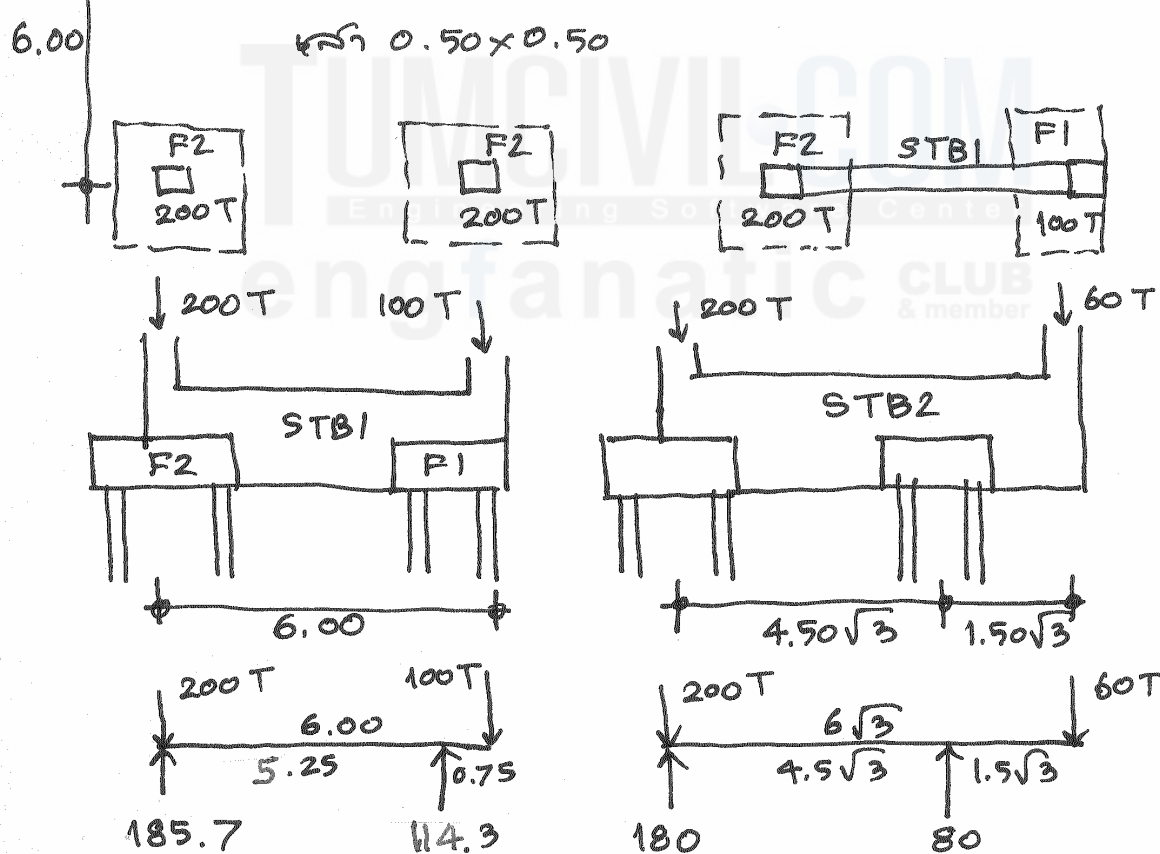
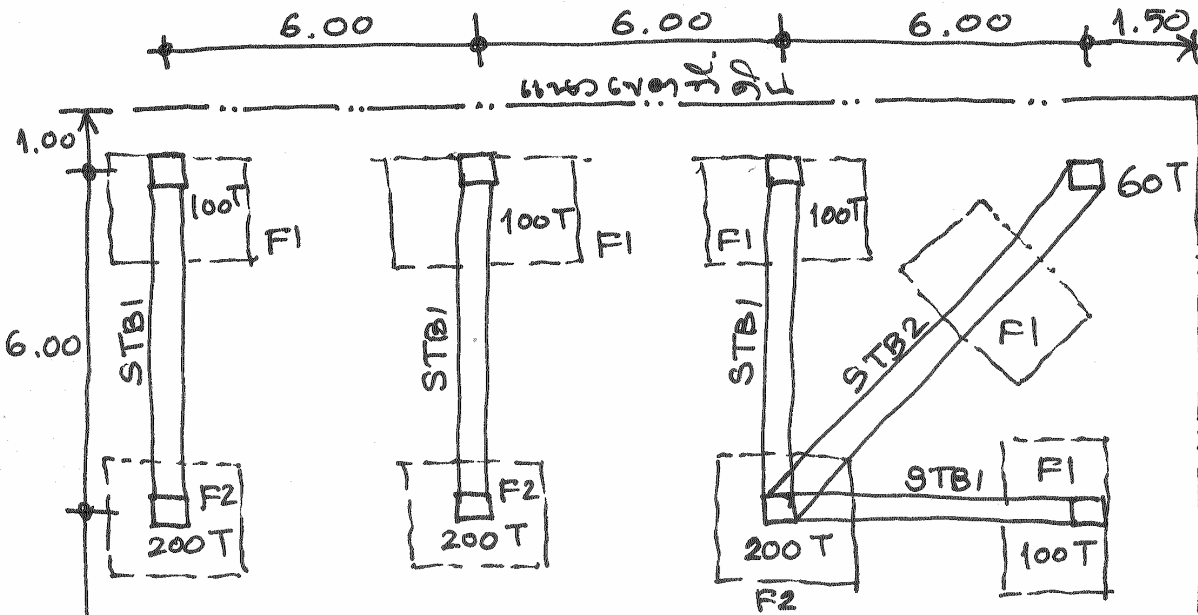


