

2000 L. V. Blvd So (2)
STRUCTURAL CALCS-1988

Debbie Ingram 9/27/89



TOM PAPPAS, INC.

STRUCTURAL ENGINEERS

PROJECT VEGAS WORLD L-R

JOB NO.

LAUNDRY ROOM LINE (8)

W_P
111
4.5

LL=100 psf
ADL=25 psf

(1) 20' x 24'

(2) 20' x 24'

(3) 20' x 24'

W_L = +1
V_L = 2

Span (1)

W_T = 74.8 psf (D)
232 psf (L)

W_L = -2
V_L = 2.4

Span (2) (3)

SIGNATURE	DESIGNED BY	CHECKED BY	DATE	SHEET NO.
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TOM PAPPAS, INC. STRUCTURAL ENGINEERS
4141 STATE STREET, SUITE F4
SANTA BARBARA, CALIFORNIA 93110

SHEET No.

Copyright 1985 Structural Data Inc. P01608
POST-TENSIONED FLAT PLATE DESIGN

PROJECT: VEGAS WORLD LAUNDRY ROOM 12-12-1988
SLAB ID: LINE 8

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2 SPANS 1 CANTILEVERS UNIF LL DL FACTOR = 1.4 LL FACTOR = 1.7 CONCRETE SLAB 4000psi 150pcf E=3834ksi
1 END SPANS LEFT 1 END SPANS RIGHT *MOMENTS REDUCED TO FACE* COLUMN 4000psi 150pcf E=3834ksi
FORCE DATA: 125psi MINIMUM F/A 0.500L MINIMUM BALANCED LOAD
ALLOWABLE TENSILE STRESSES: TOP 6.00 SORT f'c = 379psi BOT 6.00 SORT f'c = 379psi
TENDON COVER: INTERIOR SPANS TOP 0.75in EXTERIOR SPANS TOP 0.75in
BOTTOM 0.75in BOTTOM 1.50in
REBAR REQUIREMENTS: 0.075% AT TOP AND $n_c/5f_y$ AT BOTTOM WHEN n_c TENSION EXCEEDS 2 SORT f'c = 126psi REBAR YIELD = 60ksi
TENDON DIAMETER = 0.50in MAX. BAR SIZE = 4 REBAR COVER: 0.75in @ TOP AND 0.75in @ BOT

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SLAB DATA

SPAN	L(ft)	B(in)	TRIB(ft)	ADL(ksf)	DL(ksf)	LL(ksf)	TL(ksf)	MP(ksf)	UDL(ksf)	ULL(ksf)	UTL(ksf)	I(in ⁴)	S(in ³)
CANTL	5.50	7.50	5.00	0.025	0.119	0.100	0.219	0.083	0.166	0.170	0.336	421.88	112.50
1	24.00	7.50	5.00	0.025	0.119	0.100	0.219	0.083	0.166	0.170	0.336	421.88	112.50
2	24.00	7.50	14.00	0.025	0.119	0.100	0.219	0.083	0.166	0.170	0.336	421.88	112.50

COLUMN DATA

PARTIAL LOADS PER FT. OF TRIB

JOINT	---BOTTOM COLUMN---			---TOP COLUMN---			SPAN	PARTIAL LOADS PER FT. OF TRIB			
	H(ft)	B(in)	D(in)	H(ft)	B(in)	D(in)		DL(klf)	LL(klf)	A(ft)	B(ft)
1	10.00	24.00	24.00	0.00	0.00	0.00	CANT	0.075	0.232	4.50	5.50
2	10.00	24.00	24.00	0.00	0.00	0.00					
3	10.00	24.00	0.00	0.00	0.00	0.00					

EQUIVALENT FRAME DATA

---BEAM PERPENDICULAR---

STIFFNESSES (kip-in/1000)

JOINT	CAP(in)	C1(in)	L2L(ft)	L2R(ft)	H ₁ L(in)	B ₁ L(in)	H ₁ R(in)	B ₁ R(in)	K _c	K _t	K _{ec}
1	0.00	24.00	-1.00	8.00	0.00	0.00	0.00	0.00	4038.5	2309.5	1469.3
2	0.00	24.00	-2.00	24.00	0.00	0.00	0.00	0.00	4038.5	421.7	381.8
3	0.00	21.27	12.00	24.00	0.00	0.00	0.00	0.00	2379.8	351.0	305.9

ELASTIC MOMENTS AT CENTERLINES

---NET LOAD K's---

---FACTORED (ft-kips/ft)---

SPAN	KL	KN (X)	KR	ML	M ₁ (X)	MR
CANTL			0.77			7.58
1	-12.72	23.70(10.81)	7.28	-12.70	6.90(10.80)	22.40
2	-10.93	13.54(12.72)	17.76	-15.05	12.14(12.72)	9.7

MOMENTS REDUCED TO FACES OF SUPPORTS

---NET LOAD K's---

---FACTORED (ft-kips/ft)---

SPAN	KL	KN (X)	KR	ML	M ₁ (X)	MR
CANTL			0.95			6.02
1	-16.10	29.47(10.81)	8.27	-10.01	5.56(10.80)	19.71
2	-13.31	15.12(12.72)	23.92	-12.34	10.88(12.72)	6.87

