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TECHNICAL REPORT II

ALTERNATIVE FLOOR FRAMING SYSTEMS

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EXECUTIVE SUMMARY

The Kettler Capitals Iceplex is the practice facility for the NHL franchise, Washington Capitals. It is located in Arlington, Virginia just outside Washington D.C. The Iceplex was constructed on top of the existing parking structure for the Ballston Mall in Arlington.

This report begins by discussing the codes and loads that were used to design the Iceplex. The gravity system of the 8th level framing is then described in detail. The existing floor framing structure of the Iceplex is composite steel.

Eight alternative floor framing systems are analyzed and designed. Several design considerations are explained. The two most important considerations are the weight of the structure and the column layout. The structure must be as light weight as possible in order to avoid the need for reinforcing the existing foundation system. In order to avoid the need for designing and constructing new footings or the use of transfer girders, the column layout must remain the same as the existing structure.

The eight alternative framing systems are a two-way slab with beams, waffle slab, hollow-core plank, double T, non-composite steel, open web steel joists, and post-tensioned two way slab. The advantages and disadvantages of these systems are described.

After the design of these systems was complete, a feasibility study was performed in order to determine the best alternative. Ten criteria were used including cost, depth, and constructability. The study uses a ranking system with 1 being the lowest score and 5 being the highest. From the sum of the criterion scores, four systems were eliminated: waffle slab, double T, non-composite steel and open web steel joists. The final scores for the cast-in-place two-way slab with beams and the post-tensioned systems were the same. In order to choose the best alternative, the most important feasibility criteria, weight and depth, were examined. Since the post-tensioned system scored higher in both criteria, it was concluded that this system is the best alternative floor framing system for the 8th level of the Iceplex.

INTRODUCTION

The Kettler Capitals Iceplex is the practice facility for the National Hockey League team, Washington Capitals. It is located at the Ballston Common Mall in Arlington, Virginia at the intersection of Glebe Road and Randolph Street. This 137,000 square foot facility was built on top an existing parking structure and houses two regulation sized ice rinks, corporate offices, a training facility, and a pro shop. At 60 ft. above street level, the Kettler Capitals Iceplex is the home of the highest ice rink above street level in the United States.

Design for the Iceplex began in 2000; however, this was the third time the Ballston parking garage has been expanded. The original facility, which dates back to the 1950s, was a five story cast-in-place concrete structure reinforced with mild steel. Then in the 1980s, the parking garage was expanded two more times. In 1981, a five story L-shaped addition was constructed of cast-in-place post-tensioned concrete. Then in 1986, the existing five level structure was topped with two more levels, one post-tensioned concrete and the other composite steel. See Figure 1 for a schematic phasing diagram of these additions.

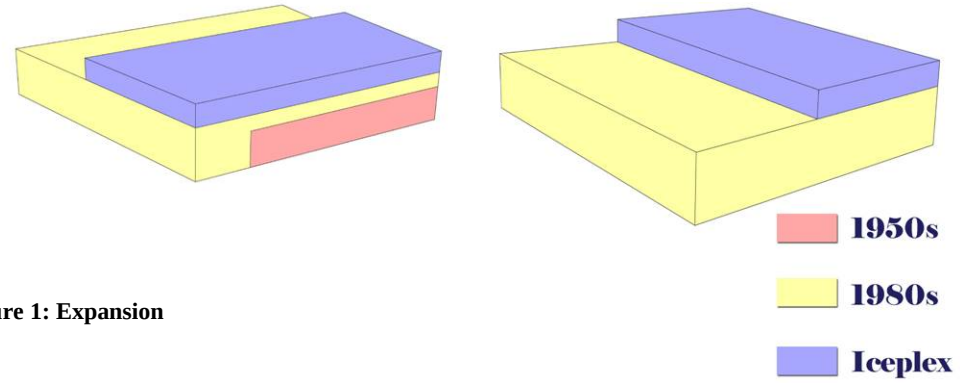


Figure 1: Expansion

There were several challenges when designing the Iceplex. The initial challenge was figuring out how to safely build an ice rink and roof weighing a total of 235 psf dead load plus 130 psf live load over an existing structure that was designed for a total expansion of 60 psf dead load and 50 psf live load. Another challenge was controlling deflection over the long 200 ft. span of each ice rink. A consultant recommended that the deflection be as close to zero as possible in order to prevent the ice from cracking. The need for large column-free spaces limited the locations where lateral members could be placed.

This report analyzes the existing floor framing system and designs several alternative systems. These systems include two-way slab with beams, waffle slab, hollow-core plank, double T, non-composite steel, open web steel joists, and post-tensioned two way slab.

CODES USED FOR ANALYSIS AND DESIGN

The Kettler Capitals Iceplex was designed using Building Officials and Code Administrators, Inc (BOCA), 1996 and ASCE 7-95 for building loads and structure analysis. Concrete design used American Concrete Institute, ACI 318-95 and the Manual of Steel Construction –Allowable Stress Design, 9th Edition, 1989 was used for the steel design.

This report uses a newer version of code to design the alternative floor systems. The International Building Code (IBC 2006) and ASCE7-05 is used to determine loads and design procedures. The concrete and steel codes used vary depending on the floor framing system.

IMPORTANT CONSIDERATIONS FOR ALTERNATIVE SYSTEMS

Listed below are several important things to be considered when designing alternative floor systems for the Iceplex.

- The column grid is unable to change. Since the Iceplex is built on top of an existing building, the same column grid must be used in order to avoid the complication of adding transfer girders throughout the building. Also, this prevents the need to design and construct additional footings. Avoiding both will save the owner a great deal of money. This means that the typical bay must remain 27’ x 30’.
- The weight of the alternative framing systems needs to be minimal. This will minimize the need to expand the existing footings, which will also save money. In the original design, only two footings needed to be expanded partly because a some-what light structure was used.
- The total depth of the alternative systems must be taken into consideration. According to IBC 406.2.2, “The clear height of each floor level in vehicle and pedestrian traffic areas shall not be less than 7 feet.” For example, when framing the 8th level, a total framing depth plus equipment of less than 35” must be used in order to maintain the current floor to floor height of 11’-0”. This dimension takes into consideration the additional slab for the ice rinks.
- Live load deflection must remain limited to L/480 to prevent the ice from cracking. Vibration must also be minimal, especially in areas where hockey players will be skating.
- The size of columns supporting the 8th level must be minimized. This will limit the amount of parking stalls that need to either be removed completely or relocated on the 7th level below.

BUILDING LOADS

Live Loads

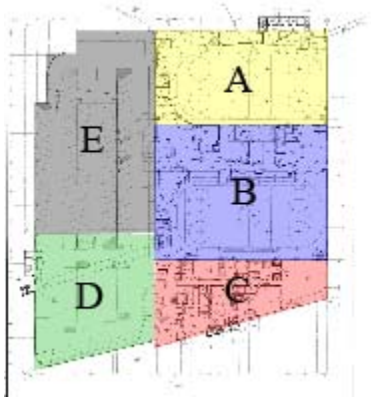
AREA	PSF USED BY ENGINEER OF RECORD	PSF USED IN ANALYSIS
Framed Floor Areas	100	100
Lobbies, Stairs, Exits	100	100
Mechanical	As noted on plans	As noted on plans
Ice Rink	100	100
Parking Decks	50	40
Parking Decks (Top Level)	80 (50LL + 30 snow)	70 (40LL + snow)
Roof LL	30 or snow load (whichever is greater)	25 or snow load (whichever is greater)

Dead Loads

AREA	PSF USED BY ENGINEER OF RECORD	PSF USED IN ANALYSIS
Rink	1.5" ice = 7.8	132
	5" NW Concrete = 63	
	4" Insulation = 6	
	4" Sand = 40	
	Misc = 15	
	132	
Wet Areas	30	30
Parking	3	3
Planter	440	440
Other	15	15

EXISTING FLOOR FRAMING SYSTEM –COMPOSITE STEEL

This report will concentrate only on Areas A and B of the 8th level. These areas will be the location of the alternative system designs. See the Keyplan below for their locations.



Keyplan

Areas 8A & 8B

Areas 8A and 8B are located on the 8th floor of the new Iceplex facility and are the location of both regulation-sized ice rinks. It was important to limit deflection of the concrete slab supporting the rinks in order to prevent the ice from cracking. The structural engineer and the ice rink consultant compromised to limit the deflection to L/480. The typical bay size is 27'-0" x 30'-0". The slab was constructed from 3½" lightweight concrete over 3" 18 gage galvanized composite deck (total thickness = 6½") reinforced with #4 at 16"oc each way 2" below the slab. Supporting the slab are mostly composite W18x40s at 9'-0"oc spanning 30'-0". These W18s frame into larger steel composite beams which range from W21x50s to W36x150s. All shear studs are ¾" dia. x 4" long. It was noted that rebar is not traditionally used in a composite slab system; however, it was necessary to properly support the ice. Steel columns supporting the rinks range from W12x58s to W14x257s. See Figure 2 for an enlarged framing plan and Figures 3 and 4 for a typical framing plan of Areas A and B respectively.

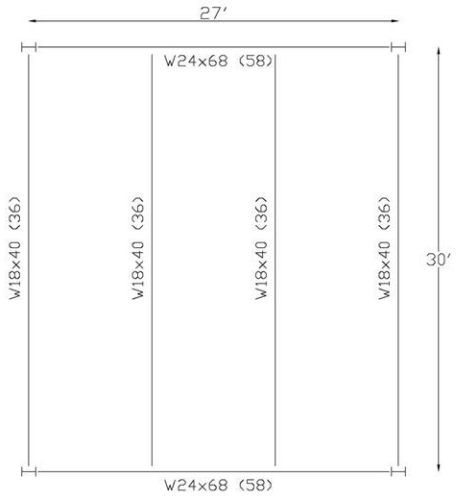
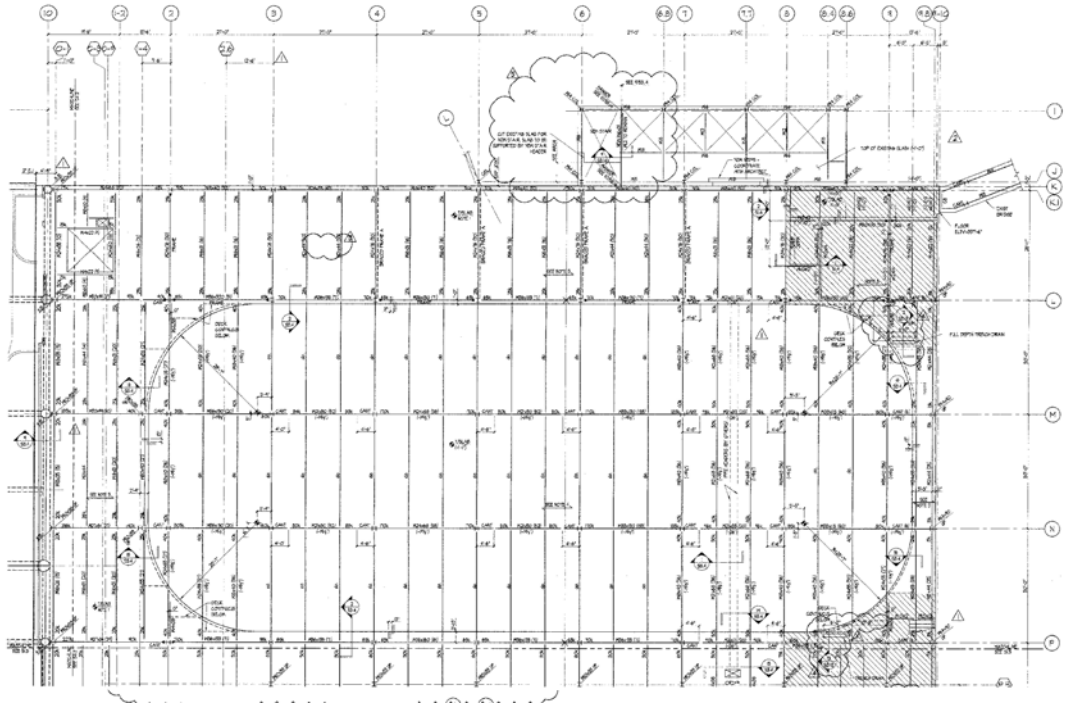