ฐานรากข้อเข่าที่ค้ำ และ มีอาคารข้างเคียง



F2 ที่ค้ำรับแรง 185.7 T แต่ที่ค้ำ STB2 จะรับแรงเพียง 80

$$200 - 14.3 - 14.3 - 20 = 151.4 \text{ T.}$$

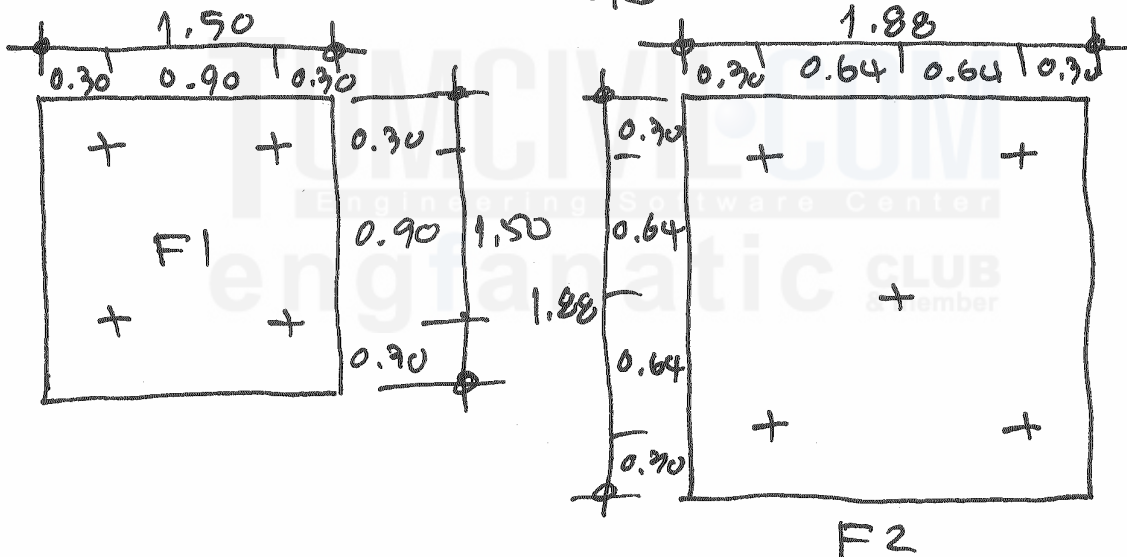
กำหนด  $f'_c = 240 \text{ ksc.}$ ,  $f_y = 3000 \text{ ksc.}$

