



Appendices

- Appendix 1: Precast Plank Design**
- Appendix 2: Steel Joist Floor System Design**
- Appendix 3: Staggered Truss Member Sizes**



Appendix 1 : Precast Plank Design

Strand Pattern Designation

76-S
 ↑ S = straight
 ↑ Diameter of strand in 16ths
 ↑ No. of strand (7)

Safe loads shown include dead load of 10 psf for untopped members and 15 psf for topped members. Remainder is live load. Long-time cambers include superimposed dead load but do not include live load.

Capacity of sections of other configurations are similar. For precise values, see local hollow-core manufacturer.

Key
 335—Safe superimposed service load, psf
 0.2—Estimated camber at erection, in.
 0.3—Estimated long-time camber, in.

HOLLOW-CORE
4'-0" x 8"
Normal Weight Concrete

$f'_c = 5,000$ psi
 $f'_a = 3,500$ psi

Section Properties

	Untopped	Topped
A	215 in ²	—
I	1,666 in ⁴	3,071 in ⁴
y _s	4.00 in.	5.29 in.
y _t	4.00 in.	4.71 in.
S _b	416 in ³	580 in ³
S _t	416 in ³	652 in ³
b _w	12.00 in.	12.00 in.
wt	224 plf	324 plf
	56 psf	81 ps
V/S	1.92 in.	

4HC8

Table of safe superimposed service load (psf) and cambers (in.) **No Topping**

Strand Designation Code	Span, ft																																																																																																																						
	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36																																																																									
66-S	335	286	246	213	185	162	141	124	109	96	85	75	66	58	50	44	38	33	335	286	246	213	185	162	141	124	109	96	85	75	66	58	50	44	38	33	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.0	0.0	-0.1	-0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.0	0.0	-0.1	-0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.0	-0.1	-0.2	-0.3	-0.5	-0.7																												
	76-S	375	337	291	252	220	193	170	150	133	118	105	93	83	73	65	58	51	45	39	34	375	337	291	252	220	193	170	150	133	118	105	93	83	73	65	58	51	45	39	34	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.1	0.0	-0.1	-0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.1	0.0	-0.1	-0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.2	0.1	0.0	-0.1	-0.2	-0.4	-0.6	-0.8																		
		58-S	372	342	317	296	275	255	225	200	179	160	143	128	115	104	93	84	76	68	61	55	49	44	39	372	342	317	296	275	255	225	200	179	160	143	128	115	104	93	84	76	68	61	55	49	44	39	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.3	0.2	0.1	0.0	-0.1	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.4	0.3	0.2	0.0	-0.2	-0.4	-0.6	-0.9	0.4	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.5	0.4	0.3	0.2	0.0	-0.2	-0.4	-0.6	-0.9		
68-S				351	326	302	284	266	250	236	218	196	176	159	143	130	117	107	97	88	80	72	65	59	54		351	326	302	284	266	250	236	218	196	176	159	143	130	117	107	97	88	80	72	65	59	54	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.6	0.5	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.6	0.4	0.2	0.0	-0.2	0.6	0.6	0.7	0.8	0.8	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.8	0.7	0.6	0.4	0.2	0.0	-0.2			
	78-S			360	335	311	290	272	256	242	229	215	205	188	170	154	141	128	117	106	97	89	81	74	67		360	335	311	290	272	256	242	229	215	205	188	170	154	141	128	117	106	97	89	81	74	67	0.5	0.6	0.6	0.7	0.7	0.8	0.9	0.9	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	0.9	0.9	0.5	0.6	0.6	0.7	0.7	0.8	0.9	0.9	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	0.9	0.9	0.7	0.8	0.8	0.9	1.0	1.0	1.1	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.1	1.0	0.9	0.7

4HC8+2



Appendix 2 : Steel Joist Floor System Design

For Steel Joist Floor with Metal Deck

Deck Design:

Max Service Live Load = 100 psf

22 Ga. 1.5" Lok-floor Composite Deck with 4" NW slab (pg. 26-27)

Load Capacity @ 3' span = 400 psf OK

$A_{wvf} = 0.023$ sq. in. \rightarrow 6x6 w1.4x1.4 (A = 0.028 sq. in.)

Weight = 39 psf

Joist Design:

Design Dead Loads: (Assumed in conjunction with AISC Staggered Truss Framing Systems Design Guide)

- Structural Steel = 5 psf
- Metal Stud Walls with 5/8" gypsum wall board = 10 psf
- MEP = 10 psf
- Carpet = 1 psf
- Ceiling Finishing = 1 psf
- Concrete Slab and Deck = 39 psf

Total Dead Loads = 66 psf

Live Loads:

40 psf (floors 3-11)

100 psf (floor 2)

@ 3' o.c.

