

實用
建築
學

實用建築學

第肆編

圖案輯要

陳兆坤著

▲工程師，測繪師，練習生的參考善本▼

▲建築師，打樣師，監工員的研究良書▼

陳魁建築事務所發行

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◀**建築學提綱**▶ 內容為工程數學，分數，比例，開方，乘方，對數，代數，幾何，三角，泛尺，力學，風力，雪壓，樓板，屋頂，樑柱，牆腳，混凝土，工字鐵，水塔，高層建築，冷熱應力，彎鋼，鋼籬，角鐵，鉚釘，樁，吊桿，瓦筒，駁岸，橋樑，設計與計算，章程，圖案等，凡木石鐵類，鋼骨混凝土類，一切基本原理與公式及引用，言簡意含，一覽便知，洵為研究建築學的路徑。念伍年肆月底出版。

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◀**現代鋼骨混凝土建屋法式**▶ 自十八世紀發明鋼骨混凝土學，對於建築上一大供獻，至今世界各國均樂用之，以其難火與牢固兼經濟也。吾國現屆建設時代，建屋上為用甚廣。惜、大抵屬於演譯的著術，並無歸納於計劃的系統。學者明于此而昧于彼，對於實際應用的途徑，無法措手。編者當時亦踏此弊病。茲憑工作經驗，特將一千九百三十六年式的最近新建築圖案，編印成冊，以供同好。內容為全部鋼骨混凝土四層以上之計劃，對於設計劃圖，計算書，各類表格說明書等布置完備。學者瀏覽此書，進步更速，足資借鏡參考引用。念伍年伍月底出版。

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陳兆坤編

◀此書有著作權翻印必究▶

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實用建築學第

壹貳參肆
編
數理
設計
計算
圖
輯要

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◀ 緒 言 ▶

吾國建築學術的研究，大抵攷諸西書。操斯業者，欲求實用簡便之華文，苦無專籍，因此不顧謏陋，爲文念餘萬言，插圖柒百餘幅，附表百餘種，共分四編。第一編以數理力學爲基礎的指導，第二編以分類設計爲初步的入門，第三編以各類計算爲進一步的研究，第四編以經驗圖案爲引用的參考，編中每節分解之後，即附例題數則，以啓學者理解與實用爲目的。凡一切緊要之專門技術，搜羅無遺，且有根據，可按圖索驥，逐步追尋。凡有志建築業者，均宜人手一帙，自初步入手，依次研究，期於最短日內，學成致用。譬諸航海南針，可操左券。惟不得謂完備，因本科有書數百種類，非一書所能包括，故曰輯要。

大中華民國念叁年仲夏日

陳兆坤識

第四編 圖案 概要

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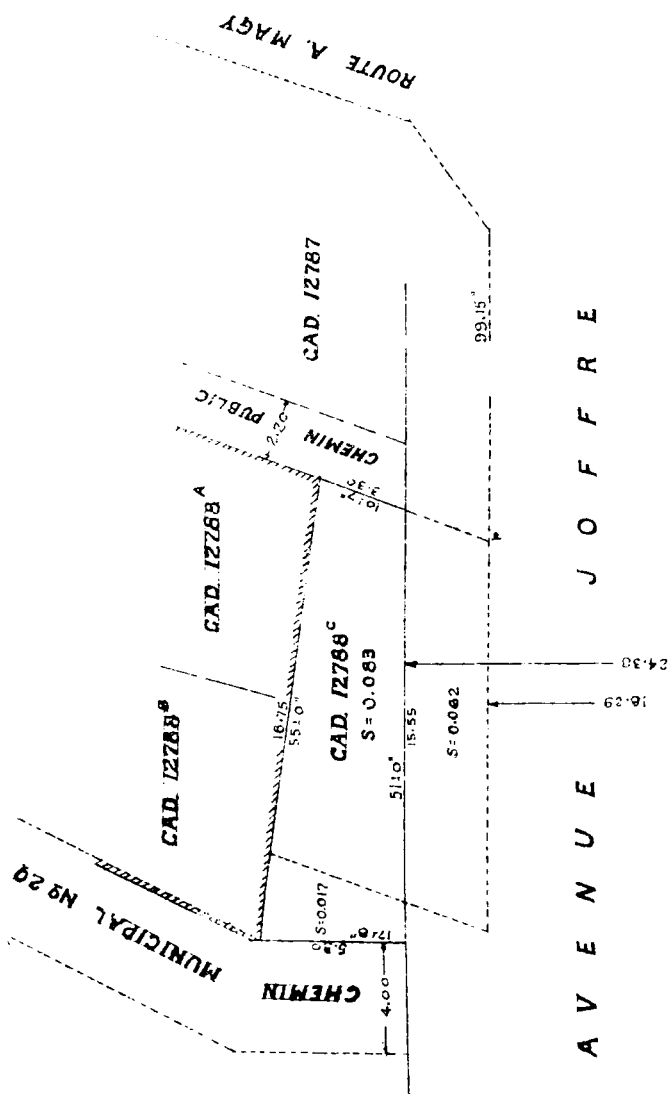
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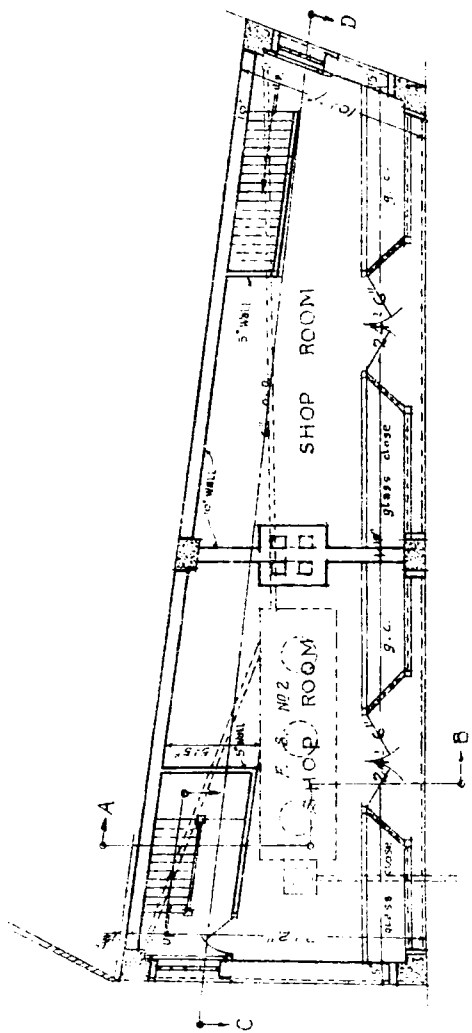
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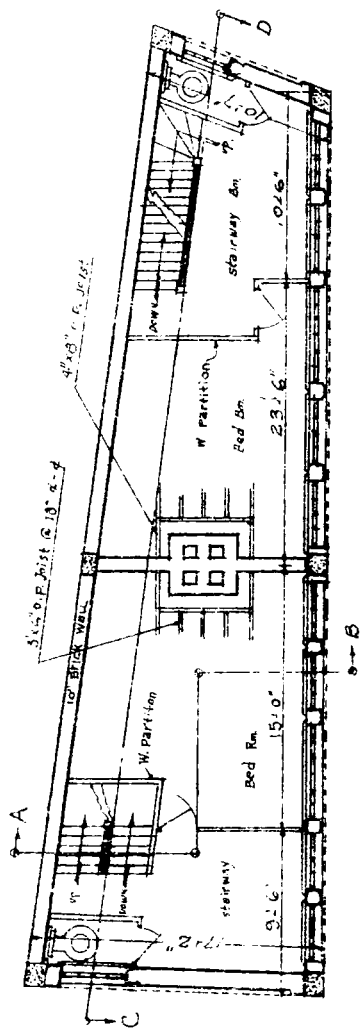


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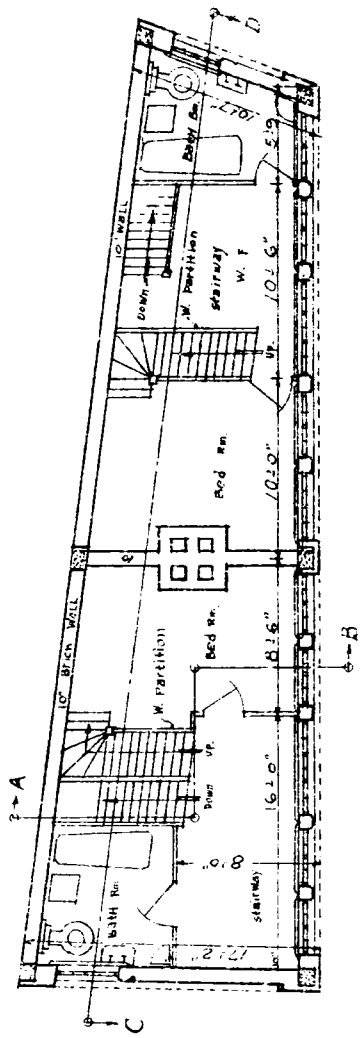


GROUND PLAN

AVENUE JOFFRE

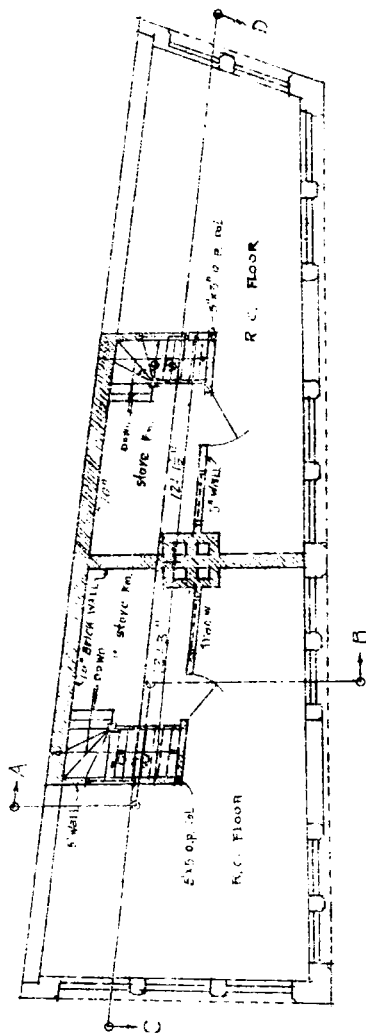


FIRST PLAN



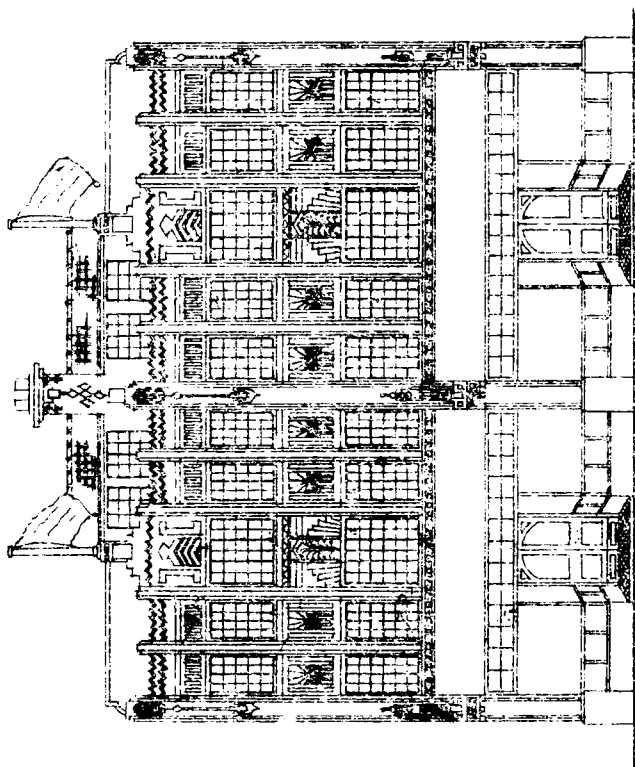
SECOND AND THIRD PLAN

scale $\frac{1}{8}'' = 1'-0''$



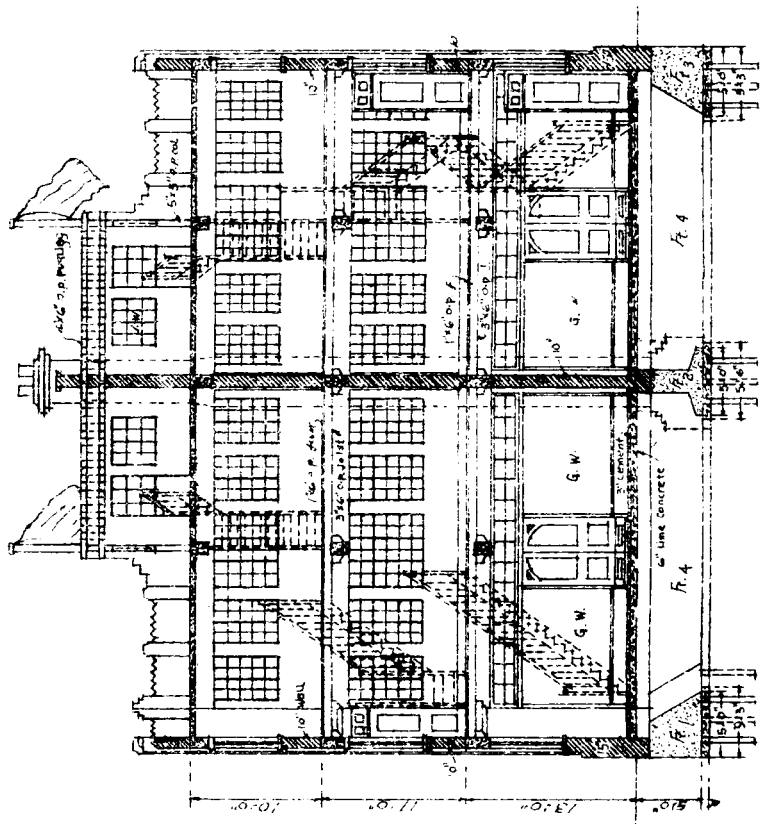
ROOF & ATTIC PLAN

scale 1/100



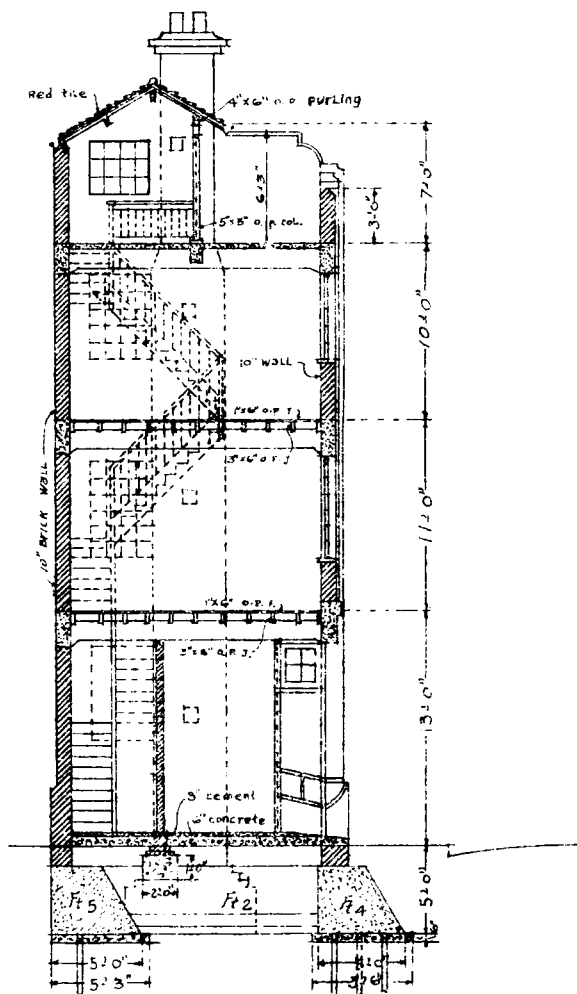
FRONT ELEVATION

SCALE 1/100



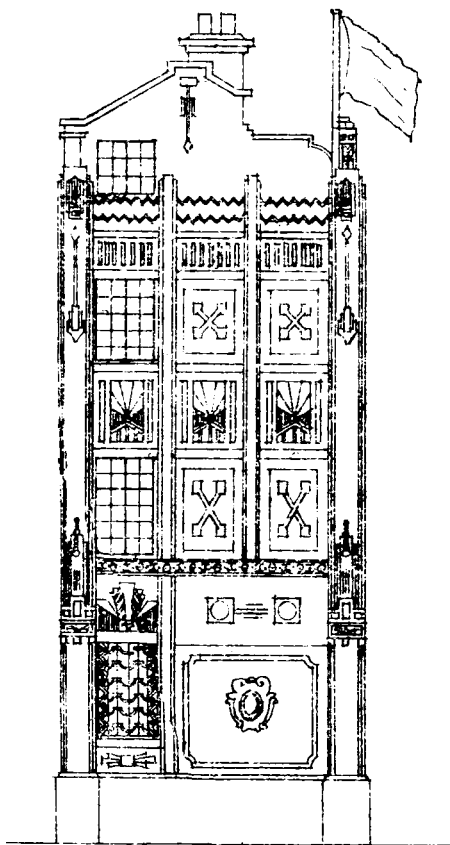
SECTION C-D

scale 3/32" = 1'-0"



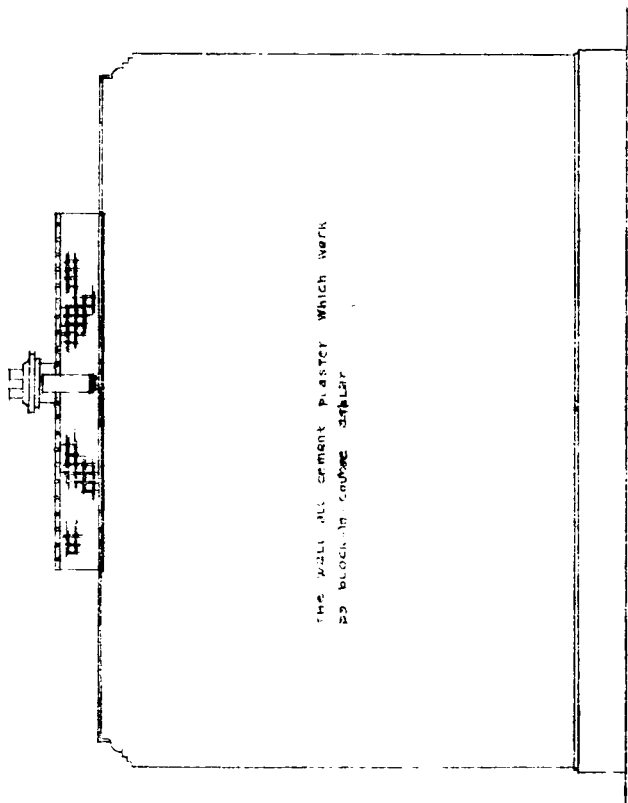
scale $\frac{1}{8}'' = 1'-0''$

SECTION A-B



SIDE ELEVATION

scale $\frac{1}{8}'' = 120'$



THE WALLS ALL CEMENT PLASTER WHICH WORK
AS BLOCK IN COURSE OUTLIER

BACK ELEVATION

Scale: $\frac{34}{32} = 1.07$

Beam $B_1 = 14 \pm 3''$ span

$$W_t = S_1 = 110 \times 7.5 = 830 \text{ ft. lb.}$$

$$\frac{10 \times 16}{144} \times 150 = \frac{170}{1000} \text{ ft. lb.}$$

$$B. M. = \frac{1000 \times 14.25^{-2} \times 12}{12} = 205000 \text{ inch lb.}$$

$$A_s = \frac{205000}{16000 \times 14.5} = 0.88''$$

Use $2 - \frac{5}{8}''$ str. $1 - \frac{5}{8}'' \phi$ Bt.

$$V = \frac{7125}{10 \times 14.5 \times .889} = 56'' \text{ per inch lb.}$$

add $6 - \frac{1}{4}'' \phi$ stirrups. on end,

$B_2 = 12 \pm 3''$ span

$$W_t = \text{Roof Load } 60 \times 4 = 240 \text{ ft. lb.}$$

$$5'' \text{ wall } 50 \times 8 = 400 \text{ ft. lb.}$$

$$S_2 \quad 110 \times 9 = 990 \text{ ft. lb.}$$

$$B_2 = \frac{10 \times 16}{144} \times 150 = \frac{170}{1800} \text{ ft. lb.}$$

$$B. M. = \frac{1800 \times 12.25^{-2} \times 12}{12} = 270000 \text{ inch lb.}$$

10" wide.

14.5" deep. $d_t = (14.5 + 1.5) = 16''$

$$A_s = \frac{270000}{16000 \times 14.5} = 1.17''$$

Use $2 - \frac{5}{8}''$ str. $1 - \frac{3}{4}''$ Bt.

$$V = \frac{110000}{10 \times 89 \times 14.5} = 86 \text{ per sq inch-lb.}$$

$$X_1 = \frac{(86 - 60)12.25}{2 \times 86} = 1.85 \text{ ft.}$$

$$V_2 = 6(86 - 60)10 \times 1.85 = 2900 \text{ inch-lb.}$$

$$\phi = \frac{2900}{12000 \times 0.98} = 3 \quad \text{say use } 6 - \frac{1}{4}'' \phi \text{ stirrups en end}$$

$B_3 = 13 \pm 0''$ span

$$W = S_2 = 110 \times 9 = 990 \text{ ft. lb.} \quad b = 10''$$

$$B_3 = \frac{10 \times 16}{144} \times 150 = \frac{170}{1160} \text{ ft. lb.} \quad d_t = 16''$$

$$B.M. = \frac{1160 \times 13^2 \times 12}{12} = 196000 \text{ in. lb.}$$

$$A_s = \frac{196000}{16000 \times 14.5} = 0.85'' \quad \text{use } 2 - \frac{5}{8}'' \text{ str.}$$

$$1 - \frac{1}{2}'' \text{ Bt.}$$

$$V = \frac{7600}{10 \times 89 \times 14.5} = 59 \text{ per in. lb.}$$

add $6 - \frac{1}{4}'' \phi$ stirrups en end.

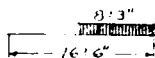
$B_4 = 16 \pm 6''$ span

$$W_1 = B_2 = 11000 \text{ ft. lb.}$$

$$M_1 = \frac{18600 \times 16.5 \times 12}{8} = 495000 \text{ in. lb.}$$

$$B_3 = \frac{7600}{18600} \text{ ft. lb.}$$

$$18600 \text{ ft. lb.}$$



$$W_2 = 5'' \text{ Wall } 50 \times 7 = 350 \text{ ft. lb.}$$

Scale $\frac{1}{16}'' = 1''$

$$R_1 = \frac{350}{2 \times 16.5} \times 8.25 (2 \times 16.5 - 8.25) = 2170 \text{ ft. lb.}$$

$$B. M_2 = (2170 \times \frac{2170}{350}) - \left[\frac{350}{2} \times \left(\frac{2170}{350} \right)^2 \right] \cdot 6700 \times 12 = 81000 \text{ in. lb.}$$

$$W_3 = B_4 = \frac{12 \times 18}{144} \times 150 = 225 \text{ K. lb.}$$

$$B. M_3 = \frac{225 \times 16.5^2 \times 12}{12} = 62000 \text{ in. lb.}$$

$$\text{TOTAL} = B. M = 465000 + 81000 + 62000 = 608000 \text{ in. lb.}$$

Wide = 12" deep = 18"

$$A_s = \frac{608000}{16000 \times 16.5} = 2.3 \text{ "}$$

Use 2-1" ϕ str.

1-1" ϕ bt.

$$V = V_1 = (18600 \div 2) = 9300 \text{ K. lb.}$$

$$R_1 = 2170 \text{ K. lb.}$$

$$V_3 = 225 \times 8.25 = 1870 \text{ K. lb.}$$

$$\underline{13340 \text{ K. lb.}}$$

$$V = \frac{13340}{12 \times 16.5 \times 89} = 76 \text{ per in. lb.}$$

$$X_1 = \frac{(76 - 60) 16.5}{2 \times 76} = 1.75 \text{ K.}$$

$$\dot{V}_2 = 6(76 - 60) 12 \times 1.75 = 2000 \text{ in. lb.}$$

$$\phi = \frac{2000}{12000 \times .089} = 2$$

sag use 6- $\frac{1}{4}$ " ϕ stirrups en end.

$$B_5 = 15 \pm 0" \text{ span}$$

$$W_1 = B_2 = (2 \times 11000) = 22000 \text{ K. lb.}$$

$$M_1 = \frac{22000 \times 15 \times 12}{8} = 500000 \text{ in. lb.}$$

$$W_2 = 10'' \text{ Wall } 100 \times 6.25 = 625 \text{ 斤. lb.}$$

$$B_5 = \frac{12 \times 18}{144} + 50 = 2.25 \text{ 斤. lb.}$$

$$\frac{850 \text{ 斤. lb.}}{850 \text{ 斤. lb.}}$$

$$M_2 = \frac{850 \times 15^2 \times 12}{12} = 193000 \text{ in. lb.}$$

$$\text{TOTAL } M = 693000 \text{ in. lb.}$$

$$\text{wide} = 12'' \quad \text{deep} = 18''$$

$$A_s = 2.65'' \quad \text{use } 2-1'' \phi \text{ str. } 2-1'' \phi \text{ bt.}$$

$$V = \frac{17400}{10 \times 16.5 \times 89} = 100 \text{ per sq in. lb.} \quad X_1 = 3 \text{ 斤.}$$

$$V_2 = 8700 \text{ in. lb.} \quad \phi = 9.4 \quad \text{use } 10 - \frac{5}{16}'' \phi \text{ stirrups en end.}$$

$$B_6 = 13.5'' \text{ span}$$

$$W_1 = B_1 = 7125 \text{ 斤. lb.}$$

$$B_2 = 11000 \text{ 斤. lb.}$$

$$\frac{18200 \text{ 斤. lb.}}{18200 \text{ 斤. lb.}}$$

$$M_1 = \frac{18200 \times 13.5 \times 12}{8} = 370000 \text{ in. lb.}$$

$$W_2 = B_4 (R_1 = 2170) = M_2 = 81000 \text{ in. lb.}$$

$$W_3 = B_6 = \frac{12 \times 18}{144} \times 150 = 2.25 \text{ 斤. lb.} \quad \text{Wide} = 12'' \quad \text{deep} = 18''$$

$$M_3 = \frac{225 \times 13.5^2 \times 12}{12} = 41500 \text{ in. lb.}$$

$$\text{TOTAL } M = 370000 + 81000 + 41500 = 492500 \text{ in. lb.}$$

$$A_s = \frac{492500}{16000 \times 16.5} = 1.86''$$

$$\text{use } 2-1'' \phi \text{ str. } 1 - \frac{3}{4}'' \phi \text{ bt.}$$

$$\begin{array}{r}
 V = 9100 \text{ ft. lb.} \\
 2170 \text{ " } \\
 1530 \text{ " } \\
 \hline
 12800 \div (12 \times 16.5 \times .89) = 73 \text{ per sq. in. lb.}
 \end{array}$$

$$X_1 = 1.2 \text{ ft.} \quad V_2 = 1200 \text{ ft. lb.}$$

Use 6 - $\frac{1}{4}$ " ϕ stirrups en end.

$$B_7 = 24' 6" \text{ span}$$

$$W_1 = B_4 = 13340 \text{ ft. lb.} \quad M_1 = \frac{13340 \times 24.5 \times 12}{8} = 490000 \text{ in. lb.}$$

$$W_2 = 5" \text{ wall } 50 \times 4 = 200 \text{ ft. lb.}$$

$$S_2 = 110 \times 4.5 = 500 \text{ "}$$

$$B_7 = \frac{10 \times 24}{144} \times 150 = \frac{250}{950} \text{ ft. lb.}$$

$$M_2 = \frac{950 \times 24.5^2 \times 12}{12} = 575000 \text{ in. lb.}$$

$$\text{Total} = 1065000 \text{ in. lb.} \quad A_s = 3.1'' \quad \text{Wide} = 10'' \quad \text{deep} = 24''$$

Use 2 - 1" ϕ str. 2 - 1" ϕ Bt.

$$V = \frac{18300}{12 \times 22 \times .89} = 102 \text{ per in. lb.}$$

$$X_1 = \frac{(102 - 60) 24.5}{2 \times 102} = 5.1 \text{ ft.}$$

$$V_3 = 6(102 - 60) 10 \times 5.1 = 12800 \text{ in. lb.}$$

$$\phi = \frac{12800}{12000 \times 0.15} = 7$$

Sag use 10 - $\frac{5}{16}$ " ϕ stirrups en end.

$B_8 = 24 \times 6''$ span

$$W_1 = B_6 = 12800 \text{ Ft. lb.} \quad M_1 = \frac{12800 \times 24.5 \times 12}{8} = 480000 \text{ in. lb.}$$

$$W_2 = 5'' \text{ Wall } 50 \times 4 = 200 \text{ Ft. lb.}$$

$$B_8 = \frac{10 \times 24}{144} 150 = 250 \quad "$$

$$S_2 = 110 \times 3.75 = \frac{415}{865} \text{ Ft. lb.}$$

$$M_2 = \frac{865 \times 24.5^2 \times 12}{12} = 520000 \text{ in. lb.}$$

$$\text{TOTAL } M = 1000000 \text{ in. lb.} \quad b = 10'' \quad d = 22'' \quad d_t = 24''$$

$$A_s = \frac{1000000}{16000 \times 22} = 2.85 \text{ "}$$

Use 2 - 1" ϕ str. 2 - $\frac{3}{4}$ " ϕ bt.

$$V = 6400 + 10625 = 17030 \text{ Ft. lb.}$$

$$V = \frac{17030}{10 \times 22 \times 89} = 88 \text{ per sq in. lb.}$$

$$X_1 = \frac{(88 - 60) \times 24.5}{2 \times 88} = 3.75 \text{ Ft.}$$

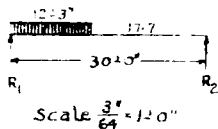
$$V_2 = 5900 \text{ in. lb.}$$

Use 10 - $\frac{1}{4}$ " ϕ stirrups en end.

$B_9 = 30 \times 0''$ span

$$W_1 = \text{ROOF Load } 60 \times 4 = 240 \text{ Ft. lb.}$$

$$R_1 = \frac{240}{2 \times 30} \times 17.75 \left[(30 \times 2) - (17.75) \right] = 3000 \text{ Ft. lb.}$$



$$M_1 = (3000 \times \frac{3000}{240}) - \left\{ \frac{240}{2} \times \left(\frac{3000}{240} \right)^2 \right\} = 18700 \times 12 = 225000 \text{ in. lb.}$$

$$W_2 \cdot B_6 = 12800 \text{ lb.} \quad M_2 = \frac{12800 \times 12.25 \times 17.75 \times 12}{30} = 1060000 \text{ in. lb.}$$

$$V' = \frac{12800 \times 17.75}{30} = 7500 \text{ lb.}$$

$$W_3 \cdot S_2 = 110 \times 4.5 = 500 \text{ lb.}$$

$$10'' \text{ wall } 100 \times 6.25 = 625 \text{ lb.}$$

$$B_9 : \frac{10 \times 30}{1+4} 150 = 315 \text{ lb.}$$

$$1440 \text{ lb.}$$

$$b = 10'', \quad d = 28'', \quad d_c = 30''$$

$$M_3 = \frac{1440 \times 30^2 \times 12}{12} = 1300000 \text{ in. lb.}$$

$$\text{TOTAL } M = 225000 + 1060000 + 1300000 = 2585000 \text{ in. lb.}$$

$$A_s = 5.7'' \quad \text{use } 3-1'' \text{ str. } 2-1'' \text{ bt. } 2-\frac{5}{8}'' \text{ top.}$$

$$V = R_1 = 3000 \text{ lb.}$$

$$V' = 7500 \text{ lb.}$$

$$V_3 = 1440 \times 15 = 21700 \text{ lb.}$$

$$32200 \text{ lb.}$$

$$V = \frac{32200}{10 \times 28 \times .89} = 128 \text{ per sq in. lb.}$$

$$X_1 = 8 \text{ ft.} \quad V_2 = 33000 \text{ in. lb.}$$

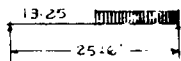
use $18-\frac{5}{16}''$ stirrups on end.

$$B_{10} = 25' 6'' \text{ span}$$

$$W_1 = B_4 (V_1 = 13340) \quad M_1 = 465000 \text{ in. lb.}$$

$$W_2 = \text{Roof } 60 \times 4 = 240 \text{ lb.}$$

$$R_1 = \frac{240}{2 \times 25.5} 13.25 \left\{ (25.5 \times 2) - 13.25 \right\} = 2320 \text{ lb.}$$



scale $\frac{3}{64}'' = 1:0''$

$$M_2 = \left(\frac{2320}{240} \times 2320 \right) - \left(\frac{240}{2} \times \frac{2320}{240} \right)^2 = 10800 \text{ Ft. lb.}$$

$$10800 \times 12 = 131000 \text{ in. lb.}$$

$$W_3 = 10" \text{ Wall } 100 \times 6.25 = 625 \text{ Ft. lb.}$$

$$S_2 = 110 \times 4.5 = 500 \text{ Ft. lb.}$$

$$B_{10} = \frac{10 \times 28}{144} 150 = \frac{290}{1420} \text{ Ft. lb.}$$

$$M_3 = 790000 \text{ in. lb.}$$

$$\text{TOTAL } M = 980000 + 131000 + 790000 = 1901000 \text{ in. lb.}$$

$$\text{wide} = 10" \quad \text{deep} = 28"$$

$$A_s = \frac{1901000}{16000 \times 26} = 4.6"$$

use 3-1" ϕ str. 2-1" ϕ bk. 2- $\frac{1}{2}$ " ϕ top.

$$V = \frac{19200}{10 \times 26 \times 89} = 114 \text{ per sq in. lb.} \quad X_1 = 6 \text{ Ft.}$$

$$V_2 = 2(114 - 60) 10 \times 6 = 19500 \text{ in. lb.} \quad \phi = -1.05$$

use 12- $\frac{5}{16}$ " ϕ stirrups en end.

$$B_{11} = 12 \div 0" \text{ span}$$

$$W_1 = B_1 = 7125 \text{ Ft. lb.} \quad M_1 = \frac{7125 \times 12 \times 12}{8} = 126000 \text{ in. lb.}$$

$$W_2 = 5" \text{ Wall } 50 \times 4 = 200 \text{ Ft. lb.}$$

$$B_{11} = \frac{10 \times 16}{144} \times 150 = \frac{170}{370} \text{ Ft. lb.}$$

$$\text{Wide} = 10" \quad \text{deep} = 16"$$

$$370 \text{ Ft. lb.}$$

$$M_2 = \frac{370 \times 12^{-2} \times 12}{12} = 53500 \text{ in. lb.}$$

$$\text{TOTAL } M = 126000 + 53500 = 179500 \text{ in. lb.}$$

$$A_s = 0.78 \text{ " " Use } 2 - \frac{5}{8} \text{ " } \phi \text{ str. } 1 - \frac{5}{8} \text{ " } \phi \text{ bt.}$$

$$V = 5782 \text{ lb. } V' = 20 \text{ per sq. in. lb. Sag Use } 6 - \frac{1}{4} \text{ " } \phi \text{ stirrups en end.}$$

$$B_{12} = 18 \pm 0 \text{ " span}$$

$$W_1 = B_3 = 7600 \text{ lb. } M_1 = \frac{7600 \times 18 \times 12}{8} = 206000 \text{ in. lb.}$$

$$W_2 = 5 \text{ " Wall } 50 \times 4 = 200 \text{ lb.}$$

$$P_{12} = \frac{10 \times 16}{144} \times 150 = 170 \text{ " } b = 10 \text{ " } d = 14.5 \text{ " } d_t = 16 \text{ "}$$

$$370 \text{ lb.}$$

$$M_2 = \frac{370 \times 18^2}{12} \times 12 = 120000 \text{ in. lb.}$$

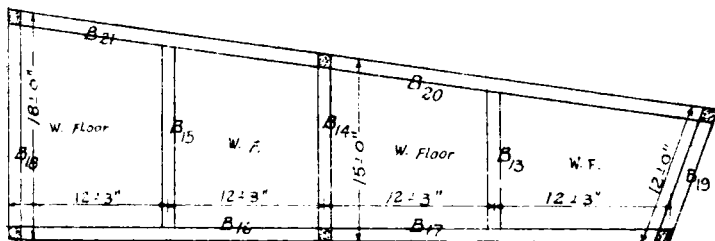
$$\text{Total } M = 206000 + 120000 = 326000 \text{ in. lb.}$$

$$A_s = \frac{326000}{16000 \times 14.5} = 1.4 \text{ " "}$$

$$\text{Use } 2 - 1 \text{ " } \phi \text{ str. } 1 - \frac{3}{4} \text{ " } \phi \text{ bt.}$$

$$V = 7130 \text{ lb. } V' = 30 \text{ lb. lb.}$$

$$\text{Sag use } 6 - \frac{1}{4} \text{ " } \phi \text{ stirrups en end.}$$



SECOND PLAN

$$\text{Scale } \frac{3}{32} = 1' 0''$$

$B_{13} = 13' 6''$ span

$$W = W. \text{ floor} = 80 \times 12.25 = 980 \text{ lb.}$$

$$B_{13} = \frac{8 \times 16}{144} \times 150 = 135 \text{ "}$$

$$1125 \text{ lb.}$$

$$M = \frac{1125 \times 13.5^2 \times 12}{12} = 206000 \text{ in. lb.}$$

Wide = 8" deep = 16"

$$A_s = \frac{206000}{16000 \times 14.5} = 0.89 \text{ "}$$

Use 2 - $\frac{5}{8}$ " ϕ str. 1 - $\frac{5}{8}$ " ϕ bt.

$$V = \frac{7750}{8 \times 14.5 \times 89} = 73 \text{ per sq in. lb. } X_1 = 1.2 \text{ Ft. } V_2 = 750 \text{ lb.}$$

Sag use 6 - $\frac{1}{4}$ " ϕ stirrups en end.

$B_{14} = 15' 0''$ span

$$W = W. F. 80 \times 12.55 = 980 \text{ lb.}$$

$$10'' \text{ wall } 100 \times 8.5 = 850 \text{ "}$$

$$B_{14} = \frac{10 \times 20}{144} \times 150 = 210 \text{ "}$$

$$2040 \text{ lb.}$$

$$M = \frac{2040 \times 15^2 \times 12}{12} = 460000 \text{ in. lb.}$$

wide = 10" deep = 20"

$$A_s = \frac{460000}{16000 \times 18.5} = 1.56 \text{ "}$$

Use 2 - $\frac{3}{4}$ " ϕ str. 1 - $\frac{3}{4}$ " ϕ bt.

$$V = \frac{15400}{10 \times 18.5 \times 89} = 93 \text{ per sq in. lb.}$$

$$X_1 = \frac{(93 - 60) 15}{2 \times 93} = 2.7 \text{ ft.}$$

$$V_2 = 6(93 - 60) 2.7 \times 10 = 4500 \text{ in. lb.}$$

$$\phi = \frac{4500}{12000 \times 0.76} = 5. \quad \text{Use } 6 - \frac{5}{16} \phi \text{ stirrups en end.}$$

$$B_{15} = 16 \times 6 \text{ span}$$

$$W = W.F. 80 \times 12.25 = 980 \text{ ft. lb.}$$

$$B_{15} = \frac{10 \times 16}{144} \times 150 = \frac{170}{1150} \text{ ft. lb.}$$

$$M_1 = 312000 \text{ in. lb.}$$

$$A_S = 1.35 \text{ in}^2 \quad \text{use } 2 - \frac{3}{4} \text{ in} \text{ str. } 1 - \frac{3}{4} \phi \text{ Bt.}$$

$$V = \frac{9500}{10 \times 14.5 \times 0.89} = 74 \text{ in}^2 \quad X_1 = 1.55 \text{ ft.} \quad V_2 = 1300 \text{ in. lb.}$$

$$\text{use } 6 - \frac{1}{4} \phi \text{ stirrups en end.}$$

$$B_{16} = 24 \times 6 \text{ span}$$

$$W_1 = B_{15} = 9500 \text{ ft. lb.} \quad M_1 = \frac{9500 \times 24.5 \times 12}{8} = 350000 \text{ in. lb.}$$

$$W_2 = 10 \text{ in wall } 100 \times 8 = 800 \text{ ft. lb.}$$

$$B_{16} = \frac{10 \times 24}{144} \times 150 = \frac{250}{1050} \text{ ft. lb.}$$

$$M_2 = \frac{1050 \times 24.5^2 \times 12}{12} = 630000 \text{ in. lb.}$$

$$\text{Total } M_1 = 350000 + 630000 = 980000 \text{ in. lb.}$$

$$b = 10 \text{ in} \quad d = 22 \text{ in} \quad d_c = 24 \text{ in}$$

$$A_S = 2.8 \text{ in}^2 \quad \text{use } 3 - 1 \text{ in} \phi \text{ str. } 2 - \frac{3}{4} \phi \text{ Bt.}$$

$$V = \frac{17750}{10 \times 22 \times .89} = 90 \frac{3}{8} \text{ in.} \quad X_1 = 4.1 \text{ ft.} \quad V_2 = 8000 \text{ in. lb.}$$

$$\phi = \frac{8000}{12000 \times .098} = 6.8 \quad \text{Use } 9 - \frac{1}{4} \text{ } \phi \text{ stirrups en end.}$$

$B_{17} = 24 - 6 \text{ } \phi \text{ span}$

$$W_1 = B_{17} = 7750 \text{ ft. lb.} \quad M_{17} = \frac{7750 \times 24.5 \times 12}{8} = 285000 \text{ in. lb.}$$

$$W_2 = 10' \text{ wall } 100 \times 8 = 800 \text{ ft. lb.}$$

$$B_{17} = \frac{10 \times 24}{144} \times 150 = \frac{250}{1050} \text{ ft. lb.}$$

$$M_2 = \frac{1050 \times 24.5^2 \times 12}{12} = 640000 \text{ in. lb.}$$

$$\text{Total } M = 285000 + 640000 = 925000 \text{ in. lb.}$$

$$b = 10 \text{ } \phi \quad d = 22 \text{ } \phi \quad d_t = 24 \text{ } \phi$$

$$A_s = 2.65 \text{ } \phi \quad \text{Use } 3 - \frac{3}{4} \text{ } \phi \text{ str.} \quad 2 - \frac{3}{4} \text{ } \phi \text{ Bt.}$$

$$V = \frac{16880}{10 \times 22 \times .89} = 87 \frac{3}{8} \text{ in.} \quad X_1 = 2.6 \text{ ft.}$$

$$V_2 = 6(89 - 60) 2.6 \times 10 = 4240 \text{ in. lb.}$$

$$\phi = \frac{4240}{12000 \times .098} = 4. \quad \text{Use } 9 - \frac{1}{4} \text{ } \phi \text{ stirrups en end.}$$

$B_{18} = 13 - 0 \text{ } \phi \text{ span}$

$$W - W.F. = 80 \times 6.125 = 490 \text{ ft. lb.}$$

$$10 \text{ } \phi \text{ wall } 100 \times 8.67 = 867 \text{ ft. lb.}$$

$$B_{18} = \frac{10 \times 14}{144} \times 150 = \frac{250}{1610} \text{ ft. lb.}$$

$$\underline{1610 \text{ ft. lb.}}$$

$$M = \frac{1610 \times 18^2 \times 12}{12} = 520000 \text{ in. lb.}$$

$$b = 10" \quad d = 22" \quad d_t = 24"$$

$$A_s = 1.6" \quad \text{use } 2 - \frac{3}{4}" \text{ str. } 1 - \frac{3}{4}" \text{ Bl.}$$

$$V = \frac{14490}{10 \times 23 \times .89} = 75 \frac{3}{4}" \text{ lb.} \quad X_1 = 1.8 \text{ ft.}$$

$$V_2 = 1650 \text{ in. lb.} \quad \text{use } 6 - \frac{1}{4}" \phi \text{ stirrups en end.}$$

$$B_{19} = 12 \pm 0" \text{ span}$$

$$W = W.F. 80 \times 6.125 = 490 \text{ ft. lb.}$$

$$10" \text{ wall } 100 \times 8.67 = 867 \text{ ft. lb.}$$

$$B_{19} = \frac{10 \times 18}{144} \times 150 = \frac{190}{1550} \text{ ft. lb.}$$

$$b = 10"$$

$$d = 16.5 \quad d_t = 18"$$

$$M = \frac{1550 \times 12^2 \times 12}{12} = 225000 \text{ in. lb.}$$

$$A_s = 0.85" \quad \text{use } 2 - \frac{5}{8}" \phi \text{ str. } 1 - \frac{5}{8}" \phi \text{ Bl.}$$

$$V = 63 \frac{3}{4}" (9240 \text{ ft. lb.}) \quad \text{add } 6 - \frac{1}{4}" \phi \text{ stirrups en end.}$$

$$B_{20} = 30 \pm 0" \text{ span}$$

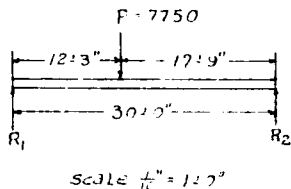
$$W_1 = B_{19} = 7750 \text{ ft. lb.}$$

$$M_1 = \frac{7750 \times 12 \times 12.25 \times 12.75}{30} = 672000 \text{ in. lb.}$$

$$R_1 = \frac{7750 \times 17.75}{30} = 4600 \text{ ft. lb.}$$

$$W_2 = 10" \text{ wall } 100 \times 8 = 800 \text{ ft. lb.}$$

$$B_{20} = \frac{10 \times 26}{144} \times 150 = \frac{270}{1070} \text{ ft. lb.}$$



$$M_2 = \frac{1070 \times 30^{-2} \times 12}{12} = 960000 \text{ in. lb.}$$

$$\text{Total } M = 1632000 \text{ in. lb.} \quad \text{Wide} = 10" \quad \text{deep} = 26"$$

$$A_s = 4.3 \text{ " Use } 3-1" \phi \text{ str. } 2-1" \phi \text{ Br.}$$

$$V = 83 \frac{3}{8} \text{ " lb. (17700 lb.)} \quad X_1 = 4.3 \text{ ft.}$$

$$V_2 = 6(83 - 60) 4.3 \times 10 = 5900 \text{ in. lb.}$$

$$\phi = \frac{5900}{12000 \times .098} = 5.2 \quad \text{Use } 9-\frac{1}{4} \phi \text{ stirrups en end.}$$

$$B_{21} = 25.5 \text{ " span}$$

$$W_1 = B_{15} = 9500 \text{ lb.} \quad M_1 = \frac{9500 \times 25.5 \times 12}{8} = 325000 \text{ in. lb.}$$

$$W_2 = 10" \text{ wall } 100 \times 8 = 800 \text{ lb.}$$

$$B_{21} = \frac{10 \times 24}{144} 150 = \frac{250}{1050} \text{ lb.}$$

$$M_2 = \frac{1050 \times 25.5^2 \times 12}{12} = 690000 \text{ in. lb.}$$

$$\text{Total } M = 1015000 \text{ in. lb.}$$

$$\text{Wide} = 10" \quad \text{deep} = 24"$$

$$A_s = \frac{1015000}{16000 \times 22} = 2.95 \text{ "}$$

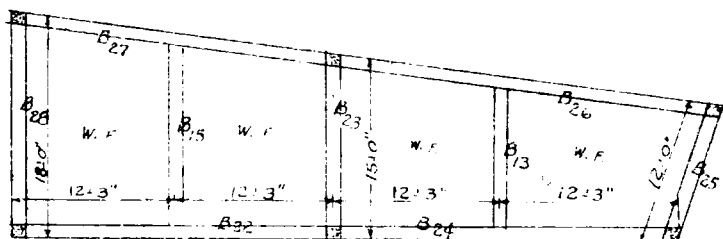
$$\text{Use } 3-1" \phi \text{ str. } 2-\frac{3}{4} \phi \text{ Br.}$$

$$V = \frac{18150}{10 \times 22 \times .89} = 93 \frac{3}{8} \text{ " lb.}$$

$$X_1 = \frac{(93 - 60) 25.5}{2 \times 93} = 4.6 \text{ ft.}$$

$$V_2 = 6(93 - 60) 4.6 \times 10 = 9200 \text{ in. lb.}$$

$$\phi = \frac{9200}{12000 \times 0.098} = 7.8 \quad \text{use } 9 - \frac{1}{4}'' \phi \text{ stirrups en end.}$$



FIRST PLAN

scale $\frac{5}{32}'' = 1'0''$

$$B_{22} = 24'6'' \text{ span}$$

$$W_1 = B_{15} = 3500 \text{ Ft. lb.} \quad M_1 = \frac{9500 \times 24.5 \times 12}{8} = 350000 \text{ in. lb.}$$

$$W_2 = 10'' \text{ wall } 100 \times 9 = 900 \text{ Ft. lb.}$$

$$P_{22} = \frac{10 \times 26}{144} \times 150 = 270 \text{ Ft. lb.}$$

$$1170 \text{ Ft. lb.}$$

$$M_2 = \frac{1170 \times 24.5^2 \times 12}{12} = 710000 \text{ in. lb.}$$

$$\text{TOTAL } M = 1060000 \text{ in. lb.} \quad \text{Wide} = 10'' \quad \text{deep} = 26''$$

$$A_s = 2.75 \text{ in}^2 \quad \text{use } 3 - 1'' \phi \text{ str. } 2 - \frac{5}{8}'' \phi \text{ bt.}$$

$$V = \frac{19100}{10 \times 24 \times 89} = 89 \frac{1}{2} \text{ lb.} \quad X_1 = 3.76 \text{ Ft.}$$

$$V_2 = 6(89 - 60) 3.76 \times 10 = 6890 \text{ in. lb.}$$

$$\phi = \frac{6800}{12000 \times 0.098} = 5.8$$

use $9 - \frac{5}{16}'' \phi$ stirrups en end.