อัตราส่วน Dead load : Live load = 60 : 40

เสาเข็ม I-0.30x0.30x21.00 m รับน้ำหนัก  
 ปลอดภัย 45 T/pile เพื่อรับน้ำหนักฐานราก, ดินถม,  
 ปลอดภัย 20%

F1 จำนวนเสาเข็ม  $\frac{114.3 \times 1.20}{45} = 3.048 \rightarrow 4 \text{ ต้น}$

F2 จำนวนเสาเข็ม  $\frac{185.7 \times 1.20}{45} = 4.952 \rightarrow 5 \text{ ต้น}$



load 200 T =  $(1.4 \times 0.6 + 1.7 \times 0.4) \times 200 = 304 \text{ T}$

load 100 T =  $(1.4 \times 0.6 + 1.7 \times 0.4) \times 100 = 152 \text{ T}$

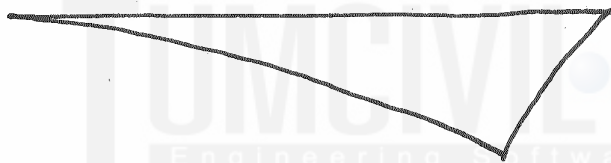
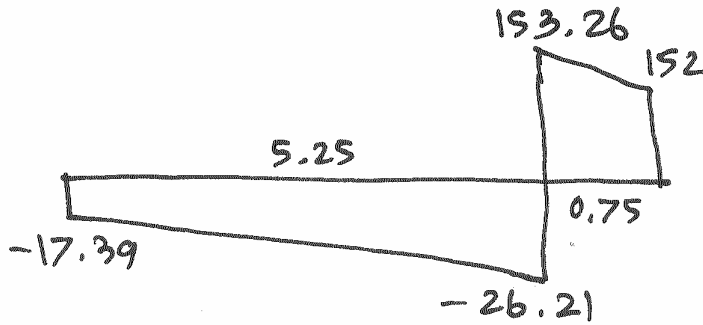
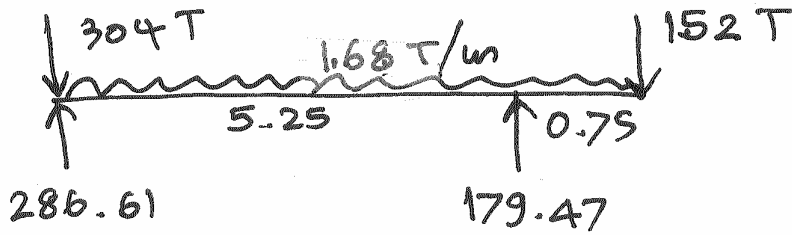
load 60 T =  $(1.4 \times 0.6 + 1.7 \times 0.4) \times 60 = 91.2 \text{ T}$

คอนกรีต STB1 ขนาดฐาน 0.50x1.00

$d' = 0.10 \text{ m}$ ,  $d = 0.90 \text{ m}$ .

$W = 1.4 \times 2.4 \times 0.50 \times 1.00 = 1.68 \text{ T/m}$

ကနဦးက နှစ်ဖက် F1 နှင့် F2 ရှိသော ကနဦးက နှစ်ဖက်  
 ကနဦးက 0.90 x 0.90 ကနဦးက



$$\frac{l_n}{d} = \frac{5.25 - \frac{1.50}{2} - \frac{1.88}{2}}{0.90} = 3.96 < 5 \text{ ကနဦးက}$$