LL:

40 psf (3') = 120 plf

100 psf (3') = 300 plf

DL:

66 psf (3') = 198 plf

TL:

120 plf + 198 plf = 318 plf

300 plf + 198 plf = 498 plf

18K4 (floors 3-11)

Capacity: TL=328 plf , LL=222 plf

Weight: 7.2 plf \rightarrow Joist weight = 9.7 plf / 3' = 2.4 psf

22K7 (floor 2)

Capacity: TL=550 plf , LL=454 plf

Weight: 9.7 plf \rightarrow Joist weight = 7.2 plf / 3' = 3.23 psf



Appendix 3 : Staggered Truss Member Sizes

Spandrel Beams (Plank)					
Floor	Shape	Number	Linear Feet	Weight	Tot. Wt.
1	W21x55	4	101.32	55	5572.6
	W36x150	4	100	150	15000
	W36x182	6	150	182	27300
2	W21x68	10	250.66	68	17044.88
	W24x76	4	100.66	76	7650.16
3	W21x55	14	351.34	55	19323.7
4	W21x55	14	351.34	55	19323.7
5	W21x55	14	351.34	55	19323.7
6	W21x55	14	351.34	55	19323.7
7	W21x55	14	351.34	55	19323.7
8	W21x55	14	351.34	55	19323.7
9	W21x55	14	351.34	55	19323.7
10	W18x50	14	351.34	50	17567
11	W18x50	14	351.34	50	17567
				Σ=	242968



**Caitlin Ferrell
Erie Convention Center and Sheraton Hotel**

Columns (Plank Floor System)																		
Col. Line 1:	A		B		C		D		E		F		G		H		Height (ft.)	Tot. Wt.
Floor	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight		
1	W14x193	193	W14x233	233	W14x311	311	W14x233	233	W14x311	311	W14x233	233	W14x283	283	W14x159	159	18	35208
2	W12x120	120	W14x159	159	W14x176	176	W14x159	159	W14x176	176	W14x159	159	W14x120	120	W12x120	120	18	22716
3	W12x106	106	W14x132	132	W14x159	159	W14x145	145	W14x145	145	W14x145	145	W12x106	106	W12x106	106	13.5	14809.5
4	W12x106	106	W14x132	132	W12x120	120	W14x132	132	W12x120	120	W14x132	132	W12x106	106	W12x106	106	10.33	10123.4
5	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W14x132	132	10.33	9028.42
6	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	10.33	8759.84
7	W12x96	96	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x96	96	10.33	8553.24
8	W12x96	96	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x96	96	10.33	8553.24
9	W12x96	96	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x96	96	10.33	8553.24
10	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	10.33	7933.44
11	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	10.33	7933.44
																	Σ=	142172
Col. Line 2:	A		B		C		D		E		F		G		H		Height (ft.)	Tot. Wt.
Floor	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight		
1	W14x193	193	W14x233	233	W14x311	311	W14x233	233	W14x311	311	W14x233	233	W14x283	283	W14x159	159	18	35208
2	W12x120	120	W14x159	159	W14x176	176	W14x159	159	W14x176	176	W14x159	159	W14x120	120	W12x120	120	18	22716
3	W12x106	106	W14x132	132	W14x159	159	W14x145	145	W14x145	145	W14x145	145	W12x106	106	W12x106	106	13.5	14809.5
4	W12x106	106	W14x132	132	W12x120	120	W14x132	132	W12x120	120	W14x132	132	W12x106	106	W12x106	106	10.33	10123.4
5	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W14x132	132	10.33	9028.42
6	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	10.33	8759.84
7	W12x96	96	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x96	96	10.33	8553.24
8	W12x96	96	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x96	96	10.33	8553.24
9	W12x96	96	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x106	106	W12x96	96	10.33	8553.24
10	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	10.33	7933.44
11	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	10.33	7933.44
																	Σ=	142172



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Truss Members Plank, Elevation G												
Floor	u1	u2	u3	d1	d2	d3	v1	v2	v3	I1	I2	I3
1	W10x39	W10x39	W10x39									
3	W10x33	W10x33	W10x33	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	W10x33	W10x33	W10x33
5	W10x33	W10x33	W10x33	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	W10x33	W10x33	W10x33
7	W10x33	W10x33	W10x33	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	W10x33	W10x33	W10x33
9	W10x33	W10x33	W10x33	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	W10x33	W10x33	W10x33
11	W10x33	W10x33	W10x33	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	W10x33	W10x33	W10x33

Truss Members Plank, Elevation H												
Floor	u1	u2	u3	d1	d2	d3	v1	v2	v3	I1	I2	I3
2	W10x33	W10x33	W10x33	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	W10x33	W10x39	W10x33
4	W10x33	W10x33	W10x33	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	W10x33	W10x33	W10x33
6	W10x33	W10x33	W10x33	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	W10x33	W10x33	W10x33
8	W10x33	W10x33	W10x33	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	W10x33	W10x33	W10x33
10	W10x33	W10x33	W10x33	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	W10x33	W10x33	W10x33

