

DATE March, '70

LLOYD DYSLAND & ASSOCIATES
STRUCTURAL ENGINEERS
LOS ANGELES, CALIFORNIA

PAGE A

JOB NO. 6965

BY _____

JOB _____

STRUCTURAL CALCULATIONS.

FOR

HOUSING DEVELOPMENT
SAN LUIS OBISPO, CALIFORNIA

EDWARD C. BARKER, A.I.A.

ARCHITECT.

TEXTEL, INC.

PLANNING, ARCHITECTURE, ENGINEERING.

DATE March, 1970LLOYD DYSLAND & ASSOCIATES
STRUCTURAL ENGINEERS
LOS ANGELES, CALIFORNIAPAGE 1JOB NO 6965

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JOB SAN LUIS Obispo HOUSING DEVELOPMENT*Lloyd Dysland 52588*

DESIGN DATA:

CODES: Uniform Building Code - 1967 Edition
See Table, p 260 of Appendix 'B' of
F.H.A. Minimum Property Standards

For members carrying primarily roof loads,
allowable stresses may be increased by 25%

Max. design soil pressure = 2000 p.s.f.
at min. depth of 2' " below adjacent grade

Roof Loads		
Comp. Roof		2.0
<u>1/2" Plywd. Shtg.</u>		2.0
Roof trusses		4.0
Gyp. Bd. Clg.		2.4
Misc. - Insul.		<u>0.6</u>
	DL	15.0 p.s.f.
	LL	20.0 p.s.f.

Second Floor		
Asphalt Tile		0.5
<u>1/2" Sheath.</u>		1.8
<u>1/2" Plywd.</u>		1.8
Joists		2.8
Gyp. Bd. Clg.		2.4
Misc.		<u>0.7</u>
	DL	10.0 p.s.f.
	LL	40.0 p.s.f.

Exterior Walls		
2x4 studs -		1.2
Exterior sheath		10.0
Gyp. Bd. Int.		2.4
Misc.		<u>1.4</u>
		15.0 p.s.f.

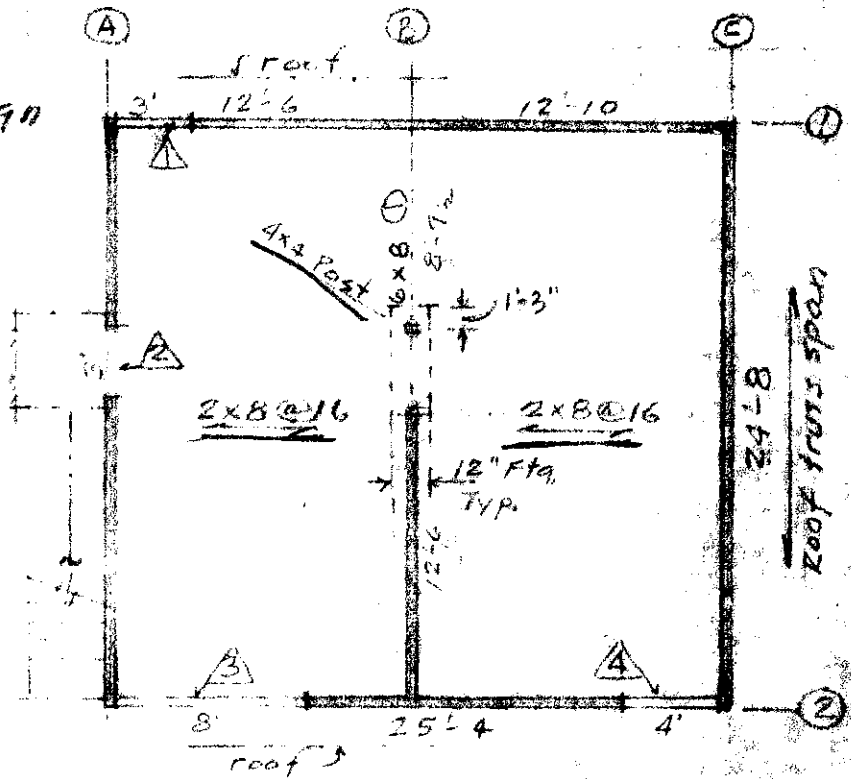
Interior Walls		
studs -		1.2
Gyp. Bd. ea. side		<u>4.8</u>
		6.0 p.s.f.

Unit A - One Bedroom

Roof - See truss design
by Truss Mfr.

2nd Floor

Double floor joists
under partitions
that are parallel
to joists



FL P.M. ① Span = 8'-8" c.c.

$$W = 50 \times 12.5 = 625 \text{ lb}$$

$$P.M. \frac{10}{625 \text{ lb}}$$

$$M = 635 \times 8.67 / 8 = 5960 \text{ lb-in}$$

$$I/c = \frac{5950 \times 12}{1500} = 47.5 \text{ in}^3$$

$$Z = \frac{5950 \times 8.67}{325} = 159 \text{ in}^3$$

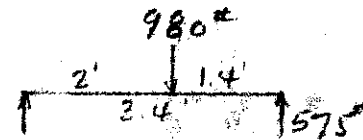
USE
6x8

Lintels

① at roof 3'-0" opng.