ကနဦးက  $M_u = \phi R_u b d^2$

$$114.47 \times 1000 \times 100 = 0.85 R_u \times 50 \times 90^2$$

$$R_u = 33.2519971$$

$$\rho = \frac{0.85 f_c'}{f_y} \left[ 1 - \sqrt{1 - \frac{2 R_u}{0.85 f_c'}} \right]$$

$$\rho = \frac{0.85 \times 240}{3000} \left[ 1 - \sqrt{1 - \frac{2 \times 33.2519971}{0.85 \times 240}} \right]$$

$$\rho = 0.012173696$$

$$\rho_{min} = \frac{14}{f_y} = \frac{14}{3000} = 0.00467$$

$$\rho_b = \beta_1 \frac{0.85 f'_c}{f_y} \cdot \frac{6120}{6120 + f_y}$$

$$\rho_b = 0.85 \times \frac{0.85 \times 240}{3000} \times \frac{6120}{6120 + 3000}$$

$$\rho_b = 0.038786842$$

$$\rho_{max} = 0.75 \rho_b = 0.029090131 > \rho \quad \text{O.K}$$

$$A_s = \rho b d = 0.012173696 \times 50 \times 90 = 54.782 \text{ cm}^2$$

$$\text{DB 25 mm จำนวน} = \frac{54.782}{4.909} = 12 \text{ ไม้}$$

บทเรียนที่ 1153 ใหม่

$$x = 0.5 \times 0.75 = 0.375 \text{ m} < d = 0.90 \text{ m}, \text{ O.K}$$

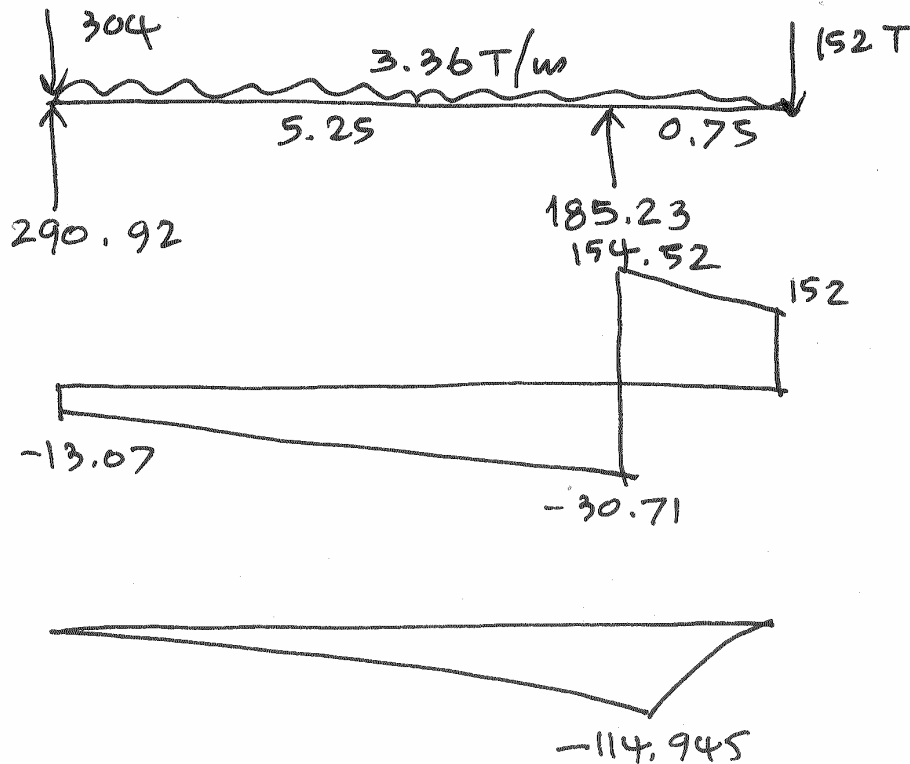
$$V_u = 153.26 - 1.68 \times 0.375 = 152.63 \text{ T}$$

$$M_u = \frac{152.63 + 152}{2} \times 0.375 = 57.18 \text{ T.m}$$

$$\begin{aligned} \phi V_n &= 0.18 \phi \left( 10 + \frac{L_u}{d} \right) \sqrt{f'_c} b_w d \\ &= 0.18 \times 0.85 \left( 10 + \frac{0.75 - 0.25}{0.90} \right) \sqrt{240} \times 50 \times 90 \\ &= 112,588 \text{ kg} = 112.6 \text{ t} < V_u = 152.63 \text{ T} \\ &\quad \text{No Good} \end{aligned}$$