$B_{23} = 15:0''$ span

$$W_1 - W.F. 90 \times 12.55 = 980 \text{ Ft. lb.}$$

$$10' \text{ Wall } 100 \times 0.33 = 933 \text{ Ft. lb.}$$

$$B_{23} \frac{10 \times 24}{144} \times 150 = 250 \text{ Ft. lb.}$$

$$2170 \text{ Ft. lb.}$$

$$b = 10''$$

$$d = 22'' \quad d_t = 24''$$

$$M = \frac{2170 \times 15^2 \times 12}{12} = 490000 \text{ in. lb.}$$

$$A_s = \frac{490000}{16000 \times 22} = 1.38 \text{ sq. in.} \quad \text{Use } 2 - \frac{3}{4}'' \phi \text{ str. } 1 - \frac{3}{4}'' \phi \text{ bt.}$$

$$V = \frac{16200}{10 \times 22 \times .89} = 82 \text{ \% lb.} \quad X_1 = 2 \text{ Ft.} \quad V_2 = 2670 \text{ in. lb.}$$

Sag use $6 - \frac{1}{4}'' \phi$ stirrups en end.

$B_{24} = 24:6''$ span

$$W_1, B_{13} = 7750 \text{ Ft. lb.} \quad M_1 = \frac{7750 \times 24.5 \times 12}{8} = 285000 \text{ in. lb.}$$

$$W_2 = 10' \text{ wall } 100 \times 9 = 900 \text{ Ft. lb.}$$

$$B_{13} = \frac{10 \times 26}{144} \times 150 = 270 \text{ Ft. lb.}$$

$$1170 \text{ Ft. lb.}$$

$$M_2 = \frac{1170 \times 24.5^2 \times 12}{12} = 700000 \text{ in. lb.}$$

$$\text{Total } M = 985000 \text{ in. lb.} \quad b = 10'' \quad d = 24'' \quad d_t = 26''$$

$$A_s = 2.56 \text{ sq. in.} \quad \text{Use } 2 - 1'' \phi \text{ str. } 1 - 1'' \phi \text{ bt.}$$

$$V = \frac{18200}{10 \times 24 \times .89} = 86 \text{ \% lb.} \quad X_1 = 3.72 \text{ Ft.}$$

$$V_2 = 6(86 - 60) 3.72 \times 10 = 5800 \text{ in. lb.}$$

$$\phi = \frac{5800}{12000 \times 0.076} = 6.3 \quad \text{Use } 9 - \frac{5}{16} \phi \text{ stirrups. en end.}$$

25 = 12'-0" span.

$$W = W.F. = 80 \times 6.125 = 490 \text{ Ft. lb.}$$

$$10'' \text{ Wall } 100 \times 10.5 = 1050 \text{ ''}$$

$$B_{25} = \frac{10 \times 20}{144} \times 150 = \frac{210}{1750 \text{ Ft. lb.}}$$

$$M = \frac{1750 \times 12^2 \times 12}{12} = 254000 \text{ in. lb. } \bar{b} = 10'' \quad d = 18.5 \quad d_c = 20''$$

$$A_s = 0.86 \text{ ''} \quad \text{Use } 2 - \frac{5}{8} \phi \text{ str. } 1 - \frac{5}{8} \phi \text{ Bt.}$$

$$V = \frac{10500}{10 \times 18.5 \times 89} = 64 \text{ per sq in. lb.}$$

Use $6 - \frac{1}{4} \phi$ stirrups en end.

26 = 30'-0 span

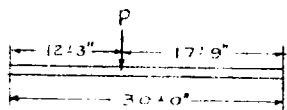
$$W_1 = B_{23} = 7750 \text{ Ft. lb.} \quad M_1 = \frac{7750 \times 12.25 \times 17.75}{30} = 672000 \text{ in. lb.}$$

$$R_1 = \frac{7750 \times 17.75}{30} = 4600 \text{ Ft. lb.}$$

$$W_2 = 10'' \text{ wall } 100 \times 9 = 900 \text{ Ft. lb.}$$

$$B_{26} = \frac{10 \times 26}{144} \times 150 = 270 \text{ Ft. lb.}$$

$$1170 \text{ Ft. lb.}$$



scale $\frac{1}{16}'' = 1'-0''$

$$M_2 = \frac{1170 \times 30^2 \times 12}{12} = 1050000 \text{ in. lb. } b = 10'' \quad d = 24'' \quad d_c = 26''$$

Total M 1722000 in lb.

$$A_s = \frac{1722000}{16000 \times 24} = 4.5 \text{ ''} \quad \text{Use } 3 - 1'' \text{ str. } 2 - 1'' \phi \text{ Bt.}$$

$$V = \frac{22200}{10 \times 24 \times 89} = 105 \frac{1}{2} \text{ lb.} \quad X_1 = 6.5 \text{ Ft.}$$

$$V_2 = 6(115 - 60)10 \times 6.5 = 17500 \text{ in. lb.}$$

$$\phi = \frac{17500}{12000 \times .153} = 9.5 \quad \text{Use } 12 - \frac{5}{16} \phi \text{ stirrups en end.}$$

$B_{27} = 25 \pm 6'' \text{ span}$

$$W_1 = B_{15} = 9500 \text{ Ft. lb.} \quad M_1 = \frac{9500 \times 25.5 \times 12}{8} = 365000 \text{ in. lb.}$$

$$W_2 = 10'' \text{ wall } 100 \times 9 = 900 \text{ Ft. lb.}$$

$$B_{27} = \frac{10 \times 26}{144} \times 150 = \frac{270}{1170} \text{ Ft. lb.}$$

$$M_2 = \frac{1170 \times 25.5^2 \times 12}{12} = 770000 \text{ in. lb.}$$

$$\text{Total } M = 1085000 \text{ in. lb.} \quad b = 10'' \quad d = 24'' \quad d_t = 26''$$

$$A_s = \frac{1085000}{16000 \times 24} = 2.85 \text{ " use } 3 - \frac{3}{4}'' \text{ str. } 2 - \frac{3}{4}'' \text{ dt.}$$

$$V = \frac{19750}{10 \times 24 \times .89} = 93 \frac{1}{2} \text{ lb.} \quad X_1 = 4.75 \text{ Ft.}$$

$$V_2 = 6(93 - 60)4.75 \times 10 = 9460 \text{ in. lb.}$$

$$\phi = \frac{9460}{12000 \times .098} = 8 \quad \text{Use } 9 - \frac{1}{4}'' \phi \text{ stirrups en end.}$$

$B_{28} = 18 \pm 0'' \text{ span}$

$$W = \text{W. F.} = 80 \times 6.125 = 490 \text{ Ft. lb.} \quad b = 10''$$

$$10'' \text{ wall } 100 \times 9 = 900 \text{ " } \quad d = 22'' \quad d_t = 26''$$

$$B_{28} = \frac{10 \times 26}{144} \times 150 = \frac{220}{2310} \text{ Ft. lb.}$$

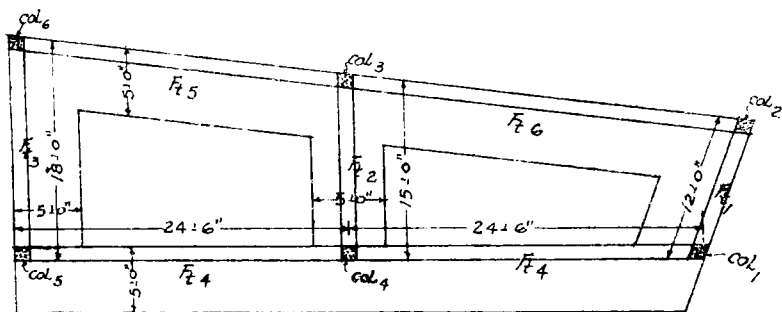
$$M = \frac{2310 \times 18^2 \times 12}{12} = 750000 \text{ in. lb.}$$

$$A_s = 1.95 \text{ in}^2 \quad \text{use } 2 - \frac{3}{4} \text{ in}^2 \text{ str. } 1 - 1 \text{ in}^2 \text{ Bt.}$$

$$V = \frac{20790}{10 \times 24 \times 89} = 98 \text{ lb.} \quad X_1 = 3.5 \text{ Ft.}$$

$$V_2 = 8000 \text{ in. lb.} \quad \phi = \frac{8000}{12000 \times .152} = 5$$

USE 6 - $\frac{5}{16}$ in ϕ stirrups en end.



COL. PLAN

scale $\frac{3}{32} \text{ in} = 1'0 \text{ in}$







注意 推算各部份柱之載重，自上至下，依次疊并便得總數。倘市房建築在三層以上，可將活力每次遞減百分之十，至對折為標準。至於廠棧等設計，仍照實地情形算。茲將各類結數，編為簡明表排列如下，以便有司審查。又設計樑與樑板，因兩端固定，改安全率集中為 8，均佈為

12. 倘有特殊情形為牢固起見, 仍用兩端支持公式為標準,







THIRD COL. a

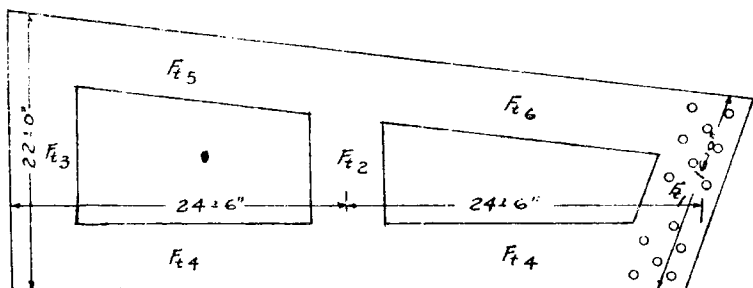
COL ₁			COL ₂			COL ₃		
Wt.	B ₈	17030	B ₉	32200	B ₅	17400		
10"	B ₁₁	5782	B ₁₁	5782	B ₁₀	19200		
	COL ₁	1000	COL ₂	1000	B ₉	32200		
		<hr/>		<hr/>	12x10	1200		
		23900		39000		<hr/>		
						70000		
COL ₆			COL ₅			COL ₄		
Wt.	B ₇	18300	B ₇	18300	B ₅	17400		
10"	B ₁₂	7130	B ₁₂	7130	B ₇	18300		
	COL ₆	1000	COL ₅	1000	B ₈	17030		
		<hr/>		<hr/>	10x12	1200		
		26430		26430		<hr/>		
						53930		
COL ₁ = COL ₂ = COL ₅ = COL ₆						COL ₃ = COL ₄		
all use 4- $\frac{3}{4}$ " str.						use 4 1" \square		
add $\frac{1}{4}$ " ϕ @ 4" c.c. stirrups						$\frac{1}{4}$ " ϕ @ 4" c.c. stirrups.		

SECOND Col. b

col ₁			col ₂			col ₃		
Wt.		23900	Wt.	39000	Wt.	70100		
	B ₁₇	16880		B ₂₀	17700		B ₁₄	15400
	B ₁₉	9240		B ₁₉	9240		B ₂₁	18150
10'x14'	col ₁	1800	10'x14'	1800		B ₂₀	17700	
		<hr/> 51820		<hr/> 66740	10'x16'		1700	
							<hr/> 124850	
col ₆			col ₅			col ₄		
	Wt.	27400	Wt.	26430	Wt.	47900		
	B ₂₁	18150		B ₁₆	17750		B ₁₄	15400
	B ₁₈	14490		B ₁₈	14490		B ₁₆	17500
10'x14'	col ₆	1800	10'x14'	1800		B ₁₇	16880	
		<hr/> 61840		<hr/> 80470	10'x16'		1700	
							<hr/> 99480	
col ₁ = col ₂ = col ₅ = col ₆ all Use 6-1"φ str. add 1/4"φ @ 4" c.c. stirrups						col ₃ = col ₄ 8-1"φ str. 1/4"φ @ 4" c.c.		

FIRST COL. C.

col ₁ 15"×18" 		col ₂ 15"×18" 		col ₃ 15"×18" 	
Wt.	51820	Wt.	66740	Wt.	124850
B ₂₅	10500	B ₂₅	10500	B ₂₃	16200
B ₂₄	18200	B ₂₆	22200	B ₂₆	22200
col ₁	4200	col ₂	4200	B ₂₇	19750
<hr/>		<hr/>		col ₃	2800
84700		103640		<hr/>	
				184800	
col ₆ 15"×18" 		col ₅ 15"×18" 		col ₄ 15"×18" 	
Wt.	61840	Wt.	60540	Wt.	99480
B ₂₈	20790	B ₂₈	20790	B ₂₃	16200
B ₂₇	19750	B ₂₂	19100	B ₂₄	18200
col ₆	4200	col ₅	4200	B ₂₂	19100
<hr/>		<hr/>		col ₄	2800
106580		104630		<hr/>	
				155780	
<p>col₁ = col₂ = col₅ = col₆ all Use 8-1" str. add $\frac{1}{4}$" ϕ @ 4" c.c. stirrups</p>				<p>col₃ = col₄ 6-1" ϕ 4-1" ϕ $\frac{1}{4}$" ϕ @ 4" c.c.</p>	



FOUNDATION PLAN

scale $\frac{3}{32}'' = 1'-0''$

$$F_{t1} = COL_1 \frac{2}{3} + COL_2 \frac{2}{3}$$

$$F_{t4} = COL_4 \frac{1}{5} + COL_5 \frac{1}{3}$$

$$F_{t2} = COL_3 \frac{2}{3} + COL_4 \frac{2}{3}$$

$$F_{t5} = COL_3 \frac{1}{5} + COL_6 \frac{1}{3}$$

$$F_{t3} = COL_5 \frac{2}{3} + COL_6 \frac{2}{3}$$

$$F_{t6} = COL_3 \frac{1}{5} + COL_2 \frac{1}{3}$$

$$F_{t1} = W_1 = \frac{2}{3} COL_1 = \frac{82100 \times 2}{3} = 54500 \text{ lb.} \quad W_2 = \frac{2}{3} COL_2 = \frac{100140 \times 2}{3} = 67000 \text{ lb.}$$

$$15'' \text{ Wall } 150 \times 4.5 \times 12 = 8000 \text{ lb.}$$

$$P_1 = 62500 \times 15 \text{ lb.}$$

$$P_2 = 75000 \times 15$$

$$9400 \text{ lb.}$$

$$11300$$

$$71900 \text{ ''}$$

$$86300 \text{ lb.}$$

$$6-5\frac{1}{2}'' \phi \times 12' \text{ pile } (6 \times 3000 = 18000) - 18000 \text{ ''}$$

$$53900 \text{ lb.}$$

$$- 24000$$

$$62300 \text{ lb.}$$

$$COL_1 = A = \frac{53900}{1700} = 31.4 \text{ ft.}$$

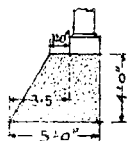
$$COL_2 = A = \frac{62300}{1975} = 31.5 \text{ ft.}$$

$$W = \frac{62500}{31.4} = 1975 \text{ lb.}$$

$$31.4 + 31.5 = 62.9 \text{ ft.}$$

$$X = \frac{86300 \times 10.5}{71900 + 86300} = 5.7 \text{ ft.}$$

$$5.7 + .66 = 6.36 \text{ ft.} \quad 6.36 \times 2 = 12.72 \text{ ft.}$$



$$\frac{62.9}{12.72} = 4.95 \text{ Ft. } 520" \text{ Wide.}$$

$$W = \frac{62500 + 75000}{22.9} = 2180 \text{ Ft. lb.}$$

$$M = 2180 \times 3.5 \times 23 = 17500 \text{ in. lb.}$$

$$d = \sqrt{\frac{17500}{1067}} = 12.9. \quad d_t = 48"$$

$$A_s = \frac{17500}{18000 \times 48 \times .89} = 0.22 \text{ "}$$

USE $\frac{3}{8}" \phi @ 6" \text{ C.C.}$

$\frac{1}{4}" \phi @ 10" \text{ C.C. stirrups}$

$$T.M. 1.2 \times 2180 \times 5 \times 9^2 = 1060000 \text{ in. lb.}$$

assume $d = 46" \quad d_t = 48"$

$$A_s = \frac{1060000}{18000 \times 46} = 1.3 \text{ "}$$

use 3- $\frac{5}{8}" \phi \text{ str.}$ 2- $\frac{5}{8}" \phi \text{ st.}$

$$U = \frac{2180 \times 5 \times 1.3}{2(3 \times 1.963)89 \times 46} = 31 \text{ per sq. in. lb.} \quad V = \frac{14200}{18 \times 89 \times 46} = 13 \text{ per sq. in.}$$

add 6- $\frac{1}{4}" \phi \text{ stirrups. en end.}$

$$F_{t2} = W_1 = \frac{3}{5} \text{ col}_3 = \frac{184800 \times 3}{5} = 111000 \text{ Ft. lb.} \quad W_2 = \frac{3}{5} \text{ col}_4 = \frac{155680 \times 3}{5} = 94000 \text{ Ft. lb.}$$

$$10" \text{ wall } 100 \times 6.25 \times 12 = 7500 \text{ "}$$

$$P_1 = 118500 \times .15$$

$$\frac{16600}{135100 \text{ Ft. lb.}}$$

$$P_2 = 101500 \times .15$$

$$\frac{15200}{116700 \text{ Ft. lb.}}$$

$$6-7\frac{1}{2}" \phi \times 18' \text{ Long pile } (6 \times 9700) = 58000 \text{ "}$$

$$\frac{77100 \text{ Ft. lb.}}$$

$$(5-7\frac{1}{2}" \phi \times 18' \text{ pile}) = 48500 \text{ "}$$

$$\frac{68200 \text{ Ft. lb.}}$$

$$\text{col}_3 = A = \frac{77100}{1700} = 45.5 \text{ Ft.}$$

$$\text{col}_4 = A = \frac{68200}{2600} = 26.3 \text{ Ft.}$$

$$W = \frac{118500}{45.5} = 2600 \text{ Ft. lb.}$$

$$45.5 + 26.3 = 71.8 \text{ Ft}$$

$$X = \frac{116700 \times 14}{135100 + 116700} = 6.54 \text{ Ft.}$$

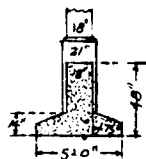
$$6.54 + .66 = 7.2 \text{ Ft.}$$

$$7.2 \times 2 = 14.4 \text{ Ft.} \quad 71.8 \div 14.4 = 5 \text{ Ft.} \quad 5'-0" \text{ wide.}$$

$$W = \frac{118500 + 101500}{72} = 3060 \text{ Ft. lb.}$$

$$M = 3060 \times 1.75 \times 23 = 123000 \text{ in. lb.}$$

$$d = 14" \quad d_f = 16"$$



$$A_s = \frac{123000}{16000 \times 12} = 0.64 \text{ "}^2 \quad \text{Use } \frac{3}{8}" \text{ @ } 3" \text{ c.f.} + \frac{1}{4}" \phi \text{ @ } 10" \text{ o.c.}$$

$$V = \frac{(5 - 1.75) 3060}{24 \times 89 \times 14} = 39 \text{ per sq in. lb.}$$

$$U = \frac{9800}{2(16 \times 1.178)12} = 59 \text{ per sq in. lb.}$$

$$M = 1.2 \times 3060 \times 5 \times 13^2 = 3070000 \text{ in. lb.}$$

$$d = 46" \quad d_f = 48"$$

$$A_s = \frac{3070000}{16000 \times 46} = 4.2 \text{ "}^2 \quad \text{Use } 4 - \frac{3}{4}" \text{ str. } 4 - \frac{3}{4}" \text{ Bl.}$$

$$U = \frac{3060 \times 5 \times 3.7}{214 \times 4 \times 56.25 \times 46 \times 89} = 76 \text{ per sq in. lb.}$$

$$V = \frac{56500}{18 \times 89 \times 46} = 77 \text{ per sq in. lb.}$$

$$X_1 = \frac{(77 - 60)13}{2 \times 77} = 1.5 \text{ Ft.} \quad V_2 = 6(77 - 60)18 \times 1.5 = 2750 \text{ Ft. lb.}$$

$$\phi = \frac{2750}{12000 \times 0.098} = 2.5 \quad \text{Say use } 6 - \frac{1}{4}" \phi \text{ stirrups en end.}$$

$$F_{c3} = W \times \frac{2}{3} \text{ col}_5 = \frac{104330 \times 2}{3} = 69500 \text{ Ft. lb.}$$

$$W_2 \times \frac{2}{3} \text{ col}_6 = \frac{107780 \times 2}{3} = 71800 \text{ Ft. lb.}$$

$$15" \text{ Wall } 150 \times 7.5 \times 12 = 13500 \text{ "}$$

$$P_1 = 83000 \times .15$$

$$\frac{12500}{95500 \text{ Ft. lb.}}$$

$$\begin{array}{r} 13500 \text{ "} \\ P_2 = 85300 \times .15 \\ 12800 \\ \hline 98100 \text{ Ft. lb.} \end{array}$$

$$\begin{array}{r}
 95500 \text{ 斤. lb.} \\
 7-5\frac{1}{2} \phi \times 12' \text{ long pile } (7 \times 3000) - 21000 \text{ " } \\
 \hline
 76500 \text{ 斤. lb.}
 \end{array}
 \qquad
 \begin{array}{r}
 98100 \text{ 斤. lb.} \\
 - 21000 \text{ " } \\
 \hline
 77100 \text{ 斤. lb.}
 \end{array}$$

$$\text{col}_5 = A = \frac{76500}{1700} = 45 \text{ 斤.}$$

$$\text{col}_6 = A = \frac{77100}{1850} = 41.5 \text{ 斤.}$$

$$W = \frac{83000}{45} = 1850 \text{ 斤. lb.}$$

$$45 + 41.5 = 86.5 \text{ 斤.}$$

$$X = \frac{98100 \times 16.5}{95500 + 98100} = \frac{1630000}{193600} = 8.4 \text{ 斤.}$$

$$8.4 \times 66 = 9.06 \text{ 斤.}$$

$$9.06 \times 2 = 18.12 \text{ 斤.} \quad \frac{86.5}{18.12} = 4.8 \text{ 斤.} \quad 5'0" \text{ Wide.}$$

$$W = \frac{83000 + 85300}{86.5} = 1940 \text{ 斤. lb.}$$

$$M = 1940 \times 3.5 \times 23 = 157000 \text{ in. lb.} \quad d = 46" \quad d_t = 48"$$

$$A_s = \frac{157000}{16000 \times 48} = 2.05 \text{ " } \quad \text{Use } \frac{3}{4} \phi @ 6" \text{ c.c.} + \frac{1}{4} \phi @ 10" \text{ c.c.}$$

$$T. M = 1.2 \times 1940 \times 5 \times 15^2 = 2600000 \text{ #} \frac{1}{2} \text{ lb.}$$

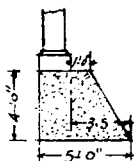
$$\text{assume } d = 46" \quad d_t = 48"$$

$$A_s = \frac{2600000}{16000 \times 46} = 3.5 \text{ " } \quad 4 - \frac{3}{4} \phi \text{ str.} \quad 4 - \frac{3}{4} \phi \text{ Bl.}$$

$$U = \frac{1940 \times 3.15 \times 5}{2 \times (4 \times 2.35 \times .89 \times 46)} = \frac{31000}{775} = 40 \text{ per in. lb.}$$

$$V = \frac{31000}{15 \times .89 \times 46} = 51 \text{ per sq in. lb.}$$

add 6 - $\frac{1}{4}$ " ϕ stirrups.



$$F_4 = W_1 = \frac{1}{5} col_4 = \frac{155680 \times 1}{5} = 31000 \times .15 = col_4 \cdot area = \frac{35670}{1700} = 21 F_4$$

$$P_1 = \frac{4670}{35670 lb.}$$

$$W_2 = \frac{1}{3} col_5 = \frac{104330 \times 1}{3} = 34700 \times .15 = col_5 \cdot area = \frac{39900}{1480} = 26.8 ft.$$

$$P_2 = \frac{5200}{39900 lb.}$$

21 + 26.8 = 47.8 Ft. Say 5'0" Wide.

$$W = \frac{31000 + 34700}{47.8} = 1370 Ft. lb.$$

$$M = 1370 \times 3.5 \times 23 = 110000 in. lb.$$

$$d = 46" \quad d_t = 48"$$

$$A_s = \frac{110000}{16000 \times 46} \rightarrow 0.15 \text{ " Use } \frac{3}{8} \text{ " } \phi @ 8 \text{ " c.c. + } \frac{1}{4} \text{ " } \phi @ 10 \text{ " c.c.}$$

$$T.M = 1.25 \times 1370 \times 3.5 \times 22.25^2 = 4050000 in. lb.$$

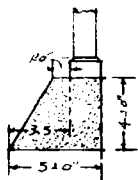
$$\text{assume } d = 46' \quad d_t = 48" \quad A_s = 4.9$$

$$\text{Use } 4 - 1 \text{ " } \phi \text{ str. } 4 - \frac{3}{4} \text{ " } \phi \text{ bt.}$$

$$\text{Use } \cdot \frac{1370 \times 5 \times 4.9}{2(4 \times 8.1416) \cdot 89 \times 46} = \frac{33500}{1020} = 33 \text{ per sq in. lb.}$$

$$V = \frac{33500}{15 \times 89 \times 46} = 55 \text{ per sq in. lb.}$$

add 9 - $\frac{3}{4}$ " ϕ stirrups en end.



$$F_5 = W_1 = \frac{1}{5} col_5 = \frac{184800 \times 1}{5} = 37000 \times .15 \quad W_2 = \frac{1}{3} col_6 = \frac{107780 \times 1}{3} = 36000 \times .15$$

$$P_1 = \frac{5560}{42560 Ft. lb.} \quad P_2 = \frac{5400}{41400 Ft. lb.}$$

	42560 斤. lb.	41400 斤. lb.
10" Wall 100 x 11.5 x 12	+ 13800 "	13800 "
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
	56360 斤. lb.	55200 斤. lb.

$$\text{Col}_3 \text{ area} = \frac{56360}{1700} = 33.2 \text{ 斤.}$$

$$\text{Col}_6 \text{ area} = \frac{55200}{1130} = 49 \text{ 斤.}$$

$$W = \frac{37000}{33.2} = 1130 \text{ 斤. lb.} \quad 33.2 + 49 = 82.24 \text{ 斤.}$$

$$.82.24 \div 18 = 4.6 \text{ 斤.} \quad 5:0' \text{ wide.}$$

$$W = \frac{37000 + 36000}{82.24} = 890 \text{ 斤. lb.}$$

$$M = 890 \times 3.5 \times 23 = 71000 \text{ in. lb.}$$

$$d = 46" \quad d_t = 48" \quad A_s = 0.09 \text{ "}$$

$$\text{Use } \frac{3}{8} \text{ " } \phi @ 10" \text{ c.c.} + \frac{1}{4} \text{ " } \phi @ 12" \text{ c.c.}$$

$$T.M. = 1.2 \times 890 \times 5 \times 23.5^2 = 2940000 \text{ in. lb.}$$

$$\text{assume } d = 46" \quad d_t = 48"$$

$$A_s = \frac{2940000}{16000 \times 46} = 4 \text{ " } \quad 4 - \frac{3}{4} \text{ " } \phi \text{ str.} \quad 4 - \frac{3}{4} \text{ " } \phi \text{ bt.}$$

$$U = \frac{890 \times 5 \times 3.6}{2(4 \times .75 \times 4) \cdot 89 \times 46} = \frac{15600}{980} = 16 \text{ per sq. in. lb.}$$

$$V = \frac{15600}{15 \times 89 \times 46} = 25 \text{ per sq. in. lb.}$$

add 10 - $\frac{1}{4}$ " ϕ stirrups en end.

$$F_1 = W_1 = \frac{1}{5} \text{ Col}_3 = \frac{184800 \times 1}{5} = 37000 \times 15$$

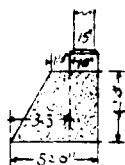
$$W_2 = \frac{1}{3} \text{ Col}_2 = \frac{100140 \times 1}{3} = 33600 \times 15$$

$$P_1 = 5560$$

$$P_2 = 5050$$

$$42560 \text{ 斤. lb.}$$

$$38650 \text{ 斤. lb.}$$



$$\begin{array}{r}
 42560 \text{ 斤. lb.} \\
 10'' \text{ wall } 100 \times 12 \times 14 = 17000 \text{ 斤. lb.} \\
 \hline
 59600 \text{ 斤. lb.}
 \end{array}
 \qquad
 \begin{array}{r}
 38650 \text{ 斤. lb.} \\
 17000 \text{ 斤. lb.} \\
 \hline
 55650 \text{ 斤. lb.}
 \end{array}$$

$$Col_3 \cdot area = \frac{59600}{1700} = 35.1 \text{ 斤.}$$

$$Col_2 \cdot area = \frac{55650}{1050} = 53 \text{ 斤}$$

$$W = \frac{37000}{35} = 1050 \text{ 斤. lb.}$$

$$35.1 + 53 = 88.1 \text{ 斤.}$$

$$88.1 \div 22.5 = 3.9 \text{ 斤. Sag } 5-0'' \text{ wide.}$$

$$W = \frac{37000 + 33600}{88.1} = 800 \text{ 斤. lb.}$$

$$M = 800 \times 3.5 \times 23 = 64500 \text{ in. lb.}$$

$$\text{assume } d = 46'' \quad d_t = 48'' \quad A_s = 0.078 \text{ *''}$$

$$\frac{3}{8}'' \phi @ 10'' \text{ c.c.} + \frac{1}{4}'' \phi @ 12'' \text{ c.c.}$$

$$M = 1.2 \times 800 \times 5 \times 28^2 = 3780000 \text{ in. lb.}$$

$$\text{assume } d = 46'' \quad d_t = 48''$$

$$A_s = \frac{3730000}{16000 \times 46} = 5.15 \text{ *''}$$

$$\text{use } 4-1'' \phi \text{ str. } \quad 4-\frac{3}{4}'' \phi \text{ bt.}$$

$$U = \frac{600 \times 5 \times 4.55}{2(4 \times 3.1416) \cdot 89 \times 46} = \frac{18200}{1020} = 18 \text{ per sq in. lb.}$$

$$V = \frac{18200}{15 \times 89 \times 46} = 30 \text{ per sq in. lb.}$$

$$\text{add } = \frac{1}{4}'' \phi @ 6'' \text{ c.c stirrups.}$$

第三節 擬建市房章程說明書

第一條 業主曹根寶擬建市房座落法組界震飛路地
 冊一七八八號原有舊平房四深淺高低吋呎均照圖樣為
 洋房連假樓二幢至於大小深淺高低吋呎均照圖樣為

第二條 凡欲承包此項工程須將圖樣章程詳細照市
 估價開明細賬將來物料漲落與東翁無涉不得加購國貨
 東翁亦不得扣除一時無待購進明工完全
 有金磅關係一項工完全
 約數(即完全一切工完全
 足月責一天為標準

第三條 承包人自訂定承攬後擇吉開工先將地面舊
 屋拆卸出清隨後方可加深腳與底鋪合吋呎均照圖樣
 師驗看地形高者須加深腳與底鋪合吋呎均照圖樣
 準但地高者須加深腳與底鋪合吋呎均照圖樣

第四條 四週樣為泥底腳與底鋪合吋呎均照圖樣
 度及根數以圖樣為泥底腳與底鋪合吋呎均照圖樣
 為度隨後法以圖樣為泥底腳與底鋪合吋呎均照圖樣
 鋼條法以圖樣為泥底腳與底鋪合吋呎均照圖樣

第五條 凡三和青水磚為合度鄰界牆下加打木
 用必須吋半方青水磚為合度鄰界牆下加打木

銀期滿照數付清，至於領銀手續，除宕銀外，分六期交付如下：

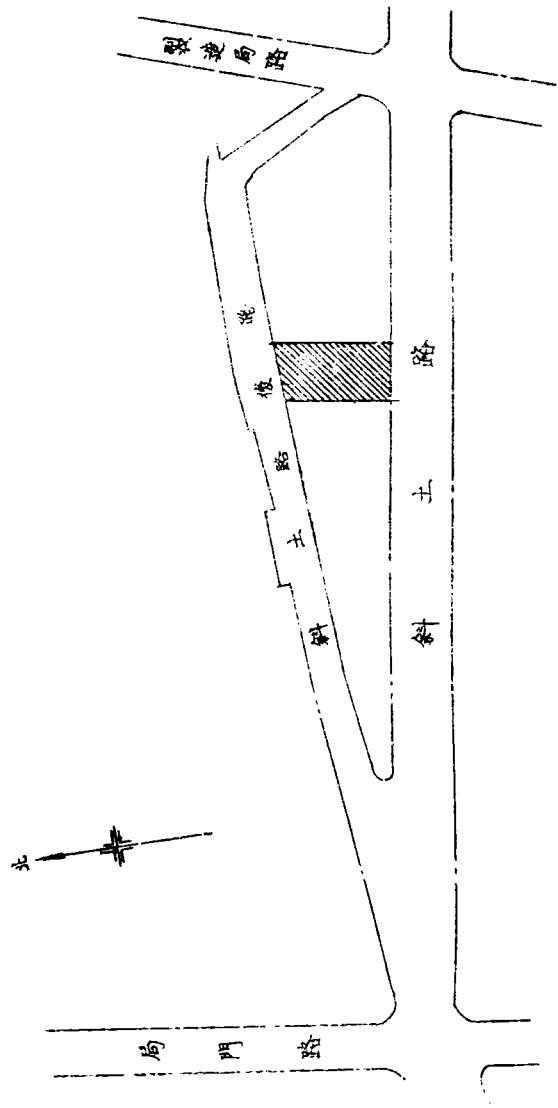
第一期	水樁拷齊	底脚做好	付 $\frac{1}{6}$
第二期	水泥搗好	至二層齊	付 $\frac{1}{6}$
第三期	屋面結頂	門窗配齊	付 $\frac{1}{6}$
第四期	裝修做齊	玻璃配全	付 $\frac{1}{6}$
第五期	油漆完全	隆溝排好	付 $\frac{1}{6}$
第六期	地面做好	完工交屋	付清

第六條 以上辦法，由承包人以興業主各執一份存照，如
 有增加師監簽有效，有程合同方為有效。完。

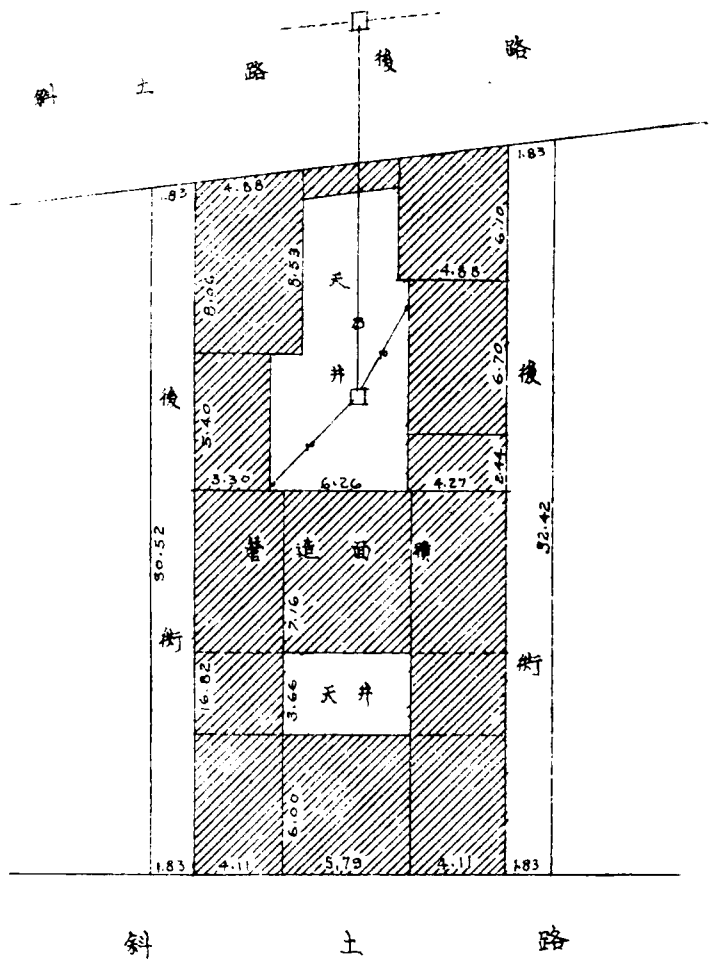
第九條 凡有工程合同，須由承包人以興業主各執一份存照，如
 有增加師監簽有效，有程合同方為有效。完。

第二章 擬建浴室圖案

第一節 業主從執經，於民國念叁年仲月，委託設計浴室
 圖案，經上海市工務局核准，分段排於下，以便備案，否則
 注意，水塔部份，應向公用局電公特別委託，亦得
 局給照，亦無礙。建築工程師受業主特別委託，亦得
 的接約，倘建築工程師受業主特別委託，亦得

