

E T A B S / C O N K E R

Concrete Frame Design Processor for ETABS

Version 6.22

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2 May 2008 10:34:49

F BUILDING RC DESIGN

UNIT : KG-METER

T. H. CHENG STRUCTURAL ENGINEERING & ASSOCIATES

DESIGN CODE TYPE-----	2 (ACI 318-89)
NUMBER OF FRAMES TO BE DESIGNED/CHECKED----	1
NUMBER OF LOAD COMBINATIONS-----	9
ETABS DEAD LOAD CONDITION NUMBER-----	1
ETABS LIVE LOAD CONDITION NUMBER-----	2
NUMBER OF REDEFINED MATERIAL PROPERTIES----	2
NUMBER OF COLUMN DESIGN PROPERTY SETS-----	3
NUMBER OF BEAM DESIGN PROPERTY SETS-----	7
NUMBER OF CURVES PER INTERACTION VOLUME----	7
NUMBER OF POINTS PER INTERACTION CURVE-----	21
CODE FOR PRINTING INTERACTION CURVES-----	0
CODE FOR UNITY PHI FACTOR OVER RIDE-----	0
TYPE OF UNITS (ENGLISH, MKS OR SI)-----	M
EXECUTION MODE-----	0
FLAG FOR MAP OF BEAM FLEXURAL STEEL-----	1
FLAG FOR MAP OF BEAM SHEAR STEEL-----	1
FLAG FOR MAP OF COLUMN DESIGN/CHECK-----	1
FLAG FOR MAP OF COLUMN SHEAR STEEL-----	1
FLAG FOR MAP OF JOINT SHEAR STRESS RATIOS--	1
FLAG FOR MAP OF B/C MOMENT CAPACITY RATIOS-	1

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MATERIAL PROPERTIES

ID	TYPE	ELASTIC MODULUS {Kg/sqm}	POISSONS RATIO	UNIT WEIGHT {Kg/cum}	UNIT MASS	COEFF OF EXPANSION
1	C	0.2100E+10	0.1700	0.2400E+04	0.0000E+00	0.0000E+00
2	C	0.2100E+10	0.1700	0.2400E+04	0.0000E+00	0.0000E+00
3	C	0.2100E+10	0.1700	0.0000E+00	0.0000E+00	0.0000E+00
4	O	0.2100E-01	0.1700	0.2400E+04	0.0000E+00	0.0000E+00

MATERIAL PROPERTIES FOR DESIGN

ID	TYPE	YIELD FY {Kg/sqm}	STRENGTH FC(FM) {Kg/sqm}	YIELD FYS {Kg/sqm}	STRENGTH FCS(FMS) {Kg/sqm}	ALLOWABLES FBMAJ {Kg/sqm}	FBMIN {Kg/sqm}
1	C	0.420E+08	0.210E+07	0.280E+08	0.210E+07		
2	C	0.420E+08	0.210E+07	0.280E+08	0.210E+07		
3	C	0.422E+08	0.281E+07	0.281E+08	0.281E+07		

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SECTION PROPERTIES FOR COLUMNS

SECT ID	SECTION TYPE	MAT ID	MAJOR DIM {m}	MINOR DIM {m}	CONCRETE COVER {m}	AREA OF BARS 1 {sqm}	AREA OF BARS 2 {sqm}
1	RR-3-5	1	0.3000	0.5000	0.07000	0.00000	0.00000
2	RR-3-3	1	0.5000	0.3000	0.07000	0.00000	0.00000
3	RR-3-3	1	0.3000	0.3000	0.07000	0.00000	0.00000

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SECTION PROPERTIES FOR BEAMS

SECT	SECT	MAT	DEPTH	DEPTH	BEAM	SLAB	SLAB	TOP	BOTTOM
ID	TYPE	ID	BELOW	ABOVE	WIDTH	THICK	WIDTH	COVER	COVER
			{m}	{m}	{m}	{m}	{m}	{m}	{m}
1	RCB	1	0.5000	0.0000	0.3000	0.0000	0.0000	0.08000	0.08000
2	RCB	1	0.5000	0.0000	0.3000	0.0000	0.0000	0.08000	0.08000
3	RCB	1	0.5000	0.0000	0.3000	0.0000	0.0000	0.08000	0.08000
4	RCB	1	0.4000	0.0000	0.2500	0.0000	0.0000	0.08000	0.08000
5	RCB	1	1.2000	0.0000	0.3500	0.0000	0.0000	0.08000	0.08000
6	RCB	1	1.2000	0.0000	0.3500	0.0000	0.0000	0.08000	0.08000
7	RCB	1	0.4500	0.0000	0.3500	0.0000	0.0000	0.08000	0.08000

F BUILDING RC DESIGN

UNIT : KG-METER

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SECTION PROPERTIES FOR BEAMS

SECT	TOP STEEL	BOT STEEL	TOP STEEL	BOT STEEL
ID	END-I	END-I	END-J	END-J
	{ sqm}	{ sqm}	{ sqm}	{ sqm}
1	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
2	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
3	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
4	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
5	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
6	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
7	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

F BUILDING RC DESIGN UNIT : KG-METER
T. H. CHENG STRUCTURAL ENGINEERING & ASSOCIATES

FRAME NUMBER----- 1
FRAMING TYPE----- 3 (NON-SEISMIC)
COLUMN PROPERTY REASSIGNMENT FLAG----- 1
BEAM PROPERTY REASSIGNMENT FLAG----- 1
YIELD OVERSTRENGTH FACTOR----- 1.00

FRAME ID NUMBER----- 1
NUMBER OF STORY LEVELS----- 4
NUMBER OF COLUMN LINES----- 21
NUMBER OF BAYS----- 29
NUMBER OF BRACING ELEMENTS----- 0
NUMBER OF PANEL ELEMENTS----- 60
NUMBER OF COLUMN LATERAL LOAD PATTERNS----- 10
NUMBER OF BEAM SPAN LOAD PATTERNS----- 9
MAXIMUM NUMBER OF LOADS PER BEAM SPAN----- 4

REASSIGNED COLUMN PROPERTY ID*S

LEVEL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PF	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0
RF	0	0	0	0	0	1	2	1	0	0	1	0	0	0	2
3F	1	1	0	0	0	1	2	1	0	0	1	1	0	1	2
2F	1	1	0	0	0	1	2	1	0	0	1	1	0	1	2

LEVEL	16	17	18	19	20	21
PF	3	3	0	0	0	0
RF	2	0	2	2	0	0
3F	2	0	2	2	0	0
2F	2	0	2	2	0	0

SPECIFIED COLUMN LIVE LOAD REDUCTION FACTORS

ALL ELEMENTS HAVE THIS OPTION SPECIFIED AS 1.000

SPECIFIED COLUMN MAJOR MM-FACTOR (SIDESWAY)

ALL ELEMENTS HAVE THIS OPTION SPECIFIED AS 0.000

SPECIFIED COLUMN MINOR MM-FACTOR (SIDESWAY)

ALL ELEMENTS HAVE THIS OPTION SPECIFIED AS 0.000

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SPECIFIED COLUMN MAJOR MM-FACTOR (NO-SIDESWAY)

ALL ELEMENTS HAVE THIS OPTION SPECIFIED AS 0.000

SPECIFIED COLUMN MINOR MM-FACTOR (NO-SIDESWAY)

ALL ELEMENTS HAVE THIS OPTION SPECIFIED AS 0.000

REASSIGNED BEAM PROPERTY ID*S

LEVEL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
-------	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----

PF	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0
----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

RF	0	0	0	2	2	2	2	2	0	2	2	2	2	0	0
----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

3F	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

2F	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

LEVEL	16	17	18	19	20	21	22	23	24	25	26	27	28	29
-------	----	----	----	----	----	----	----	----	----	----	----	----	----	----

PF	0	0	0	0	0	1	0	0	1	0	0	0	0	0
----	---	---	---	---	---	---	---	---	---	---	---	---	---	---

RF	0	2	2	0	0	2	0	0	2	2	0	2	0	0
----	---	---	---	---	---	---	---	---	---	---	---	---	---	---

3F	1	1	1	1	1	1	1	1	1	1	1	1	1	1
----	---	---	---	---	---	---	---	---	---	---	---	---	---	---

2F	1	1	1	1	1	1	1	1	1	1	1	1	0	1
----	---	---	---	---	---	---	---	---	---	---	---	---	---	---

SPECIFIED BEAM LIVE LOAD REDUCTION FACTORS

ALL ELEMENTS HAVE THIS OPTION SPECIFIED AS 1.000

F BUILDING RC DESIGN

UNIT : KG-METER

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DESIGN OF BEAM ELEMENTS (ACI 318-89)