รับน้ำหนักจากพื้นที่  $0.80 \times 1.25 \text{ m}$  &  $d' = 0.10 \text{ m}$   
 $d = 1.15 \text{ m}$

$$W_D = 1.4 \times 2.4 \times 0.80 \times 1.25 = 3.36 \text{ T/m}$$



$$114,945 \times 1000 \times 100 = 0.85 R_u \times 80 \times 115^2$$

$$R_u = 12.7816$$

$$\rho = \frac{0.85 \times 240}{3000} \left[ 1 - \sqrt{1 - \frac{2 \times 12.7816}{0.85 \times 240}} \right]$$

$$\rho = 0.0044 < \rho_{min} \quad \text{Use } \rho_{min}$$

$$A_s = \frac{14}{3000} \times 80 \times 115 = 42.93 \text{ cm}^2 = 9 \text{ -DB } 25 \text{ mm.}$$

Use 10-DB 25 mm.

$$x = 0.5 \times 0.75 = 0.375 \text{ m} < d = 1.15 \text{ m}$$

$$V_u = 152 + 3.36 \times 0.375 = 153.26 \text{ T}$$

$$M_u = \frac{152 + 153.26}{2} \times 0.375 = 57.24 \text{ T.m}$$

$$\phi V_n = 0.18 \times 0.85 \left( 10 + \frac{0.75 - 0.25}{1.15} \right) \sqrt{240} \times 80 \times 115$$

$$\phi V_n = 227545 \text{ kg} = 227.55 \text{ T} > V_u = 153.26 \text{ T O.K.}$$

$$\rho_w = \frac{A_s}{bd} = \frac{10 \times 4,909}{80 \times 115} = 0.005336$$

$$\frac{M_u}{V_{ud}} = \frac{57.24}{153.26 \times 1.15} = 0.3247$$

$$176 \rho_w \frac{V_{ud}}{M_u} = 176 \times \frac{0.005336}{0.3247} = 2.8923$$

$$3.5 - 2.5 \frac{M_u}{V_{ud}} = 3.5 - 2.5 \times 0.3247 = 2.6882$$

$$\phi V_c = 0.85 \times 2.6882 \times (0.50 \sqrt{240} + 2.8923) \times 80 \times 115$$

$$\phi V_c = 223,639 \text{ kg} = 223.639 \text{ T}$$

$$1.6 \phi \sqrt{f'_c} b_w d = 1.6 \times 0.85 \sqrt{240} \times 80 \times 115 = 193,835 \text{ kg} \\ = 193.835 \text{ T} < \phi V_c$$

$$1.6 \phi \sqrt{f'_c} b_w d = 193.835 \text{ T} > V_u = 153.26 \text{ T}$$

๑.๕) ควบคุมการบิด

$$\text{ควบคุมการบิด} \quad A_{vh} = 2 \times 1.131 = 2.262 \text{ cm}^2$$

$$A_{vh} \geq 0.0015 b_w s$$

$$2.262 \geq 0.0015 \times 80 s$$

$$s \leq 18.85 \text{ cm} \quad \text{ถ้า } 2\text{-DB } 12 \text{ mm @ } 0.15 \text{ m}$$