Figure 2: Enlarged Framing Plan

Figure 3: Area 8A Framing Plan



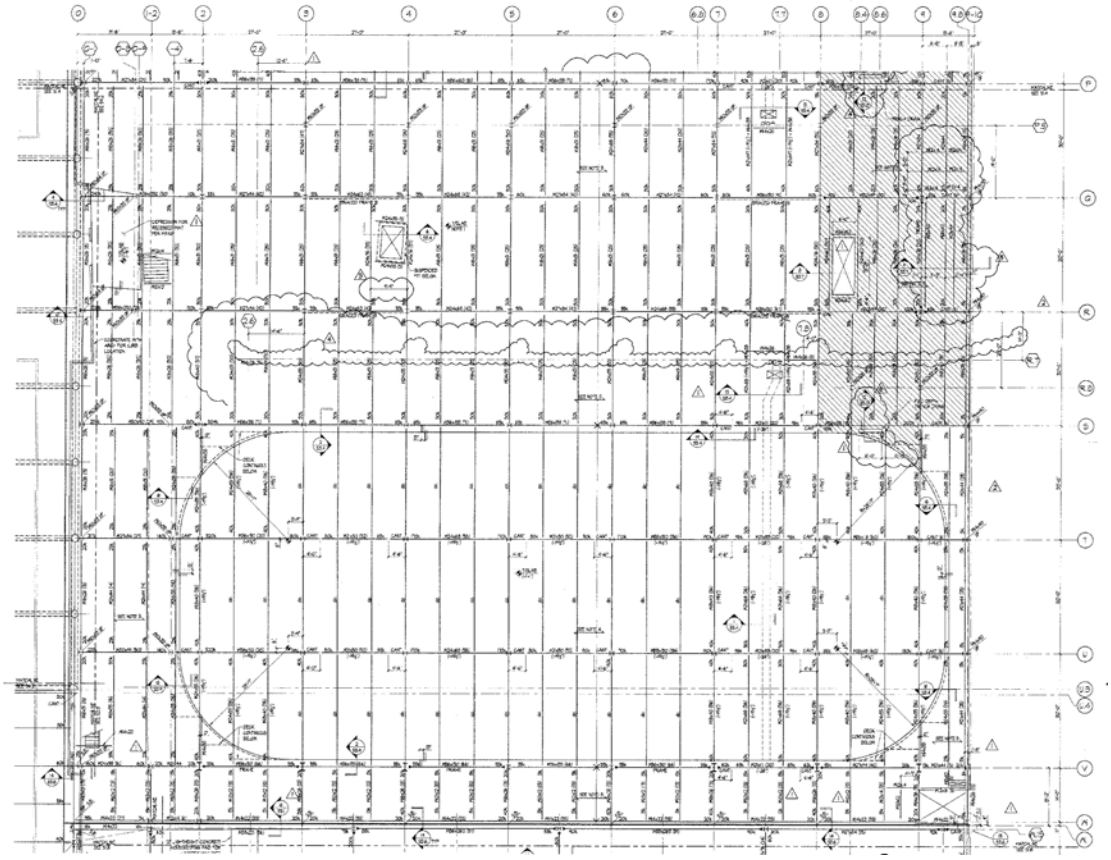
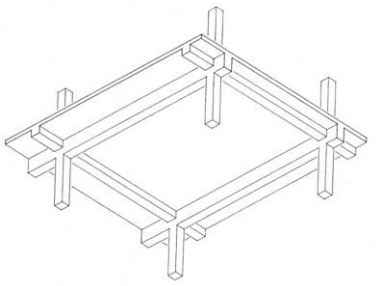


Figure 4: Area 8B Framing Plan

TWO-WAY SLAB WITH BEAMS



The PCA-Slab software program was used to design a two-way concrete slab with beams system. This program uses ACI 318-02 for concrete and ASTM A615 for reinforcing steel. Lightweight concrete with a compressive strength of 5000 psi was used during design. Two runs were analyzed and designed. The first spans east-west through Area 8B and the other spans north-south through Areas 8A and 8B. See Figure 5 for the location of these runs. A slab thickness of 12" and 14"x14" columns were needed. 14"x24" beams were designed in both directions. To avoid punching shear, drop panels were needed around every column. For simplicities sake, the reinforcing is only shown for one bay. The entire column strip and middle strip design can be found in the appendix. The beam reinforcement can be found in the tabulated design output in the appendix. For convenience, the PCA input is also provided in the appendix. The final design of a typical bay is shown in Figure 6.

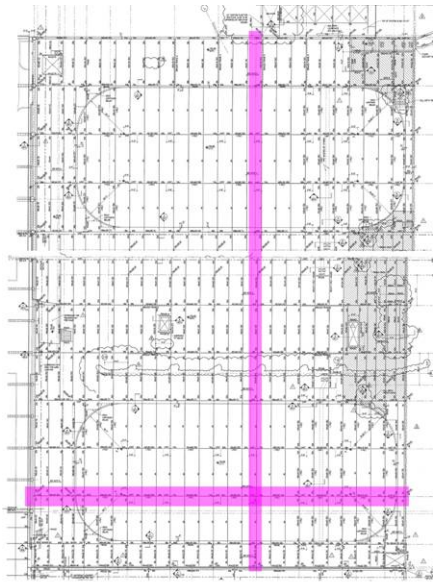
Advantages

- Depth: A maximum of 24" depth allows more than enough room to keep the existing floor-to-floor height. Deeper beams could even be designed in order to decrease the required reinforcement.
- Column Size: Small column sizes minimize the obstruction of parking stalls on the 7th level.
- Deflection/Vibration: The maximum live load deflection of L/480 was maintained during this design. Vibrations will not be a problem with this heavy concrete system.
- Aesthetics: This two-way system with beams is commonly used in parking structures; therefore, this system will not create any unsightly structure from the 7th level below.
- Lateral System: Monolithic design provides a very stiff lateral resisting system.

Disadvantages

- Utilities: This monolithic design may cause problems for placing mechanical and electrical equipment. Openings in the slab will need to be designed which may increase the slab depth and/or reinforcement.
- Weight: Even though lightweight concrete was used during this design, an all-concrete system will have significant weight. This may create the need to reinforce more existing footings than the original design required. Also, the heavy weight of this system will increase seismic loads. The weight of this system is 110 psf.

Figure 5: PCA-Slab Run Locations



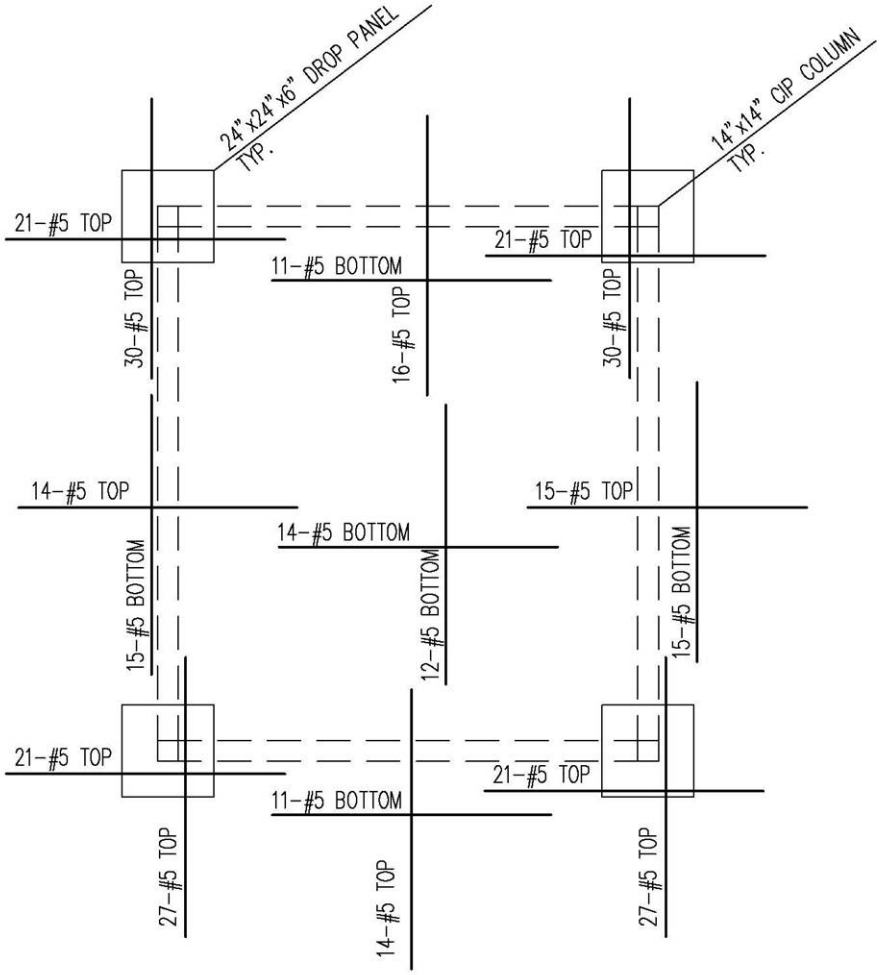
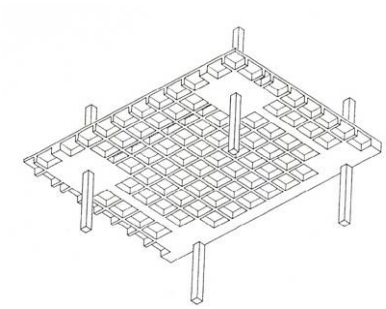


Figure 6: Two-Way Slab Design

WAFFLE SLAB



The CRSI Design Handbook 2002 was used to design a waffle slab system supporting the ice rink in Area 8B. It was assumed that $\ell_1=\ell_2=30$ ft. which is a more conservative approach than the 27'x30' actual bay. This version of CRSI uses 1.2D+1.7L. Using a 100 psf live load and 132 psf dead load, a factored superimposed load of 328 psf was calculated. The design used a superimposed load of 300 psf assuming that 5000 psi normal weight concrete will be used as opposed to the tabulated 4000 psi. A total slab depth of 15 in. is used with a minimum column size of 19"x19". See Figure 7 for the final design of column strip and middle strip reinforcement.

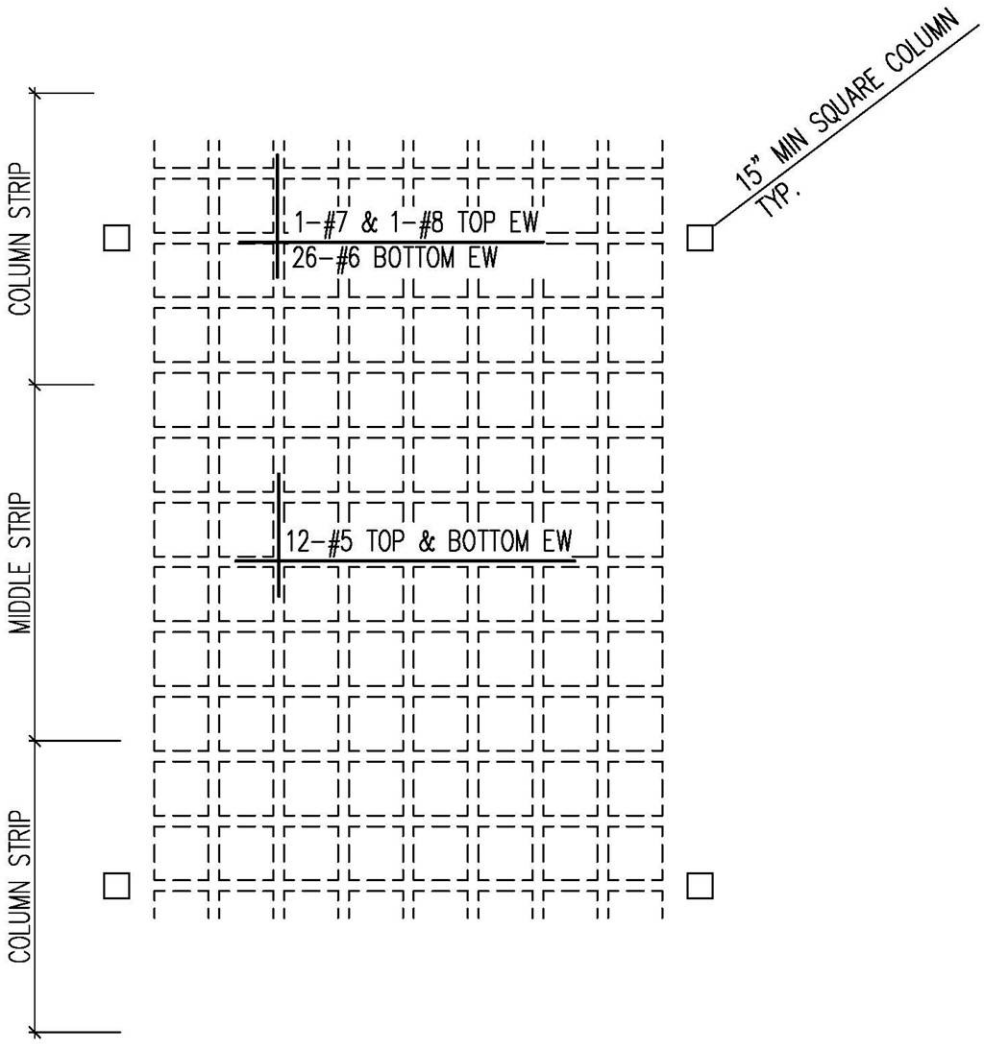
Advantages

- Weight: Lighter weight than traditional solid flat slab construction allows for decreased dead load which minimizes the need to reinforce the existing foundation system. A weight of 147 psf was calculated. (See appendix).
- Depth: Shallow depth allows for minimal floor to floor heights and minimum clearance height for the parking garage.
- Utilities: Relatively easy accommodation of electrical and mechanical equipment.
- Deflection: Very small deflections (See appendix for calculation).
- Vibration: Not an issue.
- Lateral System: Stiff system will adequately resist lateral loads.

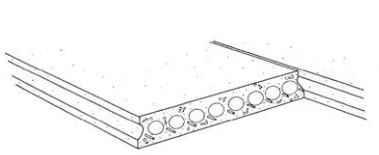
Disadvantages

- Column Size: Large column size may decrease the number of available parking stalls in the garage below.
- Aesthetics: Not preferable to use for 9th floor framing but unimportant for 8th floor framing.
- Constructability: Large amounts of square dome forms may be time consuming.

Figure 7: Waffle Slab Design



HOLLOW-CORE PLANK ON STEEL BEAMS



Online Spancrete load tables were used to design the hollow core precast floor system. Based on a superimposed dead load of 132 psf and a live load of 100 psf, the Ultralight 8" thick 1.0F-8606 T was selected. This was also based on a 15' span, cutting the current bay in half. This seemed to be the most economical selection based on self weight and depth. It is unknown what deflection criteria are used in these load tables. At this time, it was assumed that the extra load capacity was sufficient to limit deflection to L/480. The load table used for this design can be found in the appendix. After designing the hollow core planks, the steel supporting these planks was designed. Simple hand calculations were used. The design was based mainly on moment capacity and deflection. These calculations can also be found in the appendix. The final design of this system is shown in Figure 8. A connection detail is shown in Figure 9.