FRAME ID /MAIN FRAME/

LEVEL ID PF

BAY	BEAM SIZE	STRESS	/-FACTORED	LOADS &	COMBOS-//--REQUIRED	REBAR--/
ID	WIDTH X DEPTH	POINT	-MOMENT	+MOMENT	SHEAR M{top} M{bot} V {/m}	
	{m} {m}		{T-m}	{T-m}	{T} {sqcm} {sqcm} {sqcm}	
5	0.30 X 0.50	END I	2 < 7>	3 < 6>	4 < 3>	4.22 4.22 0.00
		1/4-PT	1 < 7>	2 < 2>	3 < 3>	4.22 4.22 0.00
		MIDDLE	0 < 7>	2 < 1>	2 < 6>	4.22 4.22 0.00
		3/4-PT	1 < 7>	2 < 2>	3 < 2>	4.22 4.22 0.00
		END J	3 < 3>	3 < 6>	4 < 2>	4.22 4.22 0.00
11	0.30 X 0.50	END I	3 < 3>	2 < 6>	4 < 3>	4.22 4.22 0.00
		1/4-PT	1 < 7>	1 < 2>	4 < 3>	4.22 4.22 0.00
		MIDDLE	0 < 7>	1 < 2>	3 < 3>	4.22 4.22 0.00
		3/4-PT	1 < 7>	2 < 2>	3 < 2>	4.22 4.22 0.00
		END J	3 < 7>	3 < 6>	4 < 2>	4.22 4.22 0.00
21	0.30 X 0.50	END I	6 < 5>	1 < 8>	10 < 1>	4.22 4.22 1.71
		1/4-PT	0 < 9>	6 < 4>	6 < 1>	4.22 4.22 0.00
		MIDDLE	0 < 9>	9 < 1>	1 < 4>	4.22 5.78 0.00
		3/4-PT	0 < 9>	6 < 4>	6 < 1>	4.22 4.22 0.00
		END J	7 < 5>	1 < 8>	10 < 1>	4.38 4.22 1.87
24	0.30 X 0.50	END I	6 < 5>	1 < 8>	10 < 1>	4.22 4.22 1.89
		1/4-PT	0 < 9>	5 < 1>	6 < 1>	4.22 4.22 0.00
		MIDDLE	0 < 9>	9 < 1>	1 < 5>	4.22 5.76 0.00
		3/4-PT	0 < 9>	6 < 4>	5 < 1>	4.22 4.22 0.00
		END J	7 < 5>	2 < 8>	10 < 1>	4.36 4.22 1.68

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DESIGN OF BEAM ELEMENTS (ACI 318-89)

FRAME ID /MAIN FRAME/

LEVEL ID RF

BAY	BEAM SIZE	STRESS	/-FACTORED	LOADS &	COMBOS-//--REQUIRED	REBAR--/		
ID	WIDTH X DEPTH	POINT	-MOMENT	+MOMENT	SHEAR	M{top}	M{bot}	V{/m}
	{m}	{m}	{T-m}	{T-m}	{T}	{sqcm}	{sqcm}	{sqcm}
4	0.30 X 0.50	END I	7 < 3>	4 < 6>	5 < 3>	4.91	4.22	0.00
		1/4-PT	2 < 7>	3 < 2>	4 < 3>	4.22	4.22	0.00
		MIDDLE	0 < 7>	3 < 1>	2 < 7>	4.22	4.22	0.00
		3/4-PT	2 < 7>	4 < 2>	4 < 2>	4.22	4.22	0.00
		END J	8 < 3>	4 < 6>	6 < 2>	5.30	4.22	0.00
5	0.30 X 0.50	END I	8 < 3>	4 < 6>	6 < 3>	5.58	4.22	0.00
		1/4-PT	5 < 3>	2 < 6>	6 < 3>	4.22	4.22	0.00
		MIDDLE	2 < 3>	0 < 6>	5 < 3>	4.22	4.22	0.00
		3/4-PT	3 < 3>	1 < 6>	4 < 6>	4.22	4.22	0.00
		END J	5 < 3>	4 < 6>	5 < 6>	4.22	4.22	0.00
6	0.30 X 0.50	END I	9 < 3>	0 < 6>	8 < 1>	6.14	4.22	0.00
		1/4-PT	6 < 3>	1 < 6>	8 < 1>	4.22	4.22	0.00
		MIDDLE	2 < 7>	2 < 2>	7 < 1>	4.22	4.22	0.00
		3/4-PT	0 < 7>	4 < 2>	6 < 1>	4.22	4.22	0.00
		END J	0 < 9>	6 < 1>	6 < 1>	4.22	4.22	0.00
7	0.30 X 0.50	END I	0 < 7>	6 < 1>	2 < 3>	4.22	4.22	0.00
		1/4-PT	0 < 9>	6 < 1>	2 < 3>	4.22	4.22	0.00
		MIDDLE	0 < 9>	6 < 1>	2 < 2>	4.22	4.22	0.00
		3/4-PT	0 < 7>	6 < 1>	2 < 2>	4.22	4.22	0.00
		END J	0 < 7>	5 < 2>	3 < 2>	4.22	4.22	0.00
8	0.30 X 0.50	END I	0 < 7>	5 < 2>	6 < 1>	4.22	4.22	0.00
		1/4-PT	1 < 7>	4 < 2>	6 < 1>	4.22	4.22	0.00
		MIDDLE	3 < 3>	3 < 6>	7 < 1>	4.22	4.22	0.00
		3/4-PT	6 < 3>	2 < 6>	7 < 1>	4.22	4.22	0.00
		END J	9 < 3>	1 < 6>	8 < 1>	6.18	4.22	0.00

10 0.30 X 0.50

END I	8 < 3>	6 < 6>	5 < 3>	5.15	4.22	0.00
1/4-PT	3 < 7>	4 < 2>	4 < 3>	4.22	4.22	0.00
MIDDLE	0 < 7>	1 < 2>	3 < 2>	4.22	4.22	0.00
3/4-PT	3 < 3>	3 < 6>	4 < 2>	4.22	4.22	0.00
END J	8 < 3>	4 < 6>	5 < 2>	5.61	4.22	0.00

11 0.30 X 0.50

END I	11 < 3>	1 < 6>	10 < 1>	7.43	4.22	1.60
1/4-PT	5 < 3>	2 < 6>	9 < 1>	4.22	4.22	0.95
MIDDLE	1 < 7>	4 < 2>	8 < 3>	4.22	4.22	0.09
3/4-PT	0 < 9>	7 < 1>	8 < 3>	4.22	4.46	0.00
END J	0 < 9>	11 < 1>	7 < 3>	4.22	7.31	0.00

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DESIGN OF BEAM ELEMENTS (ACI 318-89)

FRAME ID /MAIN FRAME/

LEVEL ID RF

BAY	BEAM SIZE	STRESS	/-FACTORED	LOADS &	COMBOS-//	--REQUIRED	REBAR--/	
ID	WIDTH X DEPTH	POINT	-MOMENT	+MOMENT	SHEAR	M{top}	M{bot}	V {/m}
	{m}	{m}	{T-m}	{T-m}	{T}	{sqcm}	{sqcm}	{sqcm}
12	0.30 X 0.50	END I	0 < 9>	12 < 1>	13 < 2>	4.22	7.85	5.17
		1/4-PT	0 < 9>	6 < 1>	14 < 2>	4.22	4.22	5.46
		MIDDLE	2 < 7>	3 < 2>	14 < 2>	4.22	4.22	5.90
		3/4-PT	7 < 3>	2 < 6>	15 < 2>	4.93	4.22	6.37
		END J	14 < 3>	1 < 6>	15 < 2>	9.49	4.22	6.70
13	0.30 X 0.50	END I	8 < 3>	3 < 6>	6 < 3>	5.14	4.22	0.00
		1/4-PT	3 < 3>	2 < 6>	5 < 3>	4.22	4.22	0.00
		MIDDLE	1 < 3>	1 < 6>	4 < 3>	4.22	4.22	0.00
		3/4-PT	3 < 7>	3 < 6>	4 < 6>	4.22	4.22	0.00
		END J	7 < 3>	6 < 6>	4 < 2>	4.57	4.22	0.00
17	0.30 X 0.50	END I	11 < 5>	6 < 8>	8 < 5>	7.72	4.23	0.04
		1/4-PT	8 < 5>	7 < 8>	8 < 5>	5.60	4.27	0.00
		MIDDLE	6 < 9>	6 < 4>	8 < 5>	4.22	4.25	0.00
		3/4-PT	4 < 9>	7 < 4>	7 < 5>	4.22	4.49	0.00
		END J	1 < 9>	7 < 4>	7 < 5>	4.22	4.64	0.00
18	0.30 X 0.50	END I	1 < 9>	7 < 4>	4 < 4>	4.22	4.64	0.00
		1/4-PT	0 < 9>	4 < 4>	4 < 4>	4.22	4.22	0.00
		MIDDLE	0 < 9>	3 < 4>	5 < 4>	4.22	4.22	0.00
		3/4-PT	4 < 9>	4 < 8>	6 < 4>	4.22	4.22	0.00
		END J	10 < 5>	5 < 8>	7 < 4>	6.41	4.22	0.00
21	0.30 X 0.50	END I	11 < 5>	6 < 8>	8 < 5>	7.35	4.22	0.00
		1/4-PT	3 < 9>	6 < 4>	6 < 5>	4.22	4.22	0.00
		MIDDLE	0 < 9>	4 < 1>	3 < 4>	4.22	4.22	0.00
		3/4-PT	3 < 9>	4 < 4>	6 < 4>	4.22	4.22	0.00
		END J	11 < 5>	4 < 8>	8 < 4>	7.68	4.22	0.00