Roof P.₁₀ = 2x35x14 = 980*

USE 4x6



$$M = \frac{980 \times 2 \times 1.4}{24} = 806 \text{ lb-in}$$

$$f_b = 806 \times 12 / 19.1 = 506 \text{ psi}$$

@ second floor

floor: 50[#] x 1.0 = 50[#]
wall 15[#] x 5 = 75[#]
125[#]

USE 4x4 @ 2nd floor

② at roof 3'-0" opng.

roof 2x40[#] + 4(15+50) = 340[#]
wall 15[#] x 5 = 75[#]
415[#]

$$M = 415 \times 3.4 / 8 = 600 \text{ lb-in}$$

$$V = 415 (1.7 - .30) = 581 \text{ lb}$$

at floor

floor 50[#] x 6 = 300[#]
wall 15[#] x 5 = 75[#]
375[#]

4x4 at floor & roof

$$f_b = 600 \times 12 / 19.4 = 907 \text{ psi}$$

$$V = 581 \times 1.5 / 13.1 = 66.5 \text{ psi}$$

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Unit A One B.R.

③ at roof 8'-0" Opng

roof $35' \times 28/2 + 14 = 50'$

wall $15' \times 2.5 = 38'$

$\frac{38}{542} \%$

single 2x4 under each end stud

at floor

floor $50' \times 1.0 = 50'$

wall $15' \times 5' = \frac{75'}{125} \%$

$M = 542 \times 8.5^2 / 8 = 4900'$

$I/c = 4900 \times 12 / 1500 = 392''^3$ USE

$V = 542 (4.25 - .85) = 1850'$ 4x10'

$A_{min} = 1.5 \times 1850 / 120 = 23.2''$

$M = \frac{125}{542} \times 4900 = 1130'$ USE

$I/c = 1130 \times 12 / 1500 = 9.1$ 4x8'

④ at roof 4'-0" Opng.

$W = 542 \%$

$M = 542 \times 4.4^2 / 8 = 1310'$

$V = 542 (2.2 - .45) = 949'$

4x6

$f_c = 1310 \times 12 / 19.1 = 822.9 \text{ PSI}$

⑤ 2nd floor

$W = 125 \%$

USE 4x6

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Unit 'A' One B.R. Design Soil Pressure = 2000[#]/ft²

Footings.

at wall (A)

$$\begin{array}{r}
 \text{roof } 35' \times 2' = 70' \\
 + 65' \times 4' = 260 \\
 \text{2nd fl. } 50' \times 6' = 300 \\
 \text{wall } 15' \times 20' = 300 \\
 \text{ftg.} = 500 \\
 \hline
 1430'
 \end{array}$$

Use 12" wide ftg.

at wall (B)

$$\begin{array}{r}
 \text{floor } 50' \times 12.5' = 625' \\
 \text{wall } 15' \times 8.0' = 120 \\
 \text{ftg.} = 500 \\
 \hline
 1245'
 \end{array}$$

Use 12" wide ftg.

at wall (C)

$$\begin{array}{r}
 \text{roof } 35' \times 2' = 70' \\
 \text{2nd fl. } 50' \times 6.3' = 315 \\
 \text{wall } 15' \times 20' = 300 \\
 \text{ftg.} = 500 \\
 \hline
 1185'
 \end{array}$$

Use 12" wide ftg.

Post. at wall (B)

$$\begin{array}{r}
 R = 635 \times 6.1 = 3880' \\
 \text{Length of } 12' \text{ ftg. Req'd.} \\
 = \frac{3880}{2000 - 500} = 2.6' \text{ ok.}
 \end{array}$$

at wall (1)

$$\begin{array}{r}
 \text{roof } 35' \times 28\frac{1}{2}' = 490' \\
 \text{floor } 50' \times 1.0' = 50 \\
 \text{Wall } 15' \times 20' = 300 \\
 \text{ftg.} = 500 \\
 \hline
 1340'
 \end{array}$$

Use 12" wide ftg.

Bm. (1) $R = 635 \times 4.3 = 2750'$

Length of ftg. req'd.

$$\frac{2750}{2000 - 1340} = 4.15' \text{ ok.}$$

at wall (2)

$U = 1340'$

Use 12" wide ftg.

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JOB San Luis Obispo Housing

Unit B - 2 B.R.