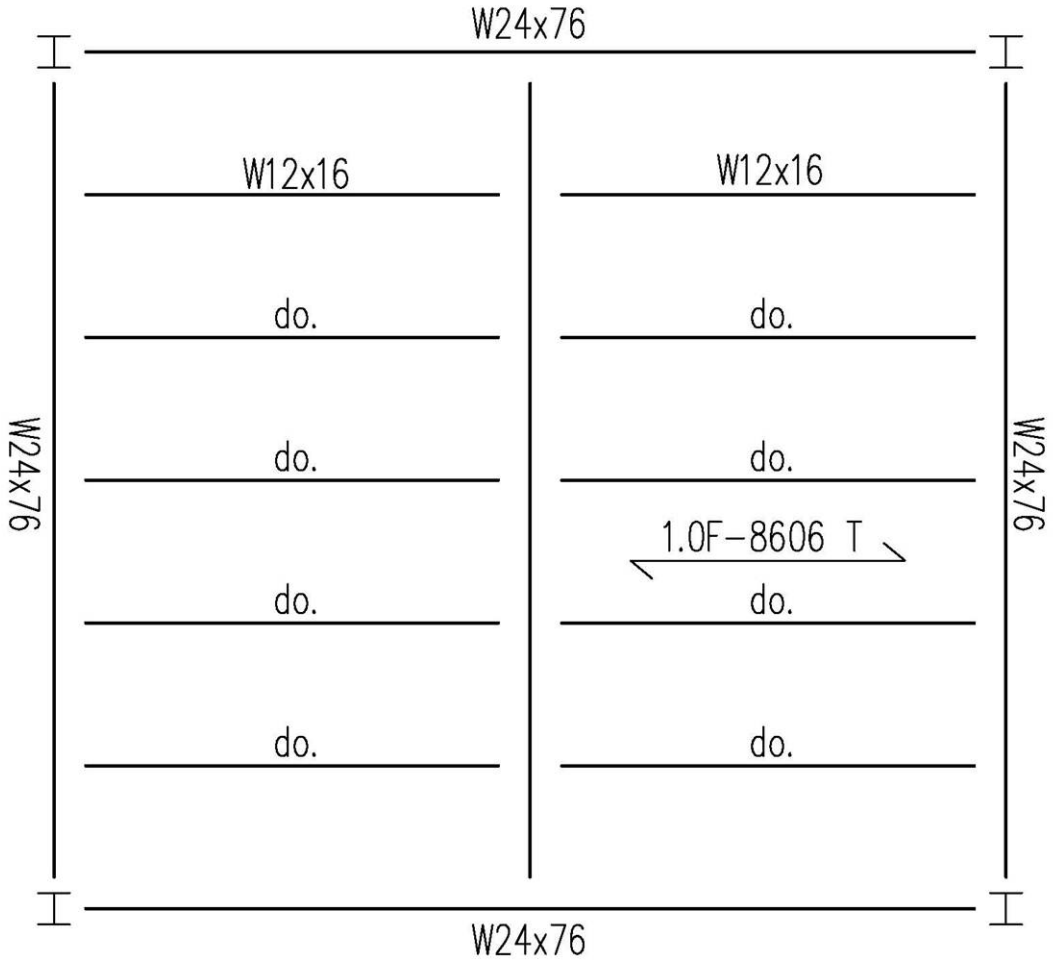
Advantages

- Weight: This system weighs significantly less than a traditional cast-in-place reinforced concrete system because of the hollow cores. The panels themselves weigh 86 psf. Assuming 10 psf for the steel, the complete system only weighs 96 psf.
- Deflection/Vibration: At this point, is it assumed that there will be no significant problem.
- Column Size: Since steel columns could be used with this system, the size could be minimized in order to avoid conflict with the parking layout.

Disadvantages

- Constructability/Lead Time: Each individual panel must be constructed one by one using a crane. This could be very time consuming. Also, since this is a precast system, there may be a long lead time for the manufacturer to design and build the panels.
- Depth/Utilities: The panels themselves only have a depth of 8". However, the steel supporting these panels has a depth of 24". This only leaves 3" to run mechanical and electrical equipment without increasing the floor-to-floor height.
- Fireproofing: Since steel is used to support the panels, spray on fireproofing will be needed.
- Lateral System: Steel supporting the hollow core panels will take all of the lateral loads. This will increase the number of moment connections.

Figure 8: Hollow Core Plank Design



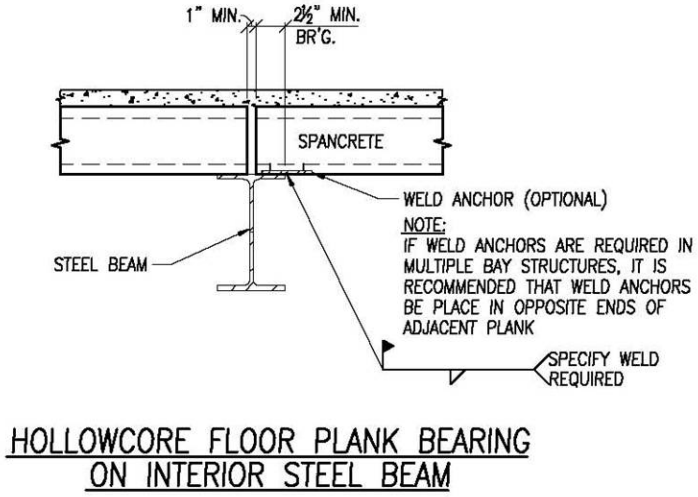
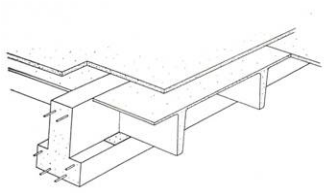


Figure 9: Hollow Core Connection Detail

DOUBLE-T WITH INVERTED T BEAMS



Online Spancrete load tables were used to design the Double T floor system. In order to avoid excess use of precast beams, the designer used a 27' span for the Double Ts. Using a superimposed dead load of 132 psf and a live load of 100 psf, the 8DT20-C88H was selected. It is unknown what deflection criteria are used in these load tables. At this time, it was assumed that the extra load capacity was sufficient to limit deflection to L/480. The Double T load table can be found in the appendix. Based on a total load of 132+75+100 psf = 307 psf, a tributary width of 10', and a span of 27', an inverted T beam was designed using load tables provided by Spancrete. A 30"x36" was selected. These two precast members will meet the connection requirements as seen in Figure 11. See Figure 10 for a framing plan using this Double T design. Using a more in depth design approach, the cast-in-place columns and beams can be designed.

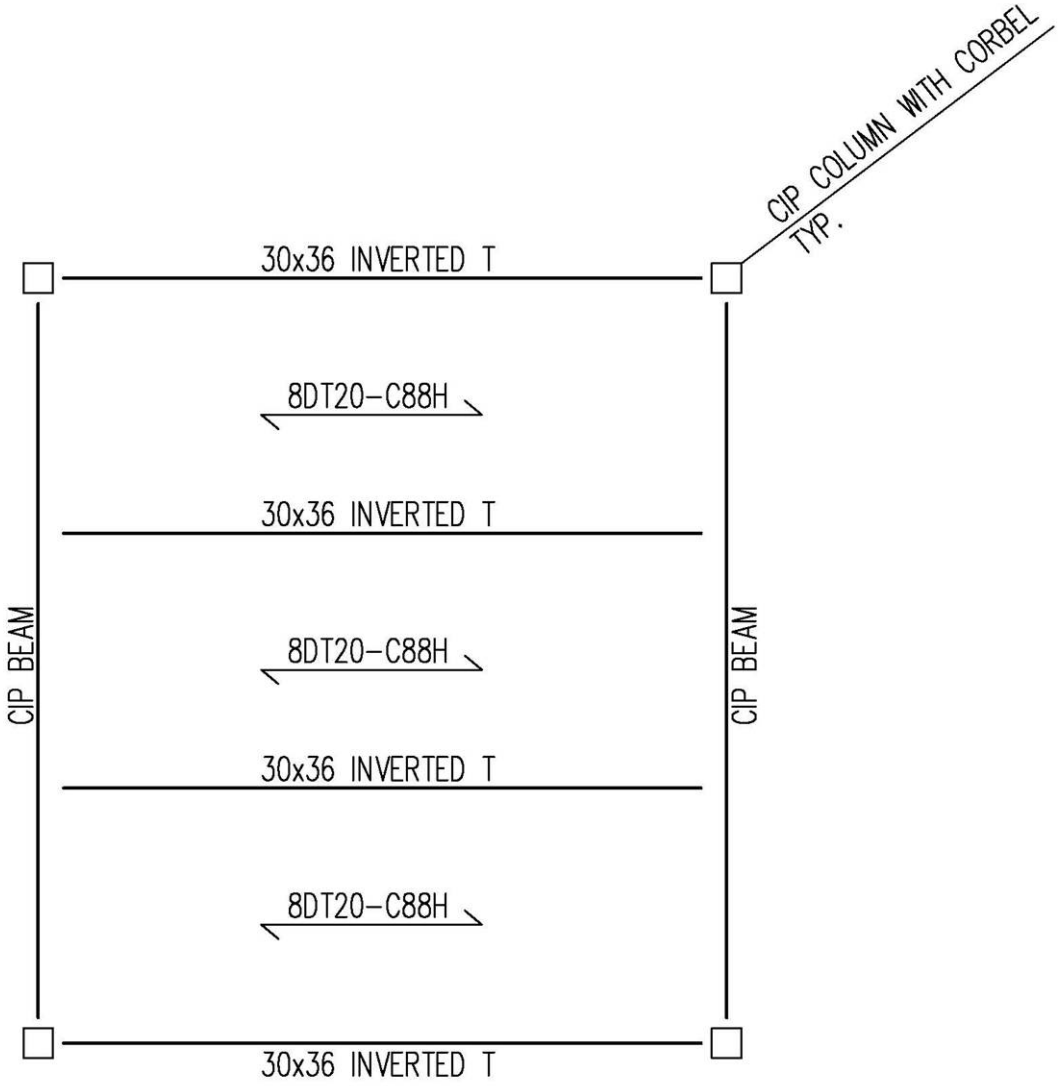
Advantages

- Utilities: The cross section of the Double T system allows for easy access for mechanical and electrical equipment.
- Weight: The Double Ts themselves only weigh 75 psf. It is unknown at this time the exact weight of the inverted T beams; however, it can be concluded that the overall weight of this system is not very high.
- Aesthetics: This system is used frequently when framing parking structures. This makes this system desirable for framing the 8th level. However, it should be noted that the aesthetics of this system may not be desirable for framing the 9th level.
- Fireproofing: Since this is an all concrete system, no additional fireproofing is required.
- Deflection: It is assumed at this point that there will be no deflection problems with this system.

Disadvantages

- Depth: Because of the high superimposed dead load, deep inverted T beams were needed. The total depth of this system is more than the allowable depth as previously described. This means that the floor-to-floor height will need to be increased.
- Constructability/Lead Time: Each individual panel must be constructed one by one using a crane. This could be very time consuming. Also, since this is a precast system, there may be a long lead time for the manufacturer to design and build the panels.
- Column Size: Since the beam width is so large, a large column size will most likely be needed. This will cause problems with the parking layout on the 7th level below.
- Lateral System: This system has very little lateral stability because the way it is constructed.

Figure 10: Double T Design



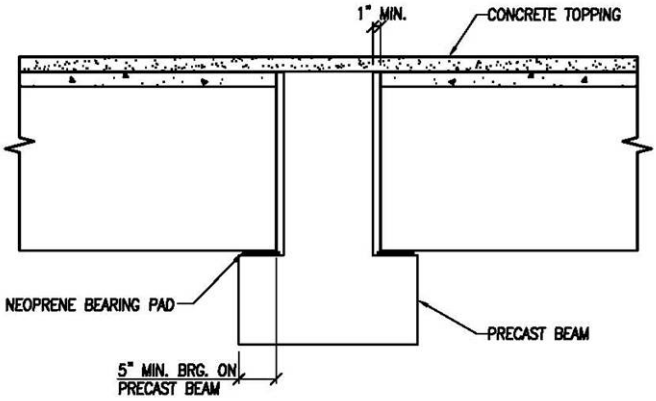
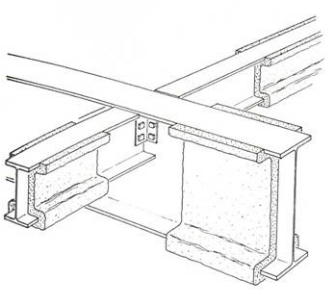


Figure 11: Double T Connection Detail

NON-COMPOSITE STEEL



RAM Structural System was used to design the non-composite steel floor system. The steel code used was LRFD 3rd Edition. The required deflection criterion was taken into consideration when using RAM. The same framing layout used in the original composite design was used for the new non-composite design. As expected, the sizes were increased and camber was needed in some cases. The design of a typical 27' x 30' bay can be found in Figure 12. The lightest weight beams were selected.

Advantages

- Weight: Since this an all steel system, with the exception of the floor slab, the weight is small. It can be estimated that the total weight of the structure can easily be less than 80 psf.
- Aesthetics: This all steel system has a very modern and appealing look to it. It is especially desirable for framing the 9th level.
- Column Size: Since steel columns will be used, the member depths can be limited in order to minimize any interference in the parking layout below.
- Deflection: The requirements were taken into consideration in the design.

Disadvantages

- Depth: Large depth of beams could push the total depth of this system over the limit, depending on the slab thickness. It should be noted that the depth of the members can be limited using RAM; however, this will only increase the weight of the structure.
- Fireproofing**:** Spray-on fireproofing will be needed.
- Efficiency of Design: A non-composite system is not a very efficient design. A concrete slab is necessary anyway for the floor, so it is more practical to use a composite system to help carry the loads.
- Lateral System: Moment frames will be used with this system. Moment frames are not very efficient lateral resisting systems.