24 0.30 X 0.50

END I	13 < 5>	5 < 8>	8 < 5>	8.65	4.22	0.00
1/4-PT	4 < 9>	5 < 4>	6 < 5>	4.22	4.22	0.00
MIDDLE	0 < 9>	5 < 4>	3 < 5>	4.22	4.22	0.00
3/4-PT	0 < 9>	4 < 4>	5 < 4>	4.22	4.22	0.00
END J	6 < 5>	3 < 8>	7 < 4>	4.22	4.22	0.00

25 0.30 X 0.50

END I	3 < 5>	2 < 8>	5 < 5>	4.22	4.22	0.00
1/4-PT	0 < 9>	4 < 1>	3 < 5>	4.22	4.22	0.00
MIDDLE	0 < 9>	5 < 1>	2 < 4>	4.22	4.22	0.00
3/4-PT	2 < 9>	4 < 4>	5 < 4>	4.22	4.22	0.00
END J	10 < 5>	1 < 8>	8 < 1>	6.76	4.22	0.00

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DESIGN OF BEAM ELEMENTS (ACI 318-89)

FRAME ID /MAIN FRAME/

LEVEL ID RF

BAY	BEAM SIZE	STRESS	/-FACTORED	LOADS &	COMBOS-//--REQUIRED	REBAR--/
ID	WIDTH X DEPTH	POINT	-MOMENT	+MOMENT	SHEAR M{top} M{bot} V {/m}	
	{m} {m}		{T-m}	{T-m}	{T} {sqcm} {sqcm} {sqcm}	
27	0.30 X 0.50					
		END I	11 < 5>	8 < 8>	6 < 5>	7.37 5.62 0.00
		1/4-PT	5 < 9>	5 < 8>	5 < 5>	4.22 4.22 0.00
		MIDDLE	0 < 9>	2 < 4>	4 < 9>	4.22 4.22 0.00
		3/4-PT	3 < 9>	4 < 4>	4 < 4>	4.22 4.22 0.00
		END J	9 < 9>	8 < 8>	5 < 4>	5.72 4.98 0.00

F BUILDING RC DESIGN

UNIT : KG-METER

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DESIGN OF BEAM ELEMENTS (ACI 318-89)

FRAME ID /MAIN FRAME/

LEVEL ID 3F

BAY	BEAM SIZE	STRESS	/-FACTORED		LOADS &	COMBOS-/- -REQUIRED REBAR--/			
ID	WIDTH X DEPTH	POINT	-MOMENT	+MOMENT	SHEAR	M{top}	M{bot}	V {/m}	
	{m} {m}		{T-m}	{T-m}	{T}	{sqcm}	{sqcm}	{sqcm}	
1	0.30 X 0.50	END I	10 < 3>	6 < 6>	8 < 3>	6.37	4.22	0.00	
		1/4-PT	3 < 7>	5 < 2>	6 < 3>	4.22	4.22	0.00	
		MIDDLE	0 < 9>	3 < 1>	4 < 7>	4.22	4.22	0.00	
		3/4-PT	3 < 7>	5 < 2>	6 < 2>	4.22	4.22	0.00	
		END J	8 < 3>	7 < 6>	7 < 2>	5.46	4.66	0.00	
2	0.30 X 0.50	END I	1 < 3>	1 < 6>	2 < 1>	4.22	4.22	0.00	
		1/4-PT	0 < 7>	1 < 2>	1 < 5>	4.22	4.22	0.00	
		MIDDLE	0 < 9>	1 < 1>	1 < 4>	4.22	4.22	0.00	
		3/4-PT	0 < 9>	1 < 4>	2 < 1>	4.22	4.22	0.00	
		END J	2 < 5>	0 < 8>	4 < 1>	4.22	4.22	0.00	
3	0.30 X 0.50	END I	1 < 7>	2 < 2>	4 < 3>	4.22	4.22	0.00	
		1/4-PT	0 < 7>	3 < 1>	2 < 3>	4.22	4.22	0.00	
		MIDDLE	0 < 7>	3 < 2>	2 < 2>	4.22	4.22	0.00	
		3/4-PT	2 < 7>	3 < 2>	4 < 2>	4.22	4.22	0.00	
		END J	7 < 3>	1 < 6>	6 < 1>	4.78	4.22	0.00	
4	0.30 X 0.50	END I	13 < 3>	4 < 6>	8 < 3>	8.60	4.22	0.26	
		1/4-PT	4 < 7>	4 < 6>	7 < 3>	4.22	4.22	0.00	
		MIDDLE	0 < 7>	3 < 1>	4 < 3>	4.22	4.22	0.00	
		3/4-PT	4 < 7>	6 < 2>	6 < 2>	4.22	4.22	0.00	
		END J	11 < 3>	7 < 6>	8 < 2>	7.51	4.49	0.00	
5	0.30 X 0.50	END I	14 < 3>	10 < 6>	11 < 3>	9.44	6.69	2.33	
		1/4-PT	8 < 3>	6 < 6>	9 < 3>	5.14	4.22	1.19	
		MIDDLE	3 < 3>	1 < 6>	9 < 2>	4.22	4.22	0.92	
		3/4-PT	6 < 3>	2 < 6>	11 < 2>	4.22	4.22	2.49	
		END J	12 < 3>	6 < 6>	12 < 2>	8.46	4.22	3.54	

6 0.30 X 0.50

END I	18 < 3>	0 < 6>	18 < 1>	13.30	4.22	9.34
1/4-PT	11 < 3>	0 < 6>	16 < 1>	7.51	4.22	8.22
MIDDLE	4 < 3>	3 < 6>	15 < 1>	4.22	4.22	6.79
3/4-PT	0 < 7>	6 < 2>	14 < 1>	4.22	4.22	5.53
END J	0 < 7>	12 < 1>	13 < 1>	4.22	8.32	4.63

7 0.30 X 0.50

END I	0 < 7>	12 < 1>	3 < 7>	4.22	7.82	0.00
1/4-PT	0 < 9>	12 < 1>	3 < 7>	4.22	7.95	0.00
MIDDLE	0 < 7>	11 < 1>	4 < 2>	4.22	7.67	0.00
3/4-PT	0 < 7>	10 < 1>	5 < 2>	4.22	6.86	0.00
END J	0 < 7>	9 < 2>	5 < 2>	4.22	6.35	0.00

F BUILDING RC DESIGN

UNIT : KG-METER

T. H. CHENG STRUCTURAL ENGINEERING & ASSOCIATES

DESIGN OF BEAM ELEMENTS (ACI 318-89)