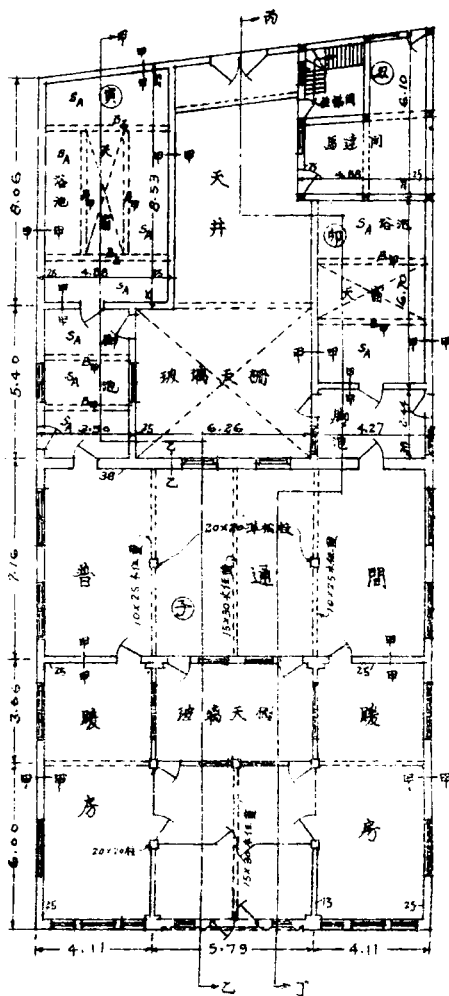


地形圖



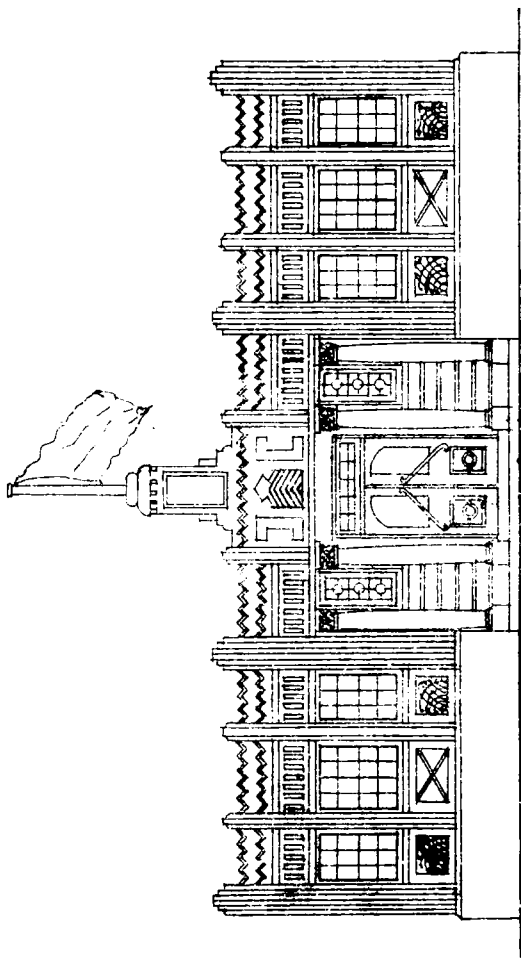
地盤圖

比例尺：二百五十分之一

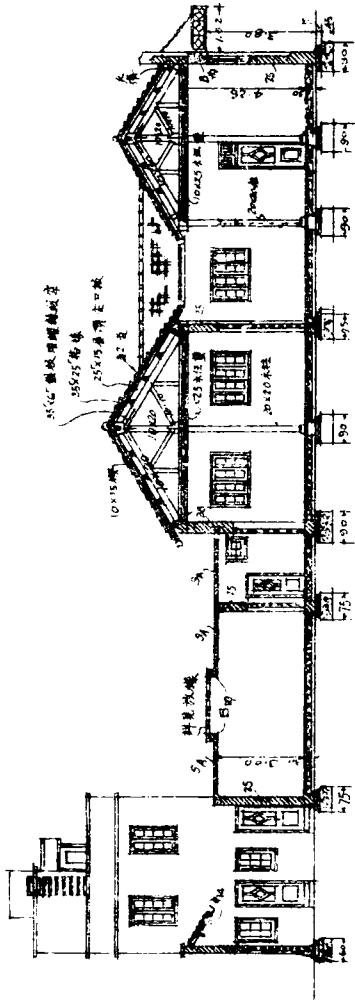


平面圖

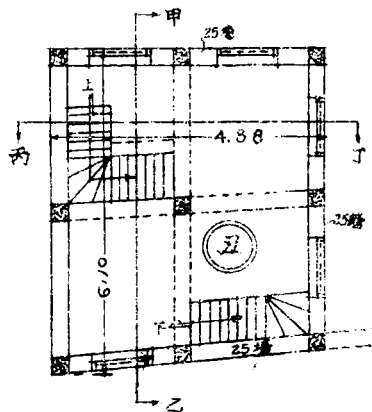
1:100 比例



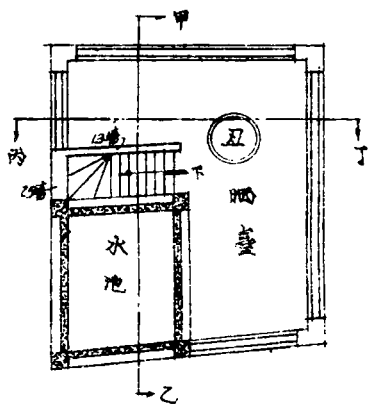
樣 面 正



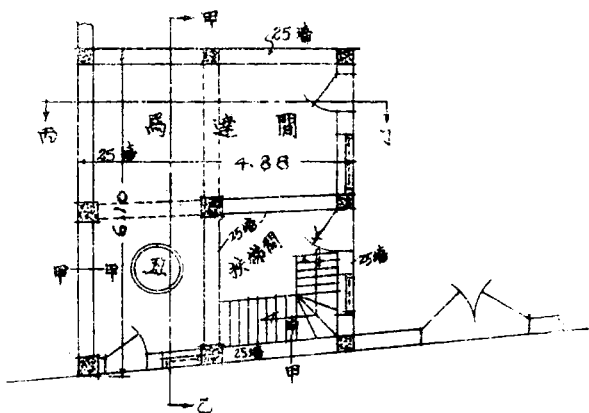
券弓內一丁



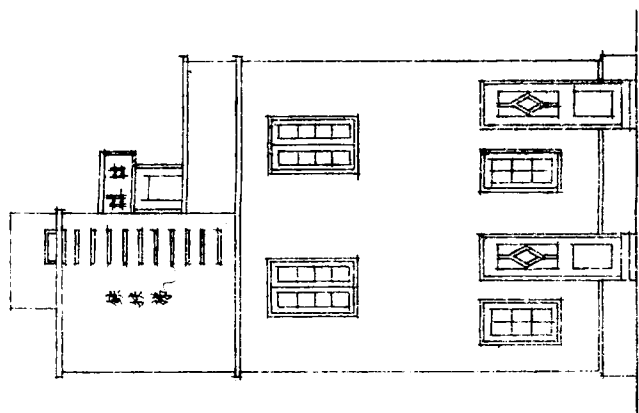
上層平面圖



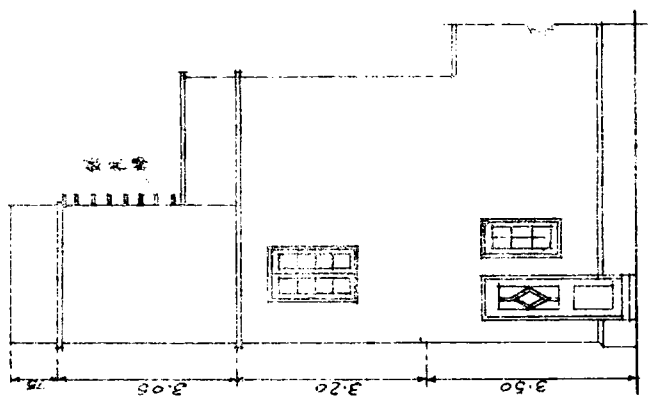
屋頂及水池平面圖



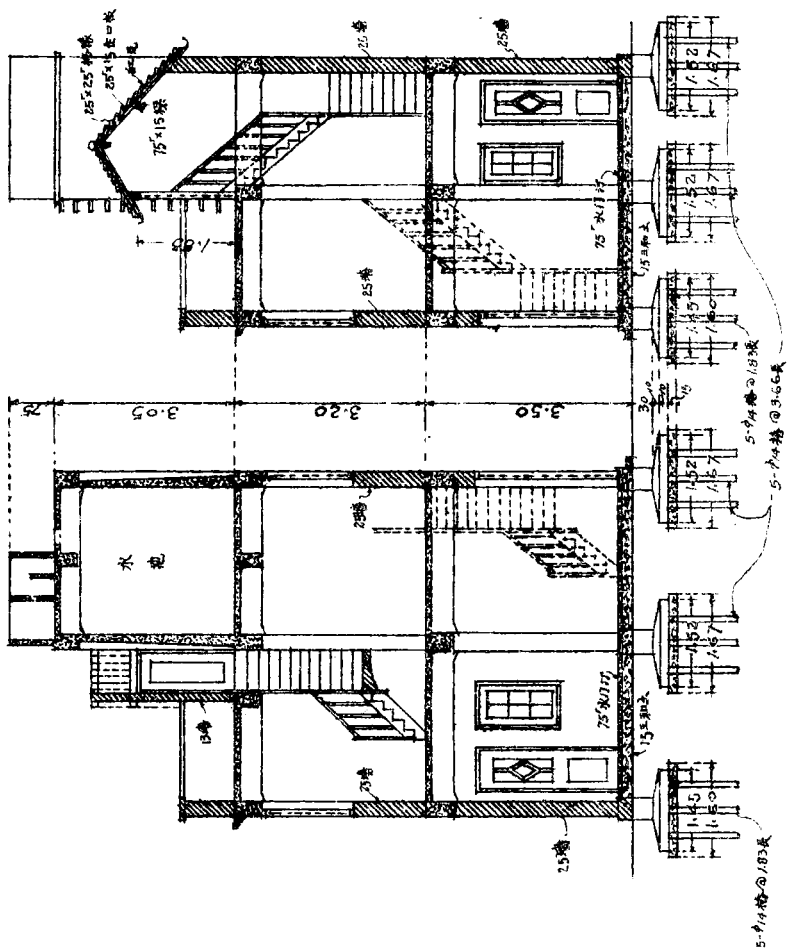
下層平面圖



側面樣



正面樣

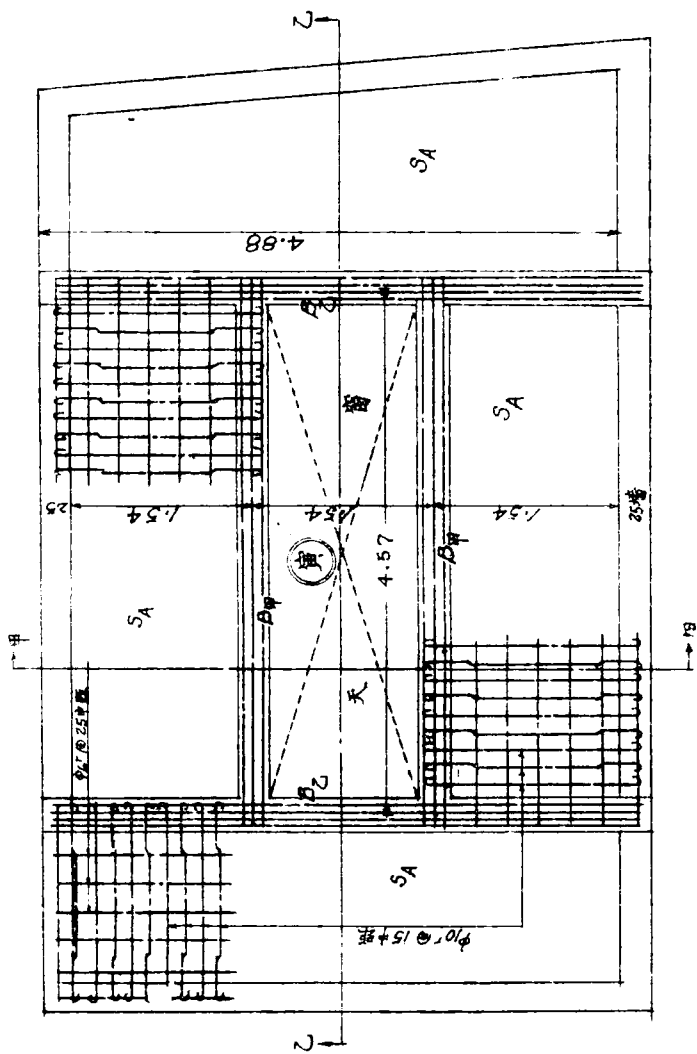


穿弓 = 丙 - 丁

穿弓 = 甲 - 乙

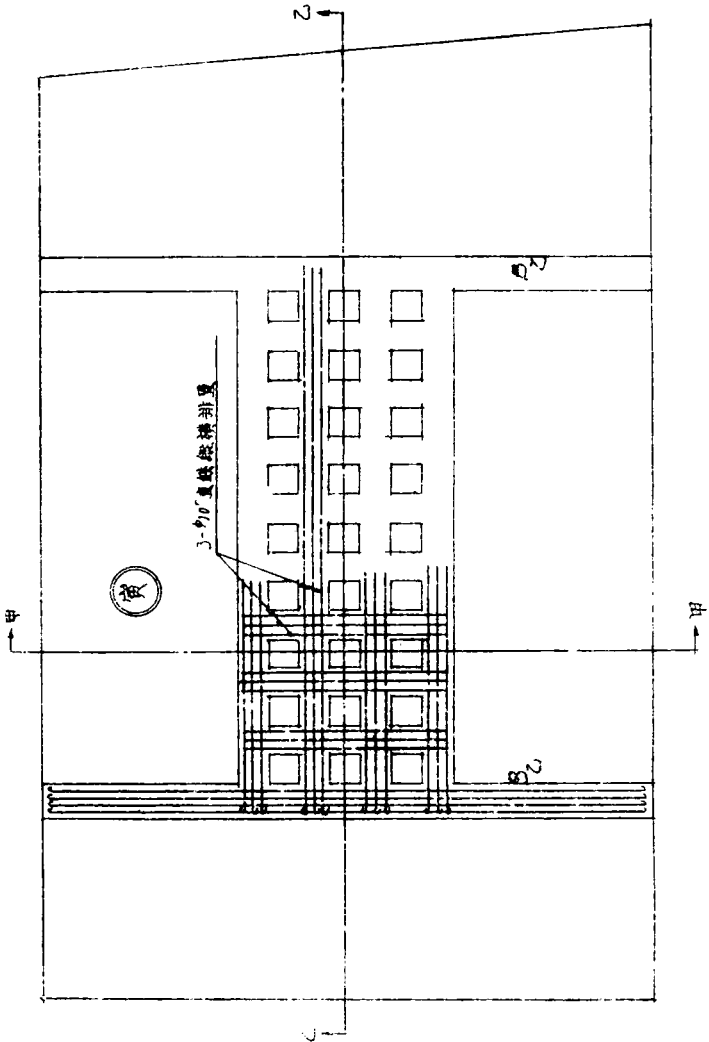
5-甲柱格向1.83長

比例公尺：面方之一



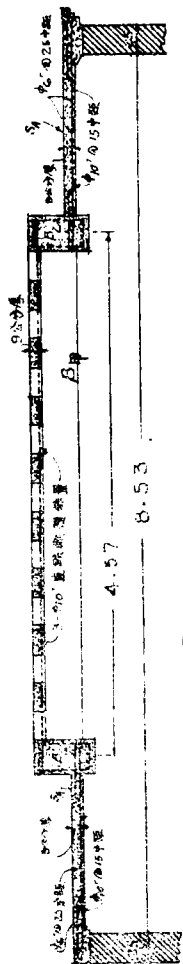
鋼架平面圖 = 實

比例尺: 1:50

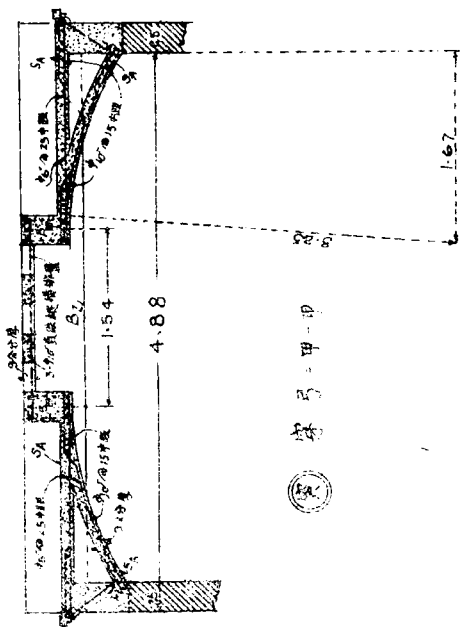


天橋平面圖

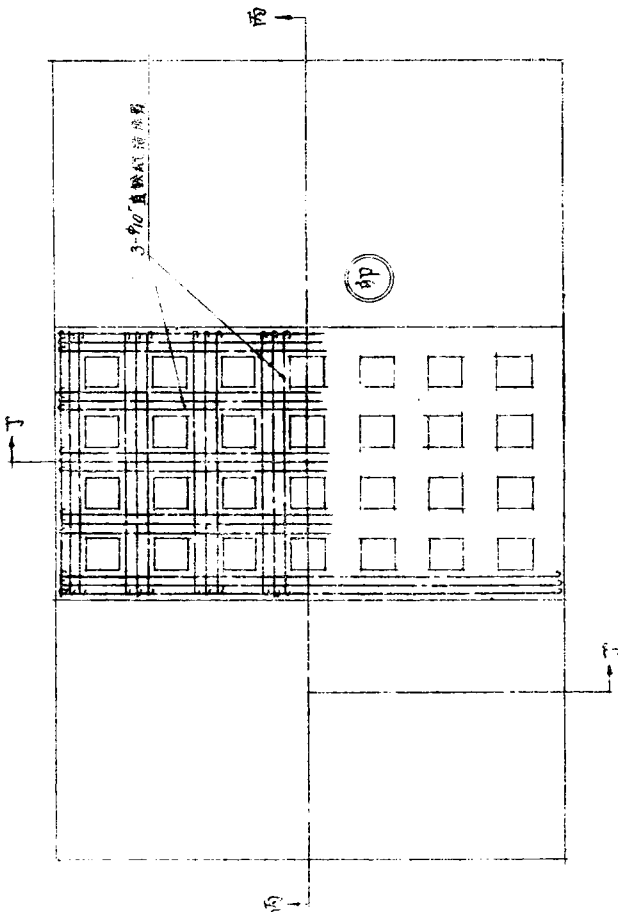




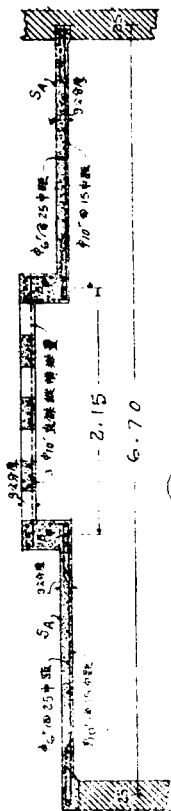
穿弓 - 乙-乙



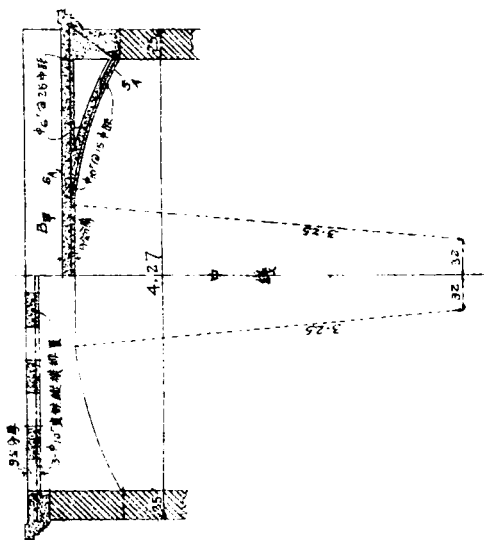
穿弓 - 甲-甲



浴室平面圖 - 印

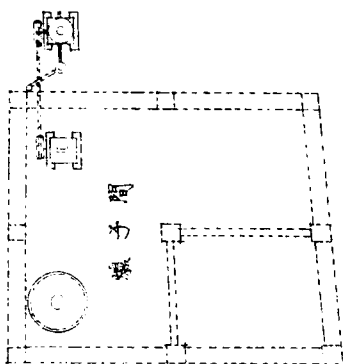


⑩ 窗弓 = 丙-丙

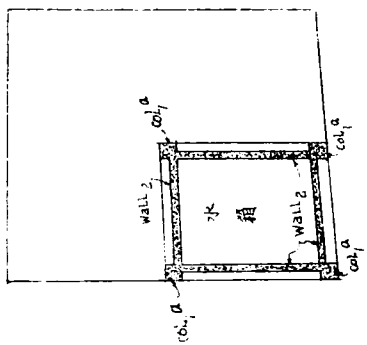


⑪ 窗弓 = 丁-丁



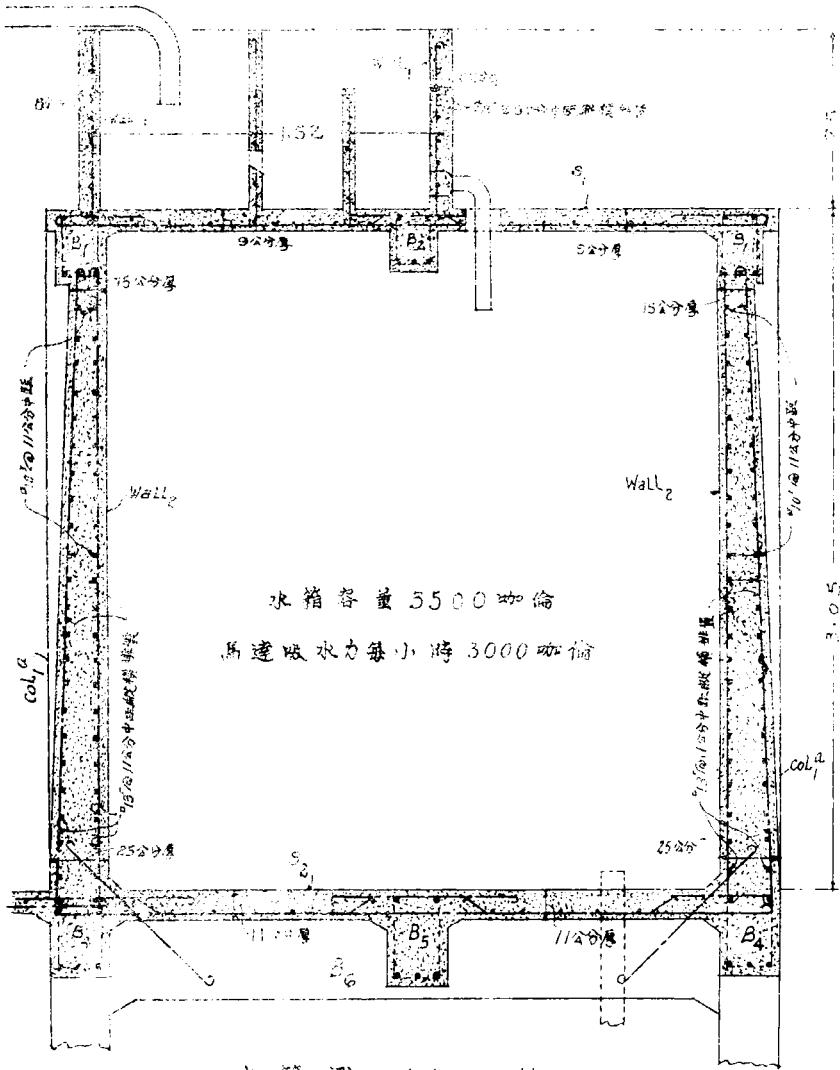


馬達平面圖



水箱平面圖

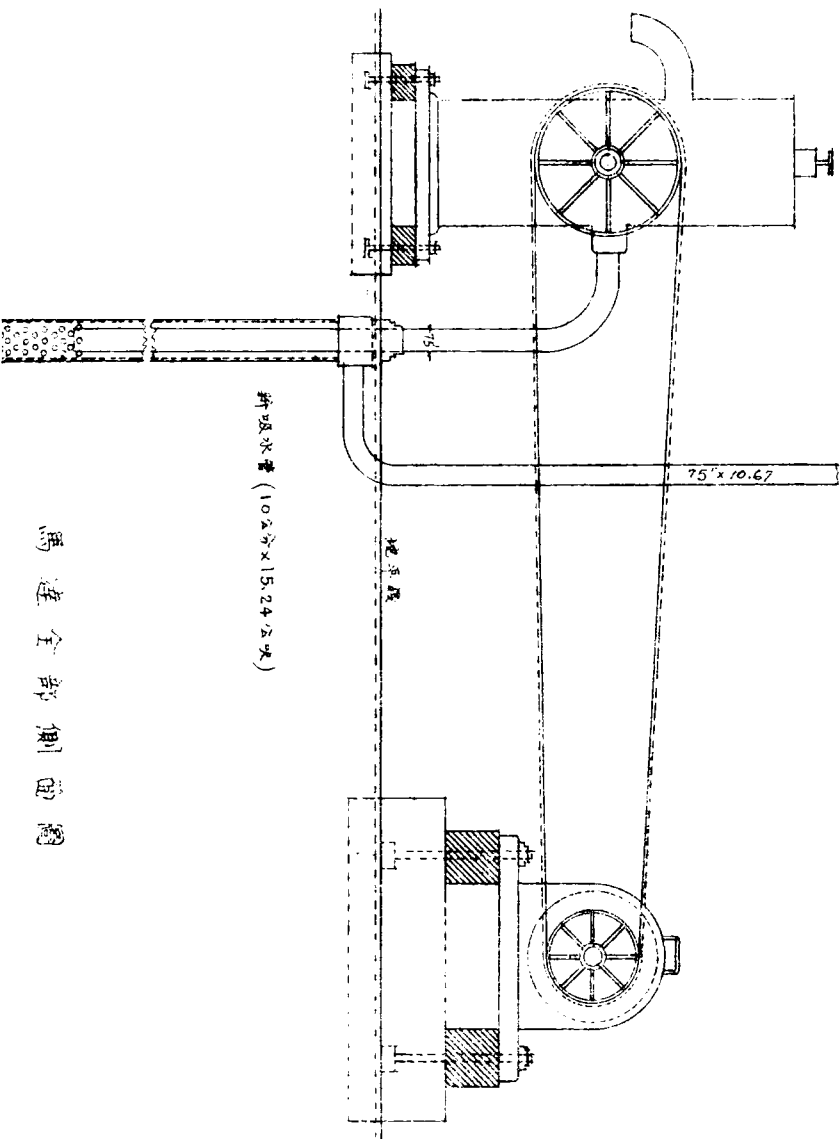
比例公尺：百分之一。



水箱容量 3500 加侖
 馬達吸水力每小時 3000 加侖

水箱圖 = $Wall_1$ = $Wall_2$

比例公尺：二十及分之一

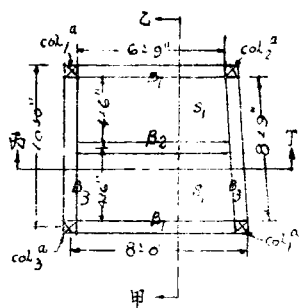


馬達全部側面圖

第二節 水池聯房屋之設計與計算書

擬建水池容量 = 3500 加侖 = 560 立方呎。

$$\text{高度} = h = \frac{560}{6.75 \times 8.75} = 9.5 = 10.0'' (3.04 \text{ 公尺})$$



箱板 = Wall = 2'6'' 高。(75 公分)

$$M = 2 \times 62.5 \times 2.5^3 = 1950 \text{ 呎磅。}$$

$$\text{厚度} = d = \sqrt{\frac{1950}{88.9 \times 12}} = 1.35 \text{ 呎。}$$

$$d_t = 3'' (75 \text{ 公厘})$$

$$\text{鋼面積} = 0.0056 \times 12 \times 1.35 = 0.095 \text{ 方呎。}$$

讓步用 $\frac{5}{16}$ " ϕ @ $3\frac{1}{2}$ " C.C. 縱橫排置。

(8 公厘 @ 9 公分中距)

$$S_1 = 4'4\frac{1}{2}" \text{ 闊。 } W = 2.5 \times 6.25 + 150 = 307 \text{ 呎磅。}$$

$$M = \frac{307 \times 4.375 \times 4.375 \times 12}{10} = 7100 \text{ 呎磅。}$$

$$d = \sqrt{\frac{7100}{1067}} = 2.6 \quad d_t = 3\frac{1}{2}" (9 \text{ 公厘})$$

$$A_s = 0.175 \text{ 方呎。}$$

用 $\frac{5}{16}$ " ϕ @ $3\frac{1}{2}$ " 中距加 $\frac{1}{4}$ " ϕ @ 6" 中距。

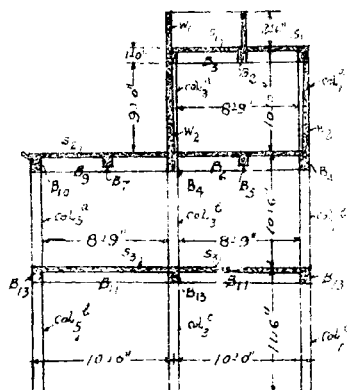
$$B_1 = 6'9" \text{ 跨度 (2.03 公尺)}$$

$$\text{重量} = W_1 = 2.5 \times \frac{3}{12} \times 150 = 110 \text{ 呎磅。}$$

$$S_1 = 307 \times 2.1875 = 680 "$$

$$B_1 = \frac{8}{12} \times 150 = 100 "$$

$$\frac{680}{890} \text{ 呎磅}$$



穿子 = 甲-乙

$$M = \frac{890 \times 6.75^2 \times 12}{8} = 62000 \text{ 吋磅。}$$

$$d = \sqrt{\frac{62000}{1067}} = 3.5 \quad d_t = 12" (30 \text{ 公分}) \quad b = 8" (20 \text{ 公分})$$

$$A_3 = 0.43 \quad \text{用 } 2\text{-}\frac{1}{2}" \text{ 直鐵 } (2\text{-}\phi 13") \quad 1\text{-}\frac{1}{2}" \text{ 彎鐵 } (1\text{-}\phi 13") \\ 6\text{-}\frac{1}{4}" \text{ 鋼環 } (6\text{-}\phi 6")$$

$$\text{剪力} = V = 890 \times 3.375 = 3000 \div (89 \times 8 \times 10.5) = 41 \text{ 每方吋磅。}$$

$$\text{滑力} = u = \frac{3000}{89 \times 2 \times 4 \times \frac{1}{2} \times 10.5} = 81 \text{ 每方吋磅。}$$

$$B_2 = 6\text{-}9" \text{ 跨度 } (2.03 \text{ 公尺})$$

$$\text{重量} = S_1 = 307 \times 4.375 = 1380 \text{ 吋磅。}$$

$$B_2 = \frac{8 \times 14}{144} \times 150 = \frac{120}{1500} \text{ 吋磅。}$$

$$M = \frac{1500 \times 6.75^2 \times 12}{8} = 103000 \text{ 吋磅。}$$

$$d = \sqrt{\frac{103000}{88.9 \times 8}} = 12 \quad d_t = 14" \text{ 吋 } (35 \text{ 公分}) \quad b = 8" \text{ 吋 } (20 \text{ 公分})$$

$$A_3 = 0.54 \text{ 方吋。} \quad \text{用 } 2\text{-}\frac{5}{8}" \text{ 直鐵 } (2\text{-}\phi 16") \quad 1\text{-}\frac{5}{8}" \text{ 彎鐵 } (1\text{-}\phi 16") \\ \text{加 } 6\text{-}\frac{1}{4}" \text{ 鋼環 } (6\text{-}\phi 6")$$

$$V = 1500 \times 3.375 = 5100 \text{ 吋磅。}$$

$$\text{剪力} = V = \frac{5100}{8 \times 12.5 \times 89} = 58 \text{ 每方吋磅。}$$

$$\text{滑力} = u = \frac{5100}{2 \times 4 \times \frac{5}{8} \times 12.5 \times 89} = 93 \text{ 每方吋磅。 (用竹節鋼條)}$$

$$B_3 = 8\text{-}9" \text{ 跨度 } (2.63 \text{ 公尺})$$

$$W_1 = S_2 \cdot M = 5100 \text{ 呎磅} \quad M_1 = \frac{5100 \times 8.75 \times 12}{4} = 134000 \text{ 吋磅}$$

$$W_2 = \frac{6 \times 16}{144} \times 150 = 133 \text{ 呎磅} \quad M_2 = \frac{133 \times 8.75^2 \times 12}{8} = 15300 \text{ 吋磅}$$

總計 $M = 149300$ 吋磅

$$d = \sqrt{\frac{149300}{53.9 \times 3}} = 14.5 \quad d_t = 16" (40 \text{ 公分}) \quad b = 3" (7.6 \text{ 公分})$$

$A_s = 0.65$ 方吋, 用 2- $\frac{1}{2}$ " 中直鐵 (2- $\frac{1}{2}$ "²), 1- $\frac{5}{8}$ " 彎鐵 (1- $\frac{5}{8}$ "²)
6- $\frac{1}{4}$ " 鋼箍 (6- $\frac{1}{4}$ "²)

$$V = 5100 \div 2 = 2550 \text{ 呎磅}$$

$$133 \times 1.375 = 530 \text{ 呎磅}$$

$$3140 \text{ 呎磅}$$

$$V = .89 \times 8 \times 14.5 \times 60 = 6100 \text{ 呎磅}$$

$$u = \frac{3140}{2 \times 157 \times 14.5 \times .89} = 79 \text{ 每方吋磅}$$

水箱板 wall₂ = 10'0" 高 (3.04 公尺)

$$M = 2 \times 62.5 \times 9^3 = 92000 \text{ 吋磅}$$

$$d = \sqrt{\frac{92000}{1067}} = 9.3 \quad d_t = 10" (25 \text{ 公分})$$

$A_s = 0.63$, 用於下端 $\frac{1}{2}$ " @ $4\frac{1}{2}$ " c.c. 縱橫排置 ($\frac{1}{3}$ " @ 12 公分)

假定上端 4 吋 (10 公分) 下端 10 吋 (25 公分)

$$\text{中央} = \frac{4+10}{2} = 7 \text{ 吋 (17 公分)} \quad M = 2 \times 62.5 \times 5^3 = 15700 \text{ 吋磅}$$

$$A_s = \frac{15700}{18000 \times 3 \times .89} = 0.325 \text{ 方吋}$$

自 5'0" 以上用 $\frac{3}{8}$ " @ $4\frac{1}{2}$ " 中距 ($\frac{1}{10}$ " @ 11 公分)

S_2 4:4 $\frac{1}{2}$ " 跨距 (1.32 公尺)

$$W_1 = 0.5 \times 62.5 + \frac{150}{2} = 675 \text{ 呎磅}$$

$$M_1 = \frac{675 \times 4.375^2 \times 12}{10} = 15600 \text{ 呎吋磅}$$

$$d = \sqrt{\frac{15600}{88.9 \times 12}} = 3.85 \quad d_t = 4\frac{1}{2}" \text{ (11 公分)}$$

$A_3 = 0.26$ 用 $\frac{3}{8}"$ 鋼 5 吋中版 + $\frac{1}{4}"$ 鋼 12 吋中版
($710" = 13$ 公分 + $96" = 25$ 公分中版)

$B_4 = 6:9"$ (2.03 公尺) 跨距。

$$W_2 = 9 \frac{75}{12} \times 150 = 700 \text{ 呎磅}$$

$$S_2 = 0.5 \times 2.1875 = 1484 \quad "$$

$$A_4 = \frac{10 \times 16}{144} \times 150 = \frac{140}{2330} \text{ 呎磅}$$

$$M = \frac{2330 \times 6.75^2 \times 12}{8} = 152000 \text{ 呎吋磅}$$

假定 $b = 10$ 吋 (25 公分) $d = 12.5$ $d_t = 14$ 吋 (35 公分)

兩面鋼骨用 2- $\frac{1}{2}"$ (2- $\frac{1}{2}"$ 上鉄) 3- $\frac{3}{8}"$ (3- $\frac{3}{8}"$ 下鉄)

$\frac{1}{4}"$ 鋼 6" 中版 ($\phi 6" = 15$ 公分中版) 鑄鉄

$$V = R = 2330 \times 3.375 = 7900 \text{ 呎磅}$$

$B_5 = 6:9"$ (2.03 公尺) 跨距

$$W = S_2 = 675 \times 4.375 = 2970 \text{ 呎磅}$$

$$A_5 = \frac{10 \times 16}{144} \times 150 = \frac{167}{3140} \text{ 呎磅}$$

$$M = \frac{3140 \times 6.75^2 \times 12}{8} = 215000 \text{ 吋磅。}$$

假定 $b = 10''$ (2.5公分), $d = 14.5$

$$d_c = 16'' (40公分)$$

兩面鋼牌用 $2 - \frac{1}{2}''$ (2-1/2吋) 上鉄。

$3 - \frac{5}{8}'' \phi$ (3-5/8吋) 下鉄。

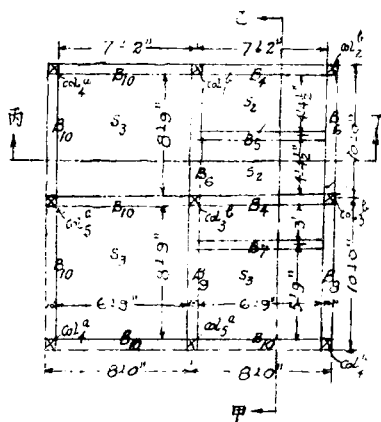
加 $\frac{1}{4}'' \phi$ @ 6" 中距 ($\phi 6''$ @ 25公分中距) 箍鉄。

$$S_3 = 7'2'' (2.16 \text{ 公尺}) \text{ 跨度。}$$

$$W = L.L = 60 \text{ 呎磅。}$$

$$D.L. = S_3 = \frac{1}{12} \times 150 = 50 \text{ 吋}$$

$$\frac{110 \text{ 呎磅。}}$$



樓盤

$$M = \frac{110 \times 7.16^2 \times 12}{10} = 6800 \text{ 吋磅。}$$

$$d = \sqrt{\frac{6800}{1067}} = 2.55 \quad d_c = 3\frac{1}{2}'' (9公分)$$

$A_s = 0.173$ 吋。用 $\frac{5}{16}'' \phi$ @ 4" 中距 ($\phi 8''$ @ 10公分)

加 $\frac{1}{4}'' \phi$ @ 8" 中距 ($\phi 6''$ @ 20公分) 助鉄。

$$B_6 = 8'9'' (2.64 \text{ 公尺}) \text{ 跨距。}$$

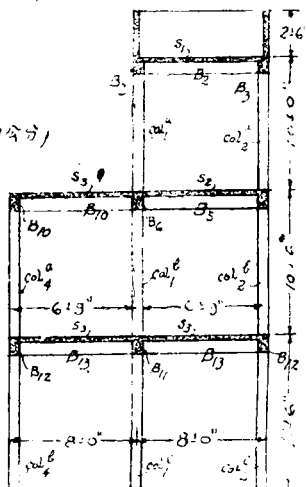
$$W_1 = B_5 = 2330 \times 3.375 = 7900 \text{ 呎磅。}$$

$$M_1 = \frac{7900 \times 8.75 \times 12}{4} = 207500 \text{ 吋磅。}$$

$$W_2 = S_3 = 110 \times 3.375 = 371 \text{ 呎磅。}$$

$$A_6 = \frac{10 \times 18}{1+4} \times 150 = 180 \text{ 吋}$$

$$S_4 = 1.5 \text{ 公尺}$$



梁子 = 丙

$$M_2 = \frac{560 \times 8.75^2 \times 12}{8} = 63500 \text{ 吋磅. } (M_1 + M_2) = 271000 \text{ 吋磅.}$$

兩面鋼骨假定 $b = 10''$ (25公分), $d = 16.5$, $d_t = 18''$ (45公分).

用 $2 \cdot \frac{5}{8}''$ ($\frac{1}{16}''$ 上鉄), $3 \cdot \frac{5}{8}''$ ($3 \cdot \frac{1}{16}''$ 下鉄).

加 $\frac{1}{4}'' \phi @ 6''$ 中距 ($\phi 6'' @ 15$ 公分) 箍鉄.

$$B_7 = 6 \times 9'' \text{ (2.03 公呎) 跨距.}$$

$$W = \text{屋頂 } 80 \times 4 = 320 \text{ 呎磅.}$$

$$5'' \text{ 牆 } 50 \times 7 = 350 \text{ ''}$$

$$B_7 = \frac{6}{12} \times 150 = 75 \text{ ''}$$

$$745 \text{ 呎磅.}$$

$$M = \frac{745 \times 6.75^2 \times 12}{8} = 57000 \text{ 吋磅.}$$

$$d = \sqrt{\frac{57000}{88.9 \times 6}} = 10.2 \quad d_t = 12'' \text{ (30 公分), } b = 6'' \text{ (15 公分).}$$

$$A_c = 0.34 \text{ 方吋. 用 } 2 \cdot \frac{1}{2}'' \phi (\phi 13'') \text{ 直鉄.}$$

$$1 \cdot \frac{1}{2}'' \phi (\phi 13'') \text{ 彎鉄.}$$

$$\text{加 } 6 \cdot \frac{1}{4}'' \phi (6 \cdot \phi 6'') \text{ 箍鉄.}$$

$$V = 745 \times 3.375 = 2500 \text{ 呎磅.}$$

$$V = \frac{2500}{89 \times 6 \times 10.5} = 45 \text{ 每方吋磅.}$$

$$u = \frac{2500}{2 \times 1.57 \times 10.5 \times 89} = 86 \text{ 每方吋磅.}$$

$$B_8 = 8 \times 9'' \text{ (2.64) 公呎跨距.}$$

$$W_1 = B_7 = 2500 \text{ 呎磅.}$$

$$M_1 = \frac{2500 \times 3 \times 5.75 \times 12}{8.75} = 46000 \text{ 吋磅}$$

$$W_2 = 10'' \text{ 牆 } 100 \times 3 = 300 \text{ 呎磅.}$$

$$B_8 = \frac{10 \times 12}{144} \times 150 = \frac{125}{430} \text{ 呎磅.}$$

$$M_2 = \frac{430 \times 8.75^2 \times 12}{8} = 50000 \text{ 吋磅. } (M_1 + M_2) = 30000 \text{ 吋磅.}$$

$$d = \sqrt{\frac{96000}{89 \times 10}} = 9.8 \quad d_t = 12'' (30 \text{ 公分}). \quad b = 10'' (25 \text{ 公分})$$

$A_s = 0.55$ 方吋. 用 $2 - \frac{5}{8}''$ 直鉄 ($2 - \phi 16'$) $1 - \frac{5}{8}''$ 彎鉄 ($1 - \phi 16'$)
 $6 - \frac{1}{4}''$ ($6 - \phi 6'$) 箍鉄.

$$V = 2500 \div 2 = 1250 \text{ 呎磅.}$$

$$430 \times 4.37 = 1880 \text{ 吋磅.}$$

$$3130 \text{ 呎磅.}$$

$$V' = \frac{3130}{89 \times 10 \times 10.5} = 34 \text{ 每方吋磅.}$$

$$u = \frac{3130}{2 \times 1.963 \times 10.5 \times 89} = 86 \text{ 每方吋磅.}$$

$$B_9 = 8'9'' (2.64 \text{ 公尺}) \text{ 跨度.}$$

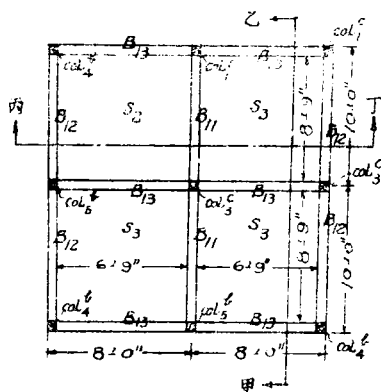
$$W_1 = B_7 = 2500 \text{ 呎磅.}$$

$$M_1 = \text{同上 } 46000 \text{ 吋磅.}$$

$$W_2 = S_3 = 110 \times 6.75 = 675 \text{ 呎磅.}$$

$$B_9 = \frac{10 \times 14}{144} \times 150 = \frac{146}{821} \text{ 呎磅.}$$

$$M_2 = \frac{821 \times 8.75^2 \times 12}{8} = 94000 \text{ 吋磅. } (M_1 + M_2) = 140000 \text{ 吋磅.}$$



平面圖

$$d = \sqrt{\frac{140000}{89 \times 10}} = 12.5 \quad d_t = 14" (35 \text{公分}) \quad b = 10" (25 \text{公分})$$

$$A_s = 0.7 \text{ 方吋} \quad \text{用 } 2-\frac{1}{2}" (2-\phi 16)$$

$$1-\frac{5}{8}" \text{ 中彎鐵 } (1-\phi 16) \quad 6-\frac{1}{4}" (6-\phi 6) \text{ 箍鐵}$$

$$V = 812 \times 4.375 = 3550 \text{ 呎磅}$$

$$V = \frac{3550}{10 \times 12.5 \times 89} = 32 \text{ 每方吋磅}$$

$$U = \frac{3550}{2 \times 3.63 \times 12.5 \times 89} = 80 \text{ 每方吋磅}$$

$$S_{10} = 8'-9" (2.64 \text{ 公尺}) \text{ 跨度}$$

$$W = 10" \text{ 橋 } 100 \times 3 = 300 \text{ 呎磅}$$

$$S_3 = 110 \times 3.375 = 375 \text{ "}$$

$$B_0 = \frac{8 \times 12}{144} \times 150 = 100 \text{ "}$$

$$\underline{780 \text{ 呎磅}}$$

$$M = \frac{780 \times 8.75^2 \times 12}{10} = 73500 \text{ 吋磅}$$

$$d = \sqrt{\frac{73500}{89 \times 8}} = 10.2 \quad d_t = 12" (30 \text{公分}) \quad b = 8" (20 \text{公分})$$

$$A_s = 0.46 \text{ 方吋} \quad \text{用 } 2-\frac{1}{2}" (2-\phi 13) \text{ 直鐵} \quad 1-\frac{1}{2}" (1-\phi 13) \text{ 彎鐵}$$

$$6-\frac{1}{4}" \phi (6-\phi 6) \text{ 箍鐵}$$

$$V = 780 \times 4.375 = 3413 \text{ 呎磅} \quad V = \frac{3413}{8 \times 10.5 \times 89} = 46 \text{ 每方吋磅}$$

$$U = \frac{3413}{2 \times 4 \times \frac{1}{2} \times 10.5 \times 89} = 92 \text{ 每方吋磅}$$

$$B_{11} = 8'-9" (2.64 \text{ 公尺}) \text{ 跨度}$$

$$W = S_3 = 110 \times 8.75 = 960 \text{ 呎磅.}$$

$$B_{11} = \frac{7 \times 16}{144} \times 150 = \frac{120}{1080} \text{ 呎磅.}$$

$$M = \frac{1080 \times 8.75^2 \times 12}{10} = 100000 \text{ 每方呎磅.}$$

$$d = \sqrt{\frac{100000}{89 \times 7}} = 13 \quad d_t = 16" (40 \text{ 公分}) \quad b = 7" (18 \text{ 公分})$$

$A_s = 0.52$ 方呎, 用 $2 - \frac{5}{8}" \phi (2 - \phi 16)$ 直鉄, $1 - \frac{5}{8}" \phi (1 - \phi 16)$ 彎鉄,
 $6 - \frac{1}{4}" \phi (6 - \phi 6)$ 箍鉄.

$$V = (1080 \times 4375) \div (7 \times 13 \times 89) = 59 \text{ 每方呎磅.}$$

$$U = \frac{V}{2 \times 1.963 \times 14.5 \times .89} = 94 \text{ 每方呎磅.}$$

$$B_{12} = 8'9" (2.64 \text{ 公尺}) \text{ 跨度.}$$

$$W = 10" \text{ 牆} = 100 \times 8.75 = 825 \text{ 呎磅.}$$

$$S_3 = 110 \times 3.375 = 375 \text{ "}$$

$$B_{12} = \frac{8 \times 16}{144} \times 150 = 133 \text{ "}$$

$$1340 \text{ 呎磅.}$$

$$M = \frac{1340 \times 8.75^2 \times 12}{10} = 123000 \text{ 呎磅.}$$

$$d = \sqrt{\frac{123000}{89 \times 8}} = 13.2 \quad d_t = 16" (40 \text{ 公分}) \quad b = 8" (20 \text{ 公分})$$

$A_s = 0.59$ 方呎, 用 $2 - \frac{3}{4}" \phi (2 - \phi 19)$ 直鉄, $1 - \frac{5}{8}" \phi (1 - \phi 16)$ 彎鉄,
 $6 - \frac{1}{4}" \phi (6 - \phi 6)$ 箍鉄.

$$V = (1340 \times 4375) \div (8 \times 14.5 \times 89) = 46 \text{ 每方呎磅.}$$

$$U = \frac{V}{2 \times 2.316 \times 14.5 \times .89} = 94 \text{ 每方呎磅.}$$

$B_{13} = 6.9''$ (2.03公呎) 跨距。

$W = 10''$ 牆 $100 \times 0.75 = 675$ 呎磅。

$$B_{13} = \frac{8 \times 12}{1.44} \times 150 = \frac{100}{780} \text{ 呎磅。}$$

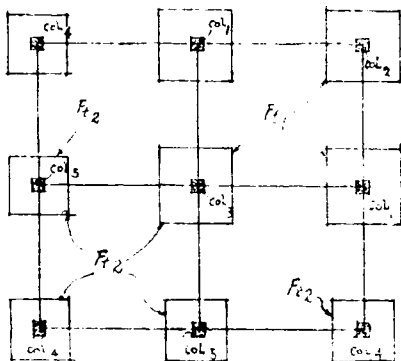
$$M = \frac{780 \times 6.75^2 \times 12}{15} = 43000 \text{ 每方呎磅。}$$

$$d = \sqrt{\frac{43000}{89 \times 8}} = 7.7 \quad d_c = 12'' \text{ (30公分)} \quad b = 8'' \text{ (20公分)}$$

$A_s = 0.35$ 方吋。用 $2 - \frac{1}{2}'' \phi$ ($2 - \phi 13''$) 直鐵。 $1 - \frac{1}{2}'' \phi$ ($1 - \phi 13''$) 彎鐵。
 $6 - \frac{1}{4}'' \phi$ ($6 - \phi 6''$) 橫鐵。

$$V = (780 \times 3.375) = 2650 \div (8 \times 10.5 \times 89) = 35 \text{ 每方呎磅。}$$

$$U = \frac{2650}{2 \times 1.57 \times 10.5 \times 89} = 91 \text{ 每方呎磅。}$$



底脚

$10' \times 10'$ (25x25) 吋公分	$10' \times 10'$ (25x25) 吋公分
$col_1^a = B_1 + B_3 = 6140 + 1000 = 7140$	$col_1^b = B_1 + B_2 = 12680 + 7140 + 1200 = 21020$
$col_2^a = B_1 + B_3 = 6140 + 1000 = 7140$	$col_2^b = B_4 + B_6 = 12680 + 7140 + 1200 = 21020$
$col_3^a = B_7 + B_3 = 6140 + 1000 = 7140$	$col_3^b = B_4 + B_6 + B_7 + B_9 = 12680 + 7140 + 1200 = 27970$
$col_4^a = B_8 + B_{10} = 6530 + 1000 = 7530$	$col_4^b = B_{12} + B_{13} = 8350 + 7530 + 1200 = 17080$
$col_5^a = B_{10} + B_{10} + B_{10} = 10200 + 1000 = 11200$	$col_5^b = B_{12} + B_{12} + B_{13} = 14050 + 11200 + 1200 = 26450$
col_1^a 至 col_5^a 4- $\frac{3}{8}$ " ϕ (4- ϕ 10") 直鉄 $\frac{1}{4}$ " ϕ @ 4" 中距 (ϕ 6" @ 10 公分) 腰箍	col_1^b 至 col_5^b 4- $\frac{1}{2}$ " ϕ (4- ϕ 13") 直鉄 $\frac{1}{4}$ " ϕ @ 4" 中距 (ϕ 6" @ 10 公分) 腰箍
$f_c = \frac{11200}{7 \times 7 + (14 \times 4 \times 0.1104)} = 219$ 吋磅	$f_c = \frac{27370}{7 \times 7 + (14 \times 4 \times 0.1963)} = 470$ 吋磅

水泥柱一覽表之一

col_1^c 至 $col_3^c = 12' \times 12'$ (30x30) 吋公分
$col_1^c = B_{12} + B_{12} + B_{13} = 11200 + 19980 + 1800 = 32980$
$col_2^c = B_{12} + B_{13} = 8350 + 19980 + 1300 = 29630$
$col_3^c = B_{11} + B_{11} + B_{13} + B_{13} = 14800 + 27930 + 1300 = 44030$
6- $\frac{1}{2}$ " ϕ (6- ϕ 13) 直鉄 $\frac{1}{4}$ " ϕ @ 4" 中距 (ϕ 6" @ 10 公分) 腰箍 $f_c = \frac{44530}{9 \times 9 + (14 \times 6 \times 1.963)} = 460$ 吋磅

水泥柱一覽表之二

$$F_p = W = 401 \frac{5}{8} = 401 \frac{5}{8} = 401 \frac{5}{8}$$

$$W = 44500 \text{ 呎磅}$$

$$\text{注基} = \frac{44500}{49000} \text{ 呎磅}$$

$$49000 \text{ 呎磅}$$

$$5\text{-格} = \frac{17000}{32000} \text{ 呎磅}$$

$$32000 \text{ 呎磅}$$

$$\text{格} = 200 \left(\frac{5 \frac{1}{2} + 3 \frac{1}{2}}{2} \right) 3.1416 \times 12 = 3400 \text{ 磅}$$

$$5 \times 3400 = 17000 \text{ 呎磅}$$

$$(5 - \phi 14 \times 3.66 \text{ 長} @ 90 \text{ 公分中距})$$

$$\text{面積} = \frac{32000}{1600} = \sqrt{20} = 4.6 \text{ 平方呎}$$

$$429" \times 429" \text{ 方呎}$$

$$(1.45 \times 1.45) \text{ 方公尺}$$

$$\text{深度} = d = \frac{4450 \left(\frac{4.75^2 - 1}{4.75 \times 4.75} \right)}{480 \times 12} = 7.8 \text{ 吋}$$

$$d_t = 10" (25 \text{ 公分})$$

$$\text{橋頂高度} = \frac{3400}{120 \times 4.5 \times 3.1416} = 2" (5 \text{ 公分})$$

$$W = \frac{1600(4.75^2 - 1) - (150 \times 4.75^2 \times .89)}{4.75 \times 4.75} = \frac{34500 - 2950}{22.6} = 1400 \text{ 呎磅}$$

$$V = \frac{4.75^2 - \left(\frac{12 + 2 \times 7.8}{12} \right)^2}{48 \left(\frac{12 + 2 \times 7.8}{12} \right)} \frac{1400 + 2 \times 3400}{7.8 \times 89} = \frac{24200 + 6800}{770} = 41 \text{ 吋磅}$$