Spandrel Beams (Joists)					
Floor	Shape	Number	Linear Feet	Weight	Tot. Wt.
1	W18x50	14	351.34	50	17567
2	W18x50	14	351.34	50	17567
3	W18x50	14	351.34	50	17567
4	W18x50	14	351.34	50	17567
5	W18x50	14	351.34	50	17567
6	W18x50	14	351.34	50	17567
7	W18x50	12	300.66	50	15033
	W21x55	2	50.66	55	2786.3
8	W18x50	12	300.66	50	15033
	W21x55	2	50.66	55	2786.3
9	W18x50	12	300.66	50	15033
	W21x55	2	50.66	55	2786.3
10	W18x50	12	300.66	50	15033
	W21x55	2	50.66	55	2786.3
11	W18x50	14	351.34	50	17567
				Σ=	194246

Joists					
Floor	Joist	Linear Ft	Weight	Tot. Wt.	
1	22K7	3513.2	9.7	34078.04	
2	18K4	3513.2	7.2	25295.04	
3	18K4	3513.2	7.2	25295.04	
4	18K4	3513.2	7.2	25295.04	
5	18K4	3513.2	7.2	25295.04	
6	18K4	3513.2	7.2	25295.04	
7	18K4	3513.2	7.2	25295.04	
8	18K4	3513.2	7.2	25295.04	
9	18K4	3513.2	7.2	25295.04	
10	18K4	3513.2	7.2	25295.04	
11	18K4	3513.2	7.2	25295.04	
				Σ=	287028



Columns (Joist Floor System)																											
Col. Line 1:		A			B			C			D			E			F			G			H			Tot. Wt.	
Floor	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Height (ft.)	Tot. Wt.			
1	W14x176	176	W14x132	132	W14x342	342	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	18	27594			
2	W14x132	132	W14x132	132	W14x257	257	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	18	24300			
3	W14x132	132	W14x159	159	W14x211	211	W14x159	159	W14x159	159	W14x211	211	W14x159	159	W14x159	159	W14x159	159	W14x159	159	W14x159	159	13.5	17793			
4	W12x96	96	W14x145	145	W14x145	145	W14x145	145	W14x145	145	W14x145	145	W14x145	145	W14x145	145	W14x145	145	W14x145	145	W14x145	145	10.33	11290.69			
5	W12x106	106	W14x145	145	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	10.33	10536.6			
6	W12x96	96	W14x145	145	W12x106	106	W14x132	132	W12x106	106	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	10.33	10030.43			
7	W12x96	96	W14x132	132	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	10.33	8677.2			
8	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	10.33	7933.44			
9	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	10.33	7933.44			
10	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	10.33	7933.44			
11	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	10.33	7933.44			
Σ= 141956																											
Col. Line 2:		A			B			C			D			E			F			G			H			Tot. Wt.	
Floor	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Shape	Weight	Height (ft.)	Tot. Wt.			
1	W14x176	176	W14x132	132	W14x342	342	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	18	27594			
2	W14x132	132	W14x132	132	W14x257	257	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	18	24300			
3	W14x132	132	W14x159	159	W14x211	211	W14x159	159	W14x159	159	W14x211	211	W14x159	159	W14x159	159	W14x159	159	W14x159	159	W14x159	159	13.5	17793			
4	W12x96	96	W14x145	145	W14x145	145	W14x145	145	W14x145	145	W14x145	145	W14x145	145	W14x145	145	W14x145	145	W14x145	145	W14x145	145	10.33	11290.69			
5	W12x106	106	W14x145	145	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	10.33	10536.6			
6	W12x96	96	W14x145	145	W12x106	106	W14x132	132	W12x106	106	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	W14x132	132	10.33	10030.43			
7	W12x96	96	W14x132	132	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	10.33	8677.2			
8	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	10.33	7933.44			
9	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	10.33	7933.44			
10	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	10.33	7933.44			
11	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	W12x96	96	10.33	7933.44			
Σ= 141956																											



Caitlin Ferrell
Erie Convention Center and Sheraton Hotel

Truss Members Joist, Elevation G												
Floor	u1	u2	u3	d1	d2	d3	v1	v2	v3	I1	I2	I3
1	W10x33	W10x33	W10x33									
3	W10x33	W10x33	W10x33	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	W10x33	W10x33	W10x33
5	W10x33	W10x33	W10x33	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	W10x33	W10x33	W10x33
7	W10x33	W10x33	W10x33	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	W10x33	W10x33	W10x33
9	W10x33	W10x33	W10x33	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	W10x33	W10x33	W10x33
11	W10x33	W10x33	W10x33	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	W10x33	W10x33	W10x33

Truss Members Joist, Elevation H												
Floor	u1	u2	u3	d1	d2	d3	v1	v2	v3	I1	I2	I3
2	W10x33	W10x33	W10x33	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	W10x33	W10x33	W10x33
4	W10x33	W10x33	W10x33	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	W10x33	W10x33	W10x33
6	W10x33	W10x33	W10x33	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	W10x33	W10x33	W10x33
8	W10x33	W10x33	W10x33	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	W10x33	W10x33	W10x33
10	W10x33	W10x33	W10x33	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	10x6x.3125	W10x33	W10x33	W10x33