FRAME ID /MAIN FRAME/

LEVEL ID 3F

BAY	BEAM SIZE	STRESS	/-FACTORED	LOADS &	COMBOS-//--REQUIRED	REBAR--/
ID	WIDTH X DEPTH	POINT	-MOMENT	+MOMENT	SHEAR M{top} M{bot} V {/m}	
	{m} {m}		{T-m}	{T-m}	{T} {sqcm} {sqcm} {sqcm}	
8	0.30 X 0.50	END I	0 < 7>	10 < 2>	12 < 1>	4.22 6.41 3.89
		1/4-PT	2 < 7>	7 < 2>	13 < 1>	4.22 4.33 4.61
		MIDDLE	7 < 3>	4 < 6>	14 < 1>	4.27 4.22 5.46
		3/4-PT	12 < 3>	2 < 6>	15 < 1>	8.38 4.22 6.42
		END J	18 < 3>	0 < 6>	15 < 1>	13.15 4.22 7.23
9	0.30 X 0.50	END I	10 < 3>	6 < 6>	9 < 3>	6.48 4.22 0.54
		1/4-PT	3 < 7>	5 < 2>	7 < 3>	4.22 4.22 0.00
		MIDDLE	0 < 7>	4 < 1>	5 < 2>	4.22 4.22 0.00
		3/4-PT	4 < 7>	6 < 2>	7 < 2>	4.22 4.22 0.00
		END J	12 < 3>	7 < 6>	10 < 2>	8.22 4.38 1.31
10	0.30 X 0.50	END I	13 < 3>	7 < 6>	8 < 3>	9.13 4.28 0.20
		1/4-PT	5 < 3>	5 < 6>	6 < 3>	4.22 4.22 0.00
		MIDDLE	0 < 7>	2 < 1>	4 < 3>	4.22 4.22 0.00
		3/4-PT	4 < 7>	5 < 2>	6 < 2>	4.22 4.22 0.00
		END J	11 < 3>	8 < 6>	7 < 2>	7.65 5.26 0.00
11	0.30 X 0.50	END I	14 < 3>	7 < 6>	10 < 3>	10.04 4.45 1.70
		1/4-PT	9 < 3>	6 < 6>	9 < 3>	5.67 4.22 0.73
		MIDDLE	4 < 7>	5 < 2>	8 < 3>	4.22 4.22 0.00
		3/4-PT	0 < 7>	4 < 2>	7 < 3>	4.22 4.22 0.00
		END J	0 < 7>	5 < 2>	6 < 3>	4.22 4.22 0.00
12	0.30 X 0.50	END I	0 < 7>	5 < 1>	8 < 2>	4.22 4.22 0.00
		1/4-PT	2 < 7>	5 < 2>	9 < 2>	4.22 4.22 0.47
		MIDDLE	5 < 7>	6 < 6>	9 < 2>	4.22 4.22 1.23
		3/4-PT	10 < 3>	6 < 6>	10 < 2>	6.74 4.22 2.07
		END J	15 < 3>	6 < 6>	11 < 2>	10.44 4.22 2.75

13 0.30 X 0.50

END I	13 < 7>	11 < 6>	10 < 3>	9.04	7.52	1.91
1/4-PT	5 < 7>	6 < 2>	9 < 3>	4.22	4.22	0.55
MIDDLE	0 < 7>	1 < 2>	8 < 2>	4.22	4.22	0.00
3/4-PT	7 < 7>	7 < 6>	9 < 2>	4.34	4.47	1.08
END J	15 < 3>	12 < 6>	11 < 2>	10.34	7.82	2.30

14 0.30 X 0.50

END I	0 < 9>	1 < 4>	4 < 2>	4.22	4.22	0.00
1/4-PT	1 < 3>	0 < 6>	4 < 2>	4.22	4.22	0.00
MIDDLE	2 < 3>	0 < 6>	5 < 2>	4.22	4.22	0.00
3/4-PT	4 < 3>	0 < 6>	5 < 1>	4.22	4.22	0.00
END J	6 < 3>	0 < 6>	6 < 1>	4.22	4.22	0.00

F BUILDING RC DESIGN

UNIT : KG-METER

T. H. CHENG STRUCTURAL ENGINEERING & ASSOCIATES

DESIGN OF BEAM ELEMENTS (ACI 318-89)

FRAME ID /MAIN FRAME/

LEVEL ID 3F

BAY	BEAM SIZE	STRESS	/-FACTORED	LOADS &	COMBOS-//--REQUIRED	REBAR--/
ID	WIDTH X DEPTH	POINT	-MOMENT	+MOMENT	SHEAR M{top} M{bot} V {/m}	
	{m} {m}		{T-m}	{T-m}	{T} {sqcm} {sqcm} {sqcm}	
15	0.30 X 0.50					
		END I	10 < 9>	10 < 8>	8 < 5>	6.98 6.71 0.00
		1/4-PT	5 < 9>	5 < 4>	7 < 9>	4.22 4.22 0.00
		MIDDLE	0 < 7>	0 < 2>	8 < 4>	4.22 4.22 0.04
		3/4-PT	7 < 5>	4 < 8>	10 < 4>	4.52 4.22 1.62
		END J	15 < 5>	7 < 8>	11 < 4>	10.15 4.73 2.79
16	0.30 X 0.50					
		END I	9 < 1>	0 < 6>	8 < 1>	6.06 4.22 0.00
		1/4-PT	6 < 1>	0 < 6>	7 < 1>	4.22 4.22 0.00
		MIDDLE	4 < 1>	0 < 6>	6 < 1>	4.22 4.22 0.00
		3/4-PT	2 < 1>	0 < 8>	5 < 1>	4.22 4.22 0.00
		END J	0 < 9>	0 < 4>	5 < 1>	4.22 4.22 0.00
17	0.30 X 0.50					
		END I	17 < 5>	7 < 8>	15 < 5>	12.26 4.44 6.34
		1/4-PT	12 < 5>	7 < 8>	14 < 5>	8.24 4.89 5.70
		MIDDLE	7 < 9>	8 < 8>	13 < 5>	4.84 5.21 4.87
		3/4-PT	4 < 9>	9 < 4>	12 < 5>	4.22 6.01 4.06
		END J	0 < 9>	10 < 4>	12 < 5>	4.22 6.74 3.51
18	0.30 X 0.50					
		END I	1 < 9>	10 < 4>	5 < 4>	4.22 6.99 0.00
		1/4-PT	0 < 9>	6 < 1>	7 < 4>	4.22 4.22 0.00
		MIDDLE	2 < 9>	4 < 4>	9 < 4>	4.22 4.22 0.51
		3/4-PT	9 < 5>	4 < 8>	11 < 4>	6.04 4.22 2.95
		END J	19 < 5>	4 < 8>	13 < 4>	13.74 4.22 4.58
19	0.30 X 0.50					
		END I	10 < 1>	0 < 6>	8 < 1>	6.83 4.22 0.00
		1/4-PT	7 < 1>	0 < 6>	7 < 1>	4.69 4.22 0.00
		MIDDLE	4 < 1>	0 < 6>	6 < 1>	4.22 4.22 0.00
		3/4-PT	2 < 1>	0 < 8>	5 < 1>	4.22 4.22 0.00
		END J	0 < 5>	0 < 8>	5 < 1>	4.22 4.22 0.00

20 0.30 X 0.50

END I	1 < 9>	2 < 4>	2 < 1>	4.22	4.22	0.00
1/4-PT	2 < 5>	1 < 8>	3 < 1>	4.22	4.22	0.00
MIDDLE	4 < 5>	0 < 8>	5 < 1>	4.22	4.22	0.00
3/4-PT	7 < 5>	0 < 8>	6 < 1>	4.54	4.22	0.00
END J	11 < 1>	0 < 8>	8 < 1>	7.18	4.22	0.00

21 0.30 X 0.50

END I	16 < 5>	5 < 8>	11 < 5>	11.43	4.22	2.90
1/4-PT	5 < 9>	5 < 4>	8 < 5>	4.22	4.22	0.16
MIDDLE	0 < 9>	4 < 1>	4 < 9>	4.22	4.22	0.00
3/4-PT	5 < 9>	7 < 4>	8 < 4>	4.22	4.31	0.00
END J	15 < 5>	7 < 8>	10 < 4>	10.27	4.93	1.69

F BUILDING RC DESIGN

UNIT : KG-METER

T. H. CHENG STRUCTURAL ENGINEERING & ASSOCIATES

DESIGN OF BEAM ELEMENTS (ACI 318-89)