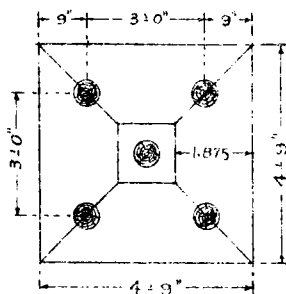
$$M = (6 \times 1 \times 1.875^2 + 8 \times 1.875^3) 1400 = 104000 \text{ 吋磅}$$

$$\text{橋之彎矩 } M = 3400 \times 12 = 82000 \text{ 吋磅}$$

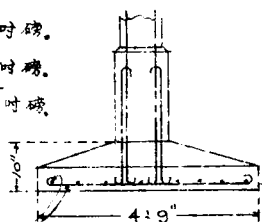
$$186000 \text{ 吋磅}$$

$$A_s = \frac{186000}{18000 \times 7.8 \times .89} = 1.5 \text{ 方吋}$$

用 14 - $\frac{3}{8}$ " ϕ (14 - $\phi 10$ ") 橫直兩方向



柱脚平面圖



柱脚穿弓

$$u = \frac{[(1 \times 1.875) + 1.875^2] 1400}{14 \times 1.178 \times 7.8 \times 89} = 67 \text{ 吋磅}$$

每 $2 = W = \text{COL}_1^6$ 至 COL_5^6 相同。

樁 $200 \times 4.5 \times 3.1416 \times 6 = 1700$ 呎磅。

$W = 27930$ 呎磅。

$5 \times 1700 = 8500$ 呎磅。

注意 - 2793 呎磅。

$(5 - \phi 14 \times 1.83 \text{ 長} @ 70 \text{ 中距})$

30730 呎磅。

樁 - 8500 呎磅。

22230 呎磅。

$$\text{面積} = \frac{22230}{1600} = \sqrt{14} = 3.75 \quad 4'0" \times 4'0" (1.22 \times 1.22) \text{ 方呎。}$$

鋼條讓步與上式 E_1 相同。

附浴池平屋頂鋼條水泥計算書

屋頂 $S = 8'0"$ (2.44 公尺) 跨距。

$W = \text{L.L.} = 20$ 呎磅。

$\text{D.L.} = 50$ 呎磅。

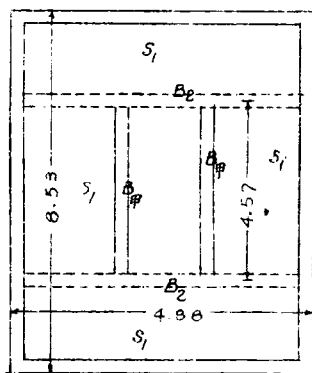
70 呎磅。

$$M = \frac{70 \times 8^2 \times 12}{8} = 6800 \text{ 吋磅。}$$

$$d = \sqrt{\frac{6800}{1067}} = 2.5. \quad d_t = 3\frac{1}{2} (9 \text{ 公分})$$

用 $\frac{3}{8}$ " ϕ 間 6" 中距 ($\phi 10'$ 間 15 公分)

$\frac{1}{4}$ " ϕ 間 8" 中距 ($\phi 6'$ 間 20 公分)



$B_{甲} = 15'0"$ (4.57 公尺) 跨度。

屋頂

$$W = S_1 = 70 \times 7 = 490 \text{ 呎磅}$$

$$B_{\text{甲}} = \frac{10 \times 16}{144} \times 150 = 170 \text{ 呎磅}$$

$$\underline{\underline{660 \text{ 呎磅}}}$$

$$M = \frac{660 \times 15^2 \times 12}{8} = 225000 \text{ 吋磅}$$

$$b = 10" \quad d = 14.5 \quad d_c = 16" (25 \times 40) \text{ 公分}$$

用 $3 - \frac{5}{8}"$ 上鉄 ($3 - \frac{5}{8}"$ 下鉄 ($3 - \frac{5}{8}"$))

加 $\frac{1}{4}" \phi @ 12"$ 中距 ($\phi 6"$ @ 30 公分)

$$V = 5300 \text{ 呎磅} \quad V_2 = 10 \times 14.5 \times 60 \times 89 = 7800 \text{ 吋磅}$$

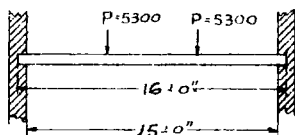
$$u = \frac{5300}{3 \times 1.96 \times 14.5 \times 89} = 72 \text{ 每方吋磅}$$

$$B_c = 15 \times 0" (4.57 \text{ 公尺}) \text{ 跨度}$$

$$W_1 = B_{\text{甲}} = V = 5300 \text{ 呎磅}$$

$$M_1 = \frac{5300 \times 15}{3} = 26500 \text{ 呎磅}$$

$$320000 \text{ 吋磅}$$



分 力 圖

$$W_2 = S_1 = 70 \times 5 = 350 \text{ 呎磅}$$

$$B_2 = \frac{12 \times 20}{144} \times 150 = 250 \text{ 呎磅}$$

$$\underline{\underline{600 \text{ 呎磅}}}$$

$$M_2 = \frac{600 \times 16^2 \times 12}{8} = 230000 \text{ 吋磅}$$

$$320000 \text{ 吋磅}$$

$$\underline{\underline{550000 \text{ 吋磅}}}$$

$$b = 12" (30 \text{ 公分}) \quad d = 18.5 \quad d_c = 20" (50 \text{ 公分})$$

用 $4 - \frac{3}{4}"$ 上鉄 ($4 - \frac{3}{4}"$ 下鉄 ($4 - \frac{3}{4}"$))

加 $\frac{1}{4}" \phi @ 12"$ 中距 ($\phi 6"$ @ 30 中距) 腰箍

$$V = 5300 + 4800 = 10100 \text{ 呎磅} \quad V_2 = 12 \times 18.5 \times 89 \times 60 = 12000 \text{ 吋磅}$$

$$u = \frac{10100}{4 \times 4 \times \frac{3}{4} \times 89 \times 18.5} = 52 \text{ 每方吋磅}$$

門眉樑 = $B_{\text{內}} = 20 \times 10$ (6.00 公尺) 跨度。

$$W_1 = \text{屋頂 } 80 \times 12 \times 10 = 9600 \text{ 呎磅。}$$

$$M_1 = \frac{9600 \times 20 \times 12}{4} = 575000 \text{ 呎磅。}$$

$$W_2 = 10'' \text{ 總} = 100 \times 5 = 500 \text{ 呎磅。}$$

$$\text{天溝} = 30 \times 5 = 150 \text{ 呎磅。}$$

$$B_{\text{面}} = \frac{14 \times 24}{1+4} \times 150 = 350 \text{ 呎磅。}$$

$$\frac{10000}{1000} \text{ 呎磅。}$$

$$M_2 = \frac{10000 \times 20^2 \times 12}{8} = 600000 \text{ 呎磅。}$$

$$M_1 = 575000 \text{ 呎磅。}$$

$$\text{總彎矩} = 1175000 \text{ 呎磅。}$$

$$b = 14'' (35 \text{ 公分}), \quad d = 22'' \quad d_c = 24'' (60 \text{ 公分}).$$

$$\text{鋼面積} = \frac{1175000}{18000 \times 22 \times .89} = 3.32 \text{ 平方吋。}$$

用 $4 - \frac{3}{4}'' (4 - \text{吋} 19')$ 直鉄, $2 - \frac{3}{4}'' (2 - \text{吋} 19')$ 彎鉄。

$$V = 4800 + 10000 = 14800 \text{ 呎磅。}$$

$$V_2 = 14 \times 22 \times .89 \times 60 = 16500 \text{ 呎磅。}$$

$$u = \frac{14800}{4 \times 4 \times \frac{3}{4} \times 22 \times .89} = 64 \text{ 每方吋磅。}$$

第三節 建造浴室章程說明書

說明書 總則

基地坐落 業主花執經, 擬建新式浴池一所, 坐落華興

門路東首, 斜土新路空地上, 建造門面三間前後二棟與

即照辦。

模範型凡有重要工作，包工人須於作場內製成模範型由
建築師檢查，如有更改之處，應即照辦。此項模範型由建築師
審定後方能出。及說明書，為建築師所全數之委託，包工人
所有權，不得任意污損。完工程師受業主之工作，有不符合同
規定之職務，與洽商時，隨時令停工。及一切工程上之疑問，

該項工程師與洽商時，隨時令停工。及一切工程上之疑問，
均應由該項工程師與洽商時，隨時令停工。及一切工程上之疑問，
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均應由該項工程師與洽商時，隨時令停工。及一切工程上之疑問，

完工 完工交屋之前，倘有損壞，必須修理完好，隨後邀業主驗收，至於領銀手續，由業主與包工人面議，另訂辦法，各執承攬，據一份存照。

第二段 工程說明

概要 承包人所用一切材料，須上等貨品，經工程師審閱後，方准應用。

磚 用普通手製磚，每塊不得小於 $9" \times 4\frac{1}{2}" \times 1\frac{3}{4}"$ ，磚樣須經工程師審查合格。

木料 一切木料除圖上註明其他木料外，其餘皆用頭等洋松，均須乾透，並無節疤裂縫等情，方可應用。

瓦 所有屋面，均用泰山西式瓦。

水門汀 用象牌或泰山牌，及其他效力同等之國貨，有相當說明者。

紙筋石灰 紙筋石灰，須用上等貨，於應用前二月，用相當水量溶化澆漿，方准施用。

黃沙 水門汀內所混合之黃沙，必須潔淨尖銳，不得含有污泥垃圾等物。

石灰三和土 係一、二、五之比例，即一份石灰，二份黃沙，五份碎磚，三者必須調拌勻齊，然後應用。碎磚大者，勿過二英吋，小者勿小於四分之三英吋，須分皮排放，隨下隨排，每皮下九英吋厚，排堅六英吋為合格。

水門汀三和土 係一、二、四之比例，即一份水坭，二份黃沙，四份石子，三者必須拌透搗熟，一俟拌好，即須應用，所儲

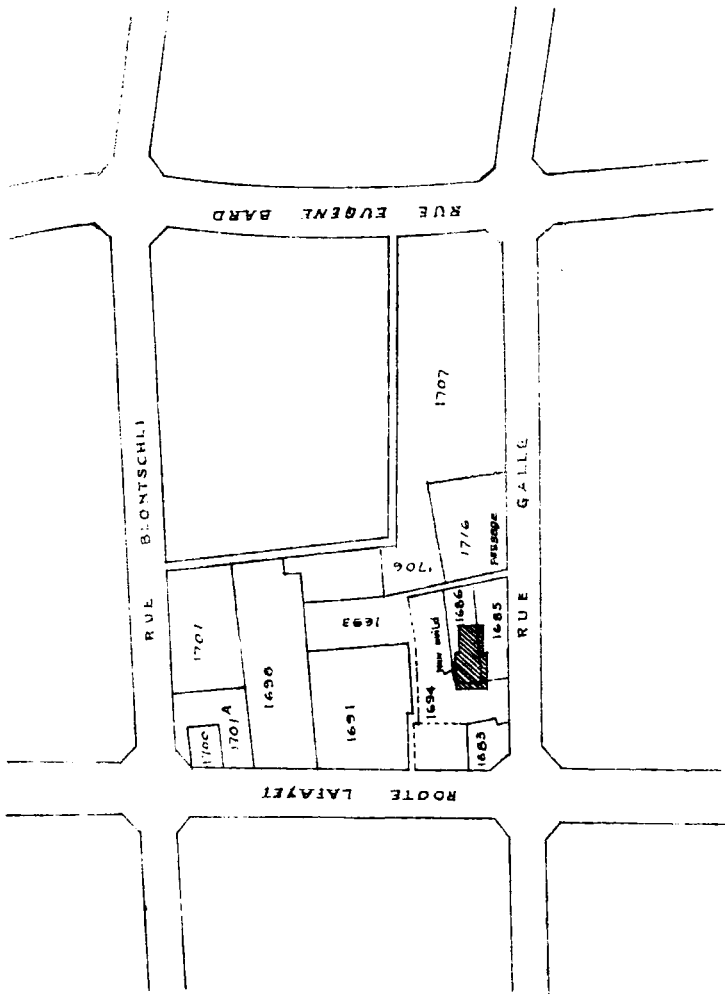
磚工砌法 所有磚工用英國式砌成，中隔以不逾十六分之二三英寸，每份半英寸，各處之前，加做鐵子三呎高，用水泥砌做，四面欄杆，均粉水，青溝及明溝，所有樓板門窗及扶梯等，一律用一底二度廣漆，水油漆，注意。

欄杆 晒台上加做鐵子三呎高，用水泥砌做，四面欄杆，均粉水，青溝及明溝，所有樓板門窗及扶梯等，一律用一底二度廣漆，水油漆，注意。

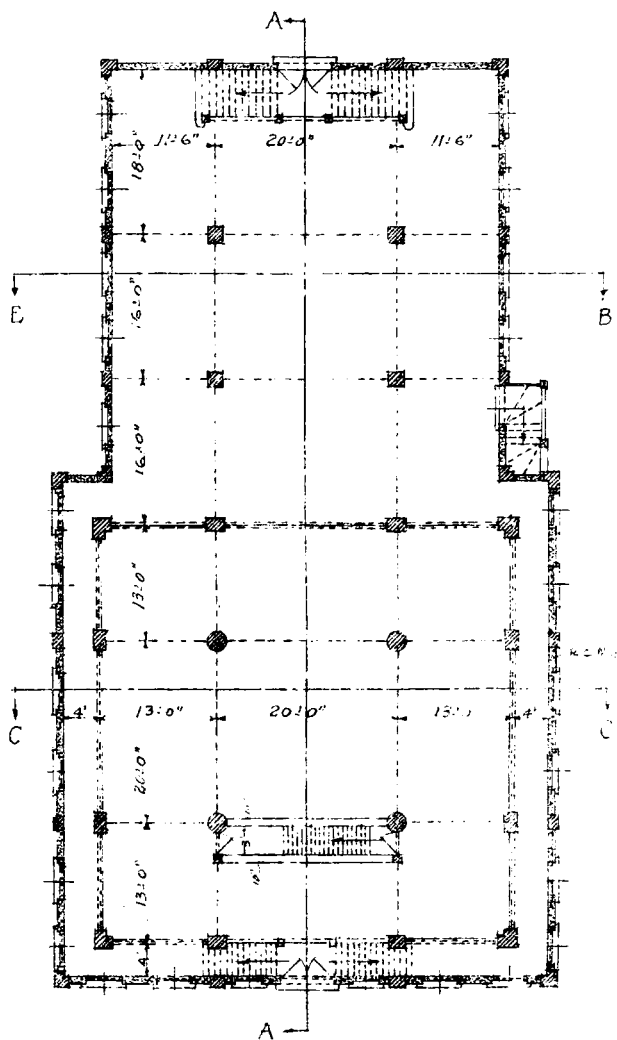
第三章 擬建法藏講寺圖案

第一節 業主烟鑿委託設計法藏講寺一所，座落法租界拓勒路法藏寺內，地冊1686號有案，茲將計劃略圖分段排列如下，以便學者參考。

又以下設計之圖案，自開工日始，至完工日止，特請經驗宏富的建築家張效良與江裕生二位先生協理監工，足見該工程之重視也。合併附誌。

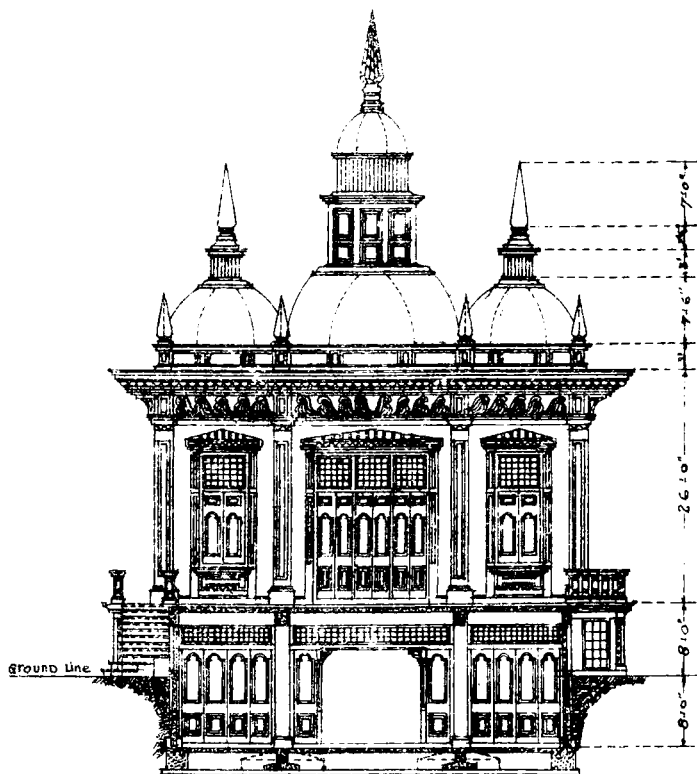


KEY PLAN



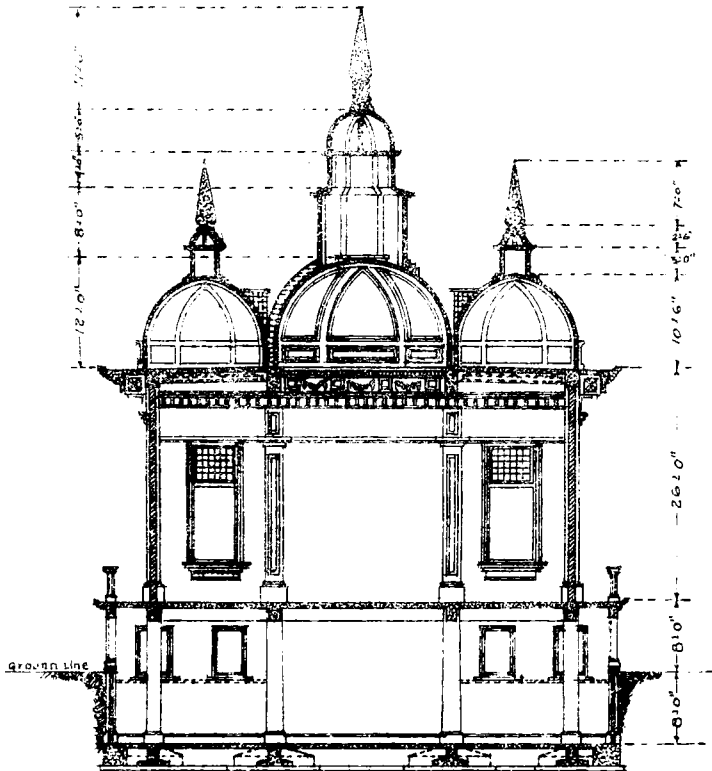
scale $\frac{1}{16}'' = 1:0''$

GROUND PLAN

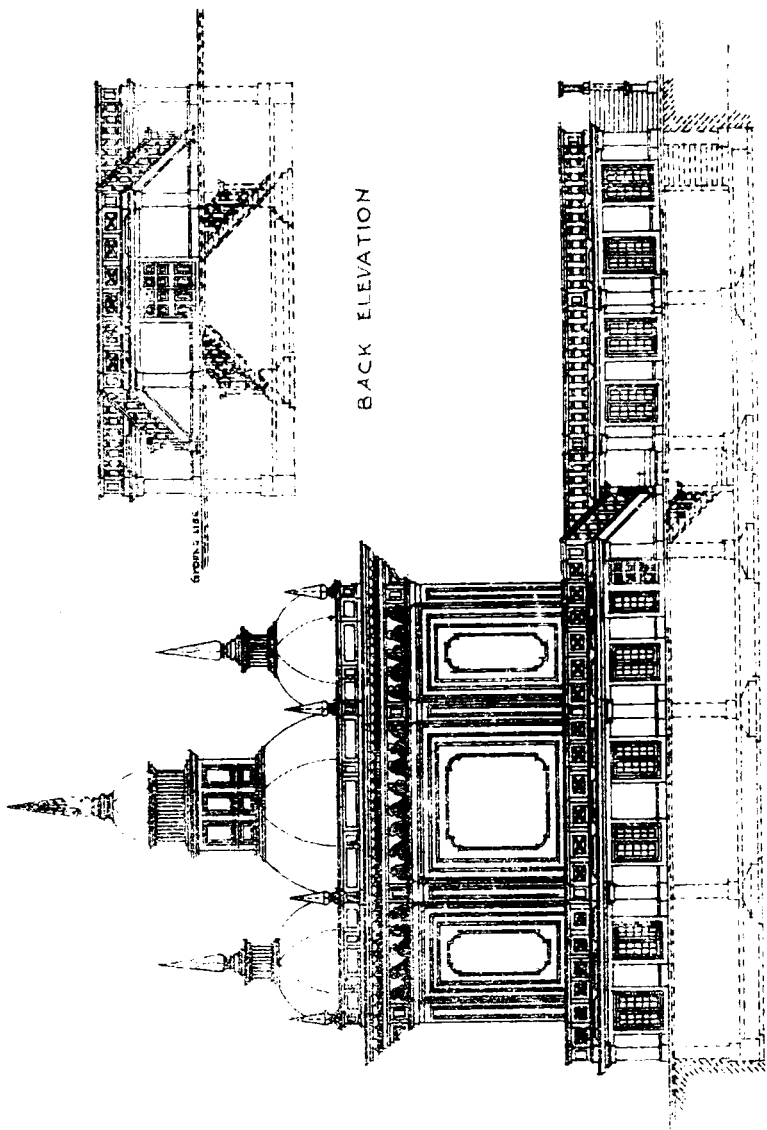


FRONT ELEVATION & SECTION = B-B

scale $\frac{1}{16}'' = 10'$



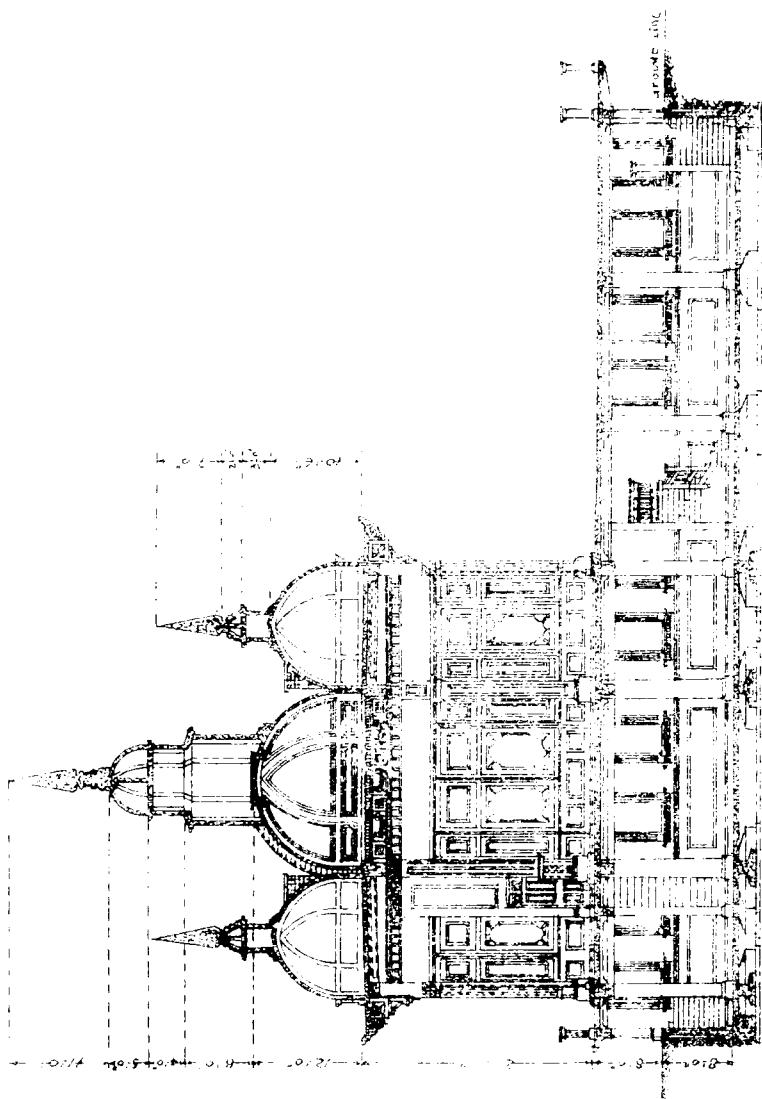
SECTION = C-C.



BACK ELEVATION

SIDE ELEVATION

Scale 1/100



SIDE SECTION · A-A

scale 1/100

第二節 法藏寺之設計與計算全書

A

A = col₁

$$W = (2 + .83 \div 2)^2 \times .7854 \times 11 \times 150 = 2600 \text{ lb.}$$

$$(2 + .83 \div 2)^2 \times .7854 \times 11 \times 20 \quad 300 \text{ "}$$

$$3000 \text{ lb.}$$

$$A_s = 0.6 \quad 4 - \frac{1}{2} \phi \text{ stir.}$$

$$\frac{1}{4} \phi @ 4 \text{ c.c. stirrups.}$$

A = col₂

$$W = \text{col}_1 = 3000 \text{ lb.}$$

$$\text{col}_2 \left(\frac{8 \times 8}{144} \times 150 \times 5 \right) = 332 \text{ "}$$

$$3400 \text{ lb.}$$

$$A_s = 0.64 \text{ " } 4 - \frac{1}{2} \phi \text{ stir.}$$

$$\frac{1}{4} \phi @ 4 \text{ c.c. stirrups.}$$

A = slab

$$S_1 = \left[(8 \times 4 \times .7854 \div 6) \div 2 \right] \times \left(\frac{4}{2} \times 150 + 60 \times 6 \right) = 1380 \text{ lb.}$$

$$M = \frac{1380 \times 4.25 \times 12}{8} = 8800 \text{ in. lb. } d = 3 \text{ " } c = 4 \text{ "}$$

$$A_s = \frac{8800}{18 \times 10 \times 3 \times .89} = 0.164 \text{ "}$$

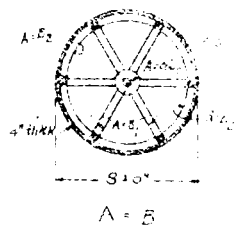
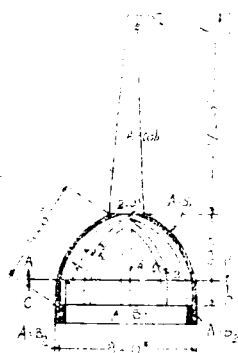
$$\frac{5}{16} \phi @ 4 \frac{1}{2} \text{ c.c. } \quad \frac{1}{4} \phi @ 8 \text{ c.c.}$$

A = beam

$$A = B_1 \quad W = A = B_1 = \frac{8 \times 8}{144} \times 150 \times 12 = 800 \text{ lb.}$$

$$A = S_1 = 1380 \times 2 = 2760 \text{ "}$$

$$3600 \text{ lb.}$$



$$M = \frac{3600 \times 12 \times 12}{8} = 6500 \text{ in. lb.} \quad b = 8" \quad d = 6.5 \quad d_f = 8"$$

$$A_s = \frac{6500}{18000 \times 6.5 \times .89} = 0.63 \text{ "} \quad \text{Use } 2 - \frac{1}{2}" \phi \text{ str.} \quad 2 - \frac{1}{2}" \phi \text{ Bt.}$$

$\frac{1}{4}" \phi$ @ 6" c.c. stirrups.

A = B₂

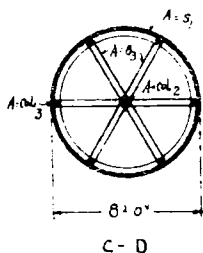
$$W = S_1 \quad 1380 \text{ Ft. lb.}$$

$$B_2 = \frac{6 \times 6}{144} \times 150 \times 25 = \frac{160 \text{ "}}{1540 \text{ Ft. lb.}}$$

$$M = \frac{1540 \times 4.25 \times 12}{8} = 9950 \text{ in. lb.}$$

$$A_s = \frac{9950}{18000 \times 4.5 \times .89} = 0.137 \text{ "} \quad b = 6" \quad d = 4.5 \quad d_f = 6"$$

2 - $\frac{3}{8}" \phi$ str



A = B₃

$$W = A = \text{COL}_2 = 6340 \div 3 = 2113 \text{ Ft. lb.}$$

$$B_3 = \frac{6 \times 10}{144} \times 150 \times 8 = \frac{510 \text{ "}}{2630 \text{ Ft. lb.}}$$

$$M = \frac{2630 \times 8 \times 12}{4} = 64000 \text{ in. lb.} \quad b = 6" \quad d = 8.5 \quad d_f = 10"$$

Use 2 - $\frac{1}{2}" \phi$ str.

2 - $\frac{1}{2}" \phi$ Bt.

$\frac{1}{4}" \phi$ @ 6" c.c. stirrups.

A S₂

$$W = \text{Wind} = 20 \times 4 \times 4.25 = 340 \text{ Ft. lb.}$$

$$A S_2 = \frac{4}{12} \times 150 \times 4 \times 4.25 = \frac{850 \text{ "}}{1190 \text{ Ft. lb.}}$$

$$M = \frac{1190 \times 4 \times 12}{8} = 7100 \text{ ft. lb.} \quad d = 2.5 \quad d_t = 4''$$

$$A_s = \frac{7100}{18000 \times 3 \times .89} = 0.152 \text{ ''}$$

$\frac{5}{16}'' \phi$ @ 6" c. c. Bar. $\frac{1}{4}'' \phi$ @ 8" c. c. stirrups.

$$A = \text{col}_3 \quad W = A \cdot B_2 = 1540 \text{ ft. lb.}$$

$$A \cdot B_3 = 2650 \div 2 = 1325 \text{ ''}$$

$$\text{Col}_3 = \frac{8 \times 8}{144} \times 150 \times 4 = 265 \text{ ''}$$

$$\frac{3130 \text{ ft. lb.}}{3130 \text{ ft. lb.}} \quad (8'' \times 8'' \text{ sq.})$$

$$A_s = 0.32 \text{ ''} \quad 4 \cdot \frac{3}{8}'' \phi \text{ Bar.}$$

$\frac{1}{4}'' \phi$ @ 4" c. c. stirrups.

$$A = B_4 \quad W = A \cdot S_2 = 1190 \text{ ft. lb.}$$

$$A = \text{col}_3 = 3130 \text{ ''}$$

$$A \cdot B_4 = \left(\frac{8 \times 20}{144} \times 150 \times 4.75 \right) = 710 \text{ ''}$$

$$\frac{5030 \text{ ft. lb.}}{5030 \text{ ft. lb.}}$$

$$M = \frac{5030 \times 4.25 \times 12}{8} = 30000 \text{ in. lb.}$$

$$b = 8'' \quad d = 18.5 \quad d_t = 20''$$

$$A_s = \frac{30000}{18000 \times 6.5 \times .89} = 0.29 \text{ ''}$$

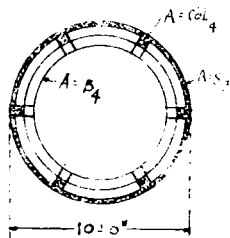
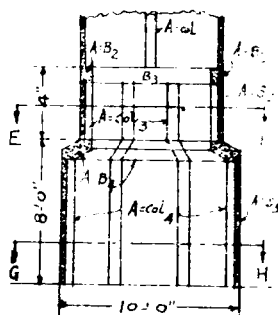
2 - $\frac{1}{2}'' \phi$ str. 2 - $\frac{1}{2}'' \phi$ pt.

$\frac{3}{8}'' \phi$ @ 6" c. c. stirrups.

$$A = S_3 \quad W = \text{wind} = (31.416 \div 6) \times 8 \times 20 = 840 \text{ ft. lb.}$$

$$S_3 = \left(\frac{4}{12} \times 150 \right) \times 8 \times 5.2 = 2100 \text{ ''}$$

$$\frac{2940 \text{ ft. lb.}}{2940 \text{ ft. lb.}}$$

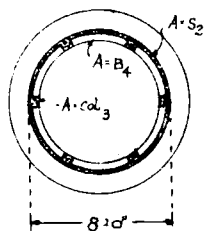


SECTION G-H

$$M = \frac{(2940 \div 5.3) \times 8 \times 12}{8} = 6700 \text{ in. lb.} \quad d = 2.5 \quad d_t = 4"$$

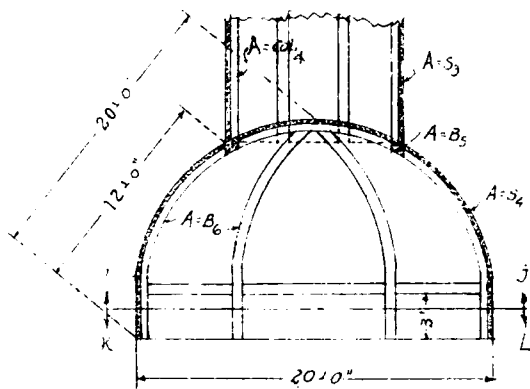
$$A_s = \frac{6700}{18000 \div 3 \times .89} = 0.15 \text{ in.}^2$$

$\frac{5}{16}$ " ϕ @ 6" c.c. Bar. $\frac{1}{4}$ " ϕ @ 8" c.c. stirrups.



A col₄ $W = A \cdot B_4 = 5030 \text{ F. lb.}$
 $col_4 = \frac{8 \times 8}{144} \times 150 \times 8 = 540 \text{ "}$
5570 F. lb.

$A_s = 0.56 \text{ in.}^2 + \frac{3}{8} \text{ in.}^2 \quad \frac{1}{4} \text{ in.} \phi @ 4 \text{ c.c.}$



A S₄ $W = (62.83 \div 6) \div 2 \times 20 \times 60 = 6283 \text{ F. lb.}$
 $S_4 = (62.83 \div 6) \div 2 \times (\frac{4}{12} \times 150 \times 20) = 5250 \text{ "}$
11533 F. lb.

$$M = \frac{(11535 \div 10) \times 10.5 \times 12}{8} = 18300 \text{ in. lb.} \quad d_t = 4"$$

$$A_s = \frac{18300}{18000 \times 3 \times .89} = 0.38 \# \quad \frac{3}{8} \square @ 4" C.C. \quad \frac{1}{4} \phi @ 6" C.C.$$

A-B₅

$$W_1 = A \cdot s_3 = 2940 \text{ Ft. lb.}$$

$$B_5 = \frac{8 \times 8}{144} \cdot 150 \times 4.25 = \frac{285}{3230} \text{ Ft. lb.}$$

$$M = \frac{3230 \times 4.25 \times 12}{8} = 20800 \text{ in. lb.} \quad b = 8" \quad d = 6.5 \quad d_f = 8"$$

$$A_s = \frac{20800}{18000 \times 6.5 \times .89} = 0.194 \# \quad 2 - \frac{1}{2} \phi \text{ Bar.}$$

A-B₆

$$W_1 = A \cdot c \cdot L_4 = 5570 \text{ Ft. lb.}$$

$$A \cdot B_5 = \frac{3230}{8800} \text{ Ft. lb.}$$

$$W_2 = A \cdot B_6 = \frac{12 \times 15}{144} \times 150 \times 20 = 3760 \text{ Ft. lb.}$$

$$R = (W_2 \div 2) = 1880 \text{ Ft. lb.}$$

$$M_1 = \frac{8800 \times 8 \times 12 \times 12}{20} = 507000 \text{ in. lb.}$$

$$M_2 = \frac{3760 \times 20 \times 12}{8} = 112000 \text{ in. lb.}$$

$$\text{Total} = 619000 \text{ in. lb.}$$

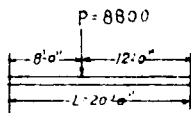
$$b = 12" \quad d = 13.5 \quad d_f = 15"$$

$$A_s = \frac{619000}{18000 \times 13.5 \times .89} = 3.35 \# \quad \text{Use } 2 - 1" \text{ str.}$$

2 - 1" = Bt.

$$R_1 = \frac{8800 \times 12}{20} \quad 5300 + 1880 = 7180 \text{ Ft. lb.}$$

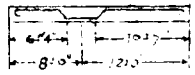
$$V = \frac{7180}{12 \times 13.5 \times .89} = 50 \text{ per sq. inch lb.}$$



$$R_2 = \frac{8800 \times 8}{20} = 3500 + 1880 = 5380 \text{ 呎. lb.}$$

$$Y = \frac{1}{3} \sqrt{3 \times 12 \times (20 + 8)} = 10' 7''$$

$$U = \frac{7182}{2 \times 8 \times 13.5 \times .83} = 75 \text{ per sq inch lb.}$$



A 5₅

$$W = (10^2 \div 2) \times .1854 \times 60 = 2350 \text{ 呎. lb.}$$

$$S_5 = \frac{10^2 \div 2 \times .1854 \times \frac{6}{12} \times 150}{4.520} = 1970 \text{ 呎. lb.}$$

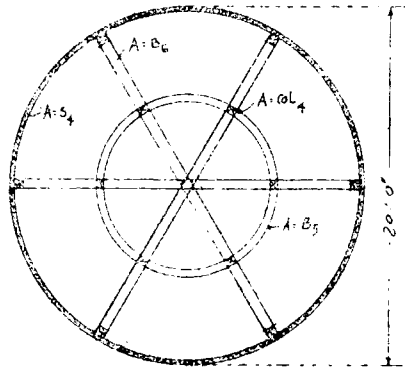
$$M = \frac{(4320 \div 5) \times 10 \times 12}{8} = 13000 \text{ in. lb.}$$

$$A_s = \frac{13000}{18000 \times 3 \times .89} = 0.27''$$

$$d_1 = 4''$$

Use $\frac{3}{8}'' \phi$ @ 5" c.c. bar.

$\frac{1}{4}'' \phi$ @ 8" c.c. stirrups.



I - J

A 5₇

$$W = A = B_6 = 8800 + 3760 = 12560 \text{ 呎. lb.}$$

$$A = B_6 \div 2 = 6280 \text{ 呎. lb.}$$

$$A = S_4 = 11630 \text{ 呎. lb.}$$

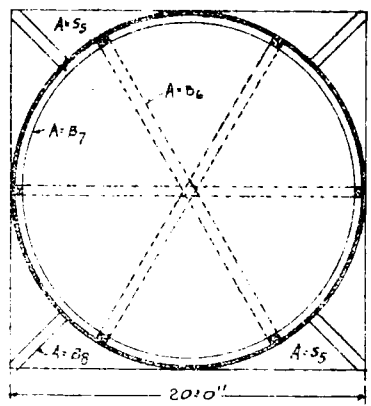
$$A = S_4 = 5765 \text{ 呎. lb.}$$

$$A = S_7 = \left(\frac{15 \times 30}{1 + 4} \right) \times 150 \div 62.83 \div 4 = 7400 \text{ 呎. lb.}$$

$$43480 \text{ 呎. lb.}$$

$$M = \frac{43480 \times 5.25 \times 10.46 \times 12}{15.73} = 180000 \text{ in. lb.}$$

$$A_s = \frac{180000}{18000 \times 23 \times .83} = 4''$$



K - L

2-1" str. 2-1" Bl. 2- $\frac{3}{4}$ " ϕ top.

b = 15" d = 28" d_t = 30"

$$R_1 = \frac{43480 \times 10.46}{15.71} = 28800 \text{ Ft. lb.} \quad R_2 = \frac{4348 \times 5.25}{15.71} = 14680 \text{ Ft. lb.}$$

$$V = \frac{28800}{15 \times 28 \times .89} = 78 \text{ per sq. inch lb.} \quad x_1 = \frac{78 - 60}{2 \times 78} \times 15.71 = 1.81 \text{ Ft.}$$

$$V_2 = (78 - 60) \times 15 \times 1.81 = 2932.2 \text{ Ft. lb.}$$

$$\text{stirrups} = \frac{2932.2}{12000 \times .076} = 3.3$$

$$y = \frac{1}{3} \sqrt[3]{3 \times 10.46 (15.71 + 5.25)} = 8.5 \text{ Ft.}$$

15- $\frac{5}{16}$ " ϕ

$$S = \frac{12000 \times .076}{(78 - 60) \times 15} = 3.5 \text{ inch. Sag } 3\frac{1}{2}" \text{ to } 10" \text{ cc. stirrups,}$$

$$U = \frac{28800}{2 \times 4 \times 28 \times .89} = 145 \text{ per sq inch lb.}$$

A-B₈ W = (A-B₇ \div 2) = 21730 Ft. lb.

$$A-B_8 = \frac{15 \times 15}{144} \times 150 \times 4 = 940 \text{ "}$$

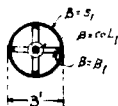
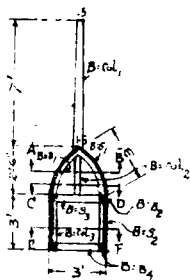
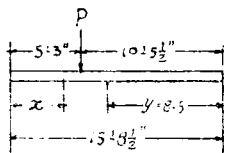
$$\frac{22670 \text{ Ft. lb.}}{22670 \text{ Ft. lb.}}$$

$$M = \frac{22670 \times 4 \times 12}{2} = 545000 \text{ in. lb.} \quad b = 15"$$

d = 13.5 d_t = 15"

$$A_s = \frac{545000}{18000 \times 13 \times .89} = 2.5 \text{ "}$$

2-1" top, 2-1" bottom, $\frac{5}{16}$ " ϕ in 4" c.c.



B=col₁ W = (1.5 + .5 \div 2) ² \times .7854 \times 7 \times 150 = 830 Ft. lb.

Wind = (1.5 + .5 \div 2) ² \times .7854 \times 7 \times 20 = 110 "

$$\frac{940 \text{ Ft. lb.}}{940 \text{ Ft. lb.}}$$

A-B.

(B)

$$A_s = 0.095'' + \frac{3}{8}'' \phi_{bar} \frac{1}{4}'' \phi \text{ in } 4'' \text{ c.c. stirrups}$$

$$B = S_1 \quad W = (3.4 \times 7854 \div 4) \div 2 \times 3 \times 60 = 213 \text{ K. lb.}$$

$$Wind = (3.4 \times 7854 \div 4) \div 2 \times 3 \left(\frac{4}{12} 150\right) = 177 \text{ ''}$$

$$\frac{390}{390 \text{ K. lb.}}$$

$$M = \frac{390(9.425 \div 4) \times 12}{8} = 3220 \text{ inch lb.} \quad d_t = 3''$$

$$A_s = \frac{3220}{18000 \times 3 \times 89} = 0.067 \text{ sq. inch.}$$

$\frac{5}{16}'' \phi$ a 4'' c.c. each way.

$$B = S_2 \quad W = B \cdot col_1 \times 2 = 470 \text{ K. lb.}$$

$$S = S_1 \times 2 = 780 \text{ ''}$$

$$B_1 = \frac{S}{2} \times 150 \times 6 = 230 \text{ ''}$$

$$\frac{1480}{1480 \text{ K. lb.}}$$

$$M = \frac{1430 \times 6 \times 12}{4} = 26600 \text{ inch lb.} \quad b = 6'' \quad d = 4.5 \quad d_t = 6''$$

$$A_s = \frac{26600}{18000 \times 4.5 \times 59} = 0.37''$$

$4 \times \frac{5}{8}'' \phi \quad \frac{1}{4}'' \phi \text{ @ } 6'' \text{ c.c.}$

$$B = B_2 \quad W = S_1 \quad 390 \text{ K. lb.}$$

$$S_2 = \frac{S}{2} \times 150 \times 2.5 = 190 \text{ K. lb.}$$

$$\frac{580}{580 \text{ K. lb.}}$$

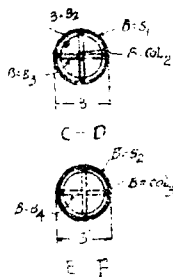
$$M = \frac{250 \times 2.5 \times 12}{8} = 2200 \text{ inch lb.}$$

$$b = 6'' \quad d = 4.5 \quad d_t = 6''$$

Use $4 \times \frac{5}{8}'' \phi_{bar} \quad \frac{1}{4}'' \phi \text{ @ } 6'' \text{ c.c. stirrups.}$

$$B = col_2 \quad W = B \cdot col_1 = 940 \text{ K. lb.}$$

$$col_2 = \left(\frac{4.5}{144} 150\right) \times 2.5 \frac{94}{1040} \text{ ''} \quad (= 12)$$



$$A_s = 0.104 \text{ " " } \quad \text{See } B\text{-col}_1 = 4 - \frac{3}{8} \text{ " } \phi \text{ Bar } \frac{1}{4} \text{ " } \phi @ 4 \text{ " c.c. stirrups.}$$

$$B = B_3 \quad W = B \cdot \text{col}_2 + 2 = (1040 + 2) = 520 \text{ sq. ft.}$$

$$B_3 = \frac{6 \times 6}{144} \times 150 \times 6 = \frac{270 \text{ "}}{750 \text{ sq. ft.}}$$

$$M = \frac{750 \times 6 \times 12}{4} = 13500 \text{ in. lb.} \quad b = 6 \text{ " } d = 4.5 \text{ " } d_f = 6 \text{ "}$$

$$A_s = 0.33 \text{ # " } \quad 4 - \frac{3}{8} \text{ " } \phi \text{ Bar } \frac{1}{4} \text{ " } \phi @ 4 \text{ " c.c. stirrups.}$$

$$B = S_2 \quad W = \text{wind } (3 \times 4 \times 7854) \div 4 \times 3 \times 20 = 142 \text{ sq. ft.}$$

$$S_2 = (9.425 \div 4) \times 3 \times (\frac{6}{12} \times 150) = \frac{357 \text{ "}}{500 \text{ sq. ft.}}$$

$$M = \frac{500 \times (9.425 \div 4) \times 12}{8} = 1760 \text{ inch lb.} \quad d_f = 4 \text{ "}$$

$$A_s = \frac{1760}{18000 \times 3 \times .89} = 0.37 \text{ # " } \quad \text{Use } \frac{3}{8} \text{ " } \phi @ 3 \text{ " c.c.}$$

$$B = \text{col}_3$$

$$W = B_2 = 580 \text{ sq. ft.}$$

$$B_2 = 750 \text{ " } \quad (6 \times 6 \text{ "})$$

$$\text{col}_3 = \frac{6 \times 6}{144} \times 150 \times 3 = 113 \text{ "}$$

$$\frac{1330 \text{ sq. ft.}}$$

$$A_s = 0.133 \text{ # " } \quad 4 - \frac{3}{8} \text{ " } \phi \text{ Bar } \frac{1}{4} \text{ " } \phi @ 4 \text{ " c.c. stirrups.}$$

$$B = S_4$$

$$W = B \cdot S_2 = 500 \text{ sq. ft.}$$

$$B_4 = \frac{6 \times 6}{144} \times 150 \times (9.425 \div 4) = 157 \text{ "}$$

$$\frac{660 \text{ sq. ft.}}$$

$$M = \frac{660 \times (9.425 \div 4) \times 12}{8} = 2350 \text{ in. lb.} \quad b = 3 \text{ " } d = 6.5 \text{ " } d_f = 8 \text{ "}$$

$$A_s = \frac{2350}{18000 \times 6.5 \times .89} = 0.0225 \text{ # "}$$

$$4 - \frac{3}{8} \text{ " } \phi \text{ Bar } \frac{1}{4} \text{ " } \phi @ 4 \text{ " c.c. stirrups.}$$

$$B = S_3$$

$$W = (13 \times 4 \times 195.4 \div 6) \div 2 \times 14 \times 60 = 2850 \text{ ft. lb.}$$

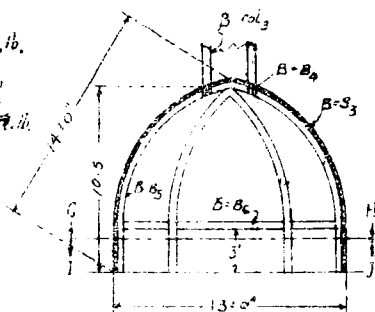
$$S_3 \cdot (40.841 \div 6) \div 2 \times 14 \times \left(\frac{1}{12} \times 150\right) = \frac{2400 \text{ "}}{5250 \text{ 磅. 呎.}}$$

$$M = \frac{5250 \times (40.841 \div 6) \times 12}{8} = 54000 \text{ in. lb.}$$

$$d_t = 4 \text{ "}$$

$$A_s = \frac{54000}{18000 \times 3 \times .89} = 1.13 \text{ "}$$

$\frac{5}{8}$ " ϕ .03" c.c. Bar. $\frac{1}{4}$ " ϕ @ 6" c.c. stirrups.



$$B = B_5$$

$$W = B \cdot \text{col}_3$$

$$1330 \text{ Ft. lb.}$$

$$B = B_4$$

$$660 \text{ "}$$

$$B = S_3$$

$$= 5300 \text{ "}$$

$$B = B_5 = \frac{12 \times 12}{144} \times 150 \times 14 = 2100 \text{ "}$$

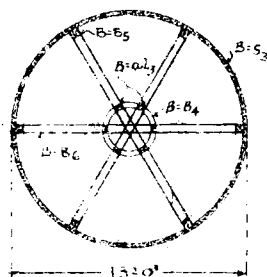
$$9100 \text{ Ft. lb.}$$

$$M = \frac{9100 \times 14 \times 12}{8} = 190000 \text{ in. lb.}$$

$$b = 12 \text{ "}, d = 10.5 \text{ "}, d_t = 12 \text{ "}$$

$$A_s = \frac{190000}{18000 \times 10.5 \times .89} = 1.1 \text{ "}$$

4 - $\frac{5}{8}$ " ϕ Bar $\frac{1}{4}$ " ϕ @ 4" c.c. stirrups.