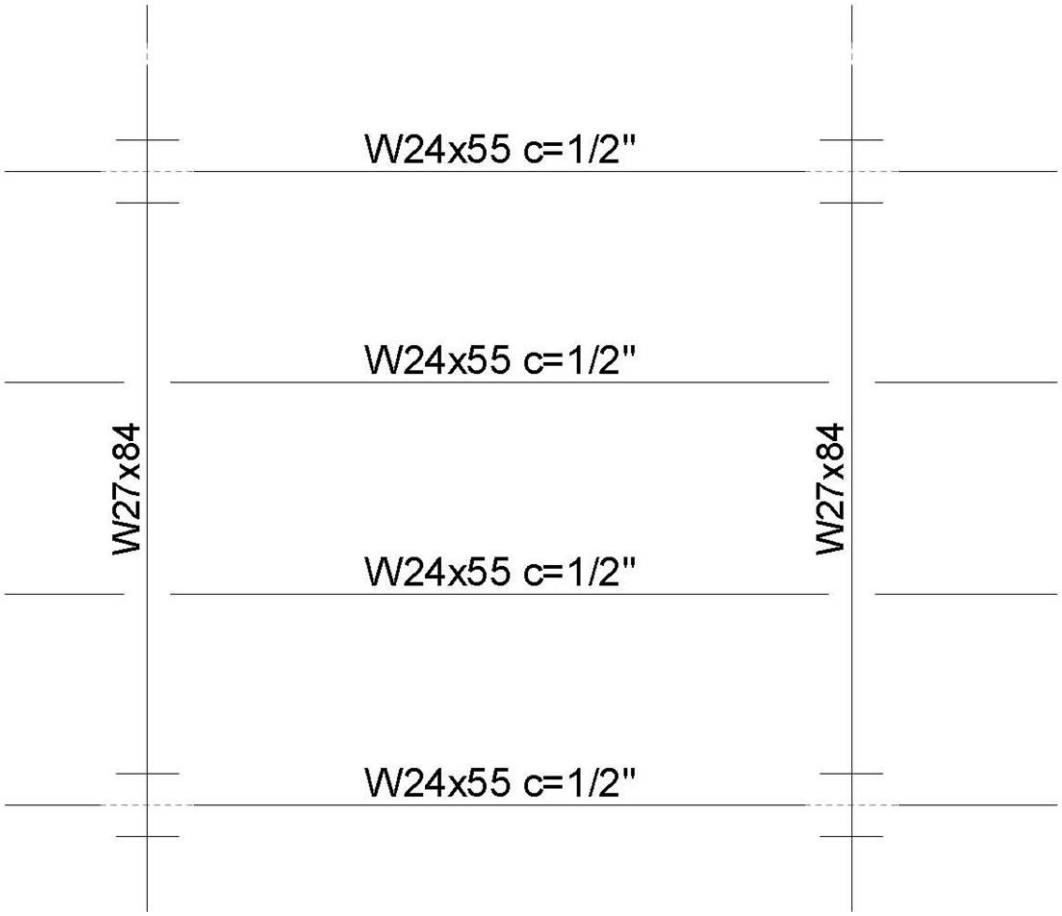
Figure 12: Non-Composite Steel Design

Floor Map

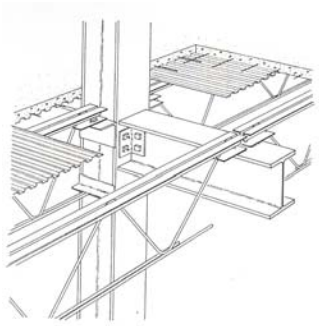
RAM Steel v11.0
Arlington Ice Rink - Rink Area
DataBase: Noncomposite
Building Code: BOCA

10/26/07 13:25:10
Steel Code: ASD 9th Ed.

Floor Type: 8th floor



OPEN-WEB STEEL JOISTS



RAM Structural System was used to design the open web steel joist floor system. The steel code used was LRFD 3rd Edition. The required deflection criterion was taken into consideration when using RAM. The design called for 24LH09 at 3'-0"oc. See Figure 13 for a typical framing plan. Since this is a preliminary design, a vibration analysis was not completed. Vibrations would need to be analyzed in order to make a final conclusion about this alternative framing system.

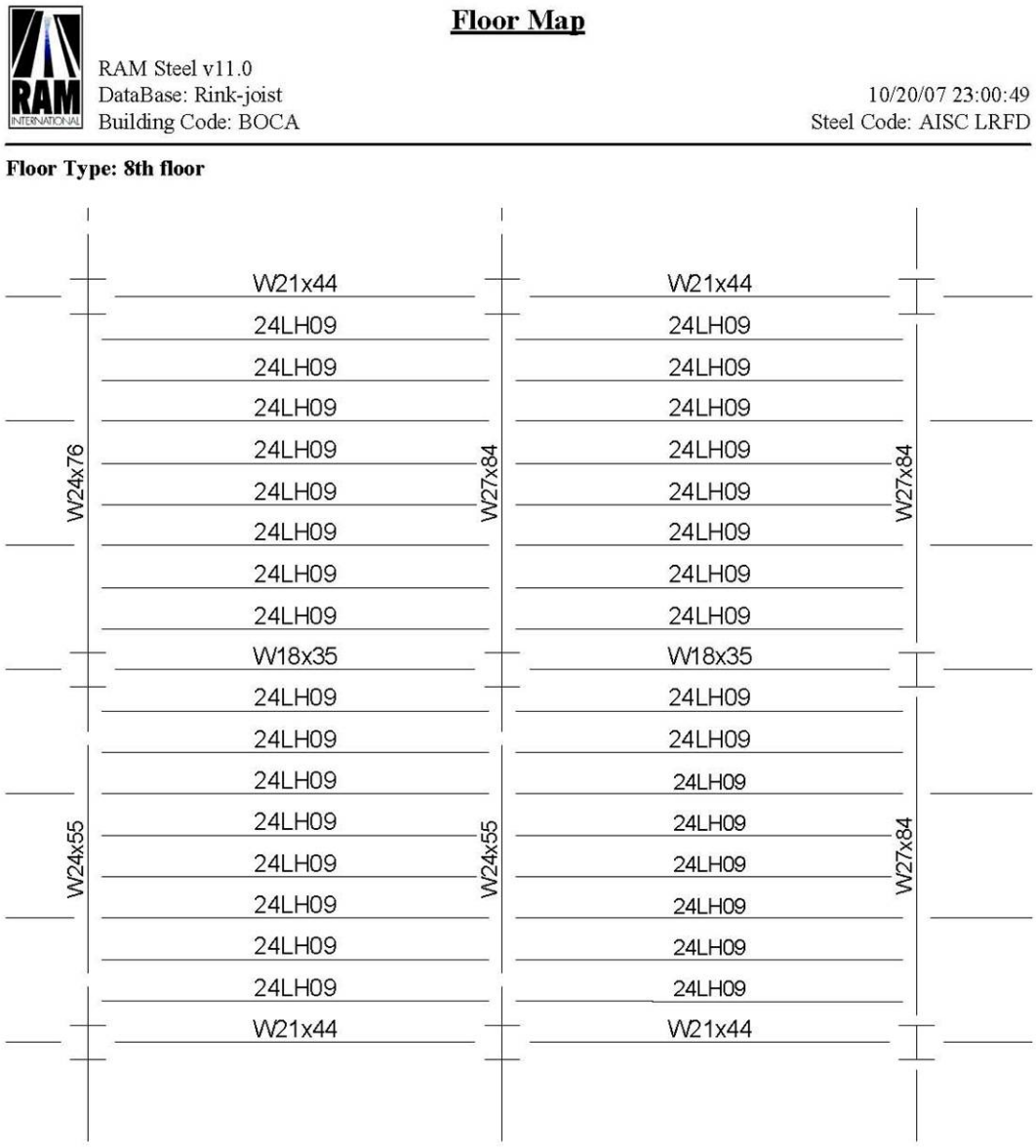
Advantages

- Weight: Extremely light weight (Joists only: 21 plf = 5.6 psf). There will be very little effect on the foundation system from the dead load of this system.
- Depth: 24" depth is within requirements. A total of 11" is allowed for a deck and slab.
- Utilities: Mechanical and electrical equipment can run in between the webs

Disadvantages

- Vibration: Large vibration issues are possible
- Fireproofing: Spray-on fireproofing and/or fire rated paint must be used. Fire rated paint is more feasible since spray-on fireproofing a joist can be extremely messy and uneconomical.
- Constructability: Small spacing could cause some issues during construction.
- Lateral System: Provides little or no lateral resistance. All lateral loads will be carried by wide flanges supporting the joists.

Figure 13: Open Web Steel Joist Design



POST-TENSIONED TWO-WAY SLAB

Since a complete design of a post-tensioned system is beyond my knowledge at this point, a preliminary design and feasibility study was completed. This will help me decide if a full design is logical. The basic design guidelines used were provided by Richard Apple, PE, vice president of Holbert Apple Associates Inc. in Olney, Maryland.

Based on the spans of the Iceplex, a two-way flat plate system with shear caps was determined to be the most practical. Using a span:depth ratio of 40-45, a preliminary depth of 8"-9" was determined. A pre-compression stress of 150-250 psi is typical of this two-way system. It is most efficient to place the uniform tendons in the long direction. This means that the uniform tendons will run in the north-south direction and the banded tendons will run in the east-west direction. See Figure 14 for a sketch of the preliminary design.

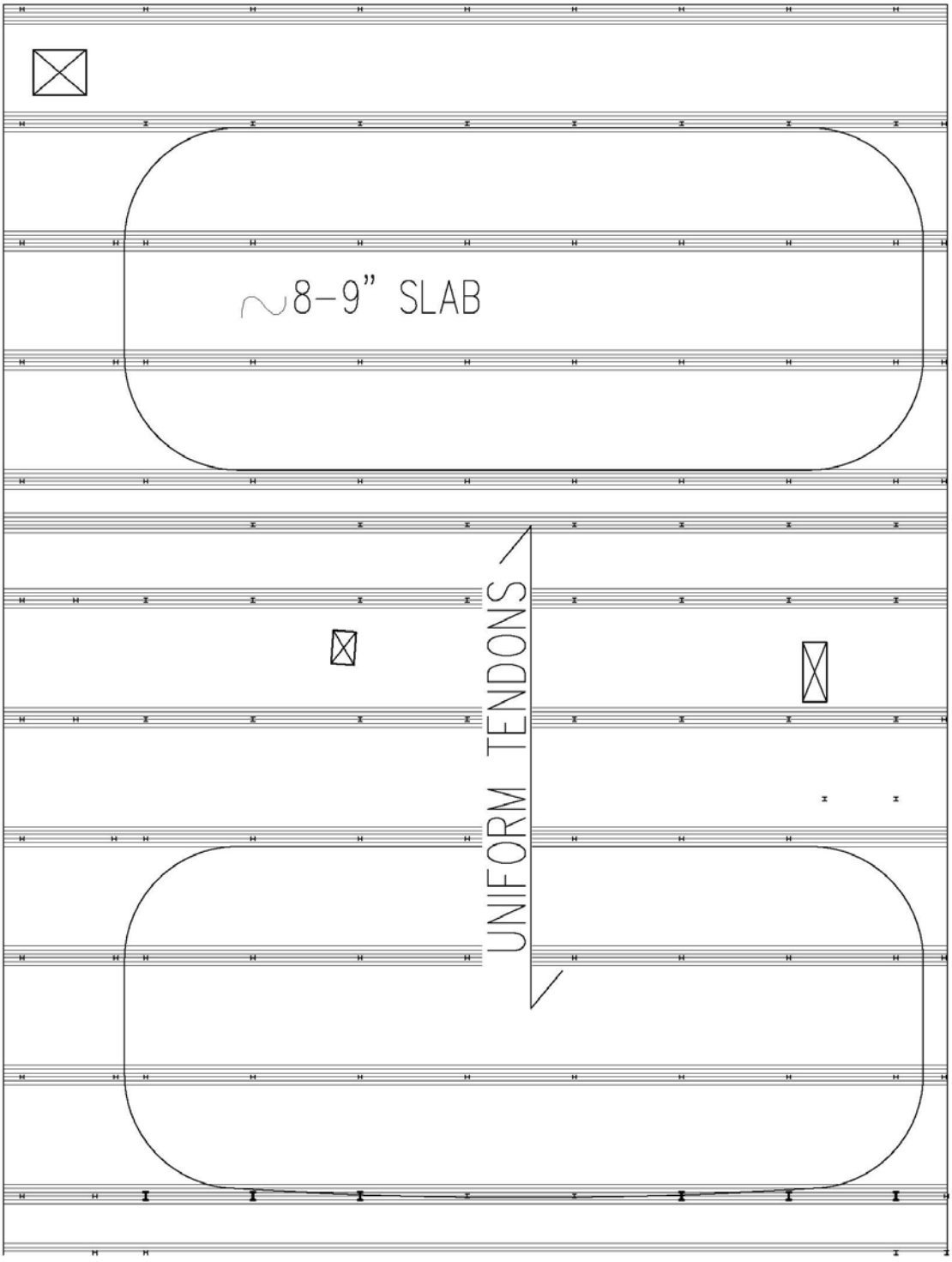
Advantages

- Depth: Because of the high capacity of this system, a very small depth is needed to adequately carry the loads.
- Deflection/Vibration: Very little deflection problems with this system. Vibration resistance is not perfect with this system, but it should be adequate for the Iceplex.
- Fireproofing: No additional fireproofing is needed as long as adequate cover is used.
- Lateral System: A very stiff system provides lateral resistance.
- Cost: Cost is usually lower than traditional mild reinforced concrete systems with spans over 25 feet.