FRAME ID /MAIN FRAME/

LEVEL ID 3F

BAY	BEAM SIZE	STRESS	/-FACTORED	LOADS &	COMBOS-//--REQUIRED	REBAR--/
ID	WIDTH X DEPTH	POINT	-MOMENT	+MOMENT	SHEAR M{top} M{bot} V {/m}	
	{m} {m}		{T-m}	{T-m}	{T} {sqcm} {sqcm} {sqcm}	
22	0.30 X 0.50					
		END I	18 < 5>	10 < 8>	12 < 5>	13.18 6.75 3.80
		1/4-PT	11 < 5>	9 < 8>	11 < 5>	7.13 6.01 2.75
		MIDDLE	4 < 9>	8 < 4>	10 < 5>	4.22 5.13 1.35
		3/4-PT	0 < 9>	6 < 4>	8 < 5>	4.22 4.22 0.00
		END J	0 < 9>	7 < 4>	7 < 5>	4.22 4.80 0.00
23	0.30 X 0.50					
		END I	0 < 9>	6 < 1>	8 < 4>	4.22 4.22 0.00
		1/4-PT	2 < 9>	6 < 4>	9 < 4>	4.22 4.22 0.68
		MIDDLE	7 < 9>	7 < 8>	10 < 4>	4.51 4.55 1.83
		3/4-PT	13 < 5>	8 < 8>	11 < 4>	8.83 5.06 3.17
		END J	20 < 5>	8 < 8>	12 < 4>	14.37 5.22 4.27
24	0.30 X 0.50					
		END I	14 < 5>	1 < 8>	11 < 1>	9.92 4.22 2.55
		1/4-PT	5 < 9>	5 < 4>	7 < 1>	4.22 4.22 0.00
		MIDDLE	0 < 9>	8 < 4>	3 < 5>	4.22 5.10 0.00
		3/4-PT	0 < 9>	6 < 4>	3 < 4>	4.22 4.22 0.00
		END J	0 < 9>	0 < 9>	6 < 1>	4.22 4.22 0.00
25	0.30 X 0.50					
		END I	3 < 5>	2 < 8>	7 < 5>	4.22 4.22 0.00
		1/4-PT	0 < 9>	5 < 1>	4 < 5>	4.22 4.22 0.00
		MIDDLE	0 < 9>	7 < 4>	4 < 4>	4.22 4.64 0.00
		3/4-PT	6 < 9>	6 < 8>	8 < 4>	4.22 4.22 0.00
		END J	18 < 5>	2 < 8>	11 < 1>	12.50 4.22 2.78
26	0.30 X 0.50					
		END I	15 < 5>	6 < 8>	7 < 5>	10.39 4.22 0.00
		1/4-PT	7 < 5>	6 < 8>	5 < 5>	4.43 4.23 0.00
		MIDDLE	1 < 9>	5 < 4>	4 < 5>	4.22 4.22 0.00
		3/4-PT	0 < 9>	3 < 1>	4 < 4>	4.22 4.22 0.00
		END J	4 < 9>	3 < 8>	6 < 4>	4.22 4.22 0.00

27 0.30 X 0.50

END I	18 < 5>	15 < 8>	10 < 5>	12.65	10.17	1.59
1/4-PT	8 < 9>	9 < 4>	8 < 5>	5.01	6.20	0.00
MIDDLE	0 < 9>	2 < 4>	7 < 8>	4.22	4.22	0.00
3/4-PT	7 < 9>	8 < 8>	8 < 4>	4.45	4.98	0.10
END J	17 < 5>	13 < 8>	10 < 4>	12.33	8.78	1.54

28 0.30 X 0.50

END I	8 < 3>	2 < 6>	8 < 1>	5.36	4.22	0.00
1/4-PT	2 < 7>	4 < 2>	5 < 3>	4.22	4.22	0.00
MIDDLE	0 < 7>	5 < 1>	2 < 3>	4.22	4.22	0.00
3/4-PT	0 < 7>	4 < 1>	4 < 2>	4.22	4.22	0.00
END J	2 < 3>	2 < 6>	6 < 2>	4.22	4.22	0.00

F BUILDING RC DESIGN

UNIT : KG-METER

T. H. CHENG STRUCTURAL ENGINEERING & ASSOCIATES

DESIGN OF BEAM ELEMENTS (ACI 318-89)

FRAME ID /MAIN FRAME/

LEVEL ID 3F

BAY	BEAM SIZE	STRESS	/-FACTORED	LOADS &	COMBOS-//	-REQUIRED	REBAR--/
ID	WIDTH X DEPTH	POINT	-MOMENT	+MOMENT	SHEAR	M{ top}	M{ bot}
	{m} {m}		{T-m}	{T-m}	{T}	{sqcm}	{sqcm}
						V {/m}	
29	0.30 X 0.50						
		END I	1 < 3>	0 < 6>	5 < 1>	4.22	4.22
		1/4-PT	0 < 7>	3 < 1>	2 < 1>	4.22	4.22
		MIDDLE	0 < 7>	5 < 1>	0 < 2>	4.22	4.22
		3/4-PT	0 < 7>	3 < 1>	3 < 1>	4.22	4.22
		END J	2 < 3>	1 < 6>	5 < 1>	4.22	4.22

F BUILDING RC DESIGN

UNIT : KG-METER

T. H. CHENG STRUCTURAL ENGINEERING & ASSOCIATES

DESIGN OF BEAM ELEMENTS (ACI 318-89)

FRAME ID /MAIN FRAME/

LEVEL ID 2F

BAY	BEAM SIZE	STRESS	/-FACTORED		LOADS &	COMBOS-/-REQUIRED REBAR--/			
ID	WIDTH X DEPTH	POINT	-MOMENT	+MOMENT	SHEAR	M{top}	M{bot}	V	{/m}
	{m}	{m}	{T-m}	{T-m}	{T}	{sqcm}	{sqcm}	{sqcm}	
1	0.30 X	0.50							
		END I	15 < 3>	12 < 6>	11 < 3>	10.81	7.92	2.60	
		1/4-PT	6 < 7>	7 < 2>	9 < 3>	4.22	4.70	1.11	
		MIDDLE	0 < 9>	2 < 1>	7 < 7>	4.22	4.22	0.00	
		3/4-PT	6 < 7>	8 < 2>	9 < 2>	4.22	5.17	0.30	
		END J	14 < 7>	13 < 6>	10 < 2>	9.74	8.74	1.65	
2	0.30 X	0.50							
		END I	1 < 3>	1 < 6>	2 < 3>	4.22	4.22	0.00	
		1/4-PT	0 < 7>	1 < 2>	2 < 3>	4.22	4.22	0.00	
		MIDDLE	0 < 9>	1 < 1>	1 < 2>	4.22	4.22	0.00	
		3/4-PT	0 < 9>	1 < 4>	2 < 2>	4.22	4.22	0.00	
		END J	2 < 5>	0 < 8>	4 < 1>	4.22	4.22	0.00	
3	0.30 X	0.50							
		END I	4 < 3>	3 < 6>	5 < 3>	4.22	4.22	0.00	
		1/4-PT	0 < 7>	2 < 2>	3 < 3>	4.22	4.22	0.00	
		MIDDLE	0 < 7>	3 < 2>	3 < 2>	4.22	4.22	0.00	
		3/4-PT	4 < 7>	4 < 6>	5 < 2>	4.22	4.22	0.00	
		END J	10 < 3>	3 < 6>	6 < 2>	6.44	4.22	0.00	
4	0.30 X	0.50							
		END I	14 < 3>	7 < 6>	9 < 3>	10.02	4.69	1.21	
		1/4-PT	5 < 7>	5 < 2>	8 < 3>	4.22	4.22	0.00	
		MIDDLE	0 < 7>	3 < 1>	5 < 3>	4.22	4.22	0.00	
		3/4-PT	5 < 7>	7 < 2>	7 < 2>	4.22	4.67	0.00	
		END J	14 < 3>	10 < 6>	9 < 2>	9.75	6.38	0.70	
5	0.30 X	0.50							
		END I	18 < 3>	16 < 6>	13 < 7>	12.89	11.21	4.83	
		1/4-PT	11 < 3>	9 < 6>	12 < 6>	7.20	5.96	4.12	
		MIDDLE	4 < 3>	1 < 6>	14 < 2>	4.22	4.22	5.61	
		3/4-PT	8 < 3>	3 < 6>	15 < 2>	5.19	4.22	7.19	
		END J	17 < 3>	8 < 6>	16 < 2>	12.26	5.40	8.24	

6 0.30 X 0.50

END I	20 < 3>	0 < 6>	18 < 1>	14.55	4.22	9.84
1/4-PT	12 < 3>	0 < 6>	17 < 1>	8.25	4.22	8.73
MIDDLE	5 < 3>	3 < 6>	16 < 1>	4.22	4.22	7.30
3/4-PT	0 < 7>	7 < 2>	14 < 1>	4.22	4.27	6.04
END J	0 < 9>	13 < 1>	13 < 1>	4.22	8.58	5.14