G - H

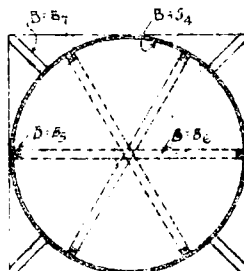
$$B = S_4$$

$$W = L \cdot L = 60 \text{ Ft. lb.}$$

$$D \cdot L = 50 \text{ "}$$

$$110 \text{ Ft. lb.}$$

$$M = \frac{110 \times 13^2 \times 12 \times .5}{12} = 3400 \text{ in. lb.} \quad d_t = 4 \text{ "}$$



$$A_s = \frac{9400}{18000 \times 4 \times .89} = 0.145 \text{ "}$$

$\frac{3}{8}$ " ϕ @ 6" c.c. each way,

$$W = \frac{1}{4} \times 110 \times 13 \times 13 = 4620 \text{ Ft. lb.}$$

$$\begin{aligned} B = B_6: \quad W = B_3 &= 3100 \text{ Ft. lb.} \\ S_3 &= 5300 \text{ " } \\ S_4 &= 4620 \text{ " } \\ B = B_6 &= \left(\frac{10 \times 30}{12} \times 150 \times 0.841 \right) \div 4 = 3200 \text{ " } \\ &= 22220 \text{ Ft. lb.} \end{aligned}$$

$$M = \frac{22220 \times (40.841 \div 6) \times 12}{10} = 181000 \text{ in. lb.}$$

$$A_s = \frac{181000}{18000 \times 28 \times .89} = 0.41 \text{ " } \quad b = 10 \text{ " } \quad d = 20 \text{ " } \quad d_f = 30 \text{ "}$$

use 4 - $\frac{1}{2}$ " ϕ bar. $\frac{3}{4}$ " ϕ @ 6" c.c. stirrups.

$$V = \frac{8804}{10 \times 28 \times .89} = 36 \text{ per sq inch lb.}$$

$$\begin{aligned} B = B_7 \quad W = B_2 &= 11110 \text{ Ft. lb.} \\ B_7 &= \frac{10 \times 5}{12} \times 150 \times 3 = 460 \text{ " } \\ &= 11570 \text{ Ft. lb.} \end{aligned}$$

$$M = \frac{11570 \times 3 \times 12}{2} = 114130 \text{ in. lb.} \quad b = 10 \text{ " } \quad d = 15 \text{ " } \quad d_f = 15 \text{ "}$$

$$A_s = \frac{114130}{18000 \times 13 \times .89} = 0.62 \text{ "}$$

4 - $\frac{1}{2}$ " bar. $\frac{3}{4}$ " ϕ @ 6" c.c. stirrups.

(C)

$$C = S, \quad W = L.L. = 60 \text{ Ft. lb.}$$

$$\begin{aligned} D.L. &= 62 \text{ " } \\ &= 122 \text{ Ft. lb.} \end{aligned}$$

$$f = \frac{0.05 \times 13 + 0.45 \times 20}{13} = 0.7425$$

$$r = 0.2577$$

(20' x 13')

$$W_1 = S_1 = 13 \times (12 \times 13 \times 20 \times 0.2403) = 23800 \text{ F. lb.}$$

$$M_1 = \frac{122 \times 13^2 \times 2 \times 0.7423}{8} = 23000 \text{ in. lb.}$$

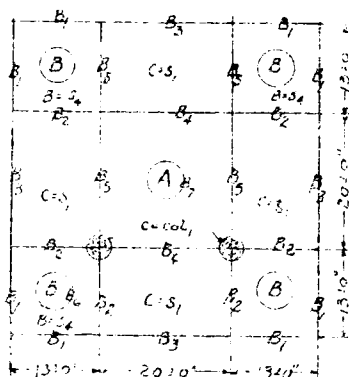
$$A_s = \frac{23000}{18000 \times 4 \times .89} = 0.37 \text{ "}$$

$$\frac{3}{8} \text{ " @ } 3 \text{ " c/c.} \quad 3 \times .14 = 0.56$$

$$n = \sqrt{\frac{2 \times 0.56 \times 15 \times 4.25}{12} + \left(\frac{0.56 \times 15}{12}\right)^2} = 1.82$$

$$C = \frac{3 \times 23000}{12 \times 1.82 \left(4.25 - \frac{1.82}{3}\right)} = \frac{46000}{78} = 590 \text{ per sq. in.}$$

$$t = \frac{590 \times 15 \left(4.25 - \frac{1.82}{3}\right)}{1.82} = 11900 \text{ per sq. inch lb.}$$



C - SECOND FLOOR BY BR. 210 SLAB

$$W_2 = S_2 = 20 \times (122 \times 20 \times 13 \times 0.2577) = 7900 \text{ F. lb.}$$

$$M_2 = \frac{122 \times 20 \times 12 \times 0.2577}{8} = 18200 \text{ in. lb.} \quad \frac{3}{8} \text{ " @ } 4 \text{ " c/c} \quad 3 \times .14 = 0.42$$

$$n = \frac{2 \times .42 \times 15 \times 4}{12} + \left(\frac{.42 \times 15}{12}\right)^2 = 1.585$$

$$C = \frac{2 \times 18200}{12 \times 1.585 \left(4 - \frac{1.585}{3}\right)} = \frac{36400}{60} = 550 \text{ per sq. in. lb.}$$

$$t = \frac{550 \times 15 \left(4 - \frac{1.585}{3}\right)}{1.585} = \frac{19800}{1.585} = 12500 \text{ per sq. in. lb.}$$

C = B₁ = 13'-0" span.

$$W_1 = B = B_6 = 22220 \text{ F. lb.} \quad M_1 = \frac{22220 \times 13 \times 12}{4} = 870000 \text{ in. lb.}$$

$$W_2 = (122 \times 4 \times 13) + \left(\frac{15+24}{144} \times 150 \times 13\right) = (6350 + 4900) = 11300 \text{ F. lb.}$$

$$M = \frac{11300 \times 13 \times 12}{8} = 220000 \text{ in. lb.} \quad b = 15 \text{ " } d = 22 \text{ " } d_t = 24 \text{ "}$$

Total: M = 1090000 inch lb.

$$A_s = \frac{1090000}{18000 \times 32 \times .89} = 3.25 \text{ " } \quad 4\text{-}1 \text{ " Bar.}$$

$$V = (22220 + 11500) \div 2 = 16760 \text{ R. lb.}$$

$$V = \frac{16760}{15 \times 22 \times .89} = 57 \text{ per sq inch lb.}$$

C = B₂ = 15' 0" span

$$W_1 = S_1 = 22220 \text{ R. lb.} \quad M_1 = \frac{22220 \times 13 \times 12}{4} = 870000 \text{ inch lb.}$$

$$W_2 = S_1 = 13' = 23800 + \left(\frac{18 \times 36}{144} \times 150 \times 13 \right) = 32600 \text{ R. lb.}$$

$$M_2 = \frac{32600 \times 13 \times 12}{8} = 640000 \text{ in. lb.}$$

$$\text{TOTAL } M = 1510000 \text{ in. lb.} \quad b = 18" \quad d = 34" \quad d_f = 36"$$

$$A_s = \frac{1510000}{18000 \times 32 \times .89} = 2.95 \text{ " } \quad 4\text{-}1 \text{ " Bar}$$

$$V = (22220 + 32600) \div 2 = 27410 \text{ R. lb.}$$

$$V = \frac{27410}{18 \times 34 \times .89} = 50 \text{ per sq inch lb.}$$

C = B₃ = 20' 0" span.

$$W = S_1 = 20 \quad 7900 \text{ R. lb.}$$

$$122 \times 4 \times 13 = 6350 \text{ "}$$

$$B_3 = \frac{13 \times 24}{144} \times 150 \times 20 = 7500 \text{ "}$$

$$\underline{21750 \text{ R. lb.}}$$

$$M = \frac{21750 \times 20 \times 12}{8} = 650000 \text{ in. lb.} \quad b = 15" \quad d = 22" \quad d_f = 24"$$

$$A_s = \frac{650000}{18000 \times 22 \times .89} = 1.85 \text{ " } \quad 4\text{-}\frac{3}{4} \text{ " Bar.}$$

$$V = 21750 \div 2 = 10875 \text{ R. lb.}$$

$$I_1 = \frac{1587.5}{15 \times 22 \times .89} = 55 \text{ #} \text{ lb.} \quad 8 - \frac{1}{4} \text{ # stirrups.}$$

$$C \cdot B_4 = 20 \cdot 0 \text{ span.}$$

$$W_1 = C \cdot S_1 = 7000 \text{ # lb.}$$

$$B_4 = \frac{18 \times 36}{144} \times 150 \times 20 = 73500 \text{ # lb.}$$

$$21400 \text{ # lb.}$$

$$M = \frac{21400 \times 20 \times 12}{8} = 640000 \text{ in. lb.}$$

$$W_2 = A \cdot B_7 = 43450 \text{ # lb.}$$

$$M_2 = \frac{43 + 50 \times 20 \times 12}{4} = 2590000 \text{ in. lb.}$$

$$\text{Total } M = 3230000 \text{ in. lb.} \quad b = 18", \quad d = 34", \quad d_c = 36"$$

$$A_s = \frac{3230000}{18000 \times 34 \times .89} = 6 \frac{1}{4}" \quad 2 - 1" \text{ DI.} \quad 4 - 1" \text{ str.} \quad 2 - 1" \text{ top.}$$

$$V = (21400 + 43450) / 2 = 32425 \text{ # lb.}$$

$$I_1 = \frac{32425}{18 \times 34 \times .89} = 59 \text{ per sq inch lb.} \quad \text{add } = \frac{5"}{16} \text{ @ } 2" \text{ c.c. stirrups.}$$

$$n = \sqrt{\frac{2 \times 15 \times 8 \times 34}{18} + \left(\frac{15 \times 8}{18}\right)^2} - \frac{15 \times 8}{18} = 22.12 - 6.6 = 15.52$$

$$M = 18000 \times 6 \left(34 - \frac{15.52}{3}\right) = 3110000 \text{ in. lb.}$$

$$C = \frac{3110000}{18 \times 10 \left(34 - \frac{15.52}{3}\right)^2} = 540 \frac{1}{8} \text{ # lb.}$$

$$t = \frac{3110000}{6 \times \left(34 - \frac{15.52}{3}\right)} = 18000 \frac{1}{8} \text{ # lb.}$$

$$u = \frac{32425}{1 \times 4 \times 4 \times (34 \times .89)} = 68 \frac{1}{2} \text{ # lb.}$$

$$C = B_5 = 33.0'' \text{ span.}$$

$$W = \frac{18 \times 36}{144} \times 150 \times 33 = 28440 \text{ Ft. lb.}$$

$$S_1 + 2(13)23800 \div 2 = 11900 \text{ " } = P_3$$

$$S_2 + 2(20)7900 \div 2 = 3950 \text{ " } = P_1$$

$$I_2 = (17600 + 32600) \div 2 = 25100 \text{ " } \left. \right\} P_2$$

$$b_4 = 21400 + 43450 \div 2 = 32425 \text{ " } \left. \right\} P_2$$

$$\underline{\underline{95820 \text{ Ft. lb.} = P}}$$

$$a = (10 + 20 + 26.5) = 56.5$$

$$b = (23 + 13 + 6.5) = 42.5$$

$$M_1 = \frac{a}{L} \sum P b = \frac{10}{33} \times 95820 \times 42.5 = 1230000 \text{ in. lb.}$$

$$M_2 = \frac{a c}{L} \sum P b - P_1 (a_2 - a_1)$$

$$\frac{20}{33} \times 95820 \times 42.5 - 3950 \times (20 - 10) = 2560500 \text{ in. lb.}$$

$$M_3 = \frac{b_2}{L} \sum P a = \frac{6.5}{33} \times 95820 \times 56.5 = 1070000 \text{ in. lb.}$$

$$\text{Total } M = 1230000 + 2560500 + 1070000 = 4860500 \text{ in. lb.}$$

$$b = 18'' \quad d = 34'' \quad d_t = 36''$$

$$A_s = \frac{4860500}{18000 \times 34 \times 89} = \frac{4860500}{550000} = 8.8 \text{ "}$$

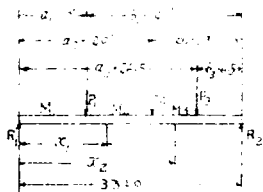
Use 5-1" str. 4-1" bt.

$$R_1 = \frac{\sum P b}{L} = \frac{95820 \times 42.5}{33} = 123000 \text{ Ft. lb.}$$

$$R_2 = \frac{\sum P b}{L} = \frac{95820 \times 56.5}{33} = 162500 \text{ Ft. lb.}$$

$$V_{x_1} = R_1 - P_1 = (123000 - 3950) = 119050 \text{ Ft. lb.}$$

$$V_{x_2} = R_1 - P_1 - P_2 = (123000 - 3950 - 57525) = 61525 \text{ Ft. lb.}$$



$$P = \frac{15 \times 600}{18000 + 15 \times 600} = 0.33 \quad \bar{W} = 0.33 \times 34 = 11.22$$

$$V = \frac{54000}{24 \times 34 \times .89} = 75 \text{ 磅/吋} \quad \text{Say} = 18 - \frac{5}{16} \text{ 吋 } \phi \text{ stirrups}$$

$$U = \frac{54000}{4 \times 5 \times .89 \times 34} = 80 \text{ 磅/吋}$$

① $C = \text{col}_1 = W = B_2 \div 2 + B_2 \div 2 + B_4 \div 2 + B_5 \div 2$

$$\text{col}_1 = \frac{22 \times 22 \times 7854}{144} \times 150 \times 23 = 9000 \text{ 磅}$$

$$B_2 = 22220 + 32600 = 54820 \text{ 吋}$$

$$B_4 \div 2 = 21400 + 43450 \div 2 = 32425 \text{ 吋}$$

$$B_5 = R_1 = 54000 = 54000 \text{ 吋}$$

$$\underline{\underline{150250 \text{ 磅}}}$$

(22" ϕ) Use 8-1" \square Bar.

$$f_c = \frac{150250}{(19 \times 19) \div 4 \times 3.1416 + 14(8 \times 1)} = 400 \text{ 磅每方吋}$$

$C = \text{col}_2 = W \cdot (B_1 \div 2 + B_2 \div 2 + B_3 \div 2)$

$$\text{col}_2 = \frac{15 \times 24}{144} \times 150 \times 24 = 9000 \text{ 磅}$$

$$B_1 \div 2 = 22220 + 11300 \div 2 = 16760 \text{ 吋}$$

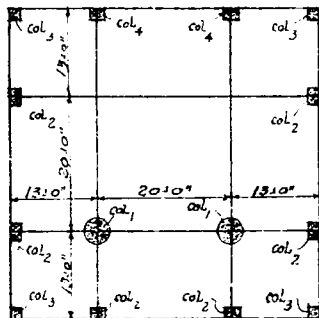
$$B_3 \div 2 = 21750 \div 2 = 10875 \text{ 吋}$$

$$\underline{\underline{36635 \text{ 磅}}}$$

use 10 - $\frac{3}{8}$ 吋 Bar. (15" \times 24")

$$Z = \frac{\sqrt{(15 \times 24)^4 + 42 \times 14 \times \sqrt{(12 \times 21)^2}}}{6 \times \sqrt{15 \times 24}}$$

$$\frac{130000 + 930}{114} = 1150 \text{ 磅}$$



C = SECOND FLOOR BY COL.

$$A_1 = 15 \times 27 + 14 \times 14 + 360 + 19.5 = 379.5 \text{ lb.} \quad V: \frac{W}{A} = 3.01$$

$$\frac{W}{A_1} \pm \frac{WY}{Z} = \frac{366.35}{379.5} \pm \frac{366.35 \times 3.01}{1150} = 97 + 97 = 194 \text{ lb.}$$

$$97 - 97 = 0$$

C = Col₃

$$W = B_1 = 22220 + 11500 = 33520 \text{ F. lb.}$$

$$\text{Col}_3 = \frac{(15 \times 24) + (15 \times 9)}{144} \times 150 \times 24 = 12400 \text{ "}$$

$$45920 \text{ F. lb.}$$

Use 10- $\frac{3}{8}$ " Bar. (15' x 24')C = Col₄

$$W = B_1 + 2 + B_3 + 2 + B_5 + 2$$

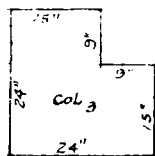
$$\text{Col}_4 = \frac{15 \times 24}{144} \times 150 \times 24 = 9000 \text{ F. lb.}$$

$$B_1 + 2 = 10760 \text{ "}$$

$$B_3 + 2 = 10875 \text{ "}$$

$$B_5 + 2 = 54000 \text{ "}$$

$$30640 \text{ F. lb.}$$

Use 10- $\frac{1}{2}$ " Bar. (15' x 24')

$$\frac{30640}{395} \pm \frac{30640 \times 2.94}{1160} = 230 + 230 = 460 \text{ lb.}$$

$$230 - 230 = 0$$

D

$$D = S_1 = W = \text{L.L.} = 100 \text{ F. lb.} \quad (5'-0'' \text{ span})$$

$$\text{Teiling} = 70 \text{ "}$$

$$\text{D.L.} = 50 \text{ "}$$

$$220 \times 5 = 1100 \text{ F. lb.}$$

$$M = \frac{2 \times 1100 \times 5 \times 12}{3} = 4400 \text{ in. lb.} \quad d = 3'' \quad d_1 = 4''$$

$$A_s = \frac{4400}{18000 \times 3 \times 0.89} = 0.94 \text{ "} \quad \frac{1}{2}'' \text{ (10 3" cc. Bar.)}$$

$$D \cdot S_2 = W = L.L. = 100 \text{ Ft. lb. } (13'0'' \times 20'0'' \text{ span})$$

$$D.L. = 75 \text{ ''}$$

$$175 \text{ Ft. lb. } \quad d_t = 5''$$

$$f = \frac{.05 \times 13 + 0.45 \times 20}{13} = 0.7423 \quad r = 0.2577$$

$$13'0'' \quad W_1 = (175 \times 13 \times 20 \times 0.7423) = 34700 \text{ Ft. lb.}$$

$$M_1 = \frac{175 \times 13^2 \times 12 \times .7423}{10} = 26500 \text{ in. lb.}$$

$$A_s = \frac{26500}{18000 \times 5 \times .89} = 0.332 \text{ ''} \quad \frac{3}{8}'' \text{ @ } 4'' \text{ c.c. } 4 - 0.14 = 0.56$$

$$n = \sqrt{\frac{2 \times .56 \times 15 \times 5}{12} + \left(\frac{.56 \times 15}{12}\right)^2} - \frac{.56 \times 15}{12} = \sqrt{7.49} = 2.74 - .7 = 2.04$$

$$C = \frac{2 \times n}{b n \left(d - \frac{n}{3}\right)} = \frac{56000}{12 \times 2 \left(5 - \frac{2}{3}\right)} = 535 \text{ \%'' lb.}$$

$$t = Cm \left(\frac{d-n}{n}\right) = \frac{5-2}{2} \times 535 \times 15 = 12000 \text{ \%'' lb.}$$

$$20'0'' \quad W = (175 \times 20 \times 13 \times 0.2577) = 11750 \text{ Ft. lb.}$$

$$M_2 = \frac{175 \times 20^2 \times 12 \times 0.2577}{10} = 21600 \text{ in. lb.}$$

$$\frac{3}{8}'' \text{ @ } 3'' \text{ c.c. Bar.}$$

$$n = \sqrt{\frac{2 \times .56 \times 15 \times 4.5}{12} + \left(\frac{.56 \times 15}{12}\right)^2} - \frac{.56 \times 15}{12} = \sqrt{6.3 + 4.9} =$$

$$2.6 - .7 = 1.9$$

$$C = \frac{43200}{12 \times 1.9 \left(4.5 - \frac{1.9}{3}\right)} = 480 \text{ \%'' lb.}$$

$$t = 480 \times 15 \left(\frac{4.5 - 1.9}{1.9}\right) = 72000 \times 1.35 = 98000 \text{ \%'' lb.}$$

$$D \cdot S_3 = W_1 = 10' (175 \times 10 \times 20 \times 95) = 33200 \text{ Ft. lb. } (10'0'' \times 20'0'')$$

$$f = .95 \quad r = 1.05$$

$$M_1 = \frac{175 \times 10^2 \times 12 \times .35}{8} = 25000 \text{ in. lb. } \frac{3}{8}'' \text{ @ } 3\frac{1}{2}'' \text{ c.c. Bar.}$$

$$W_2 = 20 \times 0 (175 \times 10 \times 20 \times .05) = 1750 \text{ Ft. lb.}$$

$$M_2 = \frac{175 \times 20^2 \times 12 \times 0.05}{8} = 5250 \text{ in. lb. } \frac{3}{4}'' \text{ @ } 10'' \text{ c.c. Bar.}$$

$$D = S_4 \quad (13 \times 0'' \times 13 \times 0'' \text{ span})$$

$$W = (175 \times 13^2 \times 0.5) = 15000 \text{ Ft. lb.} \quad d_t = 4.5$$

$$M = \frac{175 \times 13^2 \times 12 \times 0.5}{10} = 18000 \text{ in. lb.} \quad d_t = 5''$$

$$(M_2 - M_1) \frac{3}{8}'' \text{ @ } 5'' \text{ c.c. Bar.}$$

$$D = S_5 \quad W = (175 \times 20^2 \times 0.5) = 35000 \text{ Ft. lb. } (20 \times 0'' \times 20 \times 0'' \text{ span}).$$

$$M_1 = \frac{175 \times 20^2 \times 12 \times 0.5}{10} = 42000 \text{ in. lb.} \quad (M_2 = M_1)$$

$$A_s = \frac{42000}{18000 \times 5 \times .89} = 0.525 \text{ ft}^2 \quad \frac{1}{2}'' \text{ @ } 3'' \text{ c.c. Bar.}$$

$$n = \sqrt{\frac{2 \times 1 \times 15 \times 55}{12} + \left(\frac{1 \times 15}{12}\right)^2} - \frac{1 \times 15}{12} = \sqrt{13.6 + 1.56} - 1.25 = 2.63$$

$$C = \frac{8400}{18 \times 2.63 \left(5.5 - \frac{2.63}{3}\right)} = \frac{8400}{154} = 550 \text{ } \frac{1}{4}'' \text{ lb.}$$

$$t = 550 \times 15 \left(5.5 - 2.63\right) = 9000 \text{ } \frac{1}{4}'' \text{ lb.}$$

$$\text{use } \frac{1}{2}'' \text{ @ } 3'' \text{ c.c.} \quad d_t = 5.5 \quad d_t = 7''$$

$$D = S_6 \quad f = 0.7543 \quad r = 0.2457 \quad (11 \times 6'' \times 18 \times 0'' \text{ span})$$

$$W_1 = 11.5 (175 \times 11.5 \times 18 \times .7543) = 28400 \text{ Ft. lb.}$$

$$M_1 = \frac{175 \times 11.5^2 \times 12 \times .7543}{10} = 21200 \text{ in. lb.} \quad \text{Thick} = 5''$$

$\frac{3}{8}'' \text{ @ } 3\frac{1}{2}'' \text{ c.c. Bar.}$

$$W_2 = 18' (175 \times 18 \times 11.5 \times 2.457) = 6300 \text{ Ft. lb.}$$

$$M_2 = \frac{175 \times 18^2 \times 12 \times 2.457}{10} = 16800 \text{ in. lb.}$$

$\frac{3}{8}'' \text{ @ } 3\frac{1}{2}'' \text{ c.c. Bar.}$

D 57 $f = 0.55 \quad r = 0.45 \quad (18'0'' \times 20'0'' \text{ span})$

$$W_1 = 18' (175 \times 18 \times 20 \times 0.55) = 34500 \text{ Ft. lb.}$$

$$W_2 = 20' (175 \times 20 \times 18 \times 0.45) = 28500 \text{ Ft. lb.}$$

$$M_1 = \frac{175 \times 18^2 \times 12 \times 0.55}{10} = 37500 \text{ in. lb.}$$

Thick = $6\frac{1}{2}''$

$\frac{1}{2}'' \text{ @ } 3'' \text{ c.c. Bar.}$

$$n = \sqrt{\frac{2 \times 1 \times 15 \times 5}{12} + \left(\frac{1 \times 15}{12}\right)^2} - \frac{1 \times 15}{12} =$$

$$\sqrt{12.5 + 1.55} - 1.25 = 2.5$$

$$C = \frac{2 \times 37500}{12 \times 2.5 \left(5 - \frac{2.5}{3}\right)} = 598 \frac{\#}{\text{sq. in.}}$$

$$t = 598 \times 15 \left(\frac{5 - 2.5}{2.5}\right) = 9000 \frac{\#}{\text{sq. in.}}$$

$$M_2 = \frac{175 \times 20^2 \times 12 \times 0.45}{10} = 37900 \text{ in. lb.}$$

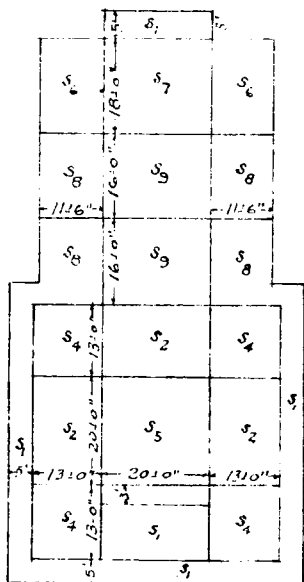
$\frac{1}{2}'' \text{ @ } 3'' \text{ c.c. Bar.}$

D 58 (11'6'' x 16'0'' span)

$$W_1 = 11.5 (175 \times 11.5 \times 16 \times 0.76) = 21600 \text{ Ft. lb.}$$

$$W_2 = 16' (175 \times 16 \times 11.5 \times 0.74) = 10400 \text{ Ft. lb.}$$

$$f = 0.676 \quad r = 0.324$$



D FIRST FLOOR BY SLAB

$$M_1 = \frac{175 \times 11.5^2 \times 12 \times 0.416}{10} = 18800 \text{ in. lb.}$$

$\frac{3}{8}$ " @ $4\frac{1}{2}$ " c.c. Bar.

$$M_2 = \frac{175 \times 16^2 \times 12 \times 0.324}{10} = 17400 \text{ in. lb.}$$

$\frac{5}{16}$ " @ 5" c.c. Bar.

$$D = S_3 \quad W_1 = 16' (175 \times 16 \times 20 \times 0.613) = 35000 \text{ ft. lb. (16' } \times 20' \times 20' \text{ span)}$$

$$W_2 = 20' (175 \times 20 \times 16 \times 0.387) = 21600 \text{ ft. lb.}$$

$$f = 0.613 \quad r = 0.387$$

$$M_1 = \frac{175 \times 16^2 \times 12 \times 0.613}{10} = 32700 \text{ in. lb.}$$

$\frac{1}{2}$ " @ $3\frac{1}{2}$ " c.c. Bar.

$$n = \sqrt{\frac{2 \times 34 \times 15 \times 5}{12} + \left(\frac{84 \times 15}{12}\right)^2} - \frac{84 \times 15}{12} = \sqrt{10.5 + 11} - 10.5 = 2.45$$

$$C = \frac{2 \times 32700}{12 \times 2.45 \left(\frac{5 - 2.45}{5}\right)} = \frac{65400}{122} = 535 \text{ ft. lb.}$$

$$M_2 = \frac{175 \times 20^2 \times 12 \times 0.387}{10} = 32700 \text{ in. lb.}$$

$\frac{1}{2}$ " @ $5\frac{1}{2}$ " c.c. Bar.

(E)

$$E = S_4 \quad W = 6' \times 150 \times 5 = 750 \text{ ft. lb. (5' } \times 6' \text{ span)}$$

$$D. = \frac{6 \times 6}{1 \times 4} \times 150 \times 5 = \frac{250}{1000} \text{ ft. lb.}$$

$$M = \frac{1000 \times 5 \times 12}{4} = 15000 \text{ in. lb.} \quad \text{thick} = 4"$$

$$A_s = \frac{15000}{18000 \times 5 \times 0.89} = 0.188 \text{ ft.} \quad 2 - \frac{3}{8} \text{ } \phi \text{ Bar.}$$

$E = B_1$ 14'0" span.

$W = (1000 \div 2) \times 16 = 9000 \text{ F. lb.}$

$A = \frac{8 \times 16}{144} \times 150 \times 14 = 1200 \text{ "}$
 $\frac{10200 \text{ F. lb.}}$

$b = 8' \quad d = 14.5 \quad d_c = 16"$

$M = \frac{10200 \times 14 \times 12}{8} = 215000 \text{ in. lb.}$

$A_s = \frac{215000}{18000 \times 12.5 \times .89} = 1.08 \text{ "}$

3 - $\frac{3}{4}$ " ϕ add $\frac{1}{4}$ " ϕ @ 6" c.c. stirrups.

$V = \frac{5100}{8 \times 12.5 \times .89} = 58 \frac{1}{2} \text{ "}$

$U = \frac{5100}{.75 \times 4 \times 2 \times .89 \times 12.5} = 77 \frac{1}{2} \text{ "}$

$E = B_2 \quad W = 14 \times 150 \times 3.5 = 7350 \text{ F. lb. (3:6" span)}$

$A = \frac{3 \times 3.5}{144} \times 150 \times 3.5 = 175 \text{ "}$
 $\frac{700 \text{ F. lb.}}$

$M = \frac{700 \times 3.5 \times 12}{8} = 2800 \text{ in. lb.}$

$A_s = 0.14 \text{ "}$ 2 - $\frac{5}{16}$ " ϕ Bar. $\frac{1}{4}$ " ϕ @ 6" c.c. stirrups.

$E = B_3 \quad W = 52 = 700 \div 2 \times 32 = 12200 \text{ F. lb.}$

$A = \frac{10 \times 22}{144} \times 150 \times 26.5 = 5600 \text{ "}$
 $\frac{18000 \text{ F. lb.}}$

$M = \frac{18000 \times 26.5 \times 12}{8} = 720000 \text{ in. lb.}$

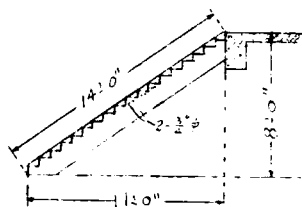
$b = 10' \quad J_1 = 18.5 \quad J_2 = 20"$

$A_s = \frac{720000}{18000 \times 18.5 \times .89} = 2.44 \text{ "}$

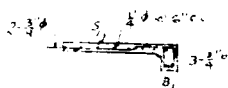
3 - 1" Bar add $\frac{1}{4}$ " ϕ @ 6" c.c. stirrups.

$$V = \frac{9000}{10 \times 18.5 \times .89} = 55 \frac{1}{2} \text{ lb.}$$

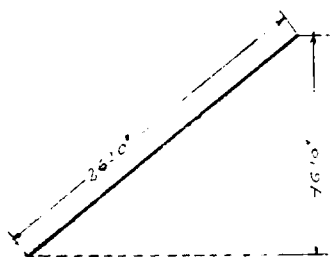
$$U = \frac{9000}{4 \times 3 \times .89 \times 18.5} = 70 \frac{1}{4} \text{ lb.}$$



Elevation = E



Section = E



E = B2

(F)

$$F = S_1 \quad W = 2.6 \quad 30 \times 8 = 240 \text{ F. lb. (8'-0" span)}$$

$$M = \frac{240 \times 8 \times 12}{2} = 11500 \text{ in. lb.}$$

$$d = \sqrt{\frac{11500}{12 \times .89}} = 3.4 \quad d_2 = 4"$$

$$A_s = 0.23 \quad \frac{3}{8} \text{ } \phi \text{ } 2 \text{ } 5 \text{ " c.c. each way.}$$

$$F = S_1 = W = \frac{4}{12} \times 150 \times 8 = 400 \text{ F. lb. Total } 640 \text{ F. lb.}$$

$$F = S_2 \quad 30 \text{ degree (8'-0" span)}$$

$$P = 120 \times 8 \times 0.5774^{-2} = 320 \text{ F. lb.}$$

$$T = \frac{320 \times 8}{2} = 1280 \text{ ft. lb.}$$

$$M_1 = \frac{1280 \times 8 \times 12}{3} = 42080 \text{ in. lb.}$$

$$d = \sqrt{\frac{42080}{12 \times 99}} = 0.5 \quad A_s = 0.42 \text{ in}^2$$

8" wide at bottom.

$\frac{1}{2}$ " @ 6" c.c. both each way.

$$M_1 = \frac{1280 \times 4 \times 12}{3} = 21000 \text{ in. lb.}$$

$d = 4.5$ Total 6 inch wide.

$A_s = 0.3 \text{ in}^2$ $\frac{1}{2}$ " @ 6" c.c. Bar. add $\frac{3}{8}$ " @ 5" c.c. stirrups.

$1 - S_2 \quad W = \frac{6}{18} \times 150 \times 8 = (600 + 1280) = 1880 \text{ ft. lb.}$

D

$$D - S_1 = W \cdot (S_1 \div 2) = 1100 \div 2 = 550 \text{ ft. lb.}$$

$$(S_1 \div 2) = 1750 \div 2 = 875 \text{ "}$$

$$10' \text{ Wall} = 100 \times 20 = 2000 \text{ "}$$

$$A_s = \frac{15 \times 24}{24} \times 150 \times 20 = 7400 \text{ "}$$

$$56830 \text{ ft. lb.}$$

$$M = \frac{56830 \times 20 \times 12}{10} = 1324000 \text{ in. lb.}$$

$$b = 15" \quad d = 22" \quad d_t = 27"$$

$$A_s = \frac{1324000}{18000 \times 22.5 \times 0.89} = 3.79 \text{ in}^2$$

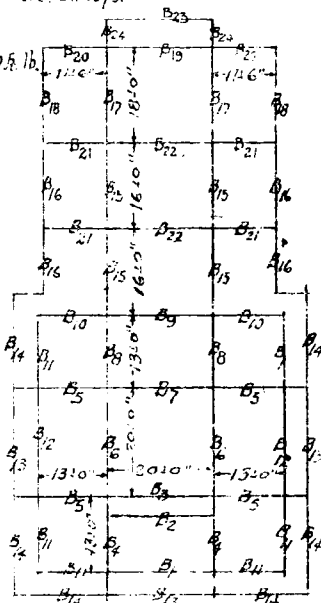
3-1" str. 2-1" pt.

$$V = \frac{28415}{15 \times 22 \times 0.89} = 91 \text{ "}$$

$$X_1 = \frac{91 - 60}{2 \times 91} \times 20 = 3.4 \text{ ft.}$$



Section of F.



D - FLOOR PLAN BY A.S.

$$V_2 = 6(51-60) \times 15 \times 3.4 = 9086 \text{ 斤. lb.} \quad \phi = \frac{9086}{12000 \times 0.098} = 7.7$$

Use 8- $\frac{1}{4}$ " ϕ stirrups.

$$S = \frac{12000 \times 0.038}{191-100} = 2.5 \text{ space.} \quad u = \frac{20415}{12 \times 85 \times 22.5} = 120 \frac{\text{斤}}{\text{ft. lb.}}$$

$D = B_2 = 20'0"$ span.

$$W = S_3 \div 2 = 815 \text{ 斤. lb.}$$

$$10' \text{ 高} \times 100 \times 20 \times 24 = 48000 \text{ "}$$

$$20' \times \frac{15 \times 24}{144} \times 150 \times 20 = \frac{7400 \text{ "}}{5 \times 230 \text{ 斤. lb.}}$$

$$M_1 = \frac{56780 \times 20 \times 12}{8} = 1675000 \text{ 吋. lb.}$$

$$b = 15" \quad d = 22" \quad d_f = 24"$$

$$A_s = \frac{1675000}{18000 \times 22.5 \times 0.89} = 4.65 \text{ " } \quad 4-1" \text{ str.} \quad 2-\frac{3}{4}" \text{ Bl.}$$

$$V = \frac{28140}{15 \times 22.5 \times 0.89} = 93 \frac{\text{斤}}{\text{ft. lb.}} \quad x_1 = \frac{(93-60)}{2 \times 93} \times 20 = 3.6 \text{ 斤.}$$

$$V_2 = 6(93-60) \times 15 \times 3.6 = 10700 \text{ 斤. lb.} \quad \phi = \frac{10700}{12000 \times 0.049} = 18$$

$$\frac{12000 \times 2 \times \frac{5}{8}}{200} \text{ 斤. lb.}$$

$$S = \frac{12000 \times 0.43}{(93 \times 60) \times 15} = 1.2 \text{ space} \quad 10-\frac{1}{4}" \phi \text{ @ } 2" \text{ to } 10' \text{ stirrups.}$$

$$u = \frac{28140}{16 \times 89 \times 22.5} = 89 \frac{\text{斤}}{\text{ft. lb.}}$$

$D = B_3 = 20'0"$ span. $W = S_3 \div 2 = 35000 \div 2 = 17500 \text{ 斤. lb.}$

$$10' \text{ 高} \times 100 \times 24 \times 20 = 48000 \text{ "}$$

$$20' \times \frac{15 \times 24}{144} \times 150 \times 20 = \frac{7400 \text{ "}}{63000 \text{ 斤. lb.}}$$

$$M_1 = \frac{63000 \times 20 \times 12}{8} = 1890000 \text{ 吋. lb.} \quad b = 15" \quad d = 22" \quad d_f = 24"$$

$$A_s = 5.7 \text{ " } \quad 6-1" \text{ str.} \quad 2-\frac{5}{8}" \text{ Bl.}$$

$$V = \frac{31700}{18 \times 22.5 \times 0.89} = 105 \frac{\text{斤}}{\text{ft. lb.}} \quad x_1 = \frac{(105-60) \times 20}{2 \times 105} = 4.4 \text{ 斤.}$$

$$V_2 = 6 \times (104 - 60) \times 15 \times 4.4 = 21500 \text{ lb.}$$

$$\frac{12000 \times 2 \times 78.54}{2800 \text{ lb. lb.}} = -18700 \text{ "}$$

$8 - \frac{1}{4} \text{ " Stirrps.}$

$$U = \frac{21500}{20 \times 22.5 \times 22} = 30 \text{ " lb.}$$

$D = B_4 = 13:0 \text{ span}$

$$W_1 = S_2 \div 2 = 56280 \div 2 = 28140 \text{ lb.}$$

$$M_1 = \frac{28140 \times 3.5 \times 9.5 \times 12}{13} = 320000 \text{ in. lb.}$$

$$R_1 = \frac{28140 \times 3.5}{13} = 20564 \text{ lb.} \quad R_2 = 7576 \text{ lb.}$$

$$W_2 = S_4 \div 2 = (15000 \div 2) = 7500 \text{ lb.}$$

$$\text{staircase } E - B_2 \div 2 = 9000$$

$$B_2 = \frac{15 \times 75}{14.3} \times 150 \times 4 = 4900 \text{ "}$$

$$\frac{4900}{21400 \text{ lb. lb.}}$$

$$M_2 = \frac{21400 \times 13 \times 12}{8} = 415000 \text{ in. lb.} \quad R_1 = 10700 \quad R_2$$

$$\text{TOTAL } M = 1235000 \text{ in. lb.} \quad b = 15" \quad d = 32 \quad d_1 = 24"$$

$$A_s = \frac{1235000}{18600 \times 22.5 \times .89} = 0.45 \text{ " } 2-1" \text{ stirr. } 2-1" \text{ top. } 2-\frac{1}{2}" \text{ top.}$$

$$R_1 + R_1 = 31264 \text{ lb.} \quad R_2 + R_2 = 18276 \text{ lb.}$$

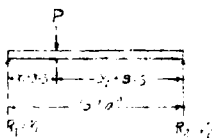
$$V = \frac{31264}{15 \times 22.5 \times .89} = 104 \text{ " lb.} \quad X_1 = \frac{104 - 60}{2 \times 104} \times 13 = 2.72 \text{ ft.}$$

$$V_2 = 6 (104 - 60) \times 15 \times 2.72 = 10411 \text{ lb.}$$

$$\phi = \frac{10411}{12000 \times 0.1534} = 6 - \frac{5}{16} \text{ " } \quad S = \frac{12000 \times 0.1534}{(104 - 60) \times 15} = 2.7$$

$$Y = \frac{1}{3} \sqrt{3 \times 15 \times (13 + 15)} = 9 \quad \text{staircase span by stirrps}$$

$$N = \sqrt{\frac{30 \times (4 + 2.5 + 4 \times 1.5)}{15} + \frac{15 \times (4 + 4)}{15}} = \frac{15 \times (4 + 4)}{15} = 1.9 - 3 = 2.9$$



$$C = \frac{2 \times 1235000}{15 \times 7.9 (22.5 - \frac{7.9}{3}) + 2 \times 4 \times 15 (\frac{7.9 - 4.5}{7.9}) (22.5 - 1.5)} = \frac{2470000}{4420} = 560 \frac{1}{2} \text{ lb.}$$

$$t = \frac{560 \times 15 (22.5 - 7.9)}{7.9} = 15600 \frac{1}{2} \text{ lb.}$$

$$u = \frac{31264}{4 \times 1 \times 4 (22.5 \times .89)} = 97 \frac{1}{2} \text{ lb.}$$

$$D = B_5 = 13'0" \text{ span.}$$

$$W = S_4 \div 2 = 15000 \div 2 = 7500 \text{ Ft. lb.}$$

$$S_2 \div 2 = 3 + 700 \div 2 = 17350 \text{ "}$$

$$B_5 = \frac{15 \times 24}{144} \times 150 \times 13 = 4900 \text{ "}$$

$$\underline{29800 \text{ Ft. lb.}}$$

$$M = \frac{29800 \times 13 \times 12}{10} = 462000 \text{ in. lb.} \quad b = 15" \quad d = 22 \quad d_t = 24"$$

$$A_s = \frac{462000}{18000 \times 22.5 \times .89} = 1.3 \text{ "} \quad 2 - \frac{3}{4} \text{ " } \phi \text{ str.} \quad 2 - \frac{3}{4} \text{ " } \phi \text{ bt.}$$

$$V = \frac{14900}{15 \times 22.5 \times .89} = 50 \frac{1}{2} \text{ lb.}$$

2 - $\frac{3}{4}$ " ϕ top. add 2 - $\frac{1}{4}$ " ϕ on end stirrups.