Disadvantages

- Constructability: This is a very dangerous system to construct. It is very time consuming to stress each tendon to the designed amount. Basket weaving tendons in a two-way system can get complicated.
- Weight: The weight of this system could be significant depending on slab thickness and depth of drop caps. A 9" slab with no shear caps using normal weight concrete will weigh 113 psf not including the weight of columns. This has the potential to affect seismic loads and the need to reinforce existing footings.
- Openings: Cutting though a slab to add openings for elevators, mechanical equipment, etc. will affect every span of the tendon in the location of the opening.
- Design: The design of a post-tensioned system is very complicated. Computer software is most likely used to design this system

Figure 14: Post-Tensioned Plan



FEASIBILITY STUDY

Below is a feasibility study comparing all eight floor framing systems including the existing system. This study uses a 1-5 ranking system, with 1 being the lowest score and 5 being the highest score. Ten different criteria were analyzed. These numbers were then added up to get a final score.

	Composite Steel (Existing System)	Two-Way Slab with Beams	Waffle Slab	Hollow Core Planks on Steel Beams	Double T	Non-Composite Steel	Open Web Steel Joists	Post-Tensioned Two-Way Slab
Weight	4	2	3	4	3	4	5	3
Constructability	3	4	2	3	3	4	2	2
Cost	4	4	3	2	4	2	4	5
Depth	3	4	4	2	1	2	4	5
Column Size	4	3	1	4	2	4	5	3
Fire Proofing	2	5	5	5	5	2	1	5
Vibration	2	4	4	4	4	2	1	3
Lateral System	3	4	4	3	1	3	2	4
Aesthetics	5	4	3	5	4	5	3	4
Utilities	4	2	3	3	5	4	5	2
Total	**34**	**36**	**32**	**35**	**32**	**32**	**32**	**36**
Feasible?		**Yes**	**No**	**Yes**	**No**	**No**	**No**	**Yes**

CONCLUSION

The existing 8th floor framing of the Kettler Capitals Iceplex is constructed of composite steel. This report analyzed and designed eight additional framing systems and determined their feasibility. The eight systems analyzed were two-way slab with beams, waffle slab, hollow core planks, double Ts, non-composite steel, open web steel joists, and post-tensioned two-way slab.

Based on the ranking system of the feasibility study, four framing alternatives were eliminated as possibilities: waffle slab, double T, non-composite steel, and steel joists. This left the two-way slab with beams, hollow core planks, and post-tensioned systems as feasible alternatives to the existing composite steel framing. The two-way slab and post-tensioned slab systems' scores were tied. However, since weight and depth are the two most important criteria, it is concluded that the post-tensioned framing system is the most feasible.

Most Feasible Alternative: Post-tensioned two-way slab

APPENDIX

Cost and Assumptions (From RSMeans Assemblies 2007) **Cost/SF**

Composite Steel (Current System) **$22.45**
- A36 Steel (unusual)
- 3000 psi concrete
- light weight concrete
- Fireproofing included
- 30x30 bay
- 200 psf load

Two-Way Slab with Beams **$21.55**
- 30x30 bay
- 200 psf load
- normal weight concrete
- 3000 psi concrete

Waffle Slab **$22.35**
- 30x30 bay
- 200 psf load
- normal weight concrete
- 4000 psi concrete

Precast Plank with 2" Concrete Topping **$23.25**
- 30x30 bay
- 100 psf load
- 5000 psi concrete

Double T with Topping on Precast Beams **$21.89**
- 30x30 bay
- 100 psf load
- 5000 psi concrete

Non-composite Steel + Deck/Concrete **$29.24**
- A36 Steel (unusual)
- Fireproofing included
- 30x30 bay
- 200 psf load

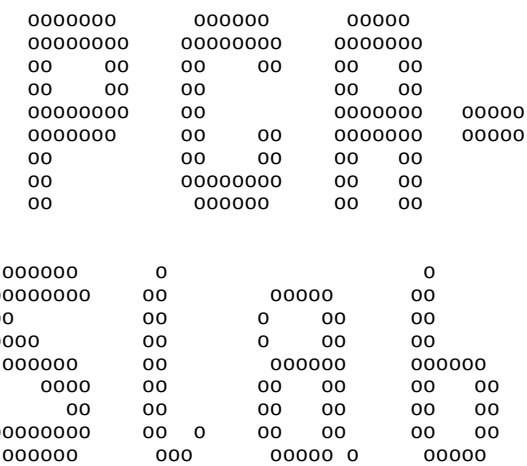
Steel Joists, Beam, and Slab on Columns **$20.55**

- A36 Steel (unusual)
- 3000 psi concrete
- 12’ column height
- 30x30 bay
- 125 psf load

Post-Tensioned Two-Way Slab **$17.00**

- Per reference

Two-Way Slab from PCA-Slab



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A Computer Program Analysis, Design, and Investigation of
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[1] INPUT ECHO

General Information:

File name: P:\Thesis\East-West.slb
Project: Iceplex
Frame: E-W Engineer: Megan Kohut
Code: ACI 318-02 Mode: Design Reinforcement Database: ASTM A615
Number of supports = 9
Floor System: Two-Way

Live load pattern ratio = 75%
Minimum free edge for punching shear = 10 times slab thickness
Deflections are based on cracked section properties.
In negative moment regions, Ig and Mcr DO NOT include flange/slab contribution (if available)
Compression reinforcement calculations NOT selected.

Material Properties:

	Slabs|Beams	Columns	
wc =	110	110	lb/ft3
f'c =	5	5	ksi
Ec =	2692.1	2692.1	ksi
fr =	0.45078	0.45078	ksi

fy = 60 ksi, Bars are not epoxy-coated
fyv = 60 ksi
Es = 29000 ksi

Reinforcement Database:

Units: Db (in), Ab (in^2), Wb (lb/ft)

Size	Db	Ab	Wb	Size	Db	Ab	Wb
#3	0.38	0.11	0.38	#4	0.50	0.20	0.67
#5	0.63	0.31	1.04	#6	0.75	0.44	1.50
#7	0.88	0.60	2.04	#8	1.00	0.79	2.67
#9	1.13	1.00	3.40	#10	1.27	1.27	4.30
#11	1.41	1.56	5.31	#14	1.69	2.25	7.65

#18 2.26 4.00 13.60

Span Data:
==========
Slabs: L1, wL, wR (ft); t, Hmin (in)

Span	Loc	L1	t	wL	wR	Hmin	
1	Int	13.500	12.00	15.000	15.000	5.00	*a
2	Int	27.000	12.00	15.000	15.000	9.87	
3	Int	27.000	12.00	15.000	15.000	9.94	
4	Int	27.000	12.00	15.000	15.000	9.94	
5	Int	27.000	12.00	15.000	15.000	9.94	
6	Int	27.000	12.00	15.000	15.000	9.94	
7	Int	27.000	12.00	15.000	15.000	9.94	
8	Int	27.000	12.00	15.000	15.000	9.87	
9	Int	13.500	12.00	15.000	15.000	5.17	RC

NOTES:
*a- Not a true two-way slab (L2/L1 > 2.0).

Ribs and Longitudinal Beams: b, h, Sp (in)

Span	Ribs b	Ribs h	Ribs Sp	Beams b	Beams h
1	0.00	0.00	0.00	14.00	24.00
2	0.00	0.00	0.00	14.00	24.00
3	0.00	0.00	0.00	14.00	24.00
4	0.00	0.00	0.00	14.00	24.00
5	0.00	0.00	0.00	14.00	24.00
6	0.00	0.00	0.00	14.00	24.00
7	0.00	0.00	0.00	14.00	24.00
8	0.00	0.00	0.00	14.00	24.00
9	0.00	0.00	0.00	14.00	24.00

Support Data:
=============
Columns: c1a, c2a, c1b, c2b (in); Ha, Hb (ft)

Supp	c1a	c2a	Ha	c1b	c2b	Hb	Red%
1	0.00	0.00	0.000	14.00	14.00	11.500	100
2	0.00	0.00	0.000	14.00	14.00	11.500	100
3	0.00	0.00	0.000	14.00	14.00	11.500	100
4	0.00	0.00	0.000	14.00	14.00	11.500	100
5	0.00	0.00	0.000	14.00	14.00	11.500	100
6	0.00	0.00	0.000	14.00	14.00	11.500	100
7	0.00	0.00	0.000	14.00	14.00	11.500	100
8	0.00	0.00	0.000	14.00	14.00	11.500	100
9	0.00	0.00	0.000	14.00	14.00	11.500	100

Drop Panels: h (in); L1, L2, W1, W2 (ft)

Supp	h	L1	L2	W1	W2	
1	6.00	0.000	2.000	2.000	2.000	*c d
2	6.00	2.000	2.000	2.000	2.000	*c d
3	6.00	2.000	2.000	2.000	2.000	*c d
4	6.00	2.000	2.000	2.000	2.000	*c d
5	6.00	2.000	2.000	2.000	2.000	*c d
6	6.00	2.000	2.000	2.000	2.000	*c d
7	6.00	2.000	2.000	2.000	2.000	*c d
8	6.00	2.000	2.000	2.000	2.000	*c d
9	8.00	2.000	2.000	2.000	2.000	*c d

*c- Invalid drop. Drop thickness will not be used for flexural design.
*d- Excessive drop thickness will not be used for flexural design.

Transverse Beams: b, h, Ecc (in)

Supp	b	h	Ecc
1	14.00	24.00	0.00
2	14.00	24.00	0.00
3	14.00	24.00	0.00
4	14.00	24.00	0.00
5	14.00	24.00	0.00
6	14.00	24.00	0.00
7	14.00	24.00	0.00
8	14.00	24.00	0.00
9	14.00	24.00	0.00

Boundary Conditions: Kz (kip/in); Kry (kip-in/rad)

Supp	Spring Kz	Spring Kry	Far End A	Far End B
1	0	0	Fixed	Fixed
2	0	0	Fixed	Fixed
3	0	0	Fixed	Fixed
4	0	0	Fixed	Fixed
5	0	0	Fixed	Fixed
6	0	0	Fixed	Fixed
7	0	0	Fixed	Fixed
8	0	0	Fixed	Fixed

9	0	0	Fixed	Fixed

Load Data:
==========

Load Cases and Combinations:

Case Type	SELF DEAD	Dead DEAD	Live LIVE
U1	1.400	1.400	0.000
U2	1.200	1.200	1.600
U3	1.200	1.200	1.600
U4	1.200	1.200	1.600
U5	1.200	1.200	1.000
U6	1.200	1.200	1.000
U7	0.900	0.900	0.000
U8	0.900	0.900	0.000
U9	1.200	1.200	1.000
U10	1.200	1.200	1.000
U11	0.900	0.900	0.000
U12	0.900	0.900	0.000

Span Loads:

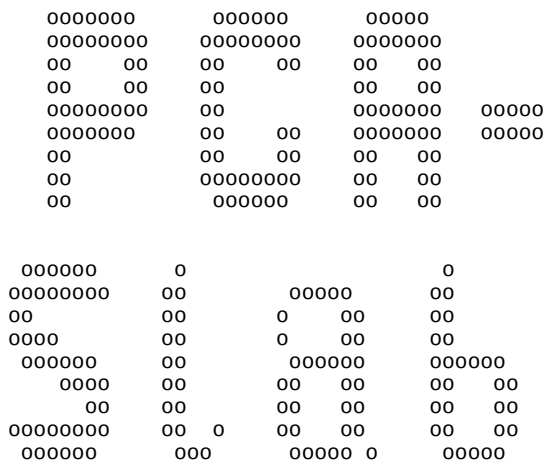
Span	Case	Wa
Area Loads - Wa (lb/ft2):		
1	Dead	132
2	Dead	132
3	Dead	132
4	Dead	132
5	Dead	132
6	Dead	132
7	Dead	132
8	Dead	132
9	Dead	132
9	Live	100
8	Live	100
7	Live	100
6	Live	100
5	Live	100
4	Live	100
3	Live	100
2	Live	100
1	Live	100

Support Loads: --- NONE ---

Support Displacements: --- NONE ---

Reinforcement Criteria:
=======================

	Top bars Min	Top bars Max	Bottom bars Min	Bottom bars Max	Stirrups Min	Stirrups Max	
Slabs and Ribs:							
Bar Size	#5	#8	#5	#8			
Bar spacing	1.00	18.00	1.00	18.00			in
Reinf ratio	0.14	5.00	0.14	5.00			%
Cover	1.00		1.00				in
Beams:							
Bar Size	#5	#8	#5	#8	#3	#5	
Bar spacing	1.00	18.00	1.00	18.00	6.00	18.00	in
Reinf ratio	0.14	5.00	0.14	5.00			%
Cover	1.50		1.50				in



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[2] DESIGN RESULTS

Top Reinforcement:

Units: Width (ft), Mmax (k-ft), Xmax (ft), As (in^2), Sp (in)