7 0.30 X 0.50

END I	0 < 7>	12 < 1>	4 < 7>	4.22	7.97	0.00
1/4-PT	0 < 9>	12 < 1>	3 < 7>	4.22	8.19	0.00
MIDDLE	0 < 7>	12 < 1>	4 < 2>	4.22	7.99	0.00
3/4-PT	0 < 7>	11 < 2>	5 < 2>	4.22	7.43	0.00
END J	0 < 7>	11 < 2>	6 < 2>	4.22	7.64	0.00

F BUILDING RC DESIGN

UNIT : KG-METER

T. H. CHENG STRUCTURAL ENGINEERING & ASSOCIATES

DESIGN OF BEAM ELEMENTS (ACI 318-89)

FRAME ID /MAIN FRAME/

LEVEL ID 2F

BAY	BEAM SIZE	STRESS	/-FACTORED	LOADS &	COMBOS-/-	REQUIRED	REBAR--/
ID	WIDTH X DEPTH	POINT	-MOMENT	+MOMENT	SHEAR	M{top} M{bot} V {/m}	
	{m} {m}		{T-m}	{T-m}	{T} {sqcm} {sqcm} {sqcm}		
8	0.30 X 0.50	END I	0 < 7>	11 < 2>	12 < 2>	4.22 7.55 3.95	
		1/4-PT	3 < 7>	9 < 2>	13 < 2>	4.22 5.77 4.49	
		MIDDLE	8 < 3>	6 < 6>	13 < 2>	4.97 4.22 5.13	
		3/4-PT	14 < 3>	5 < 6>	14 < 1>	9.34 4.22 6.02	
		END J	20 < 3>	3 < 6>	15 < 1>	14.43 4.22 6.83	
9	0.30 X 0.50	END I	16 < 3>	11 < 6>	12 < 3>	11.18 7.62 3.90	
		1/4-PT	6 < 7>	8 < 2>	10 < 3>	4.22 5.03 1.66	
		MIDDLE	0 < 7>	4 < 1>	7 < 6>	4.22 4.22 0.00	
		3/4-PT	6 < 7>	8 < 2>	10 < 2>	4.23 5.28 2.00	
		END J	17 < 3>	11 < 6>	13 < 2>	12.29 7.73 4.40	
10	0.30 X 0.50	END I	17 < 3>	11 < 6>	10 < 3>	11.81 7.21 1.65	
		1/4-PT	7 < 7>	7 < 6>	8 < 3>	4.31 4.38 0.00	
		MIDDLE	0 < 7>	2 < 1>	6 < 7>	4.22 4.22 0.00	
		3/4-PT	7 < 7>	7 < 6>	8 < 2>	4.33 4.61 0.00	
		END J	16 < 3>	11 < 6>	9 < 2>	11.11 7.81 0.76	
11	0.30 X 0.50	END I	18 < 3>	10 < 6>	12 < 3>	13.01 6.97 3.45	
		1/4-PT	11 < 3>	9 < 6>	11 < 3>	7.55 5.82 2.48	
		MIDDLE	5 < 7>	7 < 2>	9 < 3>	4.22 4.45 1.23	
		3/4-PT	0 < 7>	5 < 2>	8 < 3>	4.22 4.22 0.09	
		END J	0 < 7>	6 < 2>	7 < 3>	4.22 4.22 0.00	
12	0.30 X 0.50	END I	0 < 9>	6 < 4>	10 < 2>	4.22 4.22 1.46	
		1/4-PT	3 < 7>	7 < 2>	10 < 2>	4.22 4.31 2.06	
		MIDDLE	7 < 7>	7 < 6>	11 < 2>	4.58 4.94 2.82	
		3/4-PT	12 < 3>	9 < 6>	12 < 2>	8.22 5.77 3.65	
		END J	18 < 3>	10 < 6>	13 < 2>	12.65 6.42 4.34	

13 0.30 X 0.50

END I	19 < 3>	15 < 6>	14 < 3>	14.11	10.80	5.98
1/4-PT	8 < 7>	8 < 6>	13 < 3>	5.46	5.31	4.62
MIDDLE	0 < 7>	2 < 2>	11 < 7>	4.22	4.22	2.99
3/4-PT	10 < 7>	11 < 6>	12 < 2>	6.63	7.16	3.80
END J	20 < 7>	19 < 6>	13 < 2>	14.79	13.39	5.02

14 0.30 X 0.50

END I	0 < 9>	1 < 4>	5 < 2>	4.22	4.22	0.00
1/4-PT	1 < 3>	0 < 6>	5 < 2>	4.22	4.22	0.00
MIDDLE	3 < 3>	0 < 6>	6 < 2>	4.22	4.22	0.00
3/4-PT	5 < 3>	0 < 6>	7 < 2>	4.22	4.22	0.00
END J	8 < 3>	0 < 6>	7 < 2>	5.21	4.22	0.00

F BUILDING RC DESIGN

UNIT : KG-METER

T. H. CHENG STRUCTURAL ENGINEERING & ASSOCIATES

DESIGN OF BEAM ELEMENTS (ACI 318-89)

FRAME ID /MAIN FRAME/

LEVEL ID 2F

BAY ID	BEAM SIZE WIDTH X DEPTH {m} {m}	STRESS POINT	/-FACTORED -MOMENT {T-m}	LOADS & +MOMENT {T-m}	COMBOS-//--REQUIRED SHEAR M{top} M{bot} V {/m} {T} {sqcm} {sqcm} {sqcm}	REBAR--/
15	0.30 X 0.50	END I	16 < 9>	16 < 8>	12 < 5>	11.22 11.24 3.58
		1/4-PT	8 < 9>	8 < 4>	11 < 9>	5.03 5.56 2.60
		MIDDLE	0 < 7>	0 < 2>	12 < 4>	4.22 4.22 3.90
		3/4-PT	10 < 5>	7 < 8>	14 < 4>	6.37 4.39 5.48
		END J	20 < 5>	13 < 8>	15 < 4>	14.65 8.66 6.65
16	0.30 X 0.50	END I	11 < 1>	0 < 6>	9 < 1>	7.14 4.22 0.59
		1/4-PT	7 < 1>	0 < 6>	8 < 1>	4.89 4.22 0.00
		MIDDLE	5 < 1>	0 < 6>	7 < 1>	4.22 4.22 0.00
		3/4-PT	2 < 1>	0 < 8>	6 < 1>	4.22 4.22 0.00
		END J	0 < 7>	0 < 2>	5 < 1>	4.22 4.22 0.00
17	0.30 X 0.50	END I	18 < 5>	9 < 8>	14 < 5>	12.77 6.15 5.44
		1/4-PT	13 < 5>	9 < 8>	13 < 5>	8.94 6.25 4.80
		MIDDLE	9 < 9>	9 < 8>	12 < 5>	5.75 6.22 3.97
		3/4-PT	5 < 9>	10 < 4>	11 < 5>	4.22 6.65 3.16
		END J	2 < 9>	10 < 4>	11 < 5>	4.22 7.02 2.61
18	0.30 X 0.50	END I	2 < 9>	10 < 4>	5 < 4>	4.22 7.02 0.00
		1/4-PT	0 < 9>	6 < 1>	7 < 4>	4.22 4.22 0.00
		MIDDLE	2 < 9>	4 < 4>	9 < 4>	4.22 4.22 0.64
		3/4-PT	9 < 5>	5 < 8>	11 < 4>	6.23 4.22 3.08
		END J	19 < 5>	5 < 8>	13 < 4>	14.06 4.22 4.70
19	0.30 X 0.50	END I	12 < 1>	0 < 6>	9 < 1>	7.93 4.22 0.86
		1/4-PT	8 < 1>	0 < 6>	8 < 1>	5.43 4.22 0.05
		MIDDLE	5 < 1>	0 < 6>	7 < 1>	4.22 4.22 0.00
		3/4-PT	2 < 1>	0 < 8>	6 < 1>	4.22 4.22 0.00
		END J	0 < 3>	0 < 6>	6 < 1>	4.22 4.22 0.00

20 0.30 X 0.50

END I	1 < 9>	2 < 4>	2 < 2>	4.22	4.22	0.00
1/4-PT	2 < 5>	1 < 8>	3 < 1>	4.22	4.22	0.00
MIDDLE	5 < 5>	0 < 8>	5 < 1>	4.22	4.22	0.00
3/4-PT	7 < 5>	0 < 8>	6 < 1>	4.92	4.22	0.00
END J	11 < 5>	0 < 8>	8 < 1>	7.42	4.22	0.00

