$

$$M = 8.73 \times 6.0/4 + 2.26 \times 6.0^2/8 = 23.27$$

$$Q = 8.73 \times 1/2 + 2.26 \times 6.0/2 = 11.15$$





Y_1 端 . 中央

$b \times D = 30 \times 120$ $d = 110$ $b \cdot d = 3.3$ $b \cdot d^2 = 3.63$

$M = 8.54$ $C = 24$ $at = 2.5$ 3-D22

Y_2 端

$M = 29.46$ $C = 8.2$ $P_t = 0.46$ $at = 15.18$ 5-D22 (19.35)

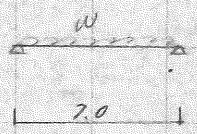
$Q = 18.9$ $Q/b_j = 6.6 < 7.0$ D10～200@

$Y_2 \sim Y_3$ 中央

$M = 19.62$ $C = 5.4$ $P_t = 0.25$ $at = 8.25$ 3-D22

上部構造からの影響は応力が小さいので無視する.

⑧

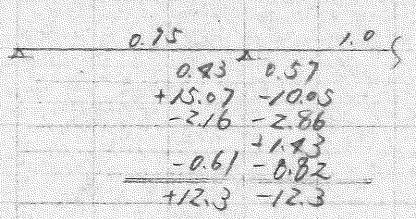


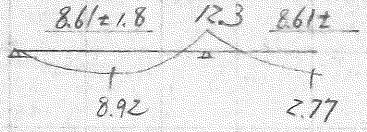
$W = 0.04 \times 3.3 + 0.44 \times 3.3 + 0.87 = 2.46$

$C = 2.46 \times 7.0^2/12 = 10.05$

$M = 2.46 \times 7.0^2/8 = 15.07$

$Q = 2.46 \times 7.0/2 = 8.61$



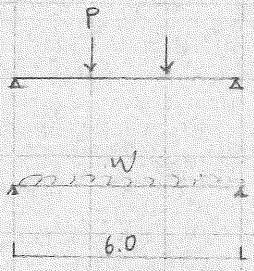


$b \times D = 30 \times 120$

$M = 12.3$ $C = 3.4$ $P_t = 0.2$ $a_t = 6.6$ 3-D22

$Q = 10.41$ D10-200@.

車荷重の検討



$P = 10.0^t \times 0.4 = 4.0^t$ (短期)

$w = 0.87^t$ (長期).

$M_0 = \frac{2}{9} \times 4.0 \times 6.0 + 0.87 \times 6.0^2/12 = 5.34 + 2.61 = 7.9$

$Q = 4.0 \times 6.0/3 + 0.87 \times 6.0^2/8 = 8.0 + 3.92 = 11.92$

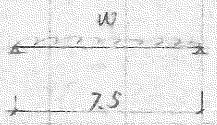
$b \times D = 30 \times 120$

$C = 7.95/3.63 = 22$ $a_t = 2.8$ 3-D22

$Q/b_j = 4.2 < 10.5$ D10-200@

No 93

⑤



$w = 0.04 \times 5.4 + 0.44 \times 1.2 + 0.87 = 1.62$

$M = 1.62 \times 7.5^2/8 = 11.4$

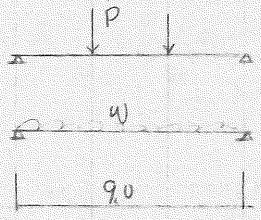
$Q = 1.62 \times 7.5/2 = 6.08$

$b \times D = 30 \times 120$

$C = 3.2$ $\quad at = 6.0$ $\quad 3-D22$

$Q/b_j = 2.1 < 7.0$ $\quad D10 \sim 200$ @

⑥



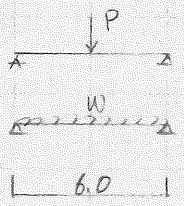
$P = 4.38$ $\quad w = 0.87$

$C = \frac{7}{9} \times 4.38 \times 9.0 + 0.87 \times 9.0^2/12 = 14.64$

$M_0 = 4.38 \times 9.0/3 + 0.87 \times 9.0^2/8 = 21.95$

$Q = 2.38 + 0.87 \times 9.0/2 = 8.30$

⑦

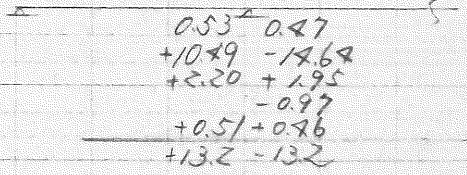


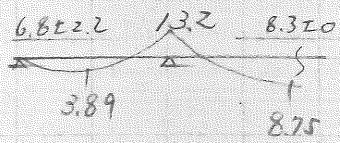
$P = 4.38$ $\quad w = 0.87$

$C = 4.38 \times 6.0/8 + 0.87 \times 6.0^2/12 = 5.9$

$M = 4.38 \times 6.0/4 + 0.87 \times 6.0^2/8 = 10.49$

$Q = 2.38 \times 1/2 + 0.87 \times 6.0/2 = 6.8$





$b \times D = 30 \times 120$

$C = 13.2/3.63 = 3.7$ $\quad at = 6.9$ $\quad 3-D22$

$Q/b_j = 2.9 < 7.0$ $\quad D10 - 200$ @