Span	Strip	Zone	Width	Mmax	Xmax	AsMin	AsMax	SpReq	AsReq	Bars
1	Column	Left	5.58	3.55	4.900	1.447	15.216	13.400	0.074	5-#5
		Middle	5.58	17.78	8.600	1.447	15.216	13.400	0.371	5-#5
		Right	5.58	33.70	12.917	1.447	15.216	3.941	0.706	17-#5
	Middle	Left	23.25	8.37	4.900	6.026	63.364	13.950	0.174	20-#5
		Middle	23.25	87.66	8.600	6.026	63.364	13.950	1.831	20-#5
		Right	23.25	361.54	12.917	6.026	63.364	11.160	7.656	25-#5
	Beam	Left	1.17	20.14	4.900	0.435	6.601	3.324	0.203	4-#5
		Middle	1.17	100.73	8.600	1.098	6.601	3.324	1.033	4-#5
		Right	1.17	190.99	12.917	1.098	6.601	1.662	2.004	7-#5
2	Column	Left	5.58	236.77	0.583	1.447	15.216	3.941	5.188	17-#5
		Middle	12.33	0.00	13.500	0.000	33.612	0.000	0.000	---
		Right	12.33	323.02	26.417	3.197	33.612	6.435	6.931	23-#5
	Middle	Left	23.25	160.07	0.583	6.026	63.364	11.160	3.355	25-#5
		Middle	16.50	0.00	13.500	0.000	44.968	0.000	0.000	---
		Right	16.50	218.38	26.417	4.277	44.968	13.200	4.612	15-#5
	Beam	Left	1.17	200.48	0.583	1.098	6.601	1.662	2.109	7-#5
		Middle	1.17	0.00	13.500	0.000	6.601	0.000	0.000	---
		Right	1.17	273.51	26.417	1.092	6.564	2.449	2.954	5-#7
3	Column	Left	12.33	321.16	0.583	3.197	33.612	6.435	6.890	23-#5
		Middle	12.33	0.00	13.500	0.000	33.612	0.000	0.000	---
		Right	12.33	297.91	26.417	3.197	33.612	7.048	6.376	21-#5
	Middle	Left	16.50	217.12	0.583	4.277	44.968	13.200	4.585	15-#5
		Middle	16.50	0.00	13.500	0.000	44.968	0.000	0.000	---
		Right	16.50	201.40	26.417	4.277	44.968	14.143	4.248	14-#5
	Beam	Left	1.17	271.94	0.583	1.092	6.564	2.449	2.936	5-#7

		Middle	1.17	0.00	13.500	0.000	6.601	0.000	0.000	---
		Right	1.17	252.25	26.417	1.092	6.564	2.449	2.708	5-#7
	4	Column	Left	12.33	298.39	0.583	3.197	33.612	7.048	6.386	21-#5
			Middle	12.33	0.00	13.500	0.000	33.612	0.000	0.000	---
			Right	12.33	305.36	26.417	3.197	33.612	6.727	6.540	22-#5
		Middle	Left	16.50	201.73	0.583	4.277	44.968	14.143	4.255	14-#5
			Middle	16.50	0.00	13.500	0.000	44.968	0.000	0.000	---
			Right	16.50	206.44	26.417	4.277	44.968	13.200	4.356	15-#5
		Beam	Left	1.17	252.65	0.583	1.092	6.564	2.449	2.713	5-#7
			Middle	1.17	0.00	13.500	0.000	6.601	0.000	0.000	---
			Right	1.17	258.55	26.417	1.092	6.564	2.449	2.781	5-#7
	5	Column	Left	12.33	305.29	0.583	3.197	33.612	6.727	6.539	22-#5
			Middle	12.33	0.00	13.500	0.000	33.612	0.000	0.000	---
			Right	12.33	300.63	26.417	3.197	33.612	7.048	6.436	21-#5
		Middle	Left	16.50	206.39	0.583	4.277	44.968	13.200	4.355	15-#5
			Middle	16.50	0.00	13.500	0.000	44.968	0.000	0.000	---
			Right	16.50	203.24	26.417	4.277	44.968	14.143	4.287	14-#5
		Beam	Left	1.17	258.50	0.583	1.092	6.564	2.449	2.780	5-#7
			Middle	1.17	0.00	13.500	0.000	6.601	0.000	0.000	---
			Right	1.17	254.55	26.417	1.092	6.564	2.449	2.735	5-#7
	6	Column	Left	12.33	300.42	0.583	3.197	33.612	7.048	6.431	21-#5
			Middle	12.33	0.00	13.500	0.000	33.612	0.000	0.000	---
			Right	12.33	312.21	26.417	3.197	33.612	6.727	6.691	22-#5
		Middle	Left	16.50	203.10	0.583	4.277	44.968	14.143	4.284	14-#5
			Middle	16.50	0.00	13.500	0.000	44.968	0.000	0.000	---
			Right	16.50	211.07	26.417	4.277	44.968	13.200	4.455	15-#5
		Beam	Left	1.17	254.37	0.583	1.092	6.564	2.449	2.733	5-#7
			Middle	1.17	0.00	13.500	0.000	6.601	0.000	0.000	---
			Right	1.17	264.35	26.417	1.092	6.564	2.449	2.848	5-#7
	7	Column	Left	12.33	313.11	0.583	3.197	33.612	6.727	6.712	22-#5
			Middle	12.33	0.00	13.500	0.000	33.612	0.000	0.000	---
			Right	12.33	286.71	26.417	3.197	33.612	7.400	6.129	20-#5
		Middle	Left	16.50	211.68	0.583	4.277	44.968	13.200	4.468	15-#5
			Middle	16.50	0.00	13.500	0.000	44.968	0.000	0.000	---
			Right	16.50	193.83	26.417	4.277	44.968	14.143	4.086	14-#5
		Beam	Left	1.17	265.12	0.583	1.092	6.564	2.449	2.857	5-#7
			Middle	1.17	0.00	13.500	0.000	6.601	0.000	0.000	---
			Right	1.17	242.76	26.417	1.095	6.582	1.977	2.591	6-#6
	8	Column	Left	12.33	285.38	0.583	3.197	33.612	7.400	6.100	20-#5
			Middle	12.33	56.27	17.375	3.197	33.612	13.455	1.176	11-#5
			Right	12.33	541.68	26.417	3.197	33.612	3.289	11.894	45-#5
		Middle	Left	16.50	192.94	0.583	4.277	44.968	14.143	4.067	14-#5
			Middle	16.50	16.84	17.375	4.277	44.968	14.143	0.351	14-#5
			Right	16.50	75.61	26.417	4.277	44.968	14.143	1.580	14-#5
		Beam	Left	1.17	241.64	0.583	1.095	6.582	1.977	2.578	6-#6
			Middle	1.17	47.65	17.375	0.644	6.582	9.884	0.484	2-#6
			Right	1.17	458.65	26.417	1.095	6.582	1.977	5.230	12-#6 2L
	9	Column	Left	12.33	625.82	0.583	3.197	33.612	3.289	13.871	45-#5
			Middle	12.33	264.41	5.104	3.197	33.612	3.289	5.640	45-#5
			Right	12.33	76.66	8.979	3.197	33.612	3.289	1.606	45-#5
		Middle	Left	16.50	74.76	0.583	4.277	44.968	14.143	1.563	14-#5
			Middle	16.50	31.59	5.104	4.277	44.968	14.143	0.658	14-#5
			Right	16.50	9.16	8.979	4.277	44.968	14.143	0.191	14-#5
		Beam	Left	1.17	439.68	0.583	1.095	6.582	1.977	4.982	12-#6 2L
			Middle	1.17	185.76	5.104	1.095	6.582	1.977	1.953	12-#6
			Right	1.17	53.86	8.979	0.729	6.582	1.977	0.548	12-#6

Top Bar Details:
==========

Units: Length (ft)

Span	Strip	Left Bars	Left Length	Left Bars	Left Length	Continuous Bars	Continuous Length	Right Bars	Right Length	Right Bars	Right Length
1	Column	---		---		5-#5	13.50	6-#5	4.65	6-#5	3.05
	Middle	---		---		20-#5	13.50	5-#5	3.30	---	
	Beam	---		---		4-#5	13.50	3-#5	5.89	---	
2	Column	9-#5	9.11	8-#5	5.75	---		12-#5	9.36	11-#5	5.75
	Middle	25-#5	6.86	---		---		15-#5	9.36	---	

	Beam	4-#5	7.19	3-#5	4.04	---		3-#7	11.02	2-#7	5.61
3	Column	12-#5	9.61	11-#5	5.75	---		11-#5	9.61	10-#5	5.75
	Middle	15-#5	9.61	---		---		14-#5	9.61	---	
	Beam	3-#7	11.25	2-#7	5.63	---		3-#7	10.99	2-#7	5.08
4	Column	11-#5	9.36	10-#5	5.75	---		11-#5	9.61	11-#5	5.75
	Middle	14-#5	9.36	---		---		15-#5	9.61	---	
	Beam	3-#7	10.75	2-#7	5.08	---		3-#7	11.07	2-#7	5.23
5	Column	11-#5	9.61	11-#5	5.75	---		11-#5	9.61	10-#5	5.75
	Middle	15-#5	9.61	---		---		14-#5	9.61	---	
	Beam	3-#7	11.07	2-#7	5.23	---		3-#7	11.02	2-#7	5.13
6	Column	11-#5	9.61	10-#5	5.75	---		11-#5	9.86	11-#5	5.75
	Middle	14-#5	9.61	---		---		15-#5	9.86	---	
	Beam	3-#7	11.02	2-#7	5.13	---		3-#7	11.40	2-#7	5.40
7	Column	11-#5	9.36	11-#5	5.75	---		11-#5	9.11	9-#5	5.75
	Middle	15-#5	9.36	---		---		14-#5	9.11	---	
	Beam	3-#7	10.91	2-#7	5.39	---		3-#6	9.87	3-#6	5.22
8	Column	9-#5	9.11	---		11-#5	27.00	17-#5	9.11	17-#5	5.75
	Middle	---		---		14-#5	27.00	---		---	
	Beam	2-#6	6.31	2-#6	4.43	2-#6	27.00	5-#6	10.44	5-#6	5.23
9	Column	---		---		45-#5	13.50	---		---	
	Middle	---		---		14-#5	13.50	---		---	
	Beam	---		---		12-#6	13.50	---		---	

Bottom Reinforcement:
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Units: Width (ft), Mmax (k-ft), Xmax (ft), As (in^2), Sp (in)

Span	Strip	Width	Mmax	Xmax	AsMin	AsMax	SpReq	AsReq	Bars
1	Column	5.58	6.28	4.250	1.447	15.216	13.400	0.131	5-#5
	Middle	23.25	67.33	4.250	6.026	63.364	13.950	1.405	20-#5
	Beam	1.17	35.57	4.250	0.478	6.601	9.972	0.359	2-#5
2	Column	12.33	162.17	13.250	3.197	33.612	12.333	3.424	12-#5
	Middle	16.50	152.28	13.250	4.277	44.968	14.143	3.200	14-#5
	Beam	1.17	137.32	13.250	1.098	6.601	2.493	1.421	5-#5
3	Column	12.33	150.50	13.750	3.197	33.612	13.455	3.174	11-#5
	Middle	16.50	141.32	13.750	4.277	44.968	14.143	2.968	14-#5
	Beam	1.17	127.43	13.750	1.098	6.601	2.493	1.316	5-#5
4	Column	12.33	158.28	13.500	3.197	33.612	13.455	3.341	11-#5
	Middle	16.50	148.62	13.500	4.277	44.968	14.143	3.123	14-#5
	Beam	1.17	134.02	13.500	1.098	6.601	2.493	1.386	5-#5
5	Column	12.33	158.38	13.500	3.197	33.612	13.455	3.343	11-#5
	Middle	16.50	148.72	13.500	4.277	44.968	14.143	3.125	14-#5
	Beam	1.17	134.11	13.500	1.098	6.601	2.493	1.387	5-#5
6	Column	12.33	157.00	13.500	3.197	33.612	13.455	3.313	11-#5
	Middle	16.50	147.42	13.500	4.277	44.968	14.143	3.097	14-#5
	Beam	1.17	132.93	13.500	1.098	6.601	2.493	1.374	5-#5
7	Column	12.33	170.61	14.000	3.197	33.612	12.333	3.605	12-#5
	Middle	16.50	160.20	14.000	4.277	44.968	14.143	3.369	14-#5
	Beam	1.17	144.46	14.000	1.098	6.601	2.493	1.498	5-#5
8	Column	12.33	143.26	13.000	3.197	33.612	13.455	3.019	11-#5
	Middle	16.50	134.52	13.000	4.277	44.968	14.143	2.824	14-#5
	Beam	1.17	121.30	13.000	1.098	6.601	2.493	1.250	5-#5
9	Column	12.33	0.00	13.500	0.000	33.612	0.000	0.000	---
	Middle	16.50	0.00	13.500	0.000	44.968	0.000	0.000	---
	Beam	1.17	0.00	13.500	0.000	6.601	0.000	0.000	---

Bottom Bar Details:
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Units: Start (ft), Length (ft)

Span	Strip	Long Bars			Short Bars		
		Bars	Start	Length	Bars	Start	Length
1	Column	5-#5	0.00	13.50	---		
	Middle	20-#5	0.00	13.50	---		
	Beam	2-#5	0.00	13.50	---		
2	Column	12-#5	0.00	27.00	---		
	Middle	14-#5	0.00	27.00	---		
	Beam	4-#5	0.00	27.00	1-#5	8.52	9.69
3	Column	11-#5	0.00	27.00	---		
	Middle	14-#5	0.00	27.00	---		

	Beam	4-#5	0.00	27.00	1-#5	9.96	7.57
4	Column	11-#5	0.00	27.00	---		
	Middle	14-#5	0.00	27.00	---		
	Beam	4-#5	0.00	27.00	1-#5	8.95	9.07
5	Column	11-#5	0.00	27.00	---		
	Middle	14-#5	0.00	27.00	---		
	Beam	4-#5	0.00	27.00	1-#5	9.00	9.09
6	Column	11-#5	0.00	27.00	---		
	Middle	14-#5	0.00	27.00	---		
	Beam	4-#5	0.00	27.00	1-#5	9.04	8.85
7	Column	12-#5	0.00	27.00	---		
	Middle	14-#5	0.00	27.00	---		
	Beam	4-#5	0.00	27.00	1-#5	8.47	10.84
8	Column	11-#5	0.00	27.00	---		
	Middle	14-#5	0.00	27.00	---		
	Beam	4-#5	0.00	27.00	1-#5	10.45	16.55
9	Column	---			---		
	Middle	---			---		
	Beam	---			---		

Flexural Capacity:
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Units: From, To (ft), As (in^2), PhiMn (k-ft)

