ALTERNATIF PONDASI UNTUK MESIN DIGITAL PRINTING
PONDASI STROUS

TINJAU PADA BEBAN 4,1 ton

I. DATA - DATA

- ♣ Mutu Beton (fc') : 18.68 Mpa
- ♣ Mutu Baja (fy) : 390 Mpa

II. TINJAU PADA BEBAN 4,1 ton

Penampang Tiang Bor Pile

Ø	=	30.0 cm
A (luas)	=	706.9 cm^2
keliling	=	94.2 cm
kedalaman	=	700.0 cm
Kedalaman		**7.00 m (dari MTA)**

PONDASI SETEMPAT (POER)

Berat total (Pu) = Reaksi kolom

Pu = 4100.00 kg

= 4.10 ton

Conus (Cn) :

Cn (rata-rata)	=	**28** kg/cm^2
Safety Factor 1	=	3
Cn.A / sf	=	6597 kg
		6.60 ton

Cleef

JHP (rata-rata)	=	**356** kg/cm
Safety Factor 2	=	5
JHP.kell/sf	=	6710.44 kg
		6.71 ton

♣ **Berdasarkan Kekuatan Bahan**

$P_{ijin} = \Phi \times Ag \times fc$

$P_{ijin} = 0.45 \times 70686 \times 22.5 = 715694.08$ N = **71569.41** Kg

♣ **Berdasarkan Daya dukung Tekan Ijin**

$$Q_{STROS} = \frac{(A \times CN)}{SF\ 1} + \frac{(\Phi \times JHP)}{SF2}$$

$$= \frac{19792.03}{3.0} + \frac{33552.21}{5.0}$$

= 6597.34 + 6710.44 = **13307.79 Kg** = **13.31 Ton**

III. PERHITUNGAN TIANG PONDASI POER

♣ **Menentukan Jumlah Tiang**

$$n = \frac{Pu}{QSTROS}$$

$$= \frac{4100.00}{13308} = 0.31 = \mathbf{1}\ \mathbf{Buah}$$

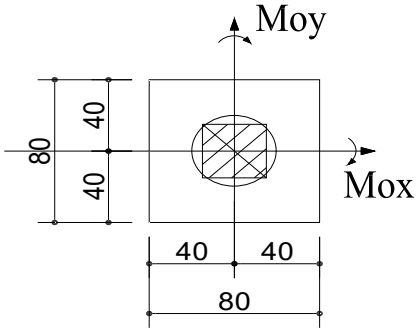
Dicoba diberi 1 bh titik bor

♣ **Beban - beban yang bekerja pada kolom dasar**

P_D = 4100.00 Kg

M_X = -369.72 Kgm M_Y = -33.70 Kgm

♣ **GAMBAR PONDASI TIANG PANCANG**



♣ **Perhitungan Momen**

Mx0 = Mx

= **369.72 kg-m**

My0 = My

= **58.93 kg-m**

Dimana :

$\Sigma Yi^2 = 1 \times 0.00^2 = 0.000\ m^2$

$\Sigma Xi^2 = 1 \times 0.00^2 = 0.000\ m^2$

Ukuran = 0.80 x 0.80 x 0.3 m
p (panjang) = 0.800 m t (tebal) = 0.300 m
l (lebar) = 0.800 m

♣ **Beban yang bekerja pada titik 0 (Titik berat susunan Tiang)**

$$P_{Tiang} = \frac{V}{n} \pm \frac{Mx_0 * Yi}{\Sigma Yi^2} \pm \frac{My_0 * Xi}{\Sigma Xi^2}$$

$$= \frac{4100.00}{1} \pm \frac{0.00}{0.000} \pm \frac{0.00}{0.000}$$

P_{MAX} = 4100.00 + 0.00 + 0.00 = **4100.000** Kg

P_{MIN} = 4100.00 - 0.00 - 0.00 = **4100.000** Kg

♣ **Daya dukung 1 tiang dalam kelompok**

$$E_F\ \eta = 1 - \text{arc tg}\frac{D}{S}\left[\frac{(m-1)n + (n-1)m}{90 * m * n}\right]$$

$$= 1 - \text{arc tg}\frac{30}{100}\left[\frac{1 - 1\ 1 + 1 - 1\ 1}{90 * 1 * 1}\right]$$

$$= 1 - \text{arc tg}\ 0.30\left[\frac{0 + 0}{90}\right]$$

= 1 - 16.70 [0.000] = **1.00**

$P_{1\ tiang\ dalam\ kelompok}$ = $E_F\ \eta$ x $Q_{PANCANG}$
= 1.00 x 13308
= **13307.79 Kg** > $P_{1\ TIANG}$ = **4100.00 Kg (OK !!!)**