21 0.30 X 0.50

END I	17 < 5>	6 < 8>	11 < 5>	12.05	4.22	3.25
1/4-PT	5 < 9>	6 < 4>	9 < 5>	4.22	4.22	0.50
MIDDLE	0 < 7>	5 < 1>	5 < 9>	4.22	4.22	0.00
3/4-PT	4 < 9>	7 < 4>	8 < 4>	4.22	4.65	0.00
END J	15 < 5>	8 < 8>	10 < 4>	10.13	5.48	1.84

F BUILDING RC DESIGN

UNIT : KG-METER

T. H. CHENG STRUCTURAL ENGINEERING & ASSOCIATES

DESIGN OF BEAM ELEMENTS (ACI 318-89)

FRAME ID /MAIN FRAME/

LEVEL ID 2F

BAY ID	BEAM SIZE WIDTH X DEPTH {m} {m}	STRESS POINT	/-FACTORED -MOMENT {T-m}	LOADS & +MOMENT {T-m}	COMBOS-//--REQUIRED SHEAR M{top} M{bot} V {/m} {T} {sqcm} {sqcm} {sqcm}	REBAR--/
22	0.30 X 0.50	END I	23 < 5>	15 < 8>	14 < 5>	17.45 10.16 5.38
		1/4-PT	14 < 5>	12 < 8>	13 < 5>	9.96 8.47 4.32
		MIDDLE	7 < 9>	10 < 4>	11 < 5>	4.58 6.61 2.92
		3/4-PT	0 < 9>	7 < 4>	10 < 5>	4.22 4.58 1.34
		END J	0 < 9>	7 < 4>	8 < 5>	4.22 4.38 0.12
23	0.30 X 0.50	END I	0 < 7>	5 < 1>	10 < 4>	4.22 4.22 1.49
		1/4-PT	3 < 9>	6 < 4>	11 < 4>	4.22 4.22 2.30
		MIDDLE	9 < 9>	8 < 8>	12 < 4>	5.66 5.31 3.45
		3/4-PT	16 < 5>	10 < 8>	13 < 4>	10.89 6.46 4.79
		END J	23 < 5>	11 < 8>	14 < 4>	17.60 7.26 5.89
24	0.30 X 0.50	END I	16 < 5>	4 < 8>	10 < 1>	11.64 4.22 2.24
		1/4-PT	6 < 9>	6 < 4>	8 < 5>	4.22 4.22 0.00
		MIDDLE	0 < 9>	7 < 4>	4 < 5>	4.22 4.56 0.00
		3/4-PT	0 < 9>	5 < 1>	5 < 4>	4.22 4.22 0.00
		END J	5 < 5>	3 < 8>	7 < 4>	4.22 4.22 0.00
25	0.30 X 0.50	END I	3 < 5>	2 < 8>	7 < 5>	4.22 4.22 0.00
		1/4-PT	0 < 9>	5 < 1>	4 < 5>	4.22 4.22 0.00
		MIDDLE	0 < 9>	8 < 4>	4 < 4>	4.22 5.06 0.00
		3/4-PT	6 < 9>	6 < 8>	7 < 4>	4.22 4.22 0.00
		END J	17 < 5>	3 < 8>	11 < 1>	12.05 4.22 2.51
26	0.30 X 0.50	END I	19 < 5>	9 < 8>	8 < 5>	13.75 6.06 0.00
		1/4-PT	10 < 5>	8 < 8>	6 < 5>	6.41 5.64 0.00
		MIDDLE	3 < 9>	6 < 4>	5 < 5>	4.22 4.22 0.00
		3/4-PT	0 < 7>	3 < 1>	4 < 4>	4.22 4.22 0.00
		END J	5 < 9>	4 < 8>	6 < 4>	4.22 4.22 0.00

27 0.30 X 0.50

END I	21 < 9>	18 < 8>	11 < 5>	15.50	13.15	2.78
1/4-PT	9 < 9>	11 < 4>	9 < 5>	6.35	7.81	0.89
MIDDLE	0 < 9>	3 < 4>	8 < 8>	4.22	4.22	0.00
3/4-PT	8 < 9>	9 < 8>	10 < 4>	4.98	5.68	1.34
END J	20 < 5>	15 < 8>	11 < 4>	14.16	10.67	2.78

29 0.30 X 0.50

END I	2 < 3>	1 < 6>	5 < 1>	4.22	4.22	0.00
1/4-PT	0 < 7>	4 < 1>	3 < 1>	4.22	4.22	0.00
MIDDLE	0 < 7>	5 < 1>	1 < 2>	4.22	4.22	0.00
3/4-PT	0 < 7>	4 < 1>	3 < 1>	4.22	4.22	0.00
END J	2 < 3>	1 < 6>	6 < 1>	4.22	4.22	0.00

F BUILDING RC DESIGN

UNIT : KG-METER

T. H. CHENG STRUCTURAL ENGINEERING & ASSOCIATES

DESIGN OF COLUMN ELEMENTS (ACI 318-89)

FRAME ID /MAIN FRAME/

LEVEL ID PF

COL	COLUMN	SIZE	STR	/-----MOMENT INTERACTION-----/				/-----SHEAR DESIGN-----/			
ID	MAJOR	X MINOR	PT	PU	MMAJ	MMIN	COMBO REBAR	DIRN	VU	COMBO A	{/m}
	{m}	{m}		{T}	{T-m}	{T-m}	{sqcm}		{T}		{sqcm}
7	0.30	X 0.30						MAJOR	0	< 0>	0.00
	RR-3-3							MINOR	0	< 0>	0.00
			TOP	8	0	5	< 4> 16.10				
			BOT	10	0	4	< 5> 9.82				
8	0.30	X 0.30						MAJOR	0	< 0>	0.00
	RR-3-3							MINOR	0	< 0>	0.00
			TOP	8	0	5	< 4> 15.91				
			BOT	6	0	2	< 9> 9.00				
16	0.30	X 0.30						MAJOR	0	< 0>	0.00
	RR-3-3							MINOR	0	< 0>	0.00
			TOP	11	0	5	< 5> 16.76				
			BOT	8	0	4	< 4> 10.94				
17	0.30	X 0.30						MAJOR	0	< 0>	0.00
	RR-3-3							MINOR	0	< 0>	0.00
			TOP	10	0	5	< 5> 17.25				
			BOT	8	1	5	< 4> 16.83				

F BUILDING RC DESIGN

UNIT : KG-METER

T. H. CHENG STRUCTURAL ENGINEERING & ASSOCIATES

DESIGN OF COLUMN ELEMENTS (ACI 318-89)

FRAME ID /MAIN FRAME/

LEVEL ID RF

COL	COLUMN SIZE	STR	/-----MOMENT INTERACTION-----/					/-----SHEAR	DESIGN-----/		
ID	MAJOR X MINOR	PT	PU	MMAJ	MMIN	COMBO	REBAR	DIRN	VU	COMBO	A {/m}
	{m}	{m}	{T}	{T-m}	{T-m}		{sqcm}		{T}		{sqcm}
6	0.30 X 0.50							MAJOR	0	< 0>	0.00
	RR-3-5							MINOR	0	< 0>	0.00
		TOP	9	0	4	< 9>	15.00				
		BOT	9	1	8	< 9>	15.00				
7	0.50 X 0.30							MAJOR	0	< 0>	0.00
	RR-3-3							MINOR	0	< 0>	0.00
		TOP	17	0	3	< 9>	15.00				
		BOT	17	0	4	< 9>	15.00				
8	0.30 X 0.50							MAJOR	0	< 0>	0.00
	RR-3-5							MINOR	0	< 0>	0.00
		TOP	18	8	3	< 2>	22.18				
		BOT	27	8	2	< 3>	21.38				
11	0.30 X 0.50							MAJOR	0	< 0>	0.00
	RR-3-5							MINOR	0	< 0>	0.00
		TOP	9	7	0	< 3>	16.97				
		BOT	7	6	1	< 2>	15.65				
15	0.50 X 0.30							MAJOR	0	< 0>	0.00
	RR-3-3							MINOR	0	< 0>	0.00
		TOP	9	0	7	< 5>	18.74				
		BOT	2	0	6	< 4>	15.11				
16	0.50 X 0.30							MAJOR	0	< 0>	0.00
	RR-3-3							MINOR	0	< 0>	0.00
		TOP	24	0	6	< 9>	15.00				
		BOT	24	2	2	< 9>	15.00				
18	0.50 X 0.30							MAJOR	9	< 2>	0.15
	RR-3-3							MINOR	0	< 0>	0.00
		TOP	23	6	8	< 5>	26.61				
		BOT	15	4	6	< 4>	16.50				
19	0.50 X 0.30							MAJOR	0	< 2>	0.00
	RR-3-3							MINOR	0	< 0>	0.00