$$u = \frac{14900}{.75 \times 4 \times 2 \times 22.5 \times .89} = 106 \frac{1}{2} \text{ lb.} \quad (B_3 = B_5)$$

$$D = B_6 = 20'0" \text{ span.}$$

$$W = S_2 \div 2 = 11750 \div 2 = 5875 \text{ Ft. lb.}$$

$$S_5 \div 2 = 35000 \div 2 = 17500 \text{ "}$$

$$B_6 = \frac{15 \times 20}{144} \times 150 \times 20 = 7400 \text{ "}$$

$$\underline{30800 \text{ Ft. lb.}}$$

$$M = \frac{30800 \times 20 \times 12}{10} = 740000 \text{ in. lb.} \quad b = 15" \quad d = 22 \quad d_t = 24"$$

$$A_s = 2.1 \text{ "} \quad 4 - \frac{3}{4} \text{ " } \phi \text{ str.} \quad 2 \frac{3}{4} \text{ " } \phi \text{ bt.} \quad \text{add } 2 - \frac{1}{4} \text{ " } \phi \text{ stirrups.}$$

$$V = 50 \frac{1}{2} \text{ lb.} \quad u = 70 \frac{1}{2} \text{ lb.} \quad (D = B_7 = D = B_6)$$

$$D = B_9 = 20'0" \text{ span.}$$

$$W: S_2 \div 2 = 11700 \div 2 = 5875 \text{ 磅}$$

$$S_9 \div 2 = 21600 \div 2 = 10800 \text{ 磅}$$

$$10' \text{ Wall } 100 \times 24 \times 20 = 48000 \text{ 磅}$$

$$B_0 = \frac{15 \times 24}{4 \times 4} \times 150 \times 20 = 7425 \text{ 磅}$$

$$72100 \text{ 磅}$$

$$M = \frac{72100 \times 20 \times 12}{10} = 1730000 \text{ in. lb. } b = 15" \quad d = 22 \quad d' = 24"$$

$$A_s = 4.8 \text{ 吋} \quad \text{Use } 3\text{-}1" \text{ 鋼筋 } 2\text{-}1" \text{ 鋼筋}$$

$$V = 120 \text{ 磅} \quad X_1 = \frac{120 - 60}{2 \times 120} \times 20 = 5 \text{ 呎}$$

$$V_2 = 6 \times (84 - 60) \times 15 \times 5 = 27000 \text{ 磅} \quad 2\text{-}1" \text{ 鋼筋}$$

$$12000 \times 2 \times 1 = 24000 \text{ 磅}$$

$$3000 \text{ 磅} \quad 8\text{-}\frac{1}{4}" \text{ 鋼筋}$$

$$U = \frac{36050}{4 \times 5 \times 89 \times 22} = 90 \text{ 磅}$$

$$D: B_{10} = 13 \times 10' \text{ span}$$

$$W: S_4 \div 2 = 15000 \div 2 = 7500 \text{ 磅}$$

$$S_8 \div 2 = 24850 \div 2 = 12425 \text{ 磅}$$

$$10' \text{ Wall } 100 \times 24 \times 13 = 31200 \text{ 磅}$$

$$B_{10} = \frac{15 \times 24}{4 \times 4} \times 150 \times 13 = 4900 \text{ 磅}$$

$$56030 \text{ 磅}$$

$$M = \frac{56030 \times 13 \times 12}{10} = 880000 \text{ in. lb. } b = 15" \quad d = 22 \quad d' = 24"$$

$$A_s = 2.5 \text{ 吋} \quad \text{Use } 2\text{-}1" \text{ 鋼筋 } 1\text{-}1" \text{ 鋼筋}$$

$$V = 93 \text{ 磅} \quad X_1 = \frac{93 - 60}{2 \times 93} \times 13 = 2.3 \text{ 呎} \quad \text{add } 2\text{-}\frac{1}{2}" \text{ 鋼筋}$$

$$6\text{-}\frac{1}{4}" \text{ 鋼筋}$$

$$V_2 = 6 \times (13 - 60) \times 15 \times 2.3 = 6850 \text{ 磅}$$

$$\frac{6000 \text{ 磅}}{250 \text{ 磅}}$$

$$U = \frac{28015}{8 \times 3 \times 10 \times 89 \times 22} = 130 \text{ 磅} \quad \text{add } 6\text{-}\frac{1}{4}" \text{ 鋼筋}$$

$$D = B_1 = 12'0'' \text{ span.}$$

$$W = S_1 = 2 \times 110 \times 12 \times 13 = 7200 \text{ ft. lb.}$$

$$S_1 = 3 \times 150 \times 2 \times 12 = 7500 \text{ ''}$$

$$10 \times 10 \times 2 \times 2 \times 24 \times 13 = 1200 \text{ ''}$$

$$B_{11} = \frac{15 \times 24}{144} \times 150 \times 13 = 4200 \text{ ''}$$

$$31300 \text{ ft. lb.}$$

$$M = \frac{31300 \times 12 \times 12}{10} = 300000 \text{ ft. lb. } b = 15'' \quad d = 22'' \quad d_c = 21''$$

$$A_s = 2.34''^2 \quad (3: 3-1'' \text{ st. } 2-1'' \phi \text{ st.})$$

$$V = 86 \frac{1}{2}'' \text{ lb. } x_1 = \frac{86 \times 60}{2 \times 36} = 21.5''$$

$$V_2 = 6(86 - 30) \times 15 \times 2 = 4700 \text{ ft. lb.}$$

$$2 - \frac{1}{2}'' \phi \text{ st.}$$

$$12000 \times 2 \times 13 = \frac{6600 \text{ ''}}{100 \text{ ft. lb.}}$$

$$6 - \frac{1}{4}'' \phi \text{ stirrups.}$$

$$U = \frac{25650}{2 \times 4 \times 22.5 \times .89} = 162 \frac{1}{2}'' \text{ lb.}$$

$$D = B_{12} = 20'0'' \text{ span.}$$

$$W = (S_1 + 2) \times 20 = 550 \times 20 = 11000 \text{ ft. lb.}$$

$$S_2 + 2 = 11750 \div 2 = 5875 \text{ ''}$$

$$B_{12} = \frac{15 \times 24}{144} \times 150 \times 20 = 7400 \text{ ''}$$

$$24300 \text{ ft. lb.}$$

$$M = \frac{24300 \times 20 \times 12}{10} = 575000 \text{ ft. lb. } b = 15'' \quad d = 22'' \quad d_c = 24''$$

$$A_s = 1.6''^2 \quad 2-1'' \text{ st. } 2-1'' \phi \text{ st. } 6 - \frac{1}{4}'' \phi \text{ stirrups.}$$

$$V = 41 \frac{1}{2}'' \text{ lb.}$$

$$U = \frac{12150}{2 \times 4 \times .89 \times 22.5} = 76 \frac{1}{2}'' \text{ lb.}$$

$$D = B_{13} = 20'0'' \text{ span.}$$

$$W = (S_1 + 2) \times 20 = 550 \times 20 = 11000 \text{ ft. lb.}$$

$$B_{13} = \frac{10 \times 18}{144} \times 150 \times 20 = 4150 \text{ ''}$$

$$15200 \text{ ft. lb.}$$

$$M = \frac{15200 \times 20 \times 12}{10} = 360000 \text{ ft. lb. } b = 10'' \quad d = 16.5'' \quad d_c = 18''$$

$$A_s = 1.1 - 2 \# \quad 2 \text{ } \frac{3}{4} \text{ } \phi \text{ str.} \quad 1 - \frac{3}{4} \text{ } \phi \text{ RL}$$

$$V = 45 \# \text{ lb.} \quad \text{add } 0.2 \times 102 \quad \text{to } \frac{1}{4} \text{ } \phi \text{ end end stirrps.}$$

$$U = \frac{7600}{3 \times 2.36 \times .89 \times 12} = 83 \# \text{ lb.}$$

$$D \cdot B_{14} = 17'0'' \text{ span} \quad W = S_3 \div 2 = 17 + 150 \div 17 = 10400 \text{ lb.}$$

$$B_{14} = \frac{10518 \times 150 \div 17 = 3500 \text{ lb. lb.}}{12900 \text{ lb.}}$$

$$M = \frac{12900 \times 17 \times 12}{10} = 264000 \text{ lb.} \quad b=10'' \quad d=16.5 \quad d_1=15''$$

$$A_s = 1.3 \# \quad 2 - \frac{3}{4} \text{ } \phi \text{ str.} \quad 1 - \frac{3}{4} \text{ } \phi \text{ RL} \quad 0 - \frac{3}{8} \text{ } \phi \text{ } \frac{1}{4} \text{ } \phi \quad 2 - \frac{3}{4} \text{ } \phi \text{ stirrps.}$$

$$V = \frac{6 + 50}{.89 \times 10 \times 16.5} = 4.1 \# \text{ lb.} \quad U = \frac{6450}{2 \times 2.36 \times .89 \times 16.5} = 94 \# \text{ lb.}$$

$$D \cdot B_{15} = 16'0'' \text{ span} \quad W = S_3 \div 2 = 10400 \div 2 = 5200 \text{ lb.}$$

$$S_3 \div 2 = 35000 \div 2 = 17500$$

$$B_{15} = \frac{12 \times 20}{144} \times 150 \times 16 = \frac{4000}{26700 \text{ lb.}}$$

$$M = \frac{26700 \times 16 \times 12}{10} = 51100 \text{ lb.} \quad b=12'' \quad d=18.5 \quad d_1=20''$$

$$A_s = 1.75 \# \quad 2 - \frac{3}{4} \text{ } \phi \text{ str.} \quad 2 - \frac{3}{4} \text{ } \phi \text{ RL}$$

$$V = 69 \# \text{ lb.} \quad X_1 = \frac{69 - 60}{2 \times 69} \times 16 = 1.04 \text{ ft.}$$

$$V_2 = 6(69 - 60) \times 1.04 = 660 \text{ lb.} \quad 0 - \frac{1}{4} \text{ } \phi \text{ stirrps.}$$

$$U = \frac{13350}{4 \times 2.36 \times .89 \times 18} = 88 \# \text{ lb.}$$

$$D \cdot B_{16} = 16'0'' \text{ span} \quad W = S_2 \div 2 = 10400 \div 2 = 5200 \text{ lb.}$$

$$\text{Rolling} = 20 \times 3.5 \times 16 = 1120 \text{ ''}$$

$$B_{16} = \frac{10 \times 20}{144} \times 150 \times 16 = 4000 \text{ ''}$$

$$10320 \text{ lb.}$$

$$M = \frac{10320 \times 10 \times 12}{10} = 12,384 \text{ m. lb.} \quad b = 10" \quad d = 18" \quad d_t = 20"$$

$$A_s = 0.25 \text{ "}^2 \quad 2 - \frac{3}{8} \text{ " str.} \quad 2 - \frac{1}{2} \text{ " str.} \quad 6 - \frac{1}{4} \text{ " stirrups.}$$

$$V = \frac{5160}{18 \times 20 \times 12} = 40 \text{ lbs.}$$

$$U = \frac{5160}{(1.75 \times 10 + 1.2) \times 18.5 \times 18} = 53 \text{ lbs.}$$

$$D = B_{17} = 18'0" \text{ span.}$$

$$W = S_2 \div 2 = 2000 \div 2 = 1000 \text{ lbs.}$$

$$S_7 \div 2 = 34000 \div 2 = 17250 \text{ "}$$

$$B_{17} = \frac{10 \times 20}{144} \times 150 \times 18 = 4500 \text{ "}$$

$$\frac{10000}{4500} = 2.22 \text{ lbs.}$$

$$M = \frac{20300 \times 18 \times 12}{10} = 446400 \text{ m. lb.} \quad b = 12" \quad d = 18.5" \quad d_t = 20"$$

$$A_s = 1.9 \text{ "}^2 \quad 2 - \frac{3}{4} \text{ " str.} \quad 2 - \frac{3}{4} \text{ " str.} \quad \text{and } 8 - \frac{1}{4} \text{ " stirrups.}$$

$$V = 67 \text{ lbs.} \quad X_1 = \frac{67 - 60}{2 \times 67} \times 18 = .945 \text{ ft.}$$

$$V_2 = 6(67 - 60) \times .945 = 477 \text{ lbs.}$$

$$U = \frac{13150}{2 \times \frac{3}{4} \times 4 \times 18 \times .89} = 137 \text{ lbs.}$$

$$D = B_{18} = 18'0" \text{ span.}$$

$$W = S_2 \div 2 = 8900 \div 2 = 4450 \text{ lbs.}$$

$$\text{Reinfg } 20 \times 3.5 \times 18 = 1260 \text{ "}$$

$$B_{18} = \frac{10 \times 18}{144} \times 150 \times 18 = 4500 \text{ "}$$

$$\frac{10000}{4500} = 2.22 \text{ lbs.}$$

$$M = \frac{10210 \times 18 \times 12}{10} = 220000 \text{ m. lb.} \quad b = 10" \quad d = 16.5" \quad d_t = 18"$$

$$A_s = 0.68 \text{ "}^2 \text{ (see } D = B_{16})$$

$$D = B_{19} = 20'0" \text{ span.}$$

$$W = S_1 \div 2 = 1100 \div 2 = 550 \times 20 = 11000 \text{ lbs.}$$

$$S_7 \div 2 = 28500 \div 2 = 14250 \text{ "}$$

$$B_{19} = \frac{12 \times 20}{144} \times 150 \times 20 = 5000 \text{ "}$$

$$\frac{11000}{5000} = 2.2 \text{ lbs.}$$

$$M = \frac{30300 \times 20 \times 12}{10} = 727200 \text{ m. lb.} \quad b = 12" \quad d = 18.5" \quad d_t = 20"$$

$$A_s = 2.4 \text{ " } 4 - \frac{3}{4} \text{ " } \phi \text{ str. } 2 - 1 \text{ " } \phi \text{ bt.}$$

$$V = \frac{15150}{.89 \times 12 \times 18.5} = 77 \frac{1}{2} \text{ " lb. } \quad X_1 = \frac{77 - 66}{2 \times 77} 20 = 2.22 \text{ ft.}$$

$$V_2 = 6(77 - 60) 12 \times 2.22 = 2450 \text{ ft. lb. } 10 - \frac{5}{16} \text{ " } \phi \text{ stirrups.}$$

$$U = \frac{15150}{4 \times 2.36 \times 18 \times .89} = 100 \frac{1}{2} \text{ " lb.}$$

$$D = B_{20} = 11'6" \text{ span. } \quad W = S_6 \div 2 = 28400 \div 2 = 14200 \text{ ft. lb.}$$

$$\text{Rebars } 20 \times 3.5 \times 11.5 = 810 \text{ "}$$

$$B_{20} = \frac{10 \times 18}{144} \times 150 \times 11.5 = 2900 \text{ "}$$

$$\underline{17900 \text{ ft. lb.}}$$

$$M = \frac{17900 \times 11.5 \times 12}{10} = 248000 \text{ in. lb. } \quad b = 10 \text{ " } d = 16.5 \text{ " } d_t = 18 \text{ "}$$

$$V = \frac{8950}{10 \times 16.5 \times .89} = 60 \frac{1}{2} \text{ " lb. } \quad A_s = \frac{248000}{18000 \times 16.5 \times .89} = .94 \text{ "}$$

$$U = \frac{8950}{2 \times 2.36 \times .89 \times 16.5} = 130 \frac{1}{2} \text{ " lb. } 2 - \frac{3}{4} \text{ " } \phi \text{ str. } 2 - \frac{3}{4} \text{ " } \phi \text{ bt. } 2 - \frac{3}{8} \text{ " } \phi \text{ top.}$$

$$D = B_{21} = 11'6" \text{ span. } \quad W = S_6 \div 2 = 28400 \div 2 = 14200 \text{ ft. lb.}$$

$$S_8 \div 2 = 24850 \div 2 = 12425 \text{ "}$$

$$B_{21} = \frac{12 \times 20}{144} \times 150 \times 11.5 = 2900 \text{ "}$$

$$\underline{29530 \text{ ft. lb.}}$$

$$M = \frac{29530 \times 11.5 \times 12}{10} = 410000 \text{ in. lb. } \quad b = 12 \text{ " } d = 18.5 \text{ " } d_t = 20 \text{ "}$$

$$A_s = \frac{410000}{8000 \times 18.5} = 1.43 \text{ " } 2 - \frac{3}{4} \text{ " } \phi \text{ str. } 2 - \frac{3}{4} \text{ " } \phi \text{ bt. } 2 - \frac{3}{8} \text{ " } \phi \text{ top.}$$

$$V = \frac{14765}{12 \times 18 \times .89} = 75 \frac{1}{2} \text{ " lb. } \quad X_1 = \frac{75 - 60}{2 \times 75} 11.5 = 1.15 \text{ ft.}$$

$$V_2 = 6(75 - 60) 12 \times 1.15 = 1240 \text{ ft. lb. } 6 - \frac{1}{4} \text{ " } \phi \text{ stirrups.}$$

$$U = \frac{14765}{4 \times 2.36 \times .89 \times 18} = 98 \frac{1}{2} \text{ " lb.}$$

$$D-B_{22} = 20'-0" \text{ span.} \quad W = S_y = 21600 \div 2 = 10800 \text{ lb.}$$

$$S_y = 34500 \div 2 = 17250 \text{ "}$$

$$B_{22} = \frac{12 \times 24}{144} \times 150 \times 20 = 6000 \text{ "}$$

$$39100 \text{ lb.}$$

$$M_j = \frac{39100 \times 20 \times 12}{10} = 940000 \text{ in. lb.} \quad b = 12" \quad d = 22 \quad d_t = 24"$$

$$A_s = \frac{940000}{16000 \times 22} = 27 \# \quad 4 - \frac{3}{4}" \text{ str} \quad 2 - \frac{3}{4}" \text{ BL.}$$

$$V = \frac{39100 \div 2}{12 \times 22 \times 0.89} = 84 \frac{3}{8}" \text{ lb} \quad x_1 = \frac{84 - 60}{2 \times 34} \times 20 = 3.85 \text{ ft.}$$

$$V_2 = 6(84 - 60) \div 2 \times 2.86 = 4000 \text{ lb.} \quad \phi = \frac{4500}{12000 \div 20} = 7.5"$$

Use 3 - $\frac{1}{2}"$ stirrups.

$$D-B_{23} = 20'-0" \text{ span.} \quad W = (S_y + 2) \times 20 = 1100 \div 2 = 550 \times 20 = 11000 \text{ lb.}$$

$$B_{23} = \frac{8 \times 14}{144} \times 150 \times 20 = 3500 \text{ "}$$

$$15350 \text{ lb.}$$

$$M_j = \frac{15350 \times 20 \times 12}{8} = 400000 \text{ in. lb.} \quad b = 8" \quad d = 12.5 \quad d_t = 14"$$

$$A_s = \frac{400000}{16000 \times 12.5} = 2 \# \quad 2 - 1" \text{ str.}$$

$$V = \frac{6700}{8 \times 12.5 \times 0.89} = 84 \frac{3}{8}" \text{ lb} \quad x_1 = \frac{84 - 60}{2 \times 84} \times 20 = 2.96 \text{ ft.}$$

$$V_2 = 6(84 - 60) \div 2 \times 2.86 = 3295 \text{ lb.} \quad 2 - \frac{1}{2}" \phi \text{ top}$$

$$\frac{12000 \times 2 \times 13}{4} = 4500 \text{ "}$$

$$- 6 \times 5 \text{ ft. lb.} \quad 2 - \frac{1}{4}" \phi \text{ stirrups.}$$

$$L = \frac{6700}{2 \times 4 \times 0.89 \times 12.5} = 76 \frac{3}{8}" \text{ lb.}$$

$$D-B_{24} = 15'-0" \text{ span.} \quad W = B_{24} \div 2 = 13400 \div 2 = 6700 \text{ lb.}$$

$$\text{stirrups } B_{24} \div 2 = 10200 \div 2 = 5100 \text{ "}$$

$$B_{24} = \frac{12 \times 20}{144} \times 150 \times 5 = 1230 \text{ "}$$

$$13100 \text{ lb.}$$

$$M = 13100 \times 5 \times 12 \times \frac{2}{3} = 530000 \text{ in.} \quad b = 12" \quad d = 18.5" \quad d_t = 20"$$

$$A_s = \frac{530000}{16000 \times 18.5} = 1.9" \quad 2-1" \text{ sq. bar.}$$

$$f_c = \frac{6350}{4 \times 2 \times 18.5 \times .89} = 50 \frac{1}{2}" \text{ lb.}$$

(D)

$$D \cdot \text{col}_1 = W = B_3 \div 2 = 63000 \div 2 = 31500 \text{ Ft. lb.}$$

$$B_4 = R_1 = 22000 "$$

$$B_5 \div 2 = 29800 \div 2 = 14900 "$$

$$B_6 \div 2 = 30800 \div 2 = 15400 "$$

$$C \cdot \text{col}_1 = 161170 "$$

$$D \cdot \text{col}_1 = \frac{24^2 \times .7854 \times 150 \times 16}{144} = 7500 "$$

$$\underline{252500 \text{ Ft. lb.}}$$

$$f_c = \frac{252500}{(24^2 \times .7854) + (10 \times .)} = 70 \frac{1}{2}" \text{ lb.}$$

$$D \cdot \text{col}_2 = W \quad C \cdot \text{col}_2 = 36635 \text{ Ft. lb.}$$

$$B_7 \div 2 = 56830 \div 2 = 28415 "$$

$$B_8 = R_2 = 8200 "$$

$$B_{11} \div 2 = 51300 \div 2 = 25650 "$$

$$D \cdot \text{col}_2 = \frac{15 \times 24}{144} \times 150 \times 16 = 5000 "$$

$$\underline{104000 \text{ Ft. lb.}}$$

$$(D \cdot \text{col}_2 = 15" \times 24") \quad \text{Use } 10 - \frac{1}{2}" \phi \text{ Bar.}$$

$$f_c = \frac{104000}{15 \times 24 + 14(10 \times .196)} = 143 \frac{1}{2}" \text{ lb.}$$

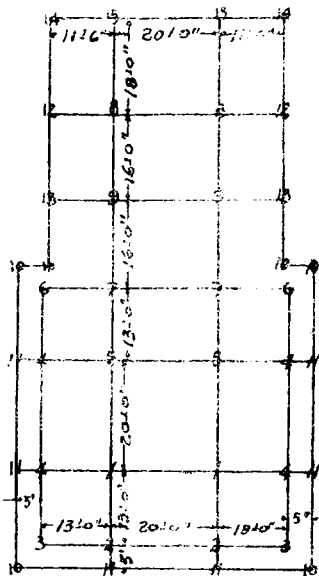
$$D \cdot \text{col}_3 \quad W = \dots \quad 45220 \text{ Ft. lb.}$$

$$B_{11} = 51300 "$$

$$D \cdot \text{col}_3 = \frac{15 \times 24 + 15 \times 9}{144} \times 150 \times 16 = 8200 "$$

$$\underline{105400 \text{ Ft. lb.}}$$

$$(D \cdot \text{col}_3 = 15" \times 24") \quad \text{Use } 10 - \frac{1}{2}" \phi$$



D = first floor by col.

$$f_c = \frac{105400}{(11 \times 20 + 11 \times 7) + 14(196)} = 173 \frac{1}{2} \text{ lb}$$

D = col₄

W = C = col₄ = 36635 斤. lb.

B₅ ÷ 2 = 29800 ÷ 2 = 14900 " "

B₁₁ ÷ 2 = 51300 ÷ 2 = 25650 " "

B₁₂ ÷ 2 = 24300 ÷ 2 = 12150 " "

D = col₄ = $\frac{15 \times 24}{144} \times 150 \times 16 = 5000$ "

94400 斤. lb.

(15" x 24") Use 8 - 1/2" φ

$$f_c = \frac{94400}{15 \times 24 + 14(8 \times 196)} = 180 \frac{1}{2} \text{ lb}$$

D = col₅

W = B₅ + 2 = 29800 ÷ 2 = 14900 斤. lb.

B₆ ÷ 2 = 30800 ÷ 2 = 15400 " "

B₇ ÷ 2 = 30800 ÷ 2 = 15400 " "

B₈ ÷ 2 = 29800 ÷ 2 = 14900 " "

D = col₅ = $\frac{24^2 \times 7854}{144} \times 150 \times 16 = 7500$ "

68100 斤. lb.

(D = col₅ = 24" φ) Use 6 - 3/8" φ

$$f_c = \frac{68100}{21^2 \times 7854 + 14(6 \times 1104)} = 220 \frac{1}{2} \text{ lb}$$

D = col₆

W = C = col₆ = 45920 斤. lb.

B₁₀ ÷ 2 = 56030 ÷ 2 = 28015 " "

B₁₁ ÷ 2 = 51300 ÷ 2 = 25650 " "

D = col₆ = $\frac{15 \times 24 + 15 \times 9}{144} \times 150 \times 16 = 8200$ "

108000 斤. lb.

(D = col₆ = 15" x 24") Use 8 - 1/2" φ

$$f_c = \frac{108000}{(11 \times 20 + 11 \times 7) + 14(8 \times 196)} = 220 \frac{1}{2} \text{ lb}$$

$$\begin{aligned}
 D = \text{COL}_7 \quad W = C = \text{COL}_4 &= 90640 \text{ Ft. lb.} \\
 B_8 \div 2 &= 29800 \div 2 = 14900 \text{ ''} \\
 B_9 \div 2 &= 72100 \div 2 = 36050 \text{ ''} \\
 B_{10} \div 2 &= 56030 \div 2 = 28015 \text{ ''} \\
 B_{15} \div 2 &= 26700 \div 2 = 13350 \text{ ''} \\
 D = \text{COL}_7 &= \frac{15 \times 24}{144} \times 150 \times 16 = 5000 \text{ ''} \\
 &= \underline{188000} \text{ Ft. lb.}
 \end{aligned}$$

(D = COL₇ = 15" x 24") use 10 - $\frac{3}{4}$ " ϕ

$$f_c = \frac{188000}{11 \times 20 + 14(10 \times .44)} = 180 \text{ } \frac{\text{lb.}}{\text{sq. ft.}}$$

$$\begin{aligned}
 D = \text{COL}_8 \quad W = B_{15} \div 2 &= 13350 \text{ Ft. lb.} \\
 B_{17} \div 2 &= 13150 \text{ ''} \\
 B_{21} \div 2 &= 14765 \text{ ''} \\
 B_{22} \div 2 &= 19600 \text{ ''} \\
 D = \text{COL}_8 &= \frac{18 \times 18}{144} \times 150 \times 16 = 5500 \text{ ''} \\
 &= \underline{66400} \text{ Ft. lb.}
 \end{aligned}$$

(D = COL₈ = 18" x 18") use 6 - $\frac{3}{8}$ " ϕ str. bar.

$$f_c = \frac{66400}{14 \times 14 + 14(6 \times .11)} = 480 \text{ } \frac{\text{lb.}}{\text{sq. ft.}}$$

$$\begin{aligned}
 D = \text{COL}_9 \quad W = B_{15} &= 26700 \text{ Ft. lb.} \\
 B_{21} \div 2 &= 14760 \text{ ''} \\
 B_{22} \div 2 &= 19000 \text{ ''} \\
 D = \text{COL}_9 &= \frac{18 \times 18}{144} \times 150 \times 16 = 5500 \text{ ''} \\
 &= \underline{66500} \text{ Ft. lb.}
 \end{aligned}$$

(D = COL₉ = 18" x 18") use 6 - $\frac{3}{8}$ " ϕ

$$f_c = \frac{66500}{14 \times 14 + 14(6 \times .11)} = 480 \text{ } \frac{\text{lb.}}{\text{sq. ft.}}$$

D = COL₁₀

$$W = B_{14}$$

$$D = \text{col}_{10} = \frac{12 \times 18 + 12 \times 6}{144} \times 150 \times 16 = \frac{4800}{17700} \text{ 磅}$$

($D = \text{col}_{10} = 12" \times 18"$) Use $6 - \frac{3}{8}" \phi$ str. Bar.

$$Z = \frac{(\sqrt{12 \times 18})^4 + 42 \times (6 \times 11) \times \sqrt{18 \times 14}^2}{6 \times \sqrt{12 \times 18}}$$

$$\frac{46500 + (42 \times 6624 \times 17.75)}{88} = \frac{46500 + 410}{88} = 535 \text{ lb.}$$

$$A' = 215 + (14 \times 6624) = 215 + 9.4 = 224.4 \text{ lb.}$$

$$y = 535 \div 224.4 = 2.4$$

$$\frac{W}{A} \pm \frac{W y}{Z} = \frac{17700}{224.4} \pm \frac{17700 \times 2.4}{535} = 79 + 79 = 158 \text{ lb.} \quad 79 - 79 = 0$$

$$D = \text{col}_{11} \quad W = B_{13} \div 2 = 7600 \text{ 磅}$$

$$B_{14} \div 2 = 6450 \text{ 磅}$$

$$D = \text{col}_{11} = \frac{12 \times 18}{144} \times 150 \times 16 = \frac{3600}{17700} \text{ 磅}$$

($D = \text{col}_{11} = 12" \times 18"$) Use $6 - \frac{3}{8}" \phi$ str. Bar.

$$D = \text{col}_{12} \quad W = B_{16} \div 2 = 5160 \text{ 磅}$$

$$B_{18} \div 2 = 5105 \text{ 磅}$$

$$B_{21} \div 2 = 14765 \text{ 磅}$$

$$D = \text{col}_{12} = \frac{12 \times 18}{144} \times 150 \times 16 = \frac{3600}{28630} \text{ 磅}$$

($D = \text{col}_{12} = 12" \times 18"$) Use $6 - \frac{3}{8}" \phi$ str. Bar.

$$f_c = \frac{28630}{9 \times 15 + 14 \times (.66)} = 200 \text{ 磅/吋}^2$$

$$D = \text{col}_{13}$$

$$W = B_{16} = 10320 \text{ 斤. lb.}$$

$$B_{21} \div 2 = 14765 \text{ 斤. lb.}$$

$$D = \text{col}_{13} = \frac{12 \times 18}{144} \times 150 \times 16 = \frac{3600 \text{ 斤. lb.}}{28700 \text{ 斤. lb.}}$$

($D = \text{col}_{13} = 12" \times 18"$) Use $6 - \frac{3}{8}" \phi$ str. Bar.

$$f_c = \frac{28700}{9 \times 15 + 14 \cdot (.66)} = 200 \text{ 斤. lb.}$$

$$D = \text{col}_{14} \quad W = B_{18} \div 2 = 5100 \text{ 斤. lb.}$$

$$B_{20} \div 2 = 8500 \text{ 斤. lb.}$$

$$D = \text{col}_{14} = \frac{12 \times 18 + 12 \times 6}{144} \times 150 \times 16 = \frac{4800 \text{ 斤. lb.}}{18500 \text{ 斤. lb.}}$$

($D = \text{col}_{14} = 12" \times 18"$) Use $6 - \frac{3}{8}" \phi$ str. Bar.

$$D = \text{col}_{15} \quad W = B_{19} \div 2 = 15150 \text{ 斤. lb.}$$

$$B_{20} \div 2 = 8500 \text{ 斤. lb.}$$

$$B_{24} \div 2 = 6550 \text{ 斤. lb.}$$

$$D = \text{col}_{15} = \frac{12 \times 18}{144} \times 150 \times 16 = \frac{3600 \text{ 斤. lb.}}{20200 \text{ 斤. lb.}}$$

($D = \text{col}_{15} = 12" \times 18"$) Use $6 - \frac{3}{8}" \phi$ str. Bar.

(F)

$$F = B_1 \quad W = 320 \times 17 = 5450 \text{ 斤. lb.}$$

$$M = 5450 \times 17 = 92100 \text{ 斤. lb.}$$

$$A_s = \frac{92100}{16000 \times 8} = 0.73 \text{ 吋}^2 \quad \text{Use } 4 - \frac{1}{2}" \phi \text{ str. Bar.}$$

$$F = B_2 \quad W = 320 \times 20 = 6400 \text{ 斤. lb.}$$

$$M = 6400 \times 20 = 128000 \text{ 斤. lb.}$$

$$A_s = \frac{128000}{1600 \times 8} = 1''$$

use $4 - \frac{1}{2}''$ str. bar.

$$F = B_3 \quad W = 320 \times 12 = 3850 \text{ lb.}$$

$$M = 3850 \times 12 = 46000 \text{ ft. lb.}$$

$$A_s = 0.23'' \quad 4 - \frac{3}{8}'' \phi \text{ str. bars}$$

$$F = B_4 \quad W = 320 \times 18 = 5760 \text{ ft. lb.}$$

$$M = 5760 \times 18 = 104000 \text{ ft. lb.}$$

$$A_s = 0.82'' \quad 4 - \frac{1}{2}''$$

$$F = B_5 \quad W = 320 \times 11.5 = 3700 \text{ ft. lb.}$$

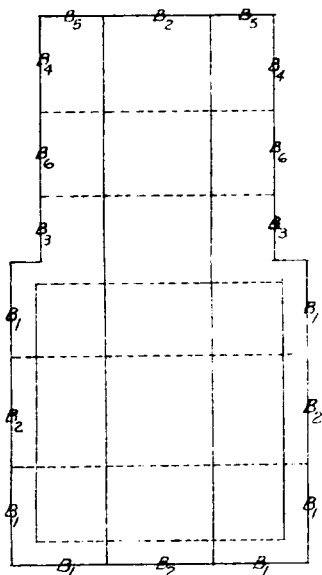
$$M = 3700 \times 11.5 = 42500 \text{ ft. lb.}$$

$$A_s = 0.335'' \quad 4 - \frac{3}{8}'' \phi \text{ straight.}$$

$$F = B_6 \quad W = 320 \times 16 = 5150 \text{ ft. lb.}$$

$$M = 5150 \times 16 = 82000 \text{ ft. lb.}$$

$$A_s = 0.65'' \quad 4 - \frac{1}{2}'' \phi \text{ bar.}$$



F = GROUND FLOOR BY Bm.

$$F_{t1} \quad col_1 = \frac{1}{4} \times 252500 = 64000 \text{ ft. lb.}$$

$$P_1 = 64000 \times 12 = 7680 \text{ ft. lb.} \quad (P_1 = P_2)$$

$$\frac{7680}{71680}$$

$$64000 - 26000 = 38000 \text{ ft. lb.}$$

$$20 - 7\frac{1}{2}'' \phi \text{ pile} \quad \frac{-26000}{45680 \text{ ft. lb.}}$$

$$area = \frac{P_1}{S} = \frac{45680}{1600} = 28.5 \text{ ft.}$$

$$28.5 + 28.5 = 57 \text{ ft.}$$

$$W = \frac{64000}{28.5} = 2240 \text{ ft. lb.}$$

$$X = \frac{38000 \times 26}{45680 \times 2} = 8.4 \text{ ft.}$$

$$8.4 + .66 = 9.06 \quad 9.06 \times 2 = 18.12 \text{ ft.}$$

$$\frac{57}{18.12} = 3.15 \quad 3 \frac{1}{2}'' \text{ breadth.}$$

$$W = \frac{33000 \times 2}{57} = 1010 \text{ ft. lb.}$$

$$M = 1010 \times 1.5 \times 24 = 36400 \text{ in. lb.}$$

$$d = \sqrt{\frac{36400}{89 \times 12}} = 5.82 \quad d_t = 10''$$

$$A_s = \frac{36400}{16000 \times 8} = .285 \#''$$

$\frac{3}{8}'' \text{ @ } 5'' \text{ c.c.}$

$$V = \frac{(3.5 - 1.5) \times 1010}{24 \times .89 \times 8} = \frac{2020}{128} = 16 \frac{1}{8}'' \text{ lb.}$$

$$U = \frac{(3.5 - 1.5) 1010}{2 \times 3.2 \times .89 \times 8} = 47 \frac{1}{8}'' \text{ lb.}$$

$$T = M = 12 \times 1260 \times 3.5 \times 17.32^2 = 1600000 \text{ in. lb.}$$

$$d = \sqrt{\frac{1600000}{89 \times 12}} = 39'' \quad d_t = 41''$$

$$A_s = \frac{1600000}{16000 \times 39} = 2.6 \#''$$

4 - $\frac{5}{8}''$ Str. 2 - $\frac{3}{4}''$ Ft.

$$U = \frac{1260 \times 3.5 \times 2.5}{2 \times (3 \times 2.5) \times .89 \times 39} = 21 \frac{1}{8}'' \text{ lb.}$$

$$V = \frac{1260 \times 3.5 \times 2.5}{18 \times .89 \times 39} = 20 \frac{1}{8}'' \text{ lb.}$$

$$150(1.5 \times 3.25 + 1 \times 2) \times 17.32 = 18000 \text{ ft. lb.}$$

$$7680 + 7680 = 153600 \text{ ft. lb.}$$

$$Ft \ 2 = col_1 - P_1 = \frac{1}{4} \times 252000 = 63000 \text{ ft. lb.} \quad col_2 - P_2 = \frac{1}{3} \times 104400 = 35000 \text{ ft. lb.}$$

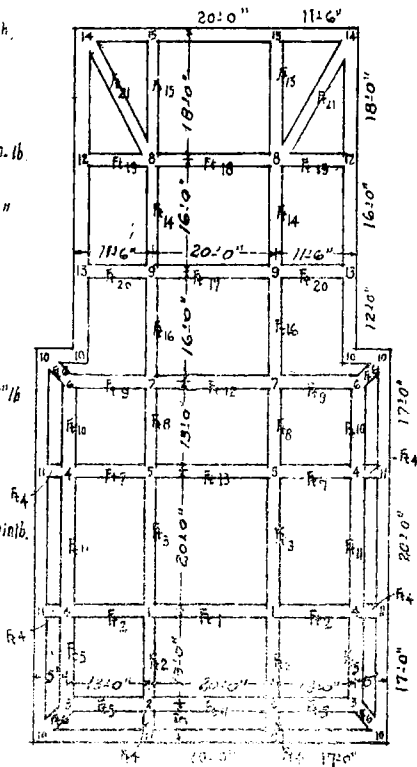


FIG. 10. FLOOR PLAN BY THE

$$P_1 = 64000 \times .12 = 7680 \text{ 磅}$$

$$\begin{array}{r} 7680 \\ \hline 71680 \end{array}$$

$$\begin{array}{r} 5 \text{ - Pile } - 26000 \\ \hline 45680 \text{ 磅} \end{array}$$

$$64000 \text{ 磅}$$

$$\begin{array}{r} 5 \text{ - Pile } - 26000 \\ \hline 38000 \text{ 磅} \end{array}$$

$$P_2 = 35000 \times .12 = 4160 \text{ 磅}$$

$$\begin{array}{r} 4160 \\ \hline 39160 \end{array}$$

$$\begin{array}{r} 3 \text{ - Pile } - 5200 \times 3 \\ \hline 23560 \text{ 磅} \end{array}$$

$$35000 \text{ 磅}$$

$$\begin{array}{r} + \text{ pile } - 15600 \\ \hline 19400 \text{ 磅} \end{array}$$

$$\text{Col}_1 = \text{area} = \frac{45680}{1600} = 28.5 \text{ 呎}$$

$$W = \frac{64000}{28.5} = 2240 \text{ 磅/呎} \quad \text{Col}_2 = \text{area} = \frac{23560}{2240} = 10.5 \text{ 呎}$$

$$28.5 + 10.5 = 39 \text{ 平方呎}$$

$$X = \frac{39160 \times 13}{71680 + 39160} = \frac{510000}{110840} = 4.6 \text{ 呎}$$

$$4.6 + .66 = 5.26 \quad 5.26 \times 2 = 10.52 \text{ 呎}$$

$$\frac{39}{10.52} = 3.7 \quad 4'0" \times 4'0" \text{ Wide}$$

$$W = \frac{64000 + 35000}{39} = \frac{99000}{39} = 2540 \text{ 磅/呎}$$

$$M = 2540 \times 1.25 \times 24 = 76000 \text{ 吋磅}$$

$$d = \sqrt{\frac{76000}{1067}} = 8.5 \quad d_t = 12"$$

$$A_s = \frac{76000}{16000 \times 10} = 4.76 \# \quad \frac{1}{2} \text{ " } \phi @ 4" \text{ c.c.}$$

$$V = \frac{(4 - 1.67) \times 2540}{24 \times .89 \times 10} = \frac{5900}{214} = 27.6 \# \frac{1}{2} \text{ 磅}$$

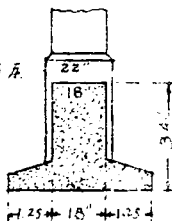
$$U = \frac{5900}{2 \times (3 \times 1.57) \times .89 \times 10} = 70 \# \frac{1}{2} \text{ 磅}$$

$$d = \sqrt{\frac{1360000}{89 \times 18}} = 30$$

$$M = 1.2 \times 2540 \times 4 \times 10.52^2 = 1360000 \text{ 吋磅}$$

$$d_t = 34"$$

$$A_s = \frac{1360000}{16000 \times 32} = 2.7 \# \quad 4 - \frac{5}{8} \text{ " } \phi \text{ str.} \quad 3 - \frac{3}{4} \text{ " } \phi \text{ bt.}$$



$$11 = \frac{2540 \times 4. \times 2.5}{2 \times 4 \times 1.96 \times .89 \times 32} = 57\% \text{ 尺}$$

$$12 = \frac{25500}{18 \times .89 \times 32} = 50\% \text{ 尺}$$

$$\begin{aligned} F_1 = \text{col}_1 &= 252500 \text{ 尺} \\ \text{col}_1 &= 252500 \text{ 尺} \\ \hline &505000 \text{ 尺} \end{aligned}$$

$$\begin{aligned} F_9 = \text{col}_6 &= 108000 \text{ 尺} \\ \text{col}_7 &= 188000 \text{ 尺} \\ \hline &296000 \text{ 尺} \end{aligned}$$

$$\begin{aligned} F_2 = \text{col}_1 &= 252500 \text{ 尺} \\ \text{col}_2 &= 104000 \text{ 尺} \\ \hline &356500 \text{ 尺} \end{aligned}$$

$$\begin{aligned} F_{10} = \text{col}_2 &= 104000 \text{ 尺} \\ \text{col}_6 &= 108000 \text{ 尺} \\ \hline &212000 \text{ 尺} \end{aligned}$$

$$\begin{aligned} F_3 = \text{col}_1 &= 252500 \text{ 尺} \\ \text{col}_5 &= 68100 \text{ 尺} \\ \hline &320600 \text{ 尺} \end{aligned}$$

$$\begin{aligned} F_{11} = \text{col}_2 &= 104000 \text{ 尺} \\ \text{col}_2 &= 104000 \text{ 尺} \\ \hline &208000 \text{ 尺} \end{aligned}$$

$$\begin{aligned} F_4 = \text{col}_2 &= 104000 \text{ 尺} \\ \text{col}_{11} &= 17700 \text{ 尺} \\ \hline &121700 \text{ 尺} \end{aligned}$$

$$\begin{aligned} F_{12} = \text{col}_7 &= 188000 \text{ 尺} \\ \text{col}_7 &= 188000 \text{ 尺} \\ \hline &376000 \text{ 尺} \end{aligned}$$

$$\begin{aligned} F_5 = \text{col}_2 &= 104000 \text{ 尺} \\ \text{col}_3 &= 105400 \text{ 尺} \\ \hline &209400 \text{ 尺} \end{aligned}$$

$$\begin{aligned} F_{13} = \text{col}_5 &= 68100 \text{ 尺} \\ \text{col}_5 &= 68100 \text{ 尺} \\ \hline &136200 \text{ 尺} \end{aligned}$$

$$\begin{aligned} F_6 = \text{col}_3 &= 105400 \text{ 尺} \\ \text{col}_{10} &= 17700 \text{ 尺} \\ \hline &123100 \text{ 尺} \end{aligned}$$

$$\begin{aligned} F_{14} = \text{col}_8 &= 53500 \text{ 尺} \\ \text{col}_9 &= 66500 \text{ 尺} \\ \hline &120000 \text{ 尺} \end{aligned}$$

$$\begin{aligned} F_7 = \text{col}_5 &= 68100 \text{ 尺} \\ \text{col}_2 &= 104000 \text{ 尺} \\ \hline &172100 \text{ 尺} \end{aligned}$$

$$\begin{aligned} F_{15} = \text{col}_8 &= 53500 \text{ 尺} \\ \text{col}_{15} &= 20200 \text{ 尺} \\ \hline &73700 \text{ 尺} \end{aligned}$$

$$\begin{aligned} F_8 = \text{col}_5 &= 68100 \text{ 尺} \\ \text{col}_7 &= 188000 \text{ 尺} \\ \hline &256100 \text{ 尺} \end{aligned}$$

$$\begin{aligned} F_{16} = \text{col}_7 &= 188000 \text{ 尺} \\ \text{col}_9 &= 66500 \text{ 尺} \\ \hline &254500 \text{ 尺} \end{aligned}$$

$F_{17} = \text{COL}_9 = 66500 \text{ 斤}$ $\text{COL}_9 = \frac{66500 \text{ 斤}}{133000 \text{ 斤}}$	$F_{21} = \text{COL}_8 = 66400 \text{ 斤}$ $\text{COL}_{14} = \frac{18000 \text{ 斤}}{84400 \text{ 斤}}$
$F_{18} = \text{COL}_8 = 66400 \text{ 斤}$ $\text{COL}_8 = \frac{66400 \text{ 斤}}{132800 \text{ 斤}}$	<p>A</p> $F_{11} = (F_{11} = F_{13} = F_{12} = F_3)$
$F_{19} = \text{COL}_8 = 66400 \text{ 斤}$ $\text{COL}_{12} = \frac{28630 \text{ 斤}}{95030 \text{ 斤}}$	<p>B</p> $F_{22} = (F_7 = F_9 = F_5 = F_{10} = F_8)$
$F_{20} = \text{COL}_9 = 66500 \text{ 斤}$ $\text{COL}_{13} = \frac{28700 \text{ 斤}}{97200 \text{ 斤}}$	<p>C</p> $F_{14} = F_6$
	<p>D</p> $F_{16} = (F_{14} = F_{17} = F_{15} = F_{18})$
	<p>E</p> $F_{20} = (F_{21} = F_{19} = F_{15})$

$$F_4 \quad \text{COL}_{11} = \frac{1770 \text{ 斤}}{42100 \text{ 斤}}$$

$$F \cdot B_1 \div 2 = 5450 \div 2 = 2725 \text{ 斤}$$

$$F \cdot B_2 \div 2 = 6400 \div 2 = 3200 \text{ 斤}$$

$$F \cdot S_1 \div 2 = 640 \times 8.5 + 10 = 1160 \text{ 斤}$$

$$F \cdot S_2 \div 2 = 1880 \times 10 + 8.5 = 3500 \text{ 斤}$$

$$\frac{42100 \text{ 斤}}$$

$$\frac{42100 \times 18.5}{166} = 4700 \text{ 斤}$$

$$42100 + 4700 = 46800 \text{ 斤}$$

$$P_2 = 46800 \times 0.12 = 5600 \text{ 斤}$$

$$P_1 = 46800 + 5600 = 52400 \text{ 斤}$$

$$\frac{52400}{16000 \times 18.5} = 1.8 \text{ 斤} \quad 2'0'' \text{ Wide.}$$

$$M = 46800 \times 18.5 = 860000 \text{ in. lb.}$$

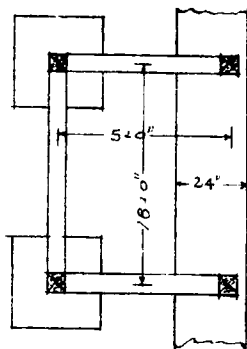
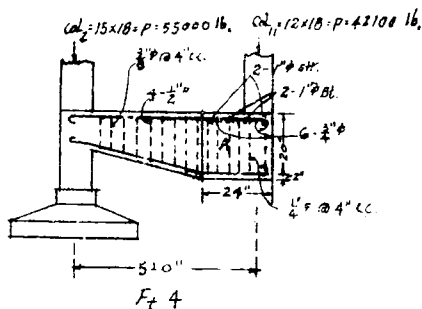
$$d = \sqrt{\frac{860000}{24 \times .89}} = 20 \quad d_t = 22" \quad b = 24"$$

$$A_s = \frac{860000}{16000 \times 20} = 2.7 \text{ " } \quad 2-1" \phi \text{ str. } \quad 2-1" \phi \text{ pt.}$$

$$V = \frac{46800}{2} \times \frac{12.1}{14.5} = \frac{525000}{37} = 15300 \text{ R. lb.}$$

$$V_2 = \frac{15300}{24 \times .89 \times 20} = \frac{15300}{540} = 28.4 \text{ } \frac{3}{8} \text{ " lb.}$$

add $\frac{1}{4} \text{ " } \phi @ 4" \text{ c.c.}$



$$U = \frac{15300}{2 \times 3.1416 \times .89 \times 20} = 138 \text{ } \frac{3}{8} \text{ " lb.}$$

$$M = 42100 \times 18.5 = 780000 \text{ m. lb.}$$

$$M = 4700 \times 42 = 200000 \text{ m. lb.}$$

$$A_s = \frac{780000}{16000 \times 20} = 2.4 \text{ " }$$

$$A_s = \frac{200000}{16000 \times 20} = .62 \text{ " }$$

6- $\frac{3}{4}$ " ϕ Bar

4- $\frac{1}{2}$ " ϕ Bar

$$B = b = 12", \quad d = 18.5, \quad d_t = 20" \quad V_1 = 53.4 \times 18 \times 20 = 19200 \text{ R. lb.}$$

$$V_2 = 4700 - 19200 = -14500 \text{ R. lb. } \quad \frac{3}{8} \text{ " } \phi @ 4" \text{ c.c.}$$

F7 20

$$\text{COL}_{13} = 28700 \text{ R. lb.}$$

$$B_1 = 2725 \text{ "}$$

$$B_2 = 3200 \text{ "}$$

$$S_1 = 640 \times (8 + 8.5) = 10500 \text{ "}$$

$$S_2 = 1880 \times (8 + 8.5) = 29500 \text{ "}$$

$$\frac{44000}{715}$$

$$\frac{44600 \times 18.5}{166} = 5000 \text{ 呎. 吋}$$

$$44600 + 5000 = 49600 \text{ 呎. 吋}$$

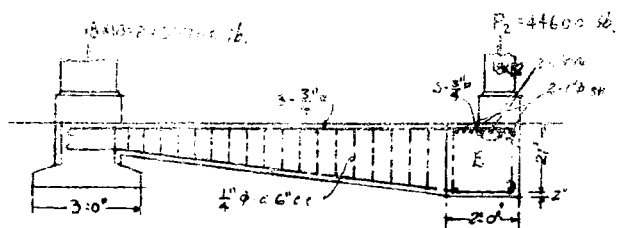
$$P_2 = 49600 \times 0.12 = 6000 \quad "$$

$$P_1 = 49600 + 6000 = 55600 \text{ 呎. 吋}$$

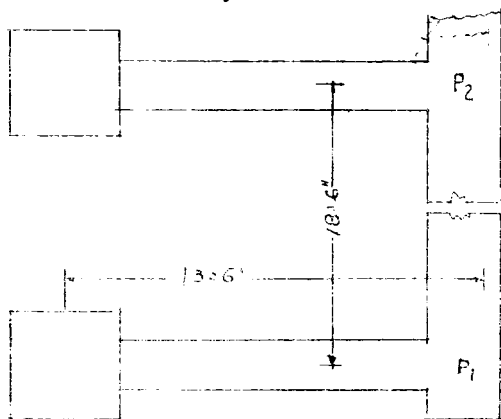
$$\frac{55600}{16000 \times 18.5} = 1.8 \text{ 呎. } 21\text{' Wide} \quad M = 49600 \times 18.5 = 920000 \text{ in. 吋}$$

$$s = \sqrt{\frac{920000}{24 \times 89}} = 21 \quad d_c = 23" \quad A_s = \frac{920000}{16000 \times 21} = 2.18 \frac{\text{吋}^2}{\text{呎. 吋}}$$

4-1" ϕ Bar.