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VEGAS WORLD LAUNDRY ROOM
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FORCE SELECTION DATA

	CANTL	1	2
FE	1.87R	18.98R	16.39L
F/A	11.25		
WPRE			

FINAL FORCES AND PROFILES

<---FE(kips)--->		<---CS(inches)--->					
SPAN	(/bay)	(/ft)	L/10P	MID/80T	R/10P	WPRE(ksf)	F/A(ksf)
CANTL	99.75	19.95	75	3.06		0.123	0.222
1	99.75	19.95	3.00	1.75	1.00	0.103	0.222
2	279.59	19.95	1.00	1.75	3.75	0.092	0.222

SECONDARY MOMENTS (ft.kips/ft)

SPAN	ML	JR
1	2.75	-2.03
2	-0.39	-2.51

JOINT MOMENTS (ft.kips/bay)

JOINT	MOMENT
1	14.95
2	73.12
3	94.49

TENDON FPS= 178.28 ksi TENDON WEIGHT= 0.453 psf

ELASTIC MOMENTS (NO REDISTRIBUTION)--REBAR WEIGHT= 317.08 lbs 0.66 psf

<---FACTORED MOMENTS (ft.kips)--->			
SPAN	ML	M+	MR
CANTL			6.02
1	-7.27	7.98	17.68
2	-12.75	12.02	4.37

<---CONTROLLING REBAR (sq.in.)--->					
JOINT	TOP	TOP BARS	BOT	MIDSPAN	TOP
1	1.620(X)	9 No 4x 6.4	0.000()	1	0.000()
2	1.620(X)	9 No 4x 9.4	0.008()	2	0.000()
3	1.620(X)	9 No 4x 5.3	0.000()		

REBAR DATA (sq.in.)

JOINTS			
TOP		BOTTOM	
JOINT	ULT	ULT	M+
1	0.100	1.620	0.000
2	1.478	1.620	0.000
3	0.000	1.620	0.000

<---SPANS--->			
<---TOP--->		<---BOTTOM--->	
SPAN	ULT	M-	ULT
1	0.000	0.000	0.000
2	0.000	0.000	0.120

MOMENTS REDISTRIBUTED INELASTICALLY--REBAR WEIGHT= 355.99 lbs 0.74 psf

<---FACTORED MOMENTS (ft.kips)--->			
SPAN	ML	M+	MR
CANTL			6.02
1	-6.32	8.50	17.68
2	-10.91	13.16	3.84

<---CONTROLLING REBAR (sq.in.)--->					
JOINT	TOP	TOP BARS	BOT	MIDSPAN	TOP
1	1.620(X)	9 No 4x 8.4	0.000()	1	0.000()
2	1.620(X)	9 No 4x 9.4	0.000()	2	0.000()
3	1.620(X)	9 No 4x 5.3	0.008()		

REBAR DATA (sq.in.)

JOINTS				
<---TOP---			<---BOTTOM---	
JOINT	ULT	%	ULT	M+
1	0.000	1.620	0.000	0.000
2	1.478	1.620	0.000	0.000
3	0.000	1.620	0.000	0.000

<---SPANS--->			
<---TOP--->		<---BOTTOM--->	
SPAN	ULT	M-	ULT
1	0.000	0.000	0.000
2	0.000	0.000	0.160

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FORCE SELECTION DATA

	CANTL	1	2
FE	1.87R	18.98R	16.89R
F/A	11.25		
UPRE			

FINAL FORCES AND PROFILES

FE(kips)---		CGS(inches)---			
SPAN	(Bay) (/ft)	LTOP	MIDBOT	RATOP	UPRE(ksf)
CANTL	99.75 19.95		3.75	3.00	0.123
1	99.75 19.95	-3.00	1.75	1.00	0.103
2	279.30 19.95	1.00	1.75	3.75	0.092

SECONDARY MOMENTS

(ft.kips/ft)			
SPAN	ML	MR	
1	2.75	-2.03	
2	10.39	-2.51	

JOINT MOMENTS

(ft.kips/bay)			
JOINT	MOMENT		
1	4.95		
2	73.12		
3	-94.49		

TENDON FPS= 178.28 ksi TENDON WEIGHT= 0.453 psf

ELASTIC MOMENTS (NO REDISTRIBUTION)--REBAR WEIGHT= 317.00 lbs 0.66 psf

FACTORED MOMENTS (ft.kips)---				CONTROLLING REBAR (sq.in.)---			
SPAN	ML	M+	MR	JOINT	TOP	TOP BARS	BOT
CANTL							
1	-7.27	7.98	17.68	1	1.620(X)	9 No 4x 6.4	0.000()
2	-12.75	12.02	4.37	2	1.620(X)	9 No 4x 9.4	0.000()
				3	1.620(X)	9 No 4x 5.3	0.000()

REBAR DATA (sq.in.)