PERENCANAAN PONDASI

TINJAU PADA BEBAN 4,1 ton

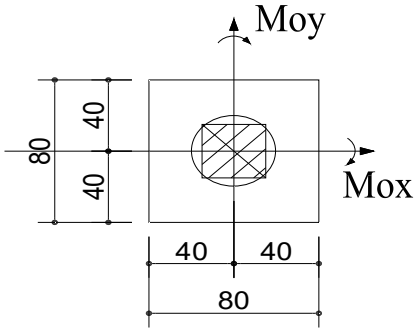
- ♣ Mutu Beton (fc') : 24.9 Mpa
- ♣ Mutu Baja (fy) : 390 Mpa

II. PRELIMINARY POER

Pembebanan

- Beban P max = 4100.0 kg +

= 4100.0 kg

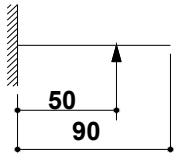


III. PENULANGAN POER

Penulangan Arah X

P_{ux} = P1
= 4100.00
= 4100.00 kg

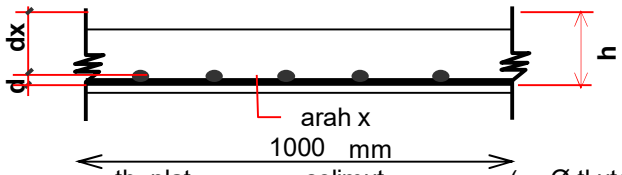
Asumsi Perletakan



Mux = Pux 0.5
= 4100.00 x 0.5
= 2050.00 kg-m

♣ **Tulangan Pondasi Poer**

- Diamater Tulangan Utama : D 13 mm
: D 13 mm



♣ dx = tb. plat - selimut - (Ø tl.utama / 2)
= 300 - 50 - (13 / 2) = **244** mm

$$m = \frac{fy}{(0.85 \times fc')} = \frac{390}{(0.85 \times 24.9)} = \mathbf{18.43}$$

$$\rho\ \textbf{balance} = \frac{0.85 \times \beta_1 \times fc'}{fy} \times \frac{600}{600 + fy}$$

$$= \frac{0.85 \times 0.9 \times 24.9}{390} \times \frac{600}{600 + 390} = \mathbf{0.0280}$$

ρ **maks.** = 0.75 x ρ balance
= 0.75 x 0.02796 = **0.0210**

$$\rho_{min} = \frac{1.4}{fy} = \frac{1.4}{390} = \mathbf{0.0036}$$

$$\clubsuit\ Rn = \frac{Mux}{Ø \times b \times dx^2} = \frac{20500000}{0.8 \times 1000 \times 244^2} = \mathbf{0.4322}$$

$$\clubsuit\ \rho\ perlu = \frac{1}{m} \times \left(1 - \sqrt{1 - \frac{2 \times Rn \times m}{fy}} \right)$$

$$= \frac{1}{18.43} \times \left(1 - \sqrt{1 - \frac{2 \times 0.4321813 \times 18.43}{390}} \right)$$

= 0.00112 < ρ min (= 0.00359)

♣ ρ pakai = 0.00146

♣ As = ρ perlu x b x d

= 0.00146 x 1000 x 244 **= 354 mm^2**

Diberi Tulangan Tarik = **D 13 - 150 mm (As = 885 mm^2)**

atau = 6 D 13 mm

♣ As' = 0.5 x As

= 0.5 x 354 = **177.22** mm^2

Diberi Tulangan Tekan = **D 13 - 250 mm (As = 531 mm^2)**

atau = 4 D 13 mm