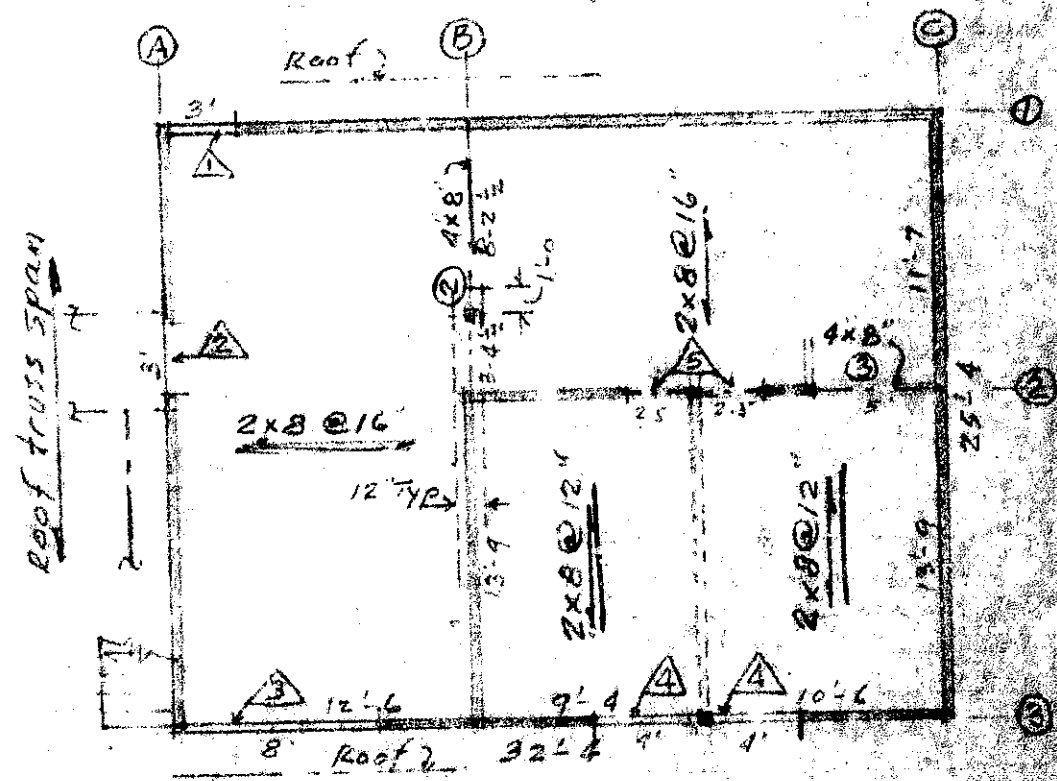
Roof

See truss design
by truss Mfgi.

Second Floor

Use double joists
under partitions
parallel to joists

See p. 1 for joists.



Floor Beams

② Span = 8'-1 c.c.
 $w = 50'' \times 7 = 356$
 $+ \frac{10}{360\%}$

$M = 360 \times 8.1^2 / 8 = 2960''$
 $I/c = \frac{2960 \times 12}{1500} = 23.7''^3$
 $I = \frac{2960 \times 8.1}{325} = 73.5''^4$
 USE 4x8

③ Span = 15'-6 c.c.
 $w = 50'' \times \frac{25}{2} = 625''$
 $+ \frac{10}{635\%}$

$M = 635 \times 15.5^2 / 8 = 2400''$
 $I/c = \frac{2400 \times 12}{1500} = 19.2''^3$
 $A_{min} = 635 \times 2 / 80 = 15.9''$
 USE 4x8

Lintels

△ at roof - Use 4x6 same as △ for Unit A p. 2
 @ 2nd floor - Use 4x4 do.

△ at roof & 2nd floor -
4x4 ok Same as △ for Unit A p. 2

△ at roof - Use 4x10 same as △ for Unit A p. 3
 @ 2nd floor Use 4x8 do.

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JOB NO. 5965JOB San Luis Obispo HousingUnit B - 2 R.R.

△ at roof - same as △ for Unit A f.r.
 at 2nd floor $w = 50' \times 6.5' = 335'$, $< 542'$ at roof
 Use 4x6 at roof & 2nd floor

△ at 2nd floor 2'-6" opening
 floor $50' \times 12.5' = 625'$
 $\frac{10}{635}'$

4x4

$W = 635 \times 2.818 = 1787'$
 $V = 635(1.4 - .30) = 700'$
 $f_b = 1787 \times 1.4 / 94 = 26.4$ psi
 $U = 700 \times 1.5 / 131 = 80$ psi etc.

Footings

at wall (A)
 Same as wall (A) Unit A
12" wide ftg.

at wall (B)
 floor $50' \times 7' = 350'$
 wall $15' \times 8' = 120'$
 ftg. $500'$
 $970'$
Use 12" wide ftg.

@ post -
 $R = 360' \times 11.5/2 = 2070'$
 Length of 12" ftg. reqd.
 $= \frac{2070}{2000 - 500} = 1.38'$

at wall (C)
 roof $35' \times 2' = 70'$
 floor $50' \times 1' = 50'$
 wall $15' \times 20' = 300'$
 ftg. $500'$
 $920'$
Use 12" wide ftg.

at wall (3)
 roof $35' \times 28.7/2 = 500'$
 2nd flr. $50' \times 6.75 = 338'$
 wall $15' \times 20' = 300'$
 ftg. $500'$
 $1638'$
Use 12" wide ftg.

at wall (2)
 2nd flr. $50' \times 2.5/2 = 625'$
 wall $15' \times 8' = 120'$
 ftg. $500'$
 $1245'$
Use 12" wide ftg.

at wall (1)
 roof $35' \times 28.7/2 = 500'$
 2nd flr. $50' \times 11.5/2 = 287'$
 wall $15' \times 20' = 300'$
 ftg. $500'$
 $1587'$
Use 12" wide ftg.