$F_2 20$



$$V = \frac{49600}{2} \times \frac{12.1}{18.5} = 16200 \text{ 磅.}$$

$$V_2 = \frac{16200}{24 \times .69 \times 21} = 30 \text{ 磅"lb.}$$

$$U = \frac{16200}{24 \times .75 \times .89 \times 21} = 50 \text{ 磅"lb.}$$

$$M = 44600 \times 18.5 = 820000 \text{ in. lb.}$$

$$A_s = \frac{820000}{16000 \times 21} = 2.5 \text{ "}$$

$$5 - \frac{3}{4} \text{ " Bar.}$$

$$5000 \times 120 = 600000 \text{ 磅"lb.}$$

$$A_s = \frac{600000}{16000 \times 21} = 1.8 \text{ "}$$

$$B = b = 18" \quad d = 22"$$

$$3 - \frac{3}{4} \text{ " Bar.}$$

$$V_1 = 53.4 \times 18 \times 22 = 21146 \text{ 磅.}$$

$$V_2 = V - V_1 = 4700 - 21146 \text{ 磅.}$$

$$\text{柱 } 10 \text{ } \text{COL}_7 = 188000 \times \frac{1}{4} = 47000 \text{ 磅.}$$

$$\text{COL}_9 = 53700 \times \frac{1}{4} = 13425 \text{ 磅.}$$

$$P_1 = 47000 \times .12$$

$$P_2 = 13425 \times .12 \text{ 磅.}$$

$$\frac{5640 \text{ 磅.}}$$

$$\frac{5640}{5 \times 6 \times 12}$$

$$\frac{1610 \text{ 磅.}}$$

$$\frac{1610}{1 \times 1 \times 12}$$

$$3 \text{ - pile} = -15600 \text{ "}$$

$$\frac{37040 \text{ "}}$$

$$47000 \text{ 磅.}$$

$$3 \text{ - pile} = -15600 \text{ "}$$

$$\frac{31400 \text{ "}}$$

$$\text{COL}_7 \text{ - area} = \frac{37040}{1600} = 23.3 \text{ 磅.}$$

$$W = \frac{47000}{23.3} = 1940 \text{ 磅.}$$

$$\text{COL}_9 \text{ - area} = \frac{15035}{1940} = 7.8 \text{ 磅.}$$

$$23.3 + 7.8 = 31.1 \text{ 磅.}$$

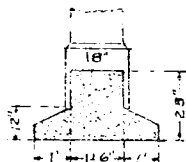
$$x = \frac{15035 \times 17}{52640 + 15035} = \frac{256000}{67675} = 3.8 \text{ 磅.}$$

$$3.8 \times 18 = 4.42 \times 2 = 8.82 \text{ 磅.}$$

$$\frac{31.1}{8.82} = 3.5 \text{ 磅.} \quad (3'6" \times 3'6")$$

$$x = \frac{47000 \times 13.425}{31.1} = \frac{60425}{31.1} = 1940 \text{ 磅.}$$

$$M = 1940 \times 1 \times 12 = 42800 \text{ in. lb.}$$



$$d = \sqrt{\frac{42800}{1067}} = 6.6 \quad d_t = 12''$$

$$A_s = \frac{42800}{16000 \times 10} = .266 \text{ *''} \quad \frac{3}{8}'' \phi @ 4'' \text{ C.C.}$$

$$V = \frac{(3.5 - 1.5) 1940}{24 \times .89 \times 10} = \frac{3880}{214} = 18 \frac{1}{2}'' \text{ lb.}$$

$$U = \frac{(3.5 - 15) 1940}{2 \times (3 \times 1.18) \times .89 \times 10} = \frac{3880}{63} = 61 \frac{1}{2}'' \text{ lb.}$$

$$T = M = 1.2 \times 1940 \times 3.5 \times 15.25^2 = 1800000 \text{ in. lb.}$$

$$d = \sqrt{\frac{1800000}{89 \times 46}} = 21 \quad d_t = 23'' \quad A_s = \frac{1800000}{16000 \times 21} = 5.36 \text{ *''}$$

$$u = \frac{1940 \times 3.5 \times 7.6}{2 \times 3 \times 4 \times .89 \times 21} = \frac{51500}{450} = 115 \frac{1}{2}'' \text{ lb.} \quad 3-1'' \text{ str.} \quad 3-1'' \text{ et.}$$

$$V = \frac{51500}{18 \times .89 \times 21} = 154 \frac{1}{2}'' \text{ lb.} \quad X_1 = \frac{(154 - 60) 15.25}{2 \times 154} = 4.7 \text{ ft.}$$

$$V_2 = 6(154 - 60) 18 \times 4.7 = 47500 \text{ ft. lb.}$$

$$A_s = \frac{47500}{12000 \times 0.2208} = 18 \text{ *''} \quad \text{use } 18 - \frac{3}{8}'' \phi$$

$$S = \frac{12000 \times 0.2208 \times 2}{(154 - 60) 18} = 3.2 \text{ space.}$$

$$150(1.5 \times 3.5 + 1 \times 7.6) 17 = 33000 \text{ ft. lb.}$$

$$5640 + 1610 = 8250 \text{ ft. lb.}$$

第三節 各類鋼條表排列如下，以便參考。

SECOND SLAB AND BEAM SCHEDULE

MARK	TOTAL	SPANS	SIZE				STEEL				SKETCH
			a	b	c	d	BENT	STRAIGHT	STIRRUPS	TOP STEEL	
S ₁	6	4'3"				4"		12- $\frac{5}{16}$ " ϕ	7- $\frac{1}{4}$ " ϕ		A
S ₂	6	4'3"				4"		9- $\frac{5}{16}$ " ϕ	7- $\frac{1}{4}$ " ϕ		"
S ₃	6	8'0"				4"		17- $\frac{5}{16}$ " ϕ	8- $\frac{1}{4}$ " ϕ		"
S ₄	6	10'6"				4"		32- $\frac{3}{8}$ " ϕ	21- $\frac{1}{4}$ " ϕ		"
S ₅	4	10'0"				4"		12- $\frac{3}{8}$ " ϕ	15- $\frac{1}{4}$ " ϕ		"
B ₁	3	12'0"	8"	0"	4"	4"	2- $\frac{1}{2}$ " ϕ	2- $\frac{1}{2}$ " ϕ	24- $\frac{1}{4}$ " ϕ		"
B ₂	6	4'3"	6"	12"	4"	4"		2- $\frac{3}{8}$ " ϕ			"
B ₃	3	8'0"	6"	10"			2- $\frac{1}{2}$ " ϕ	2- $\frac{1}{2}$ " ϕ	16- $\frac{1}{4}$ " ϕ		"
B ₄	6	4'6"	8"	16"	4"	4"	2- $\frac{1}{2}$ " ϕ	2- $\frac{1}{2}$ " ϕ	9- $\frac{1}{4}$ " ϕ		"
B ₅	6	4'6"	8"	8"			2- $\frac{1}{2}$ " ϕ	2- $\frac{1}{2}$ " ϕ	9- $\frac{1}{4}$ " ϕ		"
B ₆	6	20'0"	12"	15"	4"	4"	2-1" \square	2-1" \square	14- $\frac{5}{16}$ " ϕ		"
B ₇	4	10'5"	15"	30"	4"	4"	2-1" \square	2-1" \square	15- $\frac{5}{16}$ " ϕ	2- $\frac{1}{4}$ " ϕ	"
B ₈	4	4'0"	15"	5"	4"	4"	2-1" \square	2-1" \square	12- $\frac{5}{16}$ " ϕ		"

MARK	TOTAL	HEIGHT	SQUARE	CIRCLE	COLUMNS			SKETCH
					SKEDS ALL OUTSIDE	STRAIGHT	STIRRUPS	
C ₁	1	11'8"		11'6"	12"	4- $\frac{1}{2}$ " ϕ	$\frac{5}{8}$ " ϕ @ 4" C.C.	A
C ₂	1	5'0"	8"		12"	4- $\frac{1}{2}$ " ϕ	$\frac{5}{8}$ " ϕ @ 4" C.C.	A
C ₃	6	4'0"	8"		12"	4- $\frac{3}{8}$ " ϕ	$\frac{5}{8}$ " ϕ @ 4" C.C.	A
C ₄	6	8'0"	8"		12"	4- $\frac{3}{8}$ " ϕ	$\frac{5}{8}$ " ϕ @ 4" C.C.	A

SECOND SLAB AND BEAM SCHEDULE

MARK	TOTAL	SPANS	SIZE				STEEL				REMARKS	
			a	b	c	d	BENT	STRAIGHT	STIRRUPS	TOP STEEL		
S ₁	16	41'0"				4'		13- $\frac{3}{16}$ " ϕ	13- $\frac{3}{16}$ " ϕ			B
S ₂	4	41'0"				4'		13- $\frac{3}{16}$ " ϕ	13- $\frac{3}{16}$ " ϕ			"
S ₃	16	44'0"				4'		36- $\frac{3}{16}$ " ϕ	16- $\frac{3}{16}$ " ϕ			"
S ₄	16	13'0"				4'		27- $\frac{3}{8}$ " ϕ	27- $\frac{3}{8}$ " ϕ			"
B ₁	8	6'0"	6"	12"	4"	4'	2- $\frac{3}{8}$ " ϕ	2- $\frac{3}{8}$ " ϕ	12- $\frac{1}{4}$ " ϕ			"
B ₂	16	2'0"	6"	12"	4"	4'	2- $\frac{3}{8}$ " ϕ	2- $\frac{3}{8}$ " ϕ	12- $\frac{1}{4}$ " ϕ			"
B ₃	8	3'0"	6"	12"	6"	4'	2- $\frac{3}{8}$ " ϕ	2- $\frac{3}{8}$ " ϕ	9- $\frac{1}{4}$ " ϕ			"
B ₄	16	3'0"	6"	12"	4"	4'	2- $\frac{3}{8}$ " ϕ	2- $\frac{3}{8}$ " ϕ	9- $\frac{1}{4}$ " ϕ			"
B ₅	16	4'0"	6"	12"	4"	4'	2- $\frac{3}{8}$ " ϕ	2- $\frac{3}{8}$ " ϕ	26- $\frac{1}{4}$ " ϕ			"
B ₆	8	14'0"	10"	30"		4'	2- $\frac{1}{2}$ " ϕ	2- $\frac{1}{2}$ " ϕ	16- $\frac{1}{4}$ " ϕ			"
B ₇	16	3'0"	10"	15"		4'		2- $\frac{1}{2}$ " ϕ	6- $\frac{1}{4}$ " ϕ	2- $\frac{1}{2}$ " ϕ		"

MARK	TOTAL	HEIGHT	SQUARE	CIRCLE	COLUMNS			REMARKS
					SHOWS ALL OUTSIDE	STRAIGHT	STIRRUPS	
C ₁	4	1'0"		12"	14"	4- $\frac{3}{8}$ " ϕ	4 ϕ @ 4" O.C.	A
C ₂	4	1'0"	6"		12"	4- $\frac{3}{8}$ " ϕ	"	B
C ₃	16	3'0"	6"		15"	4- $\frac{3}{8}$ " ϕ	"	"

SECOND SLAB AND BEAM SCHEDULE

MARK	TOTAL	SPANS	SIZE				STEEL				SKETCH
			a	b	c	d	BENT	STRAIGHT	STIRRUPS	TOP STEEL	
S ₁	4	13'-0"				5"		43- $\frac{3}{8}$ "			C
S ₂	2	10'-0"				5"		61- $\frac{3}{8}$ "			"
B ₁	8	3'-0"	15"	24"	5"	4"	2-1" ^a	2-1" ^a	12- $\frac{1}{4}$ " ϕ		"
B ₂	6	13'-0"	18"	36"	5"	3"	2-1" ^a	2-1" ^a	12- $\frac{1}{4}$ " ϕ		"
B ₃	4	10'-0"	15"	24"	5"		2-1" ^a	2-1" ^a	16- $\frac{1}{4}$ " ϕ		"
B ₄	2	20'-0"	18"	36"	5"		2-1" ^a	2-1" ^a	30- $\frac{3}{16}$ " ϕ	2-1" ^a	"
B ₅	2	33'-0"	15"	36"	5"		2- $\frac{3}{4}$ " ^a	5-1" ^a	36- $\frac{5}{16}$ " ϕ	5-1" ^a	"

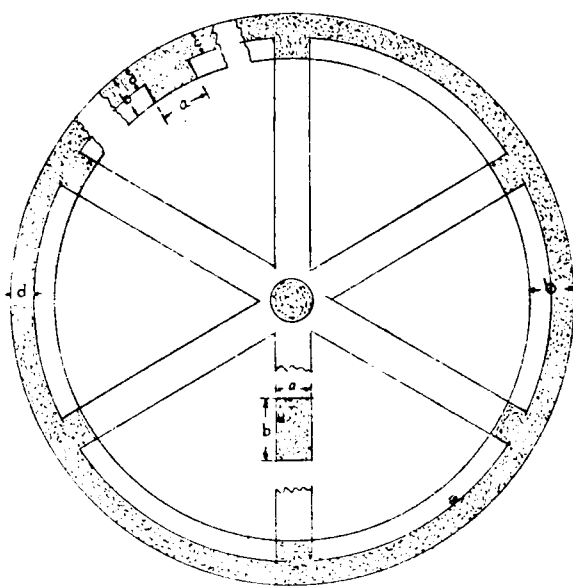
MARK	TOTAL	HEIGHT	SQUARE	CIRCLE	COLUMNS			SKETCH
					SKEWS ALL OUTSIDE	STRAIGHT	STIRRUPS	
C ₁	2	21'-0"		22"	1 $\frac{1}{2}$ "	8-1" ^a	$\frac{1}{4}$ " ϕ @ 4" C.C.	C
C ₂	4	"	15x24"		"	10- $\frac{3}{8}$ " ^a	"	"
C ₃	4	"	"		"	10- $\frac{3}{8}$ " ^a	"	"
C ₄	2	"	"		"	10- $\frac{1}{2}$ " ^a	"	"

SECOND SLAB AND BEAM SCHEDULE

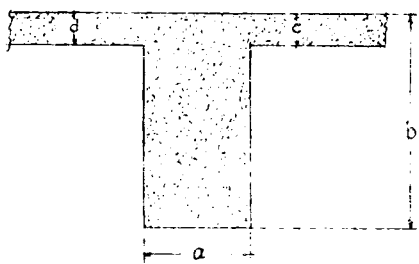
MARK	TOTAL	SPANS	SIZE				STEEL				REMARKS	
			a	b	c	d	BENT	STRAIGHT	STIRRUPS	TOP STEEL		
S ₁	1	51'0"				4"			60- $\frac{3}{8}$ "	8- $\frac{1}{4}$ "		D
S ₁	3	51'0"				4"			70- $\frac{3}{8}$ "	8- $\frac{1}{4}$ "		"
S ₂	3	118'0"				6"			52- $\frac{3}{8}$ "			"
S ₂	3	201'0"				6"			60- $\frac{3}{8}$ "			"
S ₃	1	102'0"				6"			30- $\frac{3}{8}$ "			"
S ₃	1	201'0"				6"			24- $\frac{3}{8}$ "			"
S ₄	4	131'0"				6"			16- $\frac{3}{8}$ "	16- $\frac{3}{8}$ "		"
S ₅	1	201'0"				7"			60- $\frac{1}{2}$ "	60- $\frac{1}{2}$ "		"
S ₆	2	112'6"				6"			44- $\frac{3}{8}$ "			"
S ₆	2	181'0"				6"			43- $\frac{3}{8}$ "			"
S ₇	1	181'0"				6"			72- $\frac{3}{8}$ "			"
S ₇	1	201'0"				6"			60- $\frac{1}{2}$ "			"
S ₈	4	112'6"				6"			34- $\frac{3}{8}$ "			"
S ₈	4	121'0"				6"			21- $\frac{3}{8}$ "			"
S ₉	3	161'0"				6"			62- $\frac{1}{2}$ "			"
S ₉	2	201'0"				6"			70- $\frac{1}{2}$ "			"
B ₁	1	201'0"	15'	24'	6"	6"	2-1"	2-1"	20- $\frac{1}{4}$ "			"
B ₂	1	201'0"	15'	24'	6"	6"	2-1"	2-1"	20- $\frac{1}{4}$ "	2- $\frac{3}{4}$ "		"
B ₃	1	201'0"	15'	24'	6"	6"	2-1"	2-1"	16- $\frac{1}{4}$ "	2- $\frac{3}{4}$ "		"
B ₄	2	131'0"	15'	24'	6"	6"	2-1"	4-1"	20- $\frac{5}{16}$ "	4- $\frac{1}{2}$ "		"
B ₅	2	131'0"	15'	24'	6"	6"	2- $\frac{3}{4}$ "	2- $\frac{3}{4}$ "	12- $\frac{1}{4}$ "	2- $\frac{3}{4}$ "		"
B ₆	2	201'0"	15'	24'	6"	6"	2- $\frac{3}{4}$ "	2- $\frac{3}{4}$ "	12- $\frac{1}{4}$ "	2- $\frac{3}{4}$ "		"
B ₇	1	201'0"	15'	24'	6"	6"	2- $\frac{3}{4}$ "	2- $\frac{3}{4}$ "	12- $\frac{1}{4}$ "	2- $\frac{3}{4}$ "		"
B ₈	2	131'0"	15'	24'	6"	6"	2- $\frac{3}{4}$ "	2- $\frac{3}{4}$ "	12- $\frac{1}{4}$ "	2- $\frac{3}{4}$ "		"
B ₉	1	201'0"	15'	24'	6"	6"	2-1"	3-1"	16- $\frac{1}{4}$ "	2-1"		"
B ₁₀	2	131'0"	15'	24'	6"	6"	1-1"	3-1"	12- $\frac{1}{4}$ "	2- $\frac{1}{2}$ "		"
B ₁₁	6	131'0"	15'	24'	6"	6"	2-1"	3-1"	12- $\frac{1}{4}$ "	2- $\frac{1}{2}$ "		"
B ₁₂	2	131'0"	15'	24'	6"	6"	1-1"	2-1"	12- $\frac{1}{4}$ "	2- $\frac{3}{8}$ "		"
B ₁₃	3	201'0"	10'	18'	6"		1- $\frac{3}{4}$ "	2- $\frac{3}{4}$ "	12- $\frac{1}{4}$ "	2- $\frac{1}{2}$ "		"
B ₁₄	6	131'0"	10'	18'	6"		1- $\frac{3}{4}$ "	2- $\frac{3}{4}$ "	12- $\frac{1}{4}$ "	2- $\frac{3}{8}$ "		"
B ₁₅	4	161'0"	12'	20'	6"		2- $\frac{3}{4}$ "	4- $\frac{3}{4}$ "	12- $\frac{1}{4}$ "			"
B ₁₆	4	161'0"	10'	18'	6"		2- $\frac{1}{2}$ "	2- $\frac{3}{4}$ "	12- $\frac{1}{4}$ "			"
B ₁₇	2	181'0"	12'	20'	6"	6"	2- $\frac{3}{4}$ "	4- $\frac{3}{4}$ "	12- $\frac{1}{4}$ "			"
B ₁₈	2	161'0"	10'	18'	6"		2- $\frac{1}{2}$ "	2- $\frac{3}{4}$ "	12- $\frac{1}{4}$ "			"
B ₁₉	1	201'0"	12'	20'	6"	6"	2- $\frac{3}{4}$ "	2-1"	10- $\frac{5}{16}$ "	2- $\frac{3}{4}$ "		"
B ₂₀	2	112'6"	10'	18'	6"		2- $\frac{3}{4}$ "	2- $\frac{3}{4}$ "	10- $\frac{1}{4}$ "	2- $\frac{3}{8}$ "		"

FIRST SLAB AND BEAM SCHEDULE

MARK	TOTAL	SPANS	SIZE				STEEL				REMARKS	
			a	b	c	d	BENT	STRAIGHT	STIRRUPS	TOP STEEL		
S ₁	16	5	6'	8"				2- $\frac{3}{8}$ " ϕ	11- $\frac{1}{4}$ " ϕ			E
S ₂	32	3.5	6'	8"				2- $\frac{3}{8}$ " ϕ	8- $\frac{1}{4}$ " ϕ			"
B ₁	2	14	8'	16"	6"		1- $\frac{3}{4}$ " ϕ	2- $\frac{3}{4}$ " ϕ	29- $\frac{1}{4}$ " ϕ			"
B ₂	2	26.5	10'	20"	6"		2-1" ϕ	2-1" ϕ	54- $\frac{1}{4}$ " ϕ			"
S ₁	17	8			4'			10- $\frac{3}{8}$ " ϕ	19- $\frac{3}{8}$ " ϕ			F
S ₂	17	8			8"			19- $\frac{1}{2}$ " ϕ	19- $\frac{1}{2}$ " ϕ			"
B ₁	6	17	8'	10"	5"			2- $\frac{1}{2}$ " ϕ		2- $\frac{1}{2}$ " ϕ		"
B ₂	4	20	8'	10"	5"			2- $\frac{1}{2}$ " ϕ		2- $\frac{1}{2}$ " ϕ		"
B ₃	2	12	8'	10"	5"			2- $\frac{3}{8}$ " ϕ		2- $\frac{1}{2}$ " ϕ		"
B ₄	2	18	8'	10"	5"			2- $\frac{1}{2}$ " ϕ		2- $\frac{1}{2}$ " ϕ		"
B ₅	2	11.5	8'	10"	5"			2- $\frac{3}{4}$ " ϕ		2- $\frac{1}{2}$ " ϕ		"
B ₆	2	16	8'	10"	5"			2- $\frac{1}{2}$ " ϕ		2- $\frac{1}{2}$ " ϕ		"
F _a												G
S	6	17.36	10'	3 $\frac{1}{2}$ "				3- $\frac{3}{8}$ " ϕ				"
B	6	17.36	18'	4 $\frac{1}{2}$ "			3- $\frac{3}{4}$ " ϕ	4- $\frac{5}{8}$ " ϕ	50- $\frac{1}{4}$ " ϕ			"
F _b												"
S	14	21.04	12'	4 $\frac{1}{2}$ "				3- $\frac{3}{8}$ " ϕ				"
B	14	21.04	18'	3 $\frac{1}{2}$ "			4- $\frac{5}{8}$ " ϕ	3- $\frac{3}{4}$ " ϕ	30- $\frac{1}{4}$ " ϕ			"
F _c												"
S	10	18.5		22"			1-1" ϕ	3-1" ϕ	56- $\frac{1}{4}$ " ϕ			"
B	10	5		12"	20"			4- $\frac{1}{2}$ " ϕ	30- $\frac{1}{4}$ " ϕ	6- $\frac{3}{4}$ " ϕ		"
F _d												"
S	8	18.5		20"	23"		2-1" ϕ	2-1" ϕ	50- $\frac{1}{4}$ " ϕ			"
B	8	11.5		18"	23"			5- $\frac{3}{4}$ " ϕ	35- $\frac{1}{4}$ " ϕ	3- $\frac{3}{4}$ " ϕ		"
F _e												"
S	6	23	8'	3 $\frac{1}{2}$ "				60- $\frac{3}{8}$ " ϕ				"
B	6	23	18'	25"			2- $\frac{3}{4}$ " ϕ	20- $\frac{3}{4}$ " ϕ	36- $\frac{1}{4}$ " ϕ			"
S							ALL SLAB	D ₅₁ to D ₅₉	Finish			H

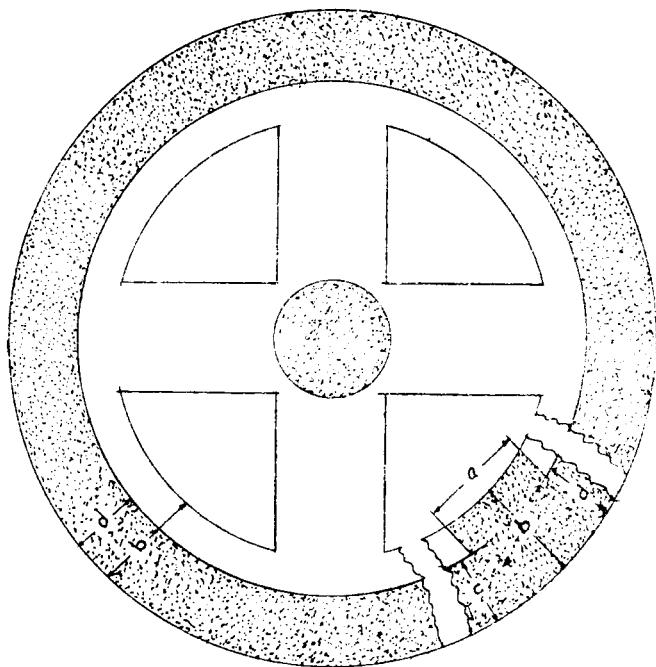


SKETCH = A.

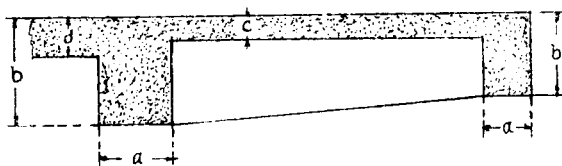


SKETCH = C

scale $\frac{1}{2} = 100'$

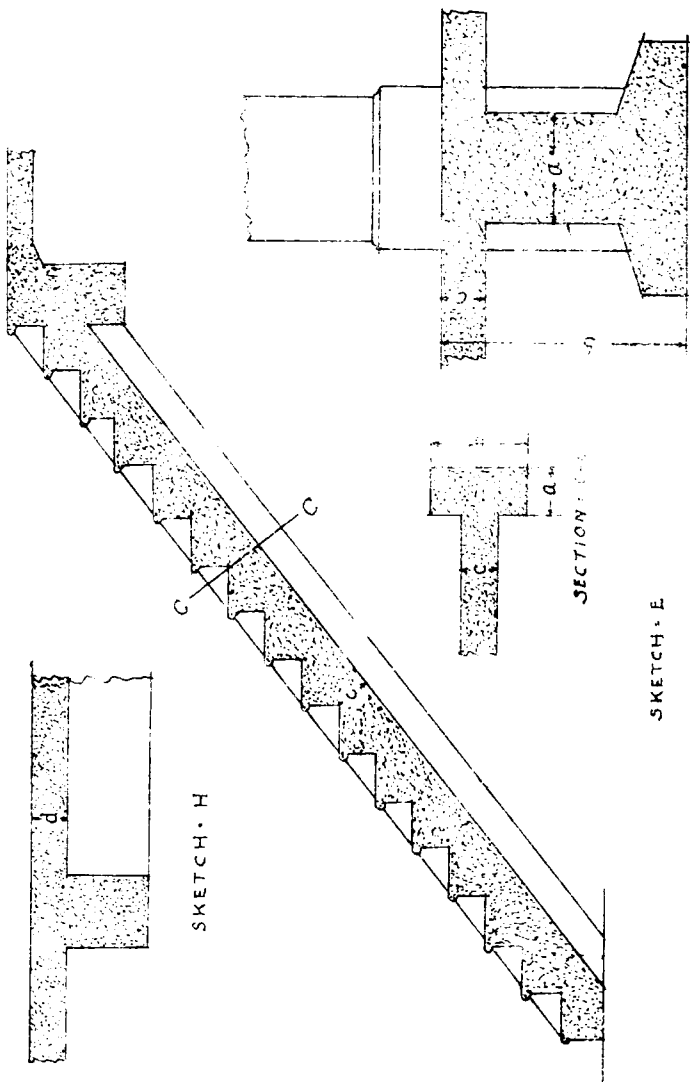


SKETCH = B



SKETCH = D

scale $\frac{1}{2}''$ & $1'' = 1:0''$



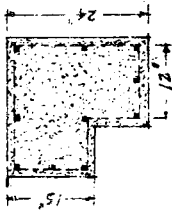
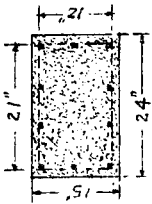
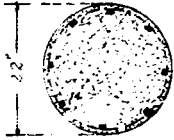
SKETCH • H

SECTION • G

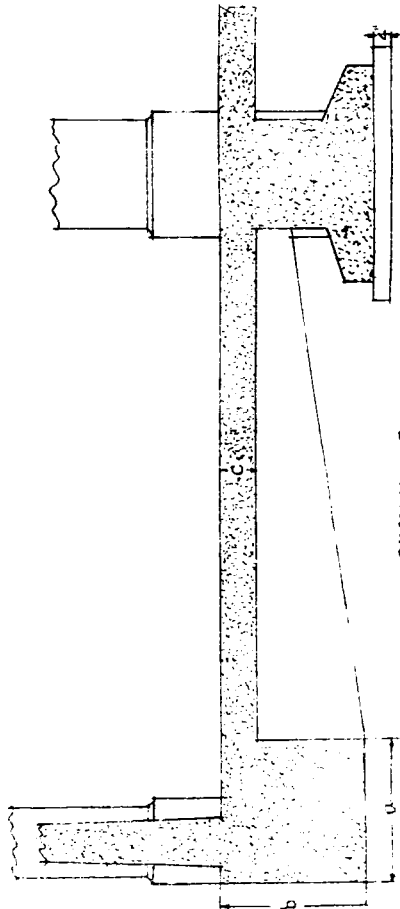
SKETCH • E

SKETCH • G

SCALE 1/4" = 1'-0"



SKETCH = A. B. C. D.



SKETCH = F.

SCALE 1/2 = 120"

四節 各類估價表排列如下，以便參考。

KIND	MARK	NUMBER	UNITS PER FOOT						TOTALS			
			FEET		FORMS	CONCRETE	STEEL	FORMS	CONCRETE	STEEL	HOOPS	
			Each	Total	Sq. Ft.	Cu. Ft.	Lbs.	Sq. Ft.	Cu. Ft.	Lbs.	Lbs.	
A	S ₁	6	8	24	1.25	0.33	1.5	55	8	36	20	
	S ₂	6	17	102	1.25	0.33	1.5	127	33.5	132	40	
	S ₃	6	42.4	385	1.25	0.33	1.5	480	126	575	96	
	S ₄	6	100	600	1.25	0.33	1.5	750	198	900	200	
	S ₅	4	39	156	1.25	0.33	1.5	195	51	234	15	
B	S ₁	16	4.5	72	1.25	0.33	0.66	72	23.5	47	47	
	S ₂	16	75	120	1.00	0.33	0.88	120	40	107	107	
	S ₃	16	91	1460	1.25	0.33	0.55	1820	480	800	800	
	S ₄	16	3.25	50	1.00	0.33	0.75	50	16.5	37.5	39	
	S ₅	4	2.60	1040	1.25	0.42	1.90	1300	420	1380	1500	
							TOTALS	4969	1396.5	4871.5	2864	

TOTALS		UNIT COST		TOTAL COST	
FORMS	4969		\$ 0.612		\$ 3020
CONCRETE	1396.5		" 0.659		" 915
STEEL	4871.5		" 0.0686		" 333
HOOPS	2864		" 0.0721		" 206
				TOTALS	" 4474

KIND	MARK	NUMBER	UNITS PER FOOT						TOTALS			
			FEET		FORMS	CONCRETE	STEEL	FORMS	CONCRETE	STEEL	HOOPS	
			each	Total	Sq. Ft.	Cu. Ft.	Lbs.	Sq. Ft.	Cu. Ft.	Lbs.	Lbs.	
a	b	c	d	e = dxc	f	g	h	i = fgd	k = gce	l = hce	m	
A	B ₁	3	12	36	2	0.44	2.7	72	16.2	37	17.5	
	B ₂	6	4.25	25.5	1.5	0.25	0.75	36.5	6.4	19.2	12	
	B ₃	3	8	24	2.3	0.42	3.7	55	10	64.5	8	
	B ₄	6	4.25	25.5	4	1.11	2.7	120	28.2	69.5	45	
	B ₅	6	4.25	25.5	4	1.00	1.34	102	25.5	34	15	
	B ₆	6	20	120	3.5	1.25	13.6	420	150	1630	37	
	B ₇	4	15.6	62.8	6.25	3.13	18.64	396	195	1175	80	
	B ₈	4	4	16	3.5	1.56	15.5	56	25	248	37	
B	B ₁	8	6	48	2.5	0.5	1.5	120	24	72	14	
	B ₂	16	2.5	40	2.5	0.5	1.5	100	20	60	13	
	B ₃	8	3	24	2.5	0.42	1.5	60	10	56	12	
	B ₄	16	2.4	38	2.25	0.44	1.5	86	16.8	57	14	
	B ₅	16	14	224	3.25	1	4.2	730	225	940	360	
	B ₆	8	13	104	6	2.08	2.7	624	216	280	240	
	B ₇	16	3	48	3.5	1.04	3.4	168	50	163	64	
C	B ₁	8	13	104	5.25	2.5	13.6	550	262	1420	94	
	B ₂	6	13	78	7.5	4.5	13.6	590	350	1050	94	
	B ₃	4	20	80	5.25	2.5	7.6	420	200	608	64	
	B ₄	2	20	40	7.5	4.5	28.2	300	180	1128	290	
	B ₅	2	33	66	7.5	4.5	76	500	300	5000	150	
							TOTALS	5509.5	2565.9	14151.2	1662.5	
TOTALS				UNIT COST				TOTAL COST				
FORMS		5509.5		\$ 1.075		\$ 412						
CONCRETE		2565.9		" 0.659		" 1680						
STEEL		14151.2		" 0.0686		" 960						
HOOPS		1662.5		" 0.0721		" 119						
				TOTALS				\$ 3171				

KIND	MARK	NUMBER	UNITS PER FOOT					TOTALS				
			FEET		FORMS	CONCRETE	STEEL	FORMS	CONCRETE	STEEL	HOOPS	
			Each	Total	Sq. Ft.	Cu. Ft.	Lbs.	Sq. Ft.	Cu. Ft.	Lbs.	Lbs.	
a	b	c	d	e+dxc	f	g	h	i=fxc	k=gxc	l=hxc	m	
A	C ₁	1	11	11	5.1	1.2	2.66	56	13.2	20.3	19.7	
	C ₂	1	2.15	2.15	4.25	0.45	2.66	9.1	1.26	5.7	5.3	
	C ₃	6	4	24	2.25	0.44	1.5	54	10.5	36	26	
	C ₄	6	8	48	2.25	0.44	1.9	108	21	91.0	24	
B	C ₁	4	7	28	4.25	1	1.5	120	28	42	4	
	C ₂	4	2.5	10	2.25	0.25	1.5	22.5	2.5	15	5	
	C ₃	16	3	48	2.25	0.25	1.5	108	12	72	34	
C	C ₁	2	23	46	5.8	2.8	27.2	270	130	1250	167	
	C ₂	4	24	96	7	2.5	4.78	672	240	460	45	
	C ₃	4	24	96	8.5	3.4	4.78	820	325	460	54	
	C ₄	2	24	48	7	2.5	8.5	336	120	400	22.5	
								TOTALS	2555.6	903.16	3680	416.5
TOTALS				UNIT COST				TOTAL COST				
FORMS			2555.6		\$ 0.533		\$ 1360					
CONCRETE			903.16		" 0.659		" 592					
STEEL			3680		" 0.0686		" 253					
HOOPS			416.5		" 0.0721		" 30					
								TOTALS	" 2235			

KIND	MARK	NUMBER	UNITS PER FOOT					TOTALS			
			FEET		FORMS	CONCRETE	STEEL	FORMS	CONCRETE	STEEL	HOOPS
			Each	Total	Sq. Ft.	CU. Ft.	Lbs.	Sq. Ft.	CU. Ft.	Lbs.	Lbs.
a	b	c	d	e-dxc	f	g	h	i-fxc	k-gxc	l-hxc	m
D	S ₁	1	100	100	1.2	0.33	1.43	125	33	143	33
	S ₂	3	230	690	1.25	0.33	1.43	1050	277	1200	276
	S ₂	3	240	780	1.25	0.42	1.9	975	328	1485	148
	S ₃	1	200	200	1.25	0.42	1.76	125	840	176	1
	S ₄	4	170	680	1.25	0.5	1.16	850	340	786	786
	S ₅	1	400	400	1.25	0.58	3.4	500	232	1360	1360
	S ₆	2	206	412	1.25	0.42	1.73	315	172	710	255
	S ₇	1	180	360	1.25	0.54	3.4	450	195	1220	1220
	S ₈	4	370	740	1.25	0.42	1.38	945	310	1020	1430
	S ₉	2	320	640	1.25	0.42	3.2	300	270	2050	2050
E	S ₁	16	5	80	1.25	0.38	0.76	106	30	61	42
	S ₂	32	35	112	1.25	0.38	0.44	140	42.5	49	59
F	S ₁	17	1015	2030	1.25	0.33	1	2550	670	3030	3030
	S ₂	17	1015	2030	1.25	0.58	1.7	2550	117	3450	3450
H	S			As top D ₅ to S ₉					2997		
							TOTALS	11745	6748.2	25890	24503
TOTALS						UNIT COST			TOTAL COST		
FORMS			11745			\$ 1.02			\$ 11790		
CONCRETE			6748.2			" 0.659			" 4420		
STEEL			25890			" 0.0686			" 1775		
HOOPS			24503			" 0.0721			" 1760		
									TOTALS		
									\$ 19745		

ITEM	KIND	MARK	NUMBER	UNITS PER FOOT			TOTALS					
				FEET		FORMS	CONCRETE	STEEL	FORMS	CONCRETE	STEEL	HOOPS
				Each	Total	Sq. Ft.	Cu. Ft.	Lbs.	Sq. Ft.	Cu. Ft.	Lbs.	Lbs.
B ₁	1	20	20	5.25	2.5	13.2	10.5	50	270	16.7		
B ₂	1	20	20	5.25	2.5	17	10.5	50	340	16.7		
B ₃	1	20	20	5.25	2.5	24.2	10.5	50	484	13.3		
B ₄	2	13	26	5.25	2.5	23.8	13.6	65	615	4.4		
B ₅	2	13	26	5.25	2.5	9	13.6	65	235	4.4		
B ₆	2	20	40	5.25	2.5	9.8	210	100	395	4.4		
B ₇	1	20	20	5.25	2.5	9.8	10.5	50	98	7.7		
B ₈	1	13	13	5.25	2.5	4.5	68	32.5	118	3.7		
B ₉	1	20	20	5.25	2.5	16.8	10.4	50	336	13.3		
B ₁₀	2	13	26	5.25	2.5	11.3	136	65	310	20		
B ₁₁	6	13	78	5.25	2.5	19.7	415	198	640	60		
B ₁₂	2	13	26	5.25	2.5	12.3	136	65	328	20		
B ₁₃	3	20	60	4.25	1.5	6.7	256	80	370	40		
B ₁₄	6	13	78	4	1.25	5.25	314	98	410	60		
B ₁₅	4	16	64	4.5	1.39	3	290	89	580	40		
B ₁₆	4	16	64	4	1.25	5.2	256	80	332	40		
B ₁₇	2	18	36	4.5	1.39	9.1	162	50	326	20		
B ₁₈	2	16	32	4	1.25	5.2	128	40	166	20		
B ₁₉	1	20	20	4	1.25	8.7	80	35	168	17.5		
B ₂₀	2	11.5	23	4	1.25	6.78	92	29	155	20		
B ₂₁	4	11.5	46	4.5	1.67	6.78	207	77	353	40		
B ₂₂	2	20	40	5.25	2	9.8	210	80	396	35		
B ₂₃	1	20	20	3.15	0.78	8.1	63	15.6	1260	9.5		
B ₂₄	2	5	10	4.5	1.67	6.8	45	16.7	68	9.5		
E	B ₁	2	4	28	3.5	0.89	5.7	38	20.7	158	34.5	
	B ₂	2	26.5	53	4.25	1.39	10.2	27.5	74	540	92	
F	B ₁	6	17	102	2	0.42	3.4	204	43	380	42	

TOTALS		UNIT COST		TOTAL COST	
FORMS					
CONCRETE					
STEEL					
HOOPS					

KIND	MARK	NUMBER	UNITS PER FOOT						TOTALS			
			FEET		FORMS	CONCRETE	STEEL	FORMS	CONCRETE	STEEL	HOOPS	
			Each	Total	Sq. Ft.	Cu. Ft.	Lbs.	Sq. Ft.	Cu. Ft.	Lbs.	Lbs.	
a	b	c	d	e = dxc	f	g	h	i = fxe	k = gxe	l = hxe	m	
	B ₂	4	20	80	2	0.42	3.4	160	43	270	60	
	B ₃	2	12	24	2	0.42	1.5	48	10	36	20	
	B ₄	2	18	36	2	0.42	3.4	72	15	122	30	
	B ₅	2	11.5	23	2	0.42	1.5	46	9.7	34.7	19	
	B ₆	2	16	32	2	0.42	2.7	64	13.4	86	26.5	
							TOTALS	4779	1774.6	11681.7	1011.7	
TOTALS						UNIT COST		TOTAL COST				
FORMS			4779			\$	1.075			\$	5150	
CONCRETE			1774.6			"	0.659			"	1165	
STEEL			11681.7			"	0.0386			"	796	
HOOPS			1011.7			"	0.0721			"	73	
								TOTALS			7184	

KIND	MARK	NUMBER	UNITS PER FOOT						TOTALS			
			FEET		FORMS	CONCRETE	STEEL	FORMS	CONCRETE	STEEL	HOOPS	
			Each	Total	Sq. Ft.	cu. ft.	lbs.	Sq. Ft.	cu. ft.	lbs.	lbs.	
a	b	c	d	e: dxc	f	g	h	i: fxc	k: gxc	l: hxc	m	
D	C ₁	2	24	48	6.3	2.89	34	302	138	1630	152	
	C ₂	2	16	32	7	2.5	6.67	224	80	213	100	
	C ₃	2	16	32	8.5	3.44	6.67	270	110	213	117	
	C ₄	4	16	64	7	2.5	5.4	448	160	345	200	
	C ₅	2	16	32	6.3	2.89	2.25	202	90	72	86	
	C ₆	2	16	32	8.7	3.44	5.4	270	110	172	117	
	C ₇	2	16	32	7	2.5	19.13	224	80	620	100	
	C ₈	2	16	32	6.25	2.25	2.25	200	72	72	100	
	C ₉	2	16	32	6.25	2.25	2.25	200	72	72	100	
	C ₁₀	4	16	64	6.25	2.25	2.25	400	140	140	194	
	C ₁₁	6	16	96	5.25	1.5	2.25	505	146	216	240	
	C ₁₂	2	16	32	5.25	1.5	2.25	167	48	72	80	
	C ₁₃	2	16	32	5.25	1.5	2.25	167	48	72	80	
	C ₁₄	2	16	32	6.25	2.25	2.25	200	80	72	97	
	C ₁₅	2	16	32	5.25	1.5	2.25	167	48	72	80	
	F _a	6	17.32	103	7	6.8	18.5	720	705	1910	740	
	F _b	14	10.52	148	7.75	6.32	14.4	1120	930	2140	520	
	F _c	10	18.5	185	2	4	10.4	370	740	1930	690	
	F _d	8	10.8	86.5	6	4.7	8.95	520	407	770	305	
	F _e	6	18.5	111	3.5	4	1.07	390	444	1190	400	
								328	177	92	220	
							TOTALS	7404	4829	12705	3848	

TOTALS		UNIT COST		TOTAL COST	
FORMS	7404		\$ 0.888		\$ 6580
CONCRETE	4829		" 0.659		" 3175
STEEL	12705		" 0.0686		" 872
HOOPS	4848		" 0.0721		" 3503
			TOTALS		" 14130

上已注者或有於工程習慣上及沿草上所必須而與本
 工程上明者必為要之關係者雖於圖樣通知亦當照完全未
 註明承已人如得監工或工程師之通知亦當照完全未
 詞推讓。

第廿二條 自開工之日起對於每次工程進出或進料編
 將樣文均歸承領人拆去按每日起打樣
 第廿三條 領銀手續自全
 業主收領完工歸還
 業主攬負

中 華 民 國 二 十 年 一 月 日 謹 訂

第 四 章 擬 建 磚 廠 圖 案

第 一 節 業 主 吳 義 和 委 託 設 計 磚 廠 拾 文 於 龍 華 江 邊
 民 橋 坑 又 修 理 石 廠 三 文 於 民 國 念 貳 年 陸 月 廿 二 日 營 建
 執 照 50 號 有 案 茲 將 圖 案 排 列 如 下

第二節 擬建磚墩之設計與計算

業主吳義和，委託設計磚墩十丈，於龍華江專民橋墩口，又修建石墩三文，於民國二十二年六月二十六日接獲圖單 52 號補送計算書如下。

參考書 RETAINING WALLS BY INTERNATIONAL TEXTBOOK COMPANY SCRANTON PA.

$$P = \frac{1}{2} \times 110 \times 9^2 + 450 \text{ 磅}$$

$$\frac{1}{3} \times 3 \times 3$$

Area in Sq Ft. for each part of the

$$\text{wall. } cde = \frac{1}{2} \times 5 \times 8 = 20 \text{ ft.}$$

$$defg = 1.25 \times 8 = 10 \text{ "}$$

$$fgh = \frac{1}{2} \times 2.25 \times 8 = 9 \text{ "}$$

$$abij = 5.5 \times 1 = 5.5 \text{ "}$$

$$\underline{30.5 \text{ ft.}}$$

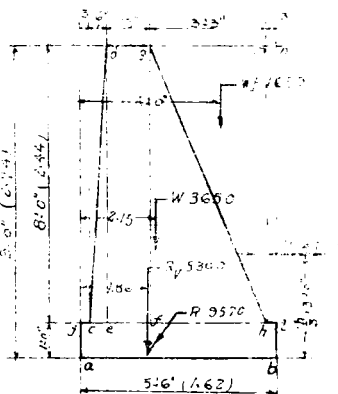
Area in Ft.

$$\frac{2}{3} \times 5 = 3.33 \text{ ft.}$$

$$.5 + \frac{1}{2} \times 1.25 = 1.125 \text{ "}$$

$$.5 + 1.25 + \frac{1}{3} \times 3.25 = 2.83 \text{ "}$$

$$.5 + \frac{1}{2} \times 5.5 = 3.25 \text{ "}$$



$$2 \times 3.33 = 6.66 \text{ ft.}$$

$$10 \times 1.125 = 11.25 \text{ "}$$

$$13 \times 2.83 = 36.75 \text{ "}$$

$$5.5 \times 3.25 = 17.8 \text{ "}$$

$$\underline{\text{Total } M = 65.675 \text{ ft. lbs.}}$$

The top of the wall 65.675 + 30.5 = 2.15 ft. lb.