$$\text{หรือ } 2\text{-DB } 16 \text{ mm, @ } 0.30 \text{ m}$$

$$\text{ควบคุมการบิด} \quad A_{vh} = 2 \times 1.131 = 2.262 \text{ cm}^2$$

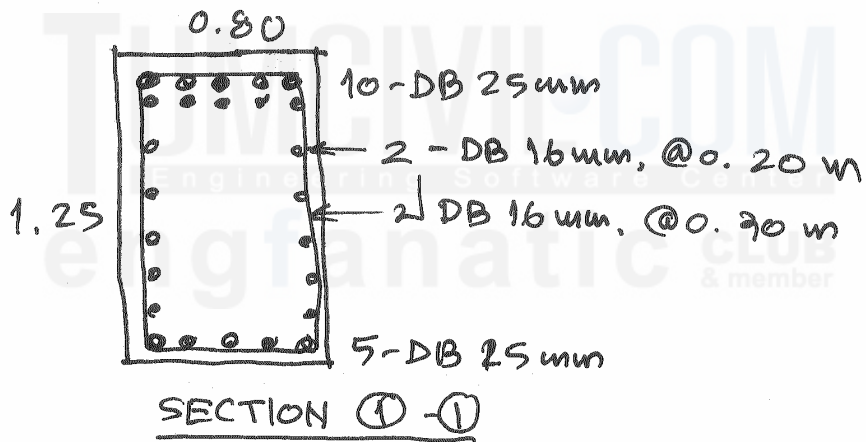
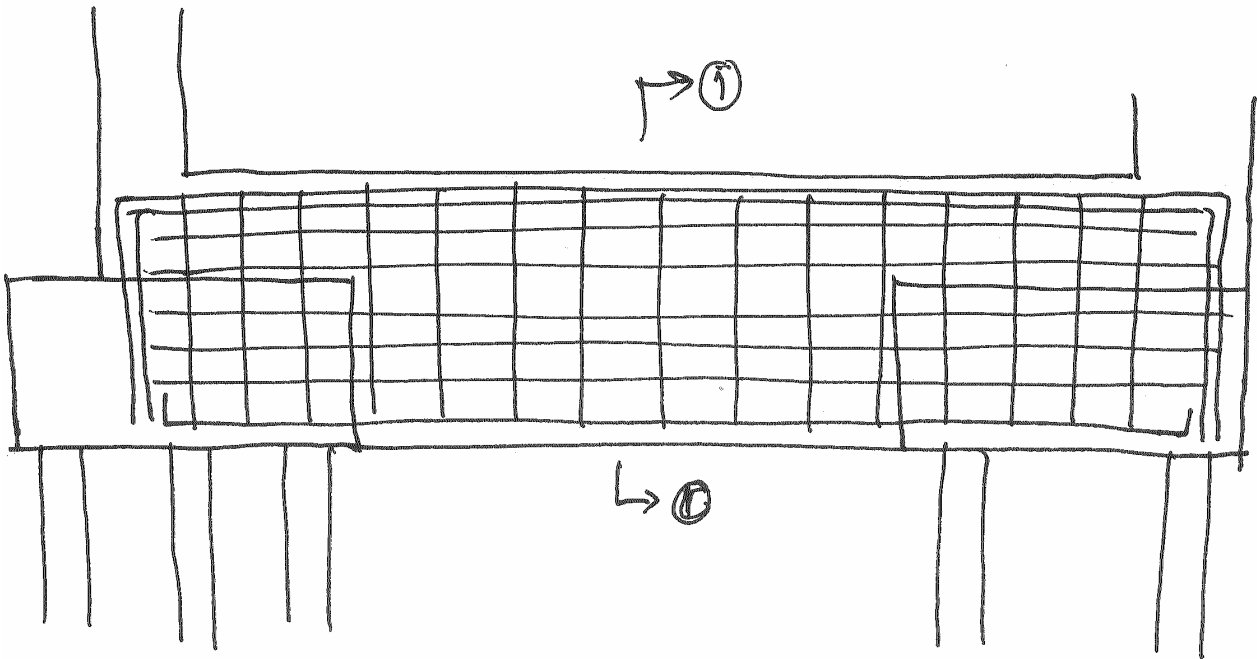
$$A_{vh} \geq 0.0025 b_w s_2$$

$$2.262 \geq 0.0025 \times 80 s_2$$

$$s_2 \leq 11.31 \text{ cm}$$

$$\text{ถ้า } 2\text{-DB } 12 \text{ mm, @ } 0.10 \text{ m}$$

$$\text{หรือ } 2\text{-DB } 16 \text{ mm, @ } 0.20 \text{ m}$$



STB1