TOP	7	1	7 < 9>	16.33
BOT	7	0	4 < 9>	15.00

F BUILDING RC DESIGN

UNIT : KG-METER

T. H. CHENG STRUCTURAL ENGINEERING & ASSOCIATES

DESIGN OF COLUMN ELEMENTS (ACI 318-89)

FRAME ID /MAIN FRAME/

LEVEL ID 3F

COL	COLUMN SIZE	STR	/-----MOMENT INTERACTION-----/					/-----SHEAR DESIGN-----/			
ID	MAJOR X MINOR	PT	PU	MMAJ	MMIN	COMBO	REBAR	DIRN	VU	COMBO	A {/m}
	{m}	{m}	{T}	{T-m}	{T-m}		{sqcm}		{T}		{sqcm}
1	0.30 X 0.50							MAJOR	0	< 2>	0.00
	RR-3-5							MINOR	10	< 5>	1.02
		TOP	4	3	15	< 4>	28.95				
		BOT	18	3	11	< 5>	18.09				
2	0.30 X 0.50							MAJOR	0	< 2>	0.00
	RR-3-5							MINOR	0	< 5>	0.00
		TOP	14	7	4	< 3>	19.24				
		BOT	7	6	3	< 2>	15.71				
6	0.30 X 0.50							MAJOR	0	< 2>	0.00
	RR-3-5							MINOR	0	< 5>	0.00
		TOP	27	6	4	< 2>	15.85				
		BOT	30	0	6	< 9>	15.00				
7	0.50 X 0.30							MAJOR	9	< 6>	0.30
	RR-3-3							MINOR	0	< 5>	0.00
		TOP	37	13	1	< 7>	15.43				
		BOT	35	1	5	< 9>	15.00				
8	0.30 X 0.50							MAJOR	0	< 6>	0.00
	RR-3-5							MINOR	9	< 8>	0.01
		TOP	46	12	1	< 2>	39.18				
		BOT	67	12	2	< 3>	41.16				
11	0.30 X 0.50							MAJOR	0	< 6>	0.00
	RR-3-5							MINOR	0	< 8>	0.00
		TOP	33	7	11	< 5>	34.02				
		BOT	16	7	8	< 4>	25.69				
12	0.30 X 0.50							MAJOR	0	< 6>	0.00
	RR-3-5							MINOR	8	< 4>	0.23
		TOP	19	2	12	< 5>	19.17				
		BOT	16	1	4	< 9>	15.00				
14	0.30 X 0.50							MAJOR	0	< 6>	0.00
	RR-3-5							MINOR	0	< 4>	0.00

			TOP	10	9	2	< 2>	24.45			
			BOT	20	8	2	< 3>	19.14			
15	0.50	X	0.30						MAJOR	9	< 6> 0.13
			RR-3-3						MINOR	0	< 4> 0.00
			TOP	26	13	0	< 7>	15.43			
			BOT	31	1	4	< 9>	15.00			
16	0.50	X	0.30						MAJOR	0	< 6> 0.00
			RR-3-3						MINOR	0	< 4> 0.00
			TOP	43	1	6	< 9>	15.00			
			BOT	38	1	7	< 4>	15.66			
18	0.50	X	0.30						MAJOR	10	< 6> 0.92
			RR-3-3						MINOR	0	< 4> 0.00
			TOP	40	14	4	< 3>	26.27			
			BOT	36	13	5	< 2>	26.56			

F BUILDING RC DESIGN UNIT : KG-METER
T. H. CHENG STRUCTURAL ENGINEERING & ASSOCIATES

DESIGN OF COLUMN ELEMENTS (ACI 318-89)

FRAME ID /MAIN FRAME/
LEVEL ID 3F

COL ID	COLUMN SIZE	STR	/-----MOMENT INTERACTION-----/				/-----SHEAR DESIGN-----/				
MAJOR	X MINOR	PT	PU	MMAJ	MMIN	COMBO	REBAR	DIRN	VU	COMBO	A {/m}
{m}	{m}		{T}	{T-m}	{T-m}		{sqcm}		{T}		{sqcm}
19	0.50 X 0.30							MAJOR	0	< 6>	0.00
	RR-3-3							MINOR	0	< 4>	0.00
		TOP	25	2	9	< 5>	27.39				
		BOT	7	2	9	< 4>	26.65				

F BUILDING RC DESIGN

UNIT : KG-METER

T. H. CHENG STRUCTURAL ENGINEERING & ASSOCIATES

DESIGN OF COLUMN ELEMENTS (ACI 318-89)

FRAME ID /MAIN FRAME/

LEVEL ID 2F

COL	COLUMN	SIZE	STR	/-----MOMENT INTERACTION-----/				/-----SHEAR DESIGN-----/			
ID	MAJOR	X MINOR	PT	PU	MMAJ	MMIN	COMBO	REBAR	DIRN	VU	COMBO A
	{m}	{m}		{T}	{T-m}	{T-m}		{sqcm}		{T}	{sqcm}
1	0.30	X 0.50							MAJOR	0	< 6> 0.00
	RR-3-5								MINOR	0	< 4> 0.00
			TOP	7	7	2	< 6>	18.89			
			BOT	34	3	18	< 9>	35.72			
2	0.30	X 0.50							MAJOR	0	< 6> 0.00
	RR-3-5								MINOR	0	< 4> 0.00
			TOP	6	6	2	< 6>	15.33			
			BOT	25	2	19	< 5>	35.43			
6	0.30	X 0.50							MAJOR	0	< 6> 0.00
	RR-3-5								MINOR	0	< 4> 0.00
			TOP	30	8	2	< 6>	18.16			
			BOT	40	9	2	< 7>	23.84			
7	0.50	X 0.30							MAJOR	13	< 6> 3.43
	RR-3-3								MINOR	0	< 4> 0.00
			TOP	26	15	0	< 6>	19.37			
			BOT	26	22	1	< 6>	34.93			
8	0.30	X 0.50							MAJOR	0	< 6> 0.00
	RR-3-5								MINOR	11	< 8> 0.49
			TOP	72	12	2	< 2>	39.32			
			BOT	111	12	3	< 3>	44.53			
11	0.30	X 0.50							MAJOR	0	< 6> 0.00
	RR-3-5								MINOR	10	< 8> 1.50
			TOP	48	9	1	< 3>	19.62			
			BOT	27	3	21	< 4>	44.29			
12	0.30	X 0.50							MAJOR	0	< 6> 0.00
	RR-3-5								MINOR	0	< 8> 0.00
			TOP	34	0	9	< 9>	15.00			
			BOT	0	0	14	< 8>	22.09			
14	0.30	X 0.50							MAJOR	0	< 6> 0.00
	RR-3-5								MINOR	0	< 8> 0.00

			TOP	20	7	2	< 2>	18.16				
			BOT	38	9	2	< 7>	21.72				
15	0.50	X	0.30						MAJOR	12	< 6>	2.06
		RR-3-3							MINOR	0	< 8>	0.00
			TOP	44	15	1	< 7>	17.09				
			BOT	41	21	1	< 6>	31.84				
16	0.50	X	0.30						MAJOR	12	< 7>	1.74
		RR-3-3							MINOR	0	< 8>	0.00
			TOP	43	15	1	< 6>	16.94				
			BOT	50	21	1	< 7>	31.60				
18	0.50	X	0.30						MAJOR	13	< 6>	3.36
		RR-3-3							MINOR	0	< 8>	0.00
			TOP	64	17	3	< 3>	27.86				
			BOT	34	22	2	< 6>	37.46				

F BUILDING RC DESIGN UNIT : KG-METER
T. H. CHENG STRUCTURAL ENGINEERING & ASSOCIATES

DESIGN OF COLUMN ELEMENTS (ACI 318-89)

FRAME ID /MAIN FRAME/
LEVEL ID 2F

COL ID	COLUMN SIZE	STR	/-----MOMENT INTERACTION-----/					/-----SHEAR DESIGN-----/			
MAJOR	X MINOR	PT	PU	MMAJ	MMIN	COMBO	REBAR	DIRN	VU	COMBO	A {/m}
{m}	{m}		{T}	{T-m}	{T-m}		{sqcm}		{T}		{sqcm}
19	0.50 X 0.30							MAJOR	10	< 6>	2.05
	RR-3-3							MINOR	0	< 8>	0.00
		TOP	35	1	8	< 9>	19.28				
		BOT	11	2	10	< 4>	31.73				