The weight of a cu. ft. of wall 30.5 × 120 = 3650 ft. lb.

The moment of W 3650 × 2.15 = 7800 ft. lb.

The Part of the filling

$$h g m = \frac{1}{2} \times 3.25 \times 8 = 13 \text{ ft.}$$

$$.5 + .25 + \frac{2}{3} \times 3.25 = 3.91 \text{ ft.}$$

$$h j m = 1 \times .25 \times 8 = \frac{2}{15} \text{ ft.}$$

$$5.5 \times \frac{1}{2} \times 2 = 4.5 \text{ ft.}$$

moment

$$13 \times 3.91 = 51 \text{ ft.}$$

The lever arm

$$\frac{2 \times 4.5}{15} = \frac{9}{15} \text{ ft.}$$

$$60 \div 15 = 4 \text{ ft.}$$

The weight W_f of the filling $15 \times 110 = 1650 \text{ ft. lb.}$

The moment of W_f $1650 \times 4 = 6600 \text{ ft. lb.}$

$$W = 7800 \text{ ft. lb.}$$

$$W_f = 6600 \text{ "$$

$$14400 \text{ ft. lb. m. of ph} = 4450 \times 3 = 13300 \text{ ft. lb.}$$

$(W_f + W)$ must exceed Ph

$$14400 - 13300 = 1100 \text{ ft. lb. O.K.}$$

$$R = 14400 - 4450 = 9950 \text{ ft. lb.}$$

$$R_v = 3650 + 1650 = 5300 \text{ ft. lb.}$$

$$9950 \div 5300 = 1.86 \text{ ft. } e = \frac{5.5}{2} \cdot 1.86 = 0.81 \text{ ft.}$$

$$S_1 = \frac{5300}{5} \left(1 + \frac{6 \times 89}{5.5} \right) = 1910 \text{ ft. lb.}$$

$$S_2 = \frac{5300}{5.5} \left(1 - \frac{6 \times 89}{5.5} \right) = 288 \text{ ft. lb.}$$

$$f j = 1910 - \frac{1.5}{5.5} \times (1910 - 288) = 1465 \text{ ft. lb.}$$

$$g h = 1910 - \frac{3}{5.5} \times (1910 - 288) = 1030 \text{ "$$

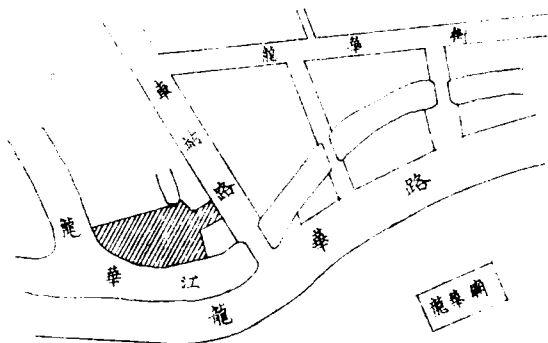
$$\frac{2i}{2} (ah + fj) = \frac{1.5}{2} \times (1910 + 1465) = 2530 \text{ "$$

$$\frac{2j}{2} (ij + gh) = \frac{1.5}{2} \times (1465 + 1030) = 1870 \text{ "$$

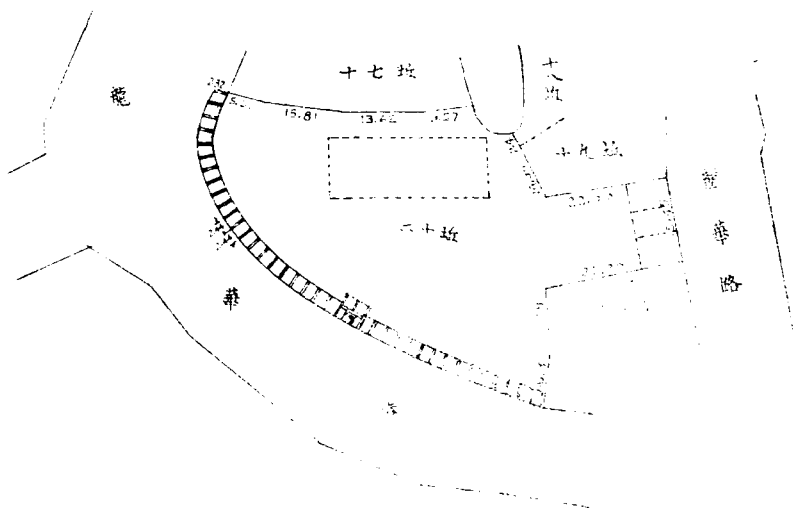
$$\frac{2h}{2} (gh + fc) = \frac{2.5}{2} \times (1030 + 288) = 1630 \text{ ft. lb.}$$

Use 5" sq pile @ 12x10' long (13.5' x 3.65' dia)

會理工 492 號通知單有案茲將略圖排列如下。

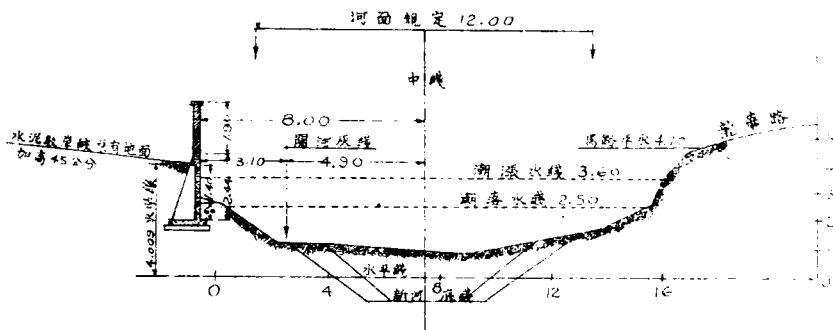


地形圖



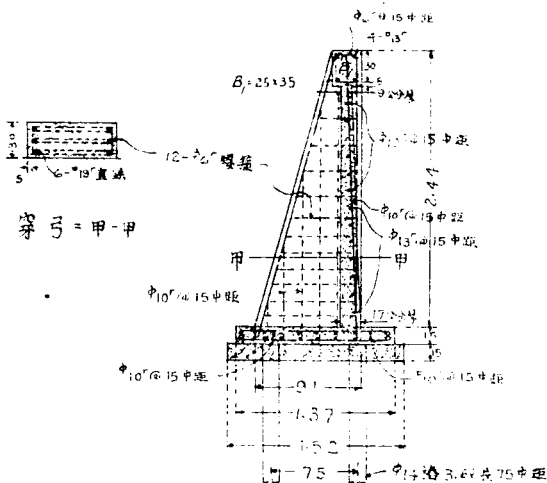
地底圖

比例公比 1:1000



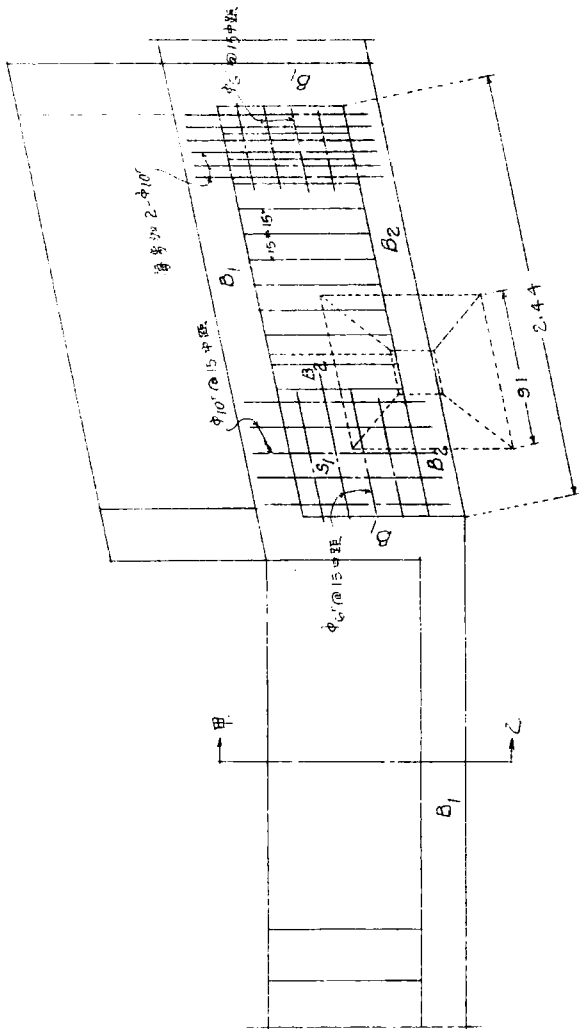
河面剖視圖

比例公呎：二百分之一



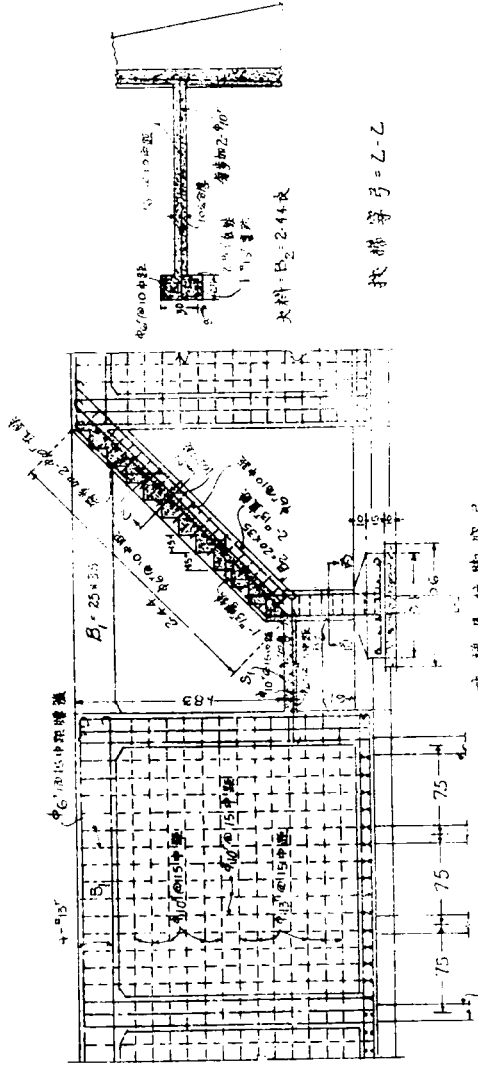
駁岸穿弓 = 甲-乙

比例公呎：五千分之一



水橋平面圖

比例公尺：三十分之一。



柱脚平法 丙·丙

柱脚平法 丙·丙

第二節 鋼筋混凝土版牆之設計與計算全書

參考書 EARTHWORK AND RETAINING WALL AT INTERNATIONAL TEXTBOOK COMPANY SCR. PA.

$$F = 0.148 \times 110 \times 8.5^2 = 1130 \text{ 斤. 呎}$$

$$y = \frac{1}{3} \times 8.5 = 2.83 \text{ 呎}$$

$$M = 1130 \times 2.83 = 3200 \text{ 斤. 呎}$$

$$4.5 - (1.25 + .5) = 2.75 \text{ 呎}$$

$$P' = 10'' \text{ Wall } 6.25 \times 110 = 625 \text{ 斤. 呎}$$

$$P'' = 3_1 = \frac{10 \times 10}{144} \times 150 \times 1 = 125 \text{ 呎}$$

$$W = 5 \times 3 \times 150 = 2250 \text{ 呎}$$

$$\text{Steel} = 1350 \text{ 斤. 呎}$$

$$\text{Base } W = 1.5 \times 4.5 \times 150 = 1025 \text{ 呎}$$

$$\text{Arch } W = 0.75 \times 8 \times 10 = 600 \text{ 呎}$$

$$R_y = 4090 \text{ 斤. 呎}$$

$$R = 1025 - 3200 = 7015 \text{ 斤. 呎}$$

$$\frac{7015}{4090} = 1.72$$

Greater than $\frac{1}{3} \times 4.5 = 1.5$

$$\text{Slab} = 110 \times 8 \times \frac{1 - .555}{1 + .555} = 254 \text{ 斤. 呎}$$

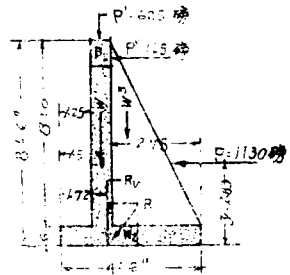
$$W = 254 \times 8 = 2030 \text{ 斤. 呎}$$

$$M' = 2030 \times 8 \times 0.106 = 1730 \text{ 斤. 呎}$$

$$A_s = \frac{1730}{18000 \times 1.69 \times 4.4} = 0.0185 \text{ 呎}$$

$$A_s = \frac{1730}{18000 \times 1.69 \times 4.4} = 0.0185 \text{ 呎}$$

$$\text{Use } \frac{3}{8}'' \phi = 0.1104 \frac{1}{2}''$$



Lever arm

$$\frac{1}{3} \times 8.5 = 2.83$$

$$\frac{1}{3} \times 4.5 = 1.5$$

$$4.5 - \frac{1}{3} \times 2.75 = 3.25$$

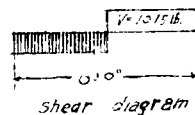
moment

$$1950 \text{ 斤. 呎}$$

$$765 \text{ 呎}$$

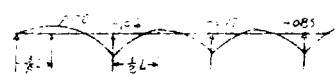
$$7500 \text{ 呎}$$

$$\text{Total moment} = 10215 \text{ 斤. 呎}$$



shear diagram

$$V = 2030 \div 2 = 1015 \text{ 斤. 呎}$$



moment of uniformly for cont. slab

$$\text{spacing} = \frac{0.1104}{0.0185} = 6 \quad \text{say } \frac{3}{8}'' \text{ @ } 5'' \text{ c.c. (} \frac{1}{2}'' \text{ @ } 15'' \text{) 4 根}$$

$$0.2 \times 8 = 1.6 \text{ ft.} \quad 4 - 1.6 = 2.4 \text{ ft.}$$

$$V' = 254 \times 2.4 = 610 \text{ lb.}$$

$$V = \frac{610}{.89 \times 44 \times \frac{12}{3} \times 1.178} = \frac{610}{11.3} = 54 \frac{3}{4} \text{ lb.}$$

$$U = \frac{V = 1015}{11.3} = 90 \frac{3}{4} \text{ lb.} \quad .06 \times 2000 = 120 \frac{3}{4} \text{ lb.}$$

$$\frac{120}{90} \times 6 = .8$$

$$.8 + 1.6 = 2.4 \quad \text{say } 2\frac{1}{2}'' \text{ c.c. (75 @ Two-third)}$$

$$\frac{1}{3} \times \frac{0.1104 \times 18000}{2 \times 80} = 4.2 \text{ inch } \frac{1}{2} \times 1.6 = .4$$

$$2.4 + .4 = 2.8 \quad \text{say } 3\frac{1}{2}'' \text{ c.c. (90 @) every third}$$

$$\text{Use } \frac{3}{8}'' \text{ @ } 8'' \text{ c.c.} \quad hy = 8 \times \frac{5}{8} = 5.0'' \quad (152 \text{ mm})$$

$$\text{Use } \frac{3}{8}'' \text{ @ } 12'' \text{ c.c.} \quad hy = 8 \times \frac{5}{12} = 3.3 = 3\frac{1}{2}'' \quad (122 \text{ mm})$$

$$0.003 \times 8 = 0.024 \quad \frac{.14}{.024} = 5.8 \quad \text{say use } \frac{3}{8}'' \text{ @ } 5\frac{1}{2}'' \text{ c.c. (} \frac{1}{2}'' \text{ @ } 14'' \text{) 4 根}$$

$$3 \times 5.8 = 17.5 \quad \text{say } 18'' \text{ c.c. (45 @)}$$

$$\text{Heel slab} = .5 \times 150 + 8 \times 110 = 75 + 880 = 955 \text{ lb.}$$

$$\text{Total load} = 955 \times 8 = 7700 \text{ lb.}$$

$$\text{Max. shear} = 7700 \div 2 = 3820 \text{ lb.}$$

$$\text{Max. } M = 7700 \times 8 \times 0.106 = 6500 \text{ ft. lb.}$$

$$d = \sqrt{\frac{6500}{88.89}} = 8.55$$

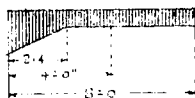
$$\frac{3820}{.89 \times 12 \times 60} = 6$$

assumed $d = 5''$

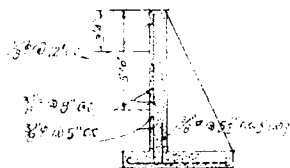
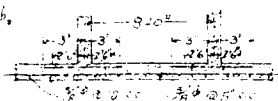
$$d_f = 6'' \quad (15 \text{ cm})$$

$$A_s = \frac{6500}{18000 \times .89 \times 5} = 0.08; \text{ say } 1 \text{ inch}$$

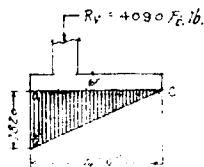
$$\text{Spacing} = \frac{0.1406}{0.0681} = 2.05$$



shear diagram



Reinforcement layout diagram



$$1. \frac{3820}{.83 \times 5 \frac{16}{15} \times 0.1406} = 58 \text{ per sq in. lb.}$$

$$.06 \times 2000 = 120 \text{ } \frac{120}{58} \times 1.75 = 3''$$

Say use $\frac{3}{8}'' \text{ @ } 2\frac{1}{2}'' \text{ o.c. (7'0" @ 7'公分)}$

$$ab = \frac{2 \times 4090}{4.5} = 1820 \text{ Ft. lb.}$$

$$\frac{1}{5} \times 1820 = 410 \text{ Ft. lb.}$$

$$955 - 410 = 545 \text{ Ft. lb.}$$

$$1.75 \times \frac{955}{545} = 3.1 \text{ say } 3'' \text{ c.c. (90公分)}$$

$$\frac{1.5}{4.5} \times 1820 = 615, \quad 955 - 615 = 340$$

$$1.75 \times \frac{955}{340} = 4.9 \text{ say @ } 4\frac{1}{2}'' \text{ c.c. (11公分)}$$

Toe cantilever $W = \frac{3.25}{4.5} \times 1820 = 1310 \text{ Ft. lb.}$

$$\frac{1.25}{2} \times (1820 + 1310) = 1970 \text{ lb.}$$

$$1.25 \times .5 \times 150 = 93 \text{ lb.}$$

Max shear = $1970 - 93 = 1877 \text{ lb.}$

$$1.25 \times 1310 \times \frac{1.25}{2} = \frac{1}{2} \times 1.25 \times (1820 - 1310) \times \frac{2}{3} \times 1.25 = 1288 \text{ Ft. lb.}$$

$$93 \times \frac{1.25}{2} = 53$$

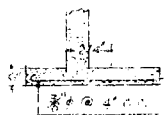
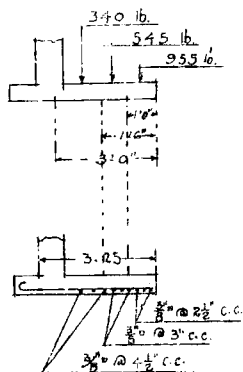
Max $M = 1288 - 53 = 1235 \text{ Ft. lb.}$

$$c = \sqrt{\frac{1235}{28.90}} = 3.8 \quad \frac{1877}{.89 \times 12 \times 60} = 5.4 \text{ assume } d_f = 6'' \text{ (15公分)}$$

$$A_s = \frac{1235}{18000 \times .83 \times 5} = 0.016 \text{ } \frac{0.1104}{0.016} = 5.8 \text{ } \frac{1877}{0.016} = 5.8 \text{ } \frac{1}{16}$$

$$U = \frac{1877}{.83 \times 5 \times \frac{16}{15}} = 110 \text{ per in. lb.}$$

$$\frac{110}{17.5} = 5.8 = 4.2 \text{ say use } \frac{3}{8}'' \text{ @ } 4'' \text{ (10公分)}$$



$$\frac{0.110 \times 18000}{1.178 \times 60} = \frac{1950}{70} = 23.214 (104\%)$$

$$\text{concrete force } 0.143 \times 110 \times 8^2 = 880 \text{ lb.}$$

$$880 \times 8 = 7000 \text{ lb.}$$

$$\frac{1}{2} \times 8 = 2.65$$

$$\text{Max } M = 7000 \times 2.65 = 18500 \text{ ft. lb.}$$

$$4.26^2 - 2.65^2 = 2.14^2 = 33' \quad b' = \frac{7000}{.89 \times 150 \times 33} = 2. \quad \text{assume } b' = 2'$$

$$\text{then } y = \frac{2.33}{2} = 0.343 \quad y = 10^{\circ} 50' \quad \cos^2 3' = 0.9453$$

$$f' = \frac{8500 \times 12}{1500 \times 4.33 \times 0.946} = 0.32^{\circ} \quad \text{then } 100 = 3 - \frac{1}{2}^{\circ}, \quad 3 - 100 = 97'$$

$$M = \frac{7000}{24 \times 3 \times 1.57 \times 0.946} = 50 \frac{\text{ft. lb.}}{\text{in.}} \quad \frac{3-1}{3} = 0.666$$

$$110 = 80 \sqrt{0.666} = 6.65 = 21.8' \quad p_x = 110 \times 0.1 \left(\frac{2 \times 0.50}{1 + 0.50} \right) = 253 \text{ lb.}$$

$$110 \times 253 \times 8 = 2030 \text{ ft. lb.}$$

$$2.9 = 0.049\% \quad \frac{2030}{0.049 \times 18000} = 2.32 \text{ sag } 2\frac{1}{2} \text{ in. } (174\%)$$

$$\frac{1}{2} \times 1820 = 202 \text{ ft. lb.} \quad 1180 - 202 = 978 \text{ ft. lb.}$$

$$978 \times 8 = 7600 \text{ ft. lb.}$$

$$\text{Space} = \frac{7800}{18000 \times \frac{12}{25}} = 0.091$$

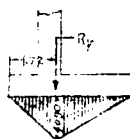
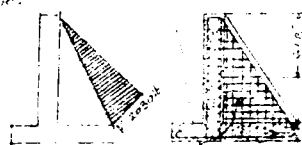
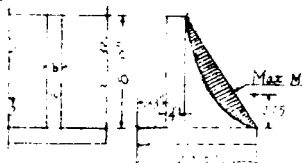
$$0.091 \times 2 = 0.042 \quad \text{use } \frac{1}{2}'' \text{ } (\phi 6) \text{ ---}$$

$$\text{spacing of pile } R_V = 4090 \text{ ft. lb.}$$

$$\text{Use } 5\frac{1}{2}'' \phi \times 15 \times 0' \text{ long piles } (\phi 14 \times \frac{1}{2}'' \times 4.5 \text{ dia.})$$

$$200 \left(\frac{5.125}{2} \right) 3.1416 \times 15 = 3500 \text{ ft. lb.}$$

$$\text{space} = \frac{2 \times 500}{4090} = 1.7 = 1-8' (50\%)$$



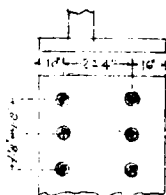
$$17.2 = 20 \div 2 = 10' (25 \text{ 公分})$$

$$4.5 - 1.72 = 2.78 \quad 2.78 \div 2 = 1.39 = 16'' (40 \text{ 公分})$$

$$B_1 = 840'' \text{ span}$$

$$W = 10'' \text{ wall } 100 \times 6.25 = 625 \text{ 磅.}$$

$$S_1 = \frac{10 \times 12}{144} \times 150 \times 11 = \frac{125}{750} \text{ 磅.}$$



$$B.M. = \frac{750 \times 8^2 \times 12}{10} = 57500 \text{ inch lb.} \quad d = \sqrt{\frac{57500}{89 \times 10}} = 3.2 \quad d_t = 12'' (30 \times 3)$$

$$A_s = 0.0056 \times 10 \times 10.5 = 0.6\% \text{ Use } 4 - \frac{1}{2}'' \phi + \frac{1}{4}'' \phi @ 6'' \text{ c.c. } (4 - \frac{1}{2}'' \phi + \frac{1}{4}'' \phi @ 15 \text{ 公分})$$

$$S_1 = 440'' \text{ span Thick } 4'' (10 \text{ 公分}) \text{ Use } 2 - \frac{3}{8}'' \phi + \frac{1}{4}'' \phi @ 6'' \text{ c.c. } (2 - \frac{3}{8}'' \phi + \frac{1}{4}'' \phi @ 15 \text{ 公分})$$

$$B_2 = 840'' \text{ span}$$

$$W = 3 - \frac{4 \times 12}{144} \times 150 \times 3 = 150 \text{ 磅.}$$

$$L.C. = 60 \times 3 = \frac{180}{330} \text{ 磅.}$$

$$330 \times 12 = 3960 \text{ 磅.}$$

$$S_2 = \frac{3 \times 16}{144} \times 150 \times 12.5 = \frac{1560}{5520} \text{ 磅.}$$

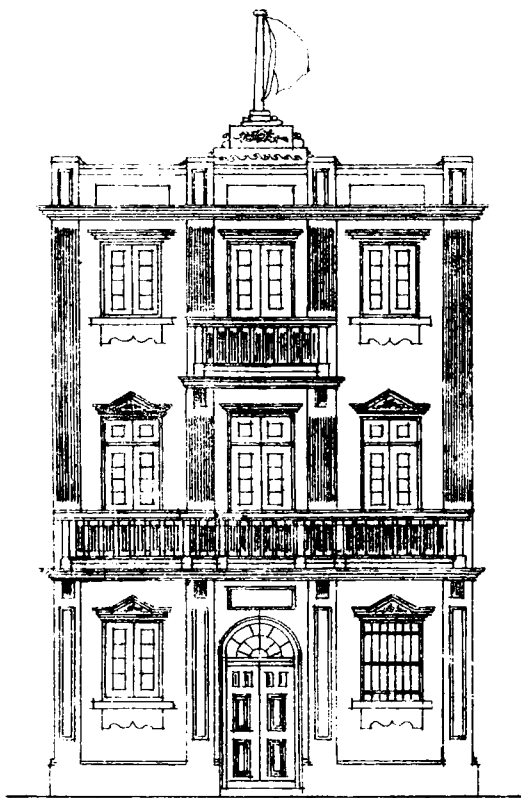
$$B.M. = \frac{5520 \times 8 \times 12}{8} = 66200 \text{ inch lb.}$$

$$d = \sqrt{\frac{66200}{89 \times 8}} = 3.8 \quad d_t = 14'' (35 \times 3)$$

$$A_s = 0.0056 \times 8 \times 12.5 = 0.65\% \text{ Use } 3 - \frac{1}{2}'' \phi + \frac{1}{4}'' \phi @ 6'' \text{ c.c.} \\ (3 - \frac{1}{2}'' \phi + \frac{1}{4}'' \phi @ 15 \text{ 公分})$$

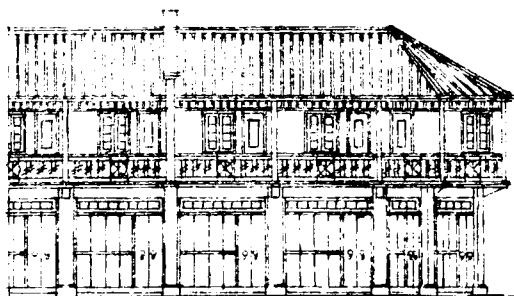
$$W = \frac{2260}{8 \times 12.5 \times 89} = 26 \text{ net sq. in. lb.}$$

榮 露 醫 院

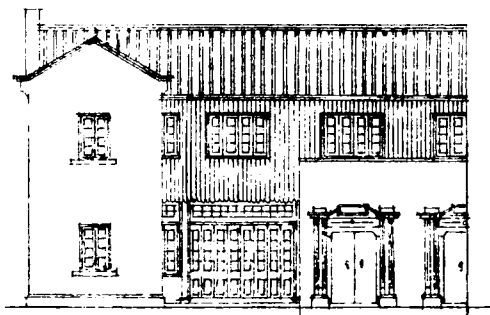


正 面 樣

比例尺 $\frac{1}{8} = 1:10''$

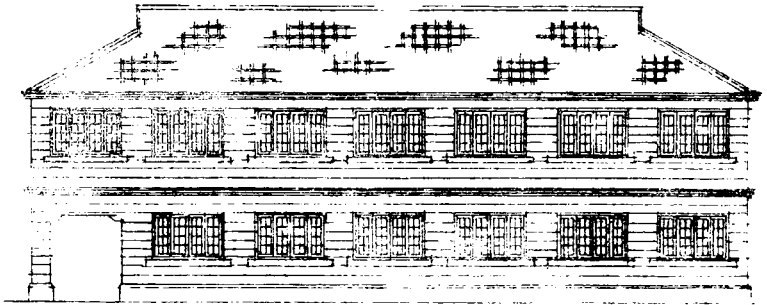


店房正面樣

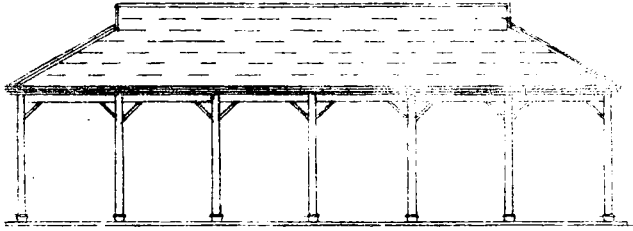


住房正面樣

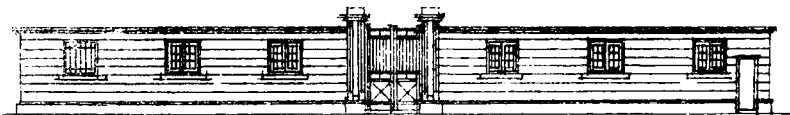
比例英尺 1:110



校舍正面樣

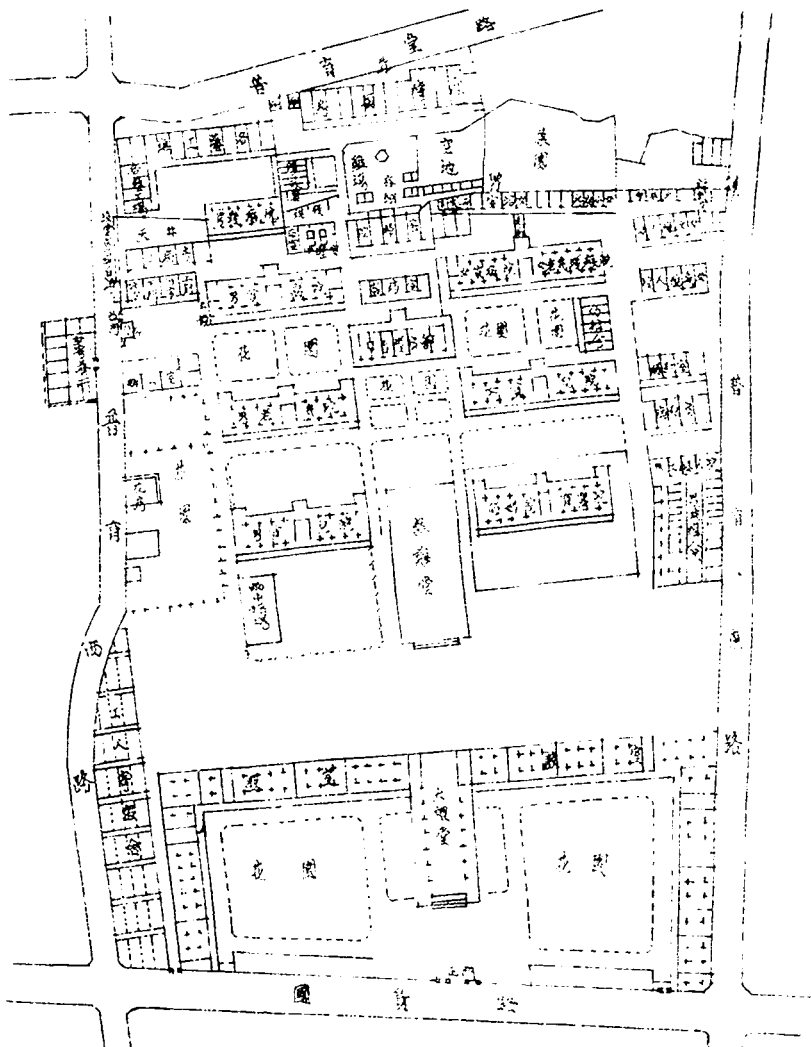


運動場正面樣



校舍頭門樣

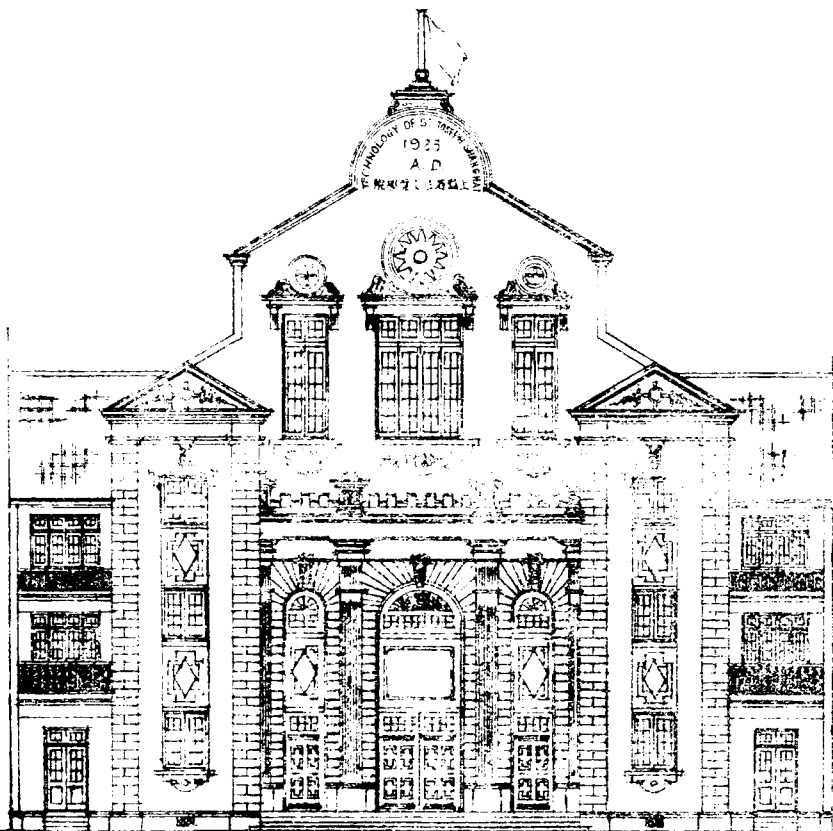
比例英尺 1/16 = 1/20"



總地盤圖

比例尺 = 1/300 = 1:300

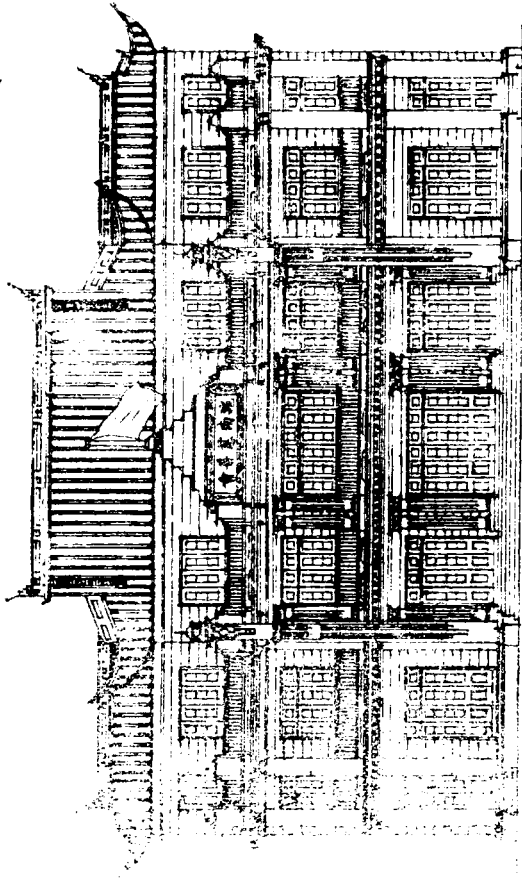
工業學院大禮堂



大禮堂正面樣

比例尺 1:100

會善堂南面



後正廳亭

第三條 建築地、址、原、有、樓、房、五、幢、歸、至、包、人、估、價、於、去、
 第四條 建築地、址、原、有、樓、房、五、幢、歸、至、包、人、估、價、於、去、
 第五條 排、反、線、後、漫、逸、藍、工、員、或、工、程、更、主、任、發、給、
 第六條 排、反、線、後、漫、逸、藍、工、員、或、工、程、更、主、任、發、給、
 第七條 排、反、線、後、漫、逸、藍、工、員、或、工、程、更、主、任、發、給、
 第八條 排、反、線、後、漫、逸、藍、工、員、或、工、程、更、主、任、發、給、
 第九條 排、反、線、後、漫、逸、藍、工、員、或、工、程、更、主、任、發、給、
 第十條 排、反、線、後、漫、逸、藍、工、員、或、工、程、更、主、任、發、給、
 第十一條 排、反、線、後、漫、逸、藍、工、員、或、工、程、更、主、任、發、給、
 第十二條 排、反、線、後、漫、逸、藍、工、員、或、工、程、更、主、任、發、給、

頭綸匙，雙開關每具若干。(估入賬內)

第 五 條 上 下 層 四 週 門 窗 玻 璃 均 用 比 國 十 六 號 模 子
 淨 片 照 樣 配 齊。

第 六 條 凡 鐵 器 先 於 紅 丹 油 一 底 雙 度 顏 色 臨 時 指 定
 水 落 一 底 雙 度 色 油 門 窗 裝 漆 及 煤 地 放 均 一 底 雙 度 顏 色 臨 時 指 定
 第 七 條 陰 溝 排 四 吋 六 吋 九 吋 陰 井 磚 砌 水 泥 蓋 頭
 吋 用 鋼 條 水 泥 搗 做。

第 八 條 本 工 程 監 工 員 隨 時 查 察 倘 有 密 切 關 係 而 章
 程 中 脫 漏 添 做 或 工 程 不 符 必 須 拆 做 承 包 人 不 得 藉 詞 加
 賬 須 將 造 價 估 定 為 妥。

第 九 條 完 工 繳 屋 須 邀 工 程 師 及 總 董 或 工 程 行 政 官
 員 會 驗 看 倘 有 損 壞 或 不 潔 走 漏 等 情 重 行 修 做 完 全 修 好
 出 掃 清 淨 為 要。

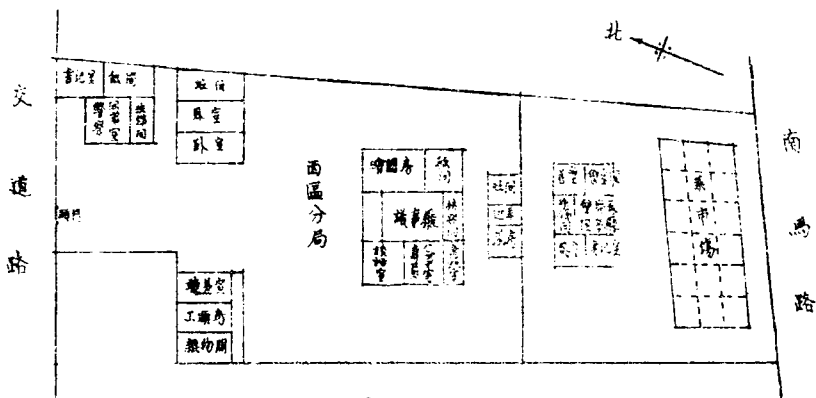
第 十 條 繳 屋 之 後 六 個 足 月 內 倘 有 損 壞 走 漏 者 仍 歸
 承 包 人 完 全 修 好 不 得 藉 詞 推 諉。

第 十 一 條 自 開 工 至 完 工 日 不 得 越 八 個 月 逾 限 按 日 照
 罰 銀 拾 兩 在 岩 銀 五 百 兩 內 扣 除。

第 十 二 條 領 銀 期 限 共 分 五 期 如 下
 第 一 期 底 腳 做 好 至 一 層 地 欄 柵 面 平。
 第 二 期 二 層 牆 身 至 欄 面 平。
 第 三 期 三 層 水 門 汀 地 板 欄 柵 搗 好。
 第 四 期 屋 面 油 漆 五 金 玻 璃 鉸 鏈 掉 銷 洋 鐵 一 應 完 工。
 第 五 期 岩 銀 五 百 兩 除 逾 八 個 月 照 罰 除 餘 後 將 款 具 領。

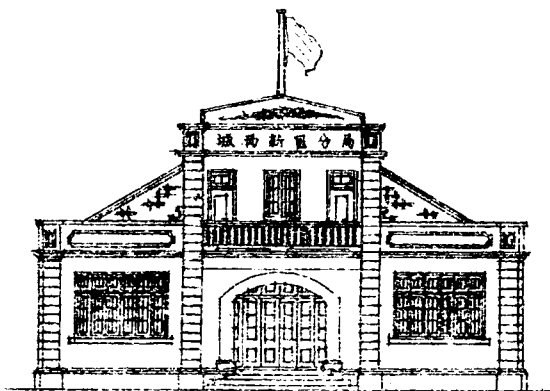
中 華 民 國 拾 肆 年 月 日 護 訂

港南工巡捕局城西新區分局參考圖



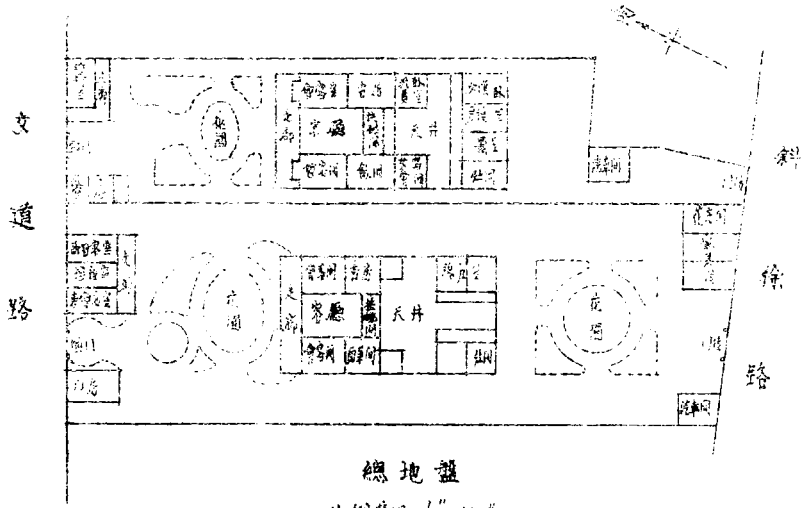
總地盤

比例尺大 1:100



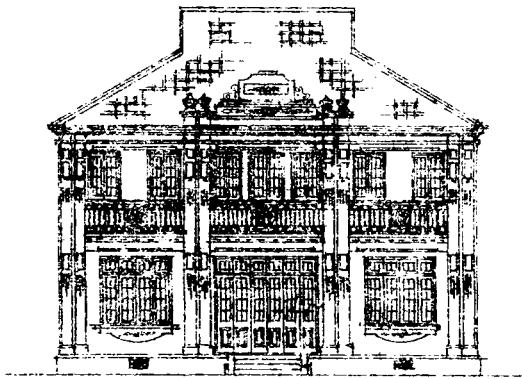
議事廳正面樣

王石二君住宅參考略圖



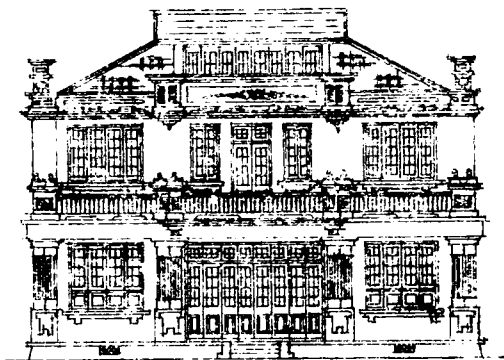
總地盤

比例尺大 1/60" = 1:60"



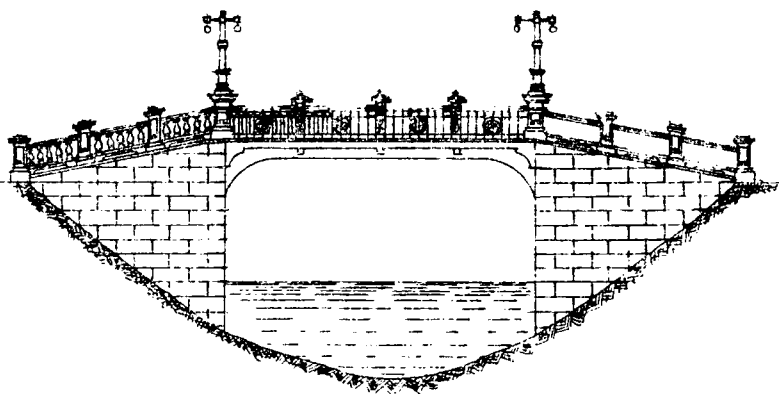
正面樣

比例尺大 1/60" = 1:60"



正面樣

附楓林橋新式欄杆參考圖



比例尺 1:100

正面樣

附證明建築圖案經驗芳名列表如下。

名稱	機關	姓氏
教育家	上海南洋中學校長	王倍生
慈善家	上海普育工藝學院校董	陸伯鴻
	中國佛教會會長	王一亭
佛家	法藏寺任持	烟鑒
道家	丹鳳廟廟主	嚴承祖
醫家	葉露醫院	葉露
	商船學校校董	朱子謀
建築家	營造廠廠主	唐裕
	營造廠廠主	衛桂
	九區工會常務理事	何連舟
	九區工會監察	胡琴山
	曾任滬南工巡捐局暨市公所工程處主任	楊駁

又將上海市營造廠業同業公會發給第柒號證明書抄錄如下。

茲證明建築工程師陳兆坤君，承接設計土木及建築工程營造事務，歷有十餘年辦事認真，成績優美，頗得社會信仰，並無技師登記第五條所載左列各情事。

一、曾因業務上之玩忽或技術不精致他人受損害者。

一、關於業務之執行曾有違法情事證據確鑿者。

一、特照技師登記法施行規則出具證明書此證。

主席會員 張致

秘書 辛繼修