JOINTS				SPANS			
TOP		BOTTOM		TOP		BOTTOM	
JOINT	ULT	%	ULT	SPAN	ULT	M-	ULT
1	0.100	1.620	0.000	1	0.000	0.000	0.000
2	1.478	1.620	0.000	2	0.000	0.000	0.120
3	0.000	1.620	0.000				0.082

MOMENTS REDISTRIBUTED INELASTICALLY--REBAR WEIGHT= 355.99 lbs 0.74 psf

FACTORED MOMENTS (ft.kips)---				CONTROLLING REBAR (sq.in.)---			
SPAN	ML	M+	MR	JOINT	TOP	TOP BARS	BOT
CANTL							
1	-6.32	8.50	17.68	1	1.620(X)	9 No 4x 6.4	0.000()
2	-10.64	13.76	3.84	2	1.620(X)	9 No 4x 9.4	0.000()
				3	1.620(X)	9 No 4x 5.3	0.000()

REBAR DATA (sq.in.)

JOINTS				SPANS			
TOP		BOTTOM		TOP		BOTTOM	
JOINT	ULT	%	ULT	SPAN	ULT	M-	ULT
1	0.000	1.620	0.000	1	0.000	0.000	0.000
2	1.478	1.620	0.000	2	0.000	0.000	0.160
3	0.000	1.620	0.000				0.082

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SHEET NO. 1
VEGAS WORLD LAUNDRY ROOM
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<--INPUT-->			PUNCHING SHEAR			Q' BASED ON H-TOP CGS-TENDON DIAM/2				<--CAP REQUIRED-->			
JOINT	A _g	J _{c/y}	SHEAR	M _{tor}	M _{flex}	V/A _c	M _y /J _c	TOTAL	ALLOW	DEPTH	M1 x M2	TYPE	
	in ²	in ³	kips	ft-kip	ft-kip	ksi	ksi	ksi	ksi	in	in x in		
1	648.0	15357.0	29.9	6.0	9.0	0.046	0.005	0.051	0.215	0.00	0.0x 0.0	CORNER	
2	678.1	8391.0	82.1	29.2	43.9	0.121	0.042	0.163	0.215	0.00	0.0x 0.0	EDGE PAR	
3	285.4	76443.5	53.1	37.8	56.7	0.186	0.006	0.192	0.215	0.00	0.0x 0.0	CORNER	

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ACTUAL NET LOAD MOMENTS (ft-kips/ft)

SPAN	SERVICE LOADS			TRANSFER OF PRESTRESS		
	ML	M _x (X)	MR	ML	M _x (X)	MR
CANTL			2.43			-0.57
4	-3.34	1.85(10.66)	7.05	0.95	-0.50(11.58)	-1422
2	-4.59	4.13(12.69)	2.61	0.57	-0.43(13.05)	-0.25

FLEXURAL STRESSES AT SERVICE LOADS (ksi... + = tension, - = compression)

CANTL	SPAN 1			SPAN 2		
	R	L	M	R	L	M
TOP	0.037	0.135	-0.419	0.432	0.268	-0.662
BOT	-0.480	-0.578	-0.024	-1.373	-0.712	0.219

FLEXURAL STRESSES AT TRANSFER OF PRESTRESS (ksi... + = tension, - = compression) WITH 0.00% OF PARTIAL DL

CANTL	SPAN 1			SPAN 2		
	R	L	M	R	L	M
TOP	-0.320	-0.360	-0.205	-0.854	-0.320	-0.215
BOT	-0.198	-0.157	-0.312	-0.594	-0.197	-0.302

UNFACTORED DL & LL MOMENTS (ft-kips) AT CENTERLINES

SPAN	DEAD LOAD		LIVE LOAD	
	ML	MR	ML	MR
CANTL		2.17		2.67
1	-4.45	7.93	-3.81	6.65
2	-5.32	3.27	-4.47	2.75

MAXIMUM SPAN DEFLECTIONS IN INCHES (Numbers in parentheses are SPAN/DELTA ratios) Left/Right=1.00

SPAN	DL	CREEP	LL	DL+CREEP+LL
CANTL	0.0033	0.0065	0.0238(2768)	0.0337(1961)
1	-0.0057	-0.0113	0.0614(4687)	0.0444(6479)
2	0.0515	0.1029	0.1836(1569)	0.3379(852)

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TOM RAPPAS, INC.

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PROJECT VEGAS WORLD L.R.

JOB NO.

MILD STEEL



$$7\frac{1}{2} \text{ SLAB: } DL = 93.75 \text{ psf} + 25 \text{ psf} = 118.75$$
$$L = 100 \text{ ft}$$

$$W_u = 336.25 \text{ psf}$$

$$M_u = 3.036 \text{ k-ft}$$

$$B = 12, \quad D = 6.4375$$

$$F = 0.0019$$

$$K_u = 73.26 \rightarrow \rho = 0.0019 \rightarrow A_s = 0.198$$

Use #4 at 12" o.c. (B)

SIGNATURE

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