Span	Strip	From	To	AsTop	AsBot	PhiMn-	PhiMn+
1	Column	0.000	0.583	1.55	1.55	-73.41	73.41
		0.583	4.900	1.55	1.55	-73.41	73.41
		4.900	6.750	1.55	1.55	-73.41	73.41
		6.750	8.600	1.55	1.55	-73.41	73.41
		8.600	8.846	1.55	1.55	-73.41	73.41
		8.846	9.846	1.55	1.55	-73.41	73.41
		9.846	10.449	3.41	1.55	-158.49	73.41
		10.449	11.449	3.41	1.55	-158.49	73.41
		11.449	12.917	5.27	1.55	-240.29	73.41
		12.917	13.500	5.27	1.55	-240.29	73.41
	Middle	0.000	0.583	6.20	6.20	-293.80	293.80
		0.583	4.900	6.20	6.20	-293.80	293.80
		4.900	6.750	6.20	6.20	-293.80	293.80
		6.750	8.600	6.20	6.20	-293.80	293.80
		8.600	10.203	6.20	6.20	-293.80	293.80
		10.203	11.450	6.20	6.20	-293.80	293.80
		11.450	12.917	7.75	6.20	-365.89	293.80
		12.917	13.500	7.75	6.20	-365.89	293.80
	Beam	0.000	0.583	1.24	0.62	-120.32	61.03
		0.583	4.900	1.24	0.62	-120.32	61.03
		4.900	6.750	1.24	0.62	-120.32	61.03
		6.750	7.607	1.24	0.62	-120.32	61.03
		7.607	8.600	1.24	0.62	-120.32	61.03
		8.600	9.449	1.24	0.62	-120.32	61.03
		9.449	12.917	2.17	0.62	-205.98	61.03
		12.917	13.500	2.17	0.62	-205.98	61.03
2	Column	0.000	0.583	5.27	3.72	-240.29	175.94
		0.583	4.507	5.27	3.72	-240.29	175.94
		4.507	5.751	2.79	3.72	-130.49	175.94
		5.751	7.866	2.79	3.72	-130.49	175.94
		7.866	9.109	0.00	3.72	0.00	175.94
		9.109	9.625	0.00	3.72	0.00	175.94
		9.625	13.500	0.00	3.72	0.00	175.94
		13.500	17.375	0.00	3.72	0.00	175.94
		17.375	17.636	0.00	3.72	0.00	175.94
		17.636	18.863	0.00	3.72	0.00	175.94
		18.863	21.249	3.72	3.72	-175.94	175.94
		21.249	22.477	3.72	3.72	-175.94	175.94
		22.477	26.417	7.13	3.72	-332.00	175.94
		26.417	27.000	7.13	3.72	-332.00	175.94
	Middle	0.000	0.583	7.75	4.34	-365.89	205.71
		0.583	5.864	7.75	4.34	-365.89	205.71
		5.864	6.864	0.00	4.34	0.00	205.71
		6.864	9.625	0.00	4.34	0.00	205.71
		9.625	13.500	0.00	4.34	0.00	205.71
		13.500	17.375	0.00	4.34	0.00	205.71
		17.375	17.636	0.00	4.34	0.00	205.71
		17.636	18.888	0.00	4.34	0.00	205.71
		18.888	26.417	4.65	4.34	-220.17	205.71
		26.417	27.000	4.65	4.34	-220.17	205.71
	Beam	0.000	0.583	2.17	1.24	-205.98	120.32
		0.583	2.097	2.17	1.24	-205.98	120.32
		2.097	4.035	1.24	1.24	-120.32	120.32
		4.035	5.250	1.24	1.24	-120.32	120.32
		5.250	7.188	0.00	1.24	0.00	120.32

	7.188	8.525	0.00	1.24	0.00	120.32
	8.525	9.625	0.00	1.24	0.00	120.32
	9.625	9.744	0.00	1.24	0.00	120.32
	9.744	13.500	0.00	1.55	0.00	149.31
	13.500	15.984	0.00	1.55	0.00	149.31
	15.984	16.994	0.00	1.55	0.00	149.31
	16.994	17.375	0.00	1.24	0.00	120.32
	17.375	18.213	0.00	1.24	0.00	120.32
	18.213	19.250	0.00	1.24	0.00	120.32
	19.250	21.391	1.80	1.24	-171.35	120.32
	21.391	24.657	1.80	1.24	-171.35	120.32
	24.657	26.417	3.00	1.24	-277.42	120.32
	26.417	27.000	3.00	1.24	-277.42	120.32
3 Column	0.000	0.583	7.13	3.41	-332.00	161.50
	0.583	4.530	7.13	3.41	-332.00	161.50
	4.530	5.751	3.72	3.41	-175.94	161.50
	5.751	8.394	3.72	3.41	-175.94	161.50
	8.394	9.614	0.00	3.41	0.00	161.50
	9.614	9.625	0.00	3.41	0.00	161.50
	9.625	13.500	0.00	3.41	0.00	161.50
	13.500	17.375	0.00	3.41	0.00	161.50
	17.375	17.386	0.00	3.41	0.00	161.50
	17.386	18.622	0.00	3.41	0.00	161.50
	18.622	21.249	3.41	3.41	-161.50	161.50
	21.249	22.486	3.41	3.41	-161.50	161.50
	22.486	26.417	6.51	3.41	-303.99	161.50
	26.417	27.000	6.51	3.41	-303.99	161.50
Middle	0.000	0.583	4.65	4.34	-220.17	205.71
	0.583	8.369	4.65	4.34	-220.17	205.71
	8.369	9.614	0.00	4.34	0.00	205.71
	9.614	9.625	0.00	4.34	0.00	205.71
	9.625	13.500	0.00	4.34	0.00	205.71
	13.500	17.375	0.00	4.34	0.00	205.71
	17.375	17.386	0.00	4.34	0.00	205.71
	17.386	18.621	0.00	4.34	0.00	205.71
	18.621	26.417	4.34	4.34	-205.71	205.71
	26.417	27.000	4.34	4.34	-205.71	205.71
Beam	0.000	0.583	3.00	1.24	-277.42	120.32
	0.583	2.383	3.00	1.24	-277.42	120.32
	2.383	5.629	1.80	1.24	-171.35	120.32
	5.629	8.000	1.80	1.24	-171.35	120.32
	8.000	9.625	0.00	1.24	0.00	120.32
	9.625	9.965	0.00	1.24	0.00	120.32
	9.965	11.093	0.00	1.24	0.00	120.32
	11.093	11.245	0.00	1.55	0.00	149.31
	11.245	13.500	0.00	1.55	0.00	149.31
	13.500	16.006	0.00	1.55	0.00	149.31
	16.006	16.404	0.00	1.55	0.00	149.31
	16.404	17.375	0.00	1.24	0.00	120.32
	17.375	17.533	0.00	1.24	0.00	120.32
	17.533	19.000	0.00	1.24	0.00	120.32
	19.000	21.919	1.80	1.24	-171.35	120.32
	21.919	24.912	1.80	1.24	-171.35	120.32
	24.912	26.417	3.00	1.24	-277.42	120.32
	26.417	27.000	3.00	1.24	-277.42	120.32
4 Column	0.000	0.583	6.51	3.41	-303.99	161.50
	0.583	4.512	6.51	3.41	-303.99	161.50
	4.512	5.751	3.41	3.41	-161.50	161.50
	5.751	8.126	3.41	3.41	-161.50	161.50
	8.126	9.364	0.00	3.41	0.00	161.50
	9.364	9.625	0.00	3.41	0.00	161.50
	9.625	13.500	0.00	3.41	0.00	161.50
	13.500	17.375	0.00	3.41	0.00	161.50
	17.375	17.386	0.00	3.41	0.00	161.50
	17.386	18.596	0.00	3.41	0.00	161.50
	18.596	21.249	3.41	3.41	-161.50	161.50
	21.249	22.460	3.41	3.41	-161.50	161.50
	22.460	26.417	6.82	3.41	-318.02	161.50
	26.417	27.000	6.82	3.41	-318.02	161.50
Middle	0.000	0.583	4.34	4.34	-205.71	205.71
	0.583	8.127	4.34	4.34	-205.71	205.71
	8.127	9.364	0.00	4.34	0.00	205.71
	9.364	9.625	0.00	4.34	0.00	205.71
	9.625	13.500	0.00	4.34	0.00	205.71
	13.500	17.375	0.00	4.34	0.00	205.71
	17.375	17.386	0.00	4.34	0.00	205.71
	17.386	18.568	0.00	4.34	0.00	205.71
	18.568	26.417	4.65	4.34	-220.17	205.71
	26.417	27.000	4.65	4.34	-220.17	205.71
Beam	0.000	0.583	3.00	1.24	-277.42	120.32
	0.583	2.082	3.00	1.24	-277.42	120.32
	2.082	5.081	1.80	1.24	-171.35	120.32
	5.081	7.750	1.80	1.24	-171.35	120.32
	7.750	8.952	0.00	1.24	0.00	120.32
	8.952	9.625	0.00	1.24	0.00	120.32

	9.625	10.141	0.00	1.24	0.00	120.32
	10.141	10.749	0.00	1.55	0.00	149.31
	10.749	13.500	0.00	1.55	0.00	149.31
	13.500	15.926	0.00	1.55	0.00	149.31
	15.926	16.835	0.00	1.55	0.00	149.31
	16.835	17.375	0.00	1.24	0.00	120.32
	17.375	18.024	0.00	1.24	0.00	120.32
	18.024	19.000	0.00	1.24	0.00	120.32
	19.000	21.773	1.80	1.24	-171.35	120.32
	21.773	24.847	1.80	1.24	-171.35	120.32
	24.847	26.417	3.00	1.24	-277.42	120.32
	26.417	27.000	3.00	1.24	-277.42	120.32
5 Column	0.000	0.583	6.82	3.41	-318.02	161.50
	0.583	4.540	6.82	3.41	-318.02	161.50
	4.540	5.751	3.41	3.41	-161.50	161.50
	5.751	8.404	3.41	3.41	-161.50	161.50
	8.404	9.614	0.00	3.41	0.00	161.50
	9.614	9.625	0.00	3.41	0.00	161.50
	9.625	13.500	0.00	3.41	0.00	161.50
	13.500	17.375	0.00	3.41	0.00	161.50
	17.375	17.386	0.00	3.41	0.00	161.50
	17.386	18.634	0.00	3.41	0.00	161.50
	18.634	21.249	3.41	3.41	-161.50	161.50
	21.249	22.498	3.41	3.41	-161.50	161.50
	22.498	26.417	6.51	3.41	-303.99	161.50
	26.417	27.000	6.51	3.41	-303.99	161.50
Middle	0.000	0.583	4.65	4.34	-220.17	205.71
	0.583	8.432	4.65	4.34	-220.17	205.71
	8.432	9.614	0.00	4.34	0.00	205.71
	9.614	9.625	0.00	4.34	0.00	205.71
	9.625	13.500	0.00	4.34	0.00	205.71
	13.500	17.375	0.00	4.34	0.00	205.71
	17.375	17.386	0.00	4.34	0.00	205.71
	17.386	18.633	0.00	4.34	0.00	205.71
	18.633	26.417	4.34	4.34	-205.71	205.71
	26.417	27.000	4.34	4.34	-205.71	205.71
Beam	0.000	0.583	3.00	1.24	-277.42	120.32
	0.583	2.154	3.00	1.24	-277.42	120.32
	2.154	5.227	1.80	1.24	-171.35	120.32
	5.227	8.000	1.80	1.24	-171.35	120.32
	8.000	9.001	0.00	1.24	0.00	120.32
	9.001	9.625	0.00	1.24	0.00	120.32
	9.625	10.191	0.00	1.24	0.00	120.32
	10.191	11.073	0.00	1.55	0.00	149.31
	11.073	13.500	0.00	1.55	0.00	149.31
	13.500	15.977	0.00	1.55	0.00	149.31
	15.977	16.903	0.00	1.55	0.00	149.31
	16.903	17.375	0.00	1.24	0.00	120.32
	17.375	18.092	0.00	1.24	0.00	120.32
	18.092	19.000	0.00	1.24	0.00	120.32
	19.000	21.868	1.80	1.24	-171.35	120.32
	21.868	24.891	1.80	1.24	-171.35	120.32
	24.891	26.417	3.00	1.24	-277.42	120.32
	26.417	27.000	3.00	1.24	-277.42	120.32
6 Column	0.000	0.583	6.51	3.41	-303.99	161.50
	0.583	4.503	6.51	3.41	-303.99	161.50
	4.503	5.751	3.41	3.41	-161.50	161.50
	5.751	8.367	3.41	3.41	-161.50	161.50
	8.367	9.614	0.00	3.41	0.00	161.50
	9.614	9.625	0.00	3.41	0.00	161.50
	9.625	13.500	0.00	3.41	0.00	161.50
	13.500	17.136	0.00	3.41	0.00	161.50
	17.136	17.375	0.00	3.41	0.00	161.50
	17.375	18.374	0.00	3.41	0.00	161.50
	18.374	21.249	3.41	3.41	-161.50	161.50
	21.249	22.488	3.41	3.41	-161.50	161.50
	22.488	26.417	6.82	3.41	-318.02	161.50
	26.417	27.000	6.82	3.41	-318.02	161.50
Middle	0.000	0.583	4.34	4.34	-205.71	205.71
	0.583	8.368	4.34	4.34	-205.71	205.71
	8.368	9.614	0.00	4.34	0.00	205.71
	9.614	9.625	0.00	4.34	0.00	205.71
	9.625	13.500	0.00	4.34	0.00	205.71
	13.500	17.136	0.00	4.34	0.00	205.71
	17.136	17.375	0.00	4.34	0.00	205.71
	17.375	18.345	0.00	4.34	0.00	205.71
	18.345	26.417	4.65	4.34	-220.17	205.71
	26.417	27.000	4.65	4.34	-220.17	205.71
Beam	0.000	0.583	3.00	1.24	-277.42	120.32
	0.583	2.111	3.00	1.24	-277.42	120.32
	2.111	5.132	1.80	1.24	-171.35	120.32
	5.132	8.000	1.80	1.24	-171.35	120.32
	8.000	9.038	0.00	1.24	0.00	120.32
	9.038	9.625	0.00	1.24	0.00	120.32
	9.625	10.217	0.00	1.24	0.00	120.32

		10.217	11.021	0.00	1.55	0.00	149.31
		11.021	13.500	0.00	1.55	0.00	149.31
		13.500	15.602	0.00	1.55	0.00	149.31
		15.602	16.714	0.00	1.55	0.00	149.31
		16.714	17.375	0.00	1.24	0.00	120.32
		17.375	17.893	0.00	1.24	0.00	120.32
		17.893	18.750	0.00	1.24	0.00	120.32
		18.750	21.603	1.80	1.24	-171.35	120.32
		21.603	24.752	1.80	1.24	-171.35	120.32
		24.752	26.417	3.00	1.24	-277.42	120.32
		26.417	27.000	3.00	1.24	-277.42	120.32
7	Column	0.000	0.583	6.82	3.72	-318.02	175.94
		0.583	4.508	6.82	3.72	-318.02	175.94
		4.508	5.751	3.41	3.72	-161.50	175.94
		5.751	8.122	3.41	3.72	-161.50	175.94
		8.122	9.364	0.00	3.72	0.00	175.94
		9.364	9.625	0.00	3.72	0.00	175.94
		9.625	13.500	0.00	3.72	0.00	175.94
		13.500	17.375	0.00	3.72	0.00	175.94
		17.375	17.886	0.00	3.72	0.00	175.94
		17.886	19.134	0.00	3.72	0.00	175.94
		19.134	21.249	3.41	3.72	-161.50	175.94
		21.249	22.498	3.41	3.72	-161.50	175.94
		22.498	26.417	6.20	3.72	-289.93	175.94
		26.417	27.000	6.20	3.72	-289.93	175.94
	Middle	0.000	0.583	4.65	4.34	-220.17	205.71
		0.583	8.151	4.65	4.34	-220.17	205.71
		8.151	9.364	0.00	4.34	0.00	205.71
		9.364	9.625	0.00	4.34	0.00	205.71
		9.625	13.500	0.00	4.34	0.00	205.71
		13.500	17.375	0.00	4.34	0.00	205.71
		17.375	17.886	0.00	4.34	0.00	205.71
		17.886	19.074	0.00	4.34	0.00	205.71
		19.074	26.417	4.34	4.34	-205.71	205.71
		26.417	27.000	4.34	4.34	-205.71	205.71
	Beam	0.000	0.583	3.00	1.24	-277.42	120.32
		0.583	2.231	3.00	1.24	-277.42	120.32
		2.231	5.389	1.80	1.24	-171.35	120.32
		5.389	7.750	1.80	1.24	-171.35	120.32
		7.750	8.473	0.00	1.24	0.00	120.32
		8.473	9.625	0.00	1.24	0.00	120.32
		9.625	9.758	0.00	1.24	0.00	120.32
		9.758	10.908	0.00	1.55	0.00	149.31
		10.908	13.500	0.00	1.55	0.00	149.31
		13.500	17.130	0.00	1.55	0.00	149.31
		17.130	17.375	0.00	1.55	0.00	149.31
		17.375	18.026	0.00	1.55	0.00	149.31
		18.026	19.310	0.00	1.24	0.00	120.32
		19.310	19.500	0.00	1.24	0.00	120.32
		19.500	21.784	1.32	1.24	-127.47	120.32
		21.784	24.154	1.32	1.24	-127.47	120.32
		24.154	26.417	2.64	1.24	-247.03	120.32
		26.417	27.000	2.64	1.24	-247.03	120.32
8	Column	0.000	0.583	6.20	3.41	-289.93	161.50
		0.583	7.866	6.20	3.41	-289.93	161.50
		7.866	9.109	3.41	3.41	-161.50	161.50
		9.109	9.625	3.41	3.41	-161.50	161.50
		9.625	13.500	3.41	3.41	-161.50	161.50
		13.500	17.375	3.41	3.41	-161.50	161.50
		17.375	17.891	3.41	3.41	-161.50	161.50
		17.891	18.968	3.41	3.41	-161.50	161.50
		18.968	21.249	8.68	3.41	-401.28	161.50
		21.249	22.326	8.68	3.41	-401.28	161.50
		22.326	26.417	13.95	3.41	-629.14	161.50
		26.417	27.000	13.95	3.41	-629.14	161.50
	Middle	0.000	0.583	4.34	4.34	-205.71	205.71
		0.583	9.625	4.34	4.34	-205.71	205.71
		9.625	13.500	4.34	4.34	-205.71	205.71
		13.500	17.375	4.34	4.34	-205.71	205.71
		17.375	26.417	4.34	4.34	-205.71	205.71
		26.417	27.000	4.34	4.34	-205.71	205.71
	Beam	0.000	0.583	2.64	1.24	-247.03	120.32
		0.583	2.071	2.64	1.24	-247.03	120.32
		2.071	3.949	1.76	1.24	-168.20	120.32
		3.949	4.429	0.88	1.24	-85.86	120.32
		4.429	6.307	0.88	1.24	-85.86	120.32
		6.307	9.625	0.88	1.24	-85.86	120.32
		9.625	10.452	0.88	1.24	-85.86	120.32
		10.452	11.525	0.88	1.24	-85.86	120.32
		11.525	13.500	0.88	1.55	-85.86	149.31
		13.500	16.559	0.88	1.55	-85.86	149.31
		16.559	17.375	0.88	1.55	-85.86	149.31
		17.375	18.950	0.88	1.55	-85.86	149.31
		18.950	21.767	3.08	1.55	-285.13	149.31
		21.767	24.159	3.08	1.55	-285.13	149.31

		24.159	26.417	5.28	1.55	-462.44	149.31
		26.417	27.000	5.28	1.55	-462.44	149.31
9	Column	0.000	0.583	13.95	0.00	-629.14	0.00
		0.583	5.104	13.95	0.00	-629.14	0.00
		5.104	6.750	13.95	0.00	-629.14	0.00
		6.750	8.979	13.95	0.00	-629.14	0.00
		8.979	13.500	13.95	0.00	-629.14	0.00
	Middle	0.000	0.583	4.34	0.00	-205.71	0.00
		0.583	5.104	4.34	0.00	-205.71	0.00
		5.104	6.750	4.34	0.00	-205.71	0.00
		6.750	8.979	4.34	0.00	-205.71	0.00
		8.979	13.500	4.34	0.00	-205.71	0.00
	Beam	0.000	0.583	5.28	0.00	-462.44	0.00
		0.583	5.104	5.28	0.00	-462.44	0.00
		5.104	6.750	5.28	0.00	-462.44	0.00
		6.750	8.979	5.28	0.00	-462.44	0.00
		8.979	13.500	5.28	0.00	-462.44	0.00

Longitudinal Beam Shear Reinforcement Required:

Units: d (in), Start, End, Xu (ft), PhiVc, Vu (kip), Av/s (in^2/in)

Span	d	PhiVc	Start	End	Vu	Xu	Av/s
1	22.19	28.00	2.432	4.591	27.92	4.591	0.0124
			4.591	6.750	49.59	6.750	0.0216
			6.750	8.909	79.10	8.909	0.0512
			8.909	11.068	108.60	11.068	0.0807
2	22.06	27.85	2.422	5.587	77.12	2.422	0.0496
			5.587	8.752	53.79	5.587	0.0261
			8.752	11.917	31.04	8.752	0.0124
			11.917	15.083	16.37	15.083	0.0124
			15.083	18.248	39.54	18.248	0.0124
			18.248	21.413	62.87	21.413	0.0353
			21.413	24.578	86.21	24.578	0.0588
3	22.06	27.85	2.422	5.587	82.89	2.422	0.0554
			5.587	8.752	59.56	5.587	0.0319
			8.752	11.917	36.22	8.752	0.0124
			11.917	15.083	14.75	11.917	0.0124
			15.083	18.248	34.58	18.248	0.0124
			18.248	21.413	57.11	21.413	0.0295
			21.413	24.578	80.44	24.578	0.0530
4	22.06	27.85	2.422	5.587	81.30	2.422	0.0538
			5.587	8.752	57.96	5.587	0.0303
			8.752	11.917	35.18	8.752	0.0124
			11.917	15.083	14.38	15.083	0.0124
			15.083	18.248	35.66	18.248	0.0124
			18.248	21.413	58.70	21.413	0.0311
			21.413	24.578	82.03	24.578	0.0546
5	22.06	27.85	2.422	5.587	81.91	2.422	0.0545
			5.587	8.752	58.58	5.587	0.0310
			8.752	11.917	35.59	8.752	0.0124
			11.917	15.083	14.30	11.917	0.0124
			15.083	18.248	35.27	18.248	0.0124
			18.248	21.413	58.08	21.413	0.0305
			21.413	24.578	81.42	24.578	0.0540
6	22.06	27.85	2.422	5.587	81.04	2.422	0.0536
			5.587	8.752	57.71	5.587	0.0301
			8.752	11.917	35.04	8.752	0.0124
			11.917	15.083	14.59	15.083	0.0124
			15.083	18.248	35.87	18.248	0.0124
			18.248	21.413	58.95	21.413	0.0313
			21.413	24.578	82.28	24.578	0.0548
7	22.06	27.85	2.422	5.587	83.91	2.422	0.0565
			5.587	8.752	60.57	5.587	0.0330
			8.752	11.917	37.24	8.752	0.0124
			11.917	15.083	15.75	11.917	0.0124
			15.083	18.248	34.55	18.248	0.0124
			18.248	21.413	56.09	21.413	0.0284
			21.413	24.578	79.42	24.578	0.0519
8	22.13	27.93	2.427	5.591	74.68	2.427	0.0470
			5.591	8.754	53.41	5.591	0.0256
			8.754	11.918	32.14	8.754	0.0124
			11.918	15.082	20.43	15.082	0.0124
			15.082	18.246	43.38	18.246	0.0155
			18.246	21.409	66.70	21.409	0.0389
			21.409	24.573	90.02	24.573	0.0624
9	22.13	27.93	2.427	4.642	73.46	2.427	0.0457
			4.642	6.856	58.77	4.642	0.0310

6.856	9.071	44.08	6.856	0.0162
9.071	11.285	29.39	9.071	0.0124
11.285	13.500	14.69	11.285	0.0124

Longitudinal Beam Shear Reinforcement Details:

Units: spacing & distance (in).
Span Size Stirrups (2 legs each unless otherwise noted)

1	#3 5 @ 9.0 + 3 @ 8.6 + 5 @ 5.2 [3L] + 13 @ 3.8 [3L]
2	#3 9 @ 6.3 [3L] + 5 @ 7.6 + 11 @ 10.4 + 7 @ 5.4 + 12 @ 5.2 [3L]
3	#3 10 @ 5.7 [3L] + 6 @ 6.3 + 11 @ 10.4 + 6 @ 6.3 + 11 @ 5.7 [3L]
4	#3 10 @ 5.7 [3L] + 6 @ 6.3 + 11 @ 10.4 + 6 @ 6.3 + 11 @ 5.7 [3L]
5	#3 10 @ 5.7 [3L] + 6 @ 6.3 + 11 @ 10.4 + 6 @ 6.3 + 11 @ 5.7 [3L]
6	#3 10 @ 5.7 [3L] + 6 @ 6.3 + 11 @ 10.4 + 6 @ 6.3 + 11 @ 5.7 [3L]
7	#3 11 @ 5.2 [3L] + 6 @ 6.3 + 11 @ 10.4 + 6 @ 6.3 + 11 @ 5.7 [3L]
8	#3 9 @ 6.3 [3L] + 5 @ 7.6 + 11 @ 10.4 + 5 @ 7.6 [3L] + 12 @ 5.2 [3L]
9	#3 7 @ 6.5 [3L] + 4 @ 6.6 + 8 @ 11.0

Beam Shear Capacity:

Units: d, Sp (in), Start, End, Xu (ft), PhiVc, PhiVn, Vu (kip), Av/s (in^2/in)

Span	d	PhiVc	Start	End	Av/s	Sp	PhiVn	Vu	Xu
1	22.19	28.00	0.000	0.833	-----	-----	52.36	56.24	0.000
			0.833	4.591	0.0244	9.0	52.36	27.92	4.591
			4.591	6.750	0.0255	8.6	53.44	49.59	6.750
			6.750	8.909	0.0637	5.2	91.60	79.10	8.909
			8.909	12.667	0.0878	3.8	115.68	108.60	11.068
			12.667	13.500	-----	-----	115.68	144.33	13.500
2	22.19	28.00	0.000	0.833	-----	-----	84.01	96.31	0.000
			0.833	5.587	0.0521	6.3	79.99	77.04	2.432
			5.587	8.752	0.0290	7.6	56.92	53.79	5.587
			8.752	18.248	0.0212	10.4	49.21	39.54	18.248
			18.248	21.413	0.0405	5.4	68.49	62.87	21.413
			21.413	26.167	0.0636	5.2	91.54	86.13	24.568
			26.167	27.000	-----	-----	91.54	105.40	27.000
3	22.06	27.85	0.000	0.833	-----	-----	83.54	102.08	0.000
			0.833	5.587	0.0578	5.7	85.28	82.89	2.422
			5.587	8.752	0.0348	6.3	62.35	59.56	5.587
			8.752	18.248	0.0212	10.4	48.93	36.22	8.752
			18.248	21.413	0.0348	6.3	62.35	57.11	21.413
			21.413	26.167	0.0578	5.7	85.28	80.44	24.578
			26.167	27.000	-----	-----	83.54	99.63	27.000
4	22.06	27.85	0.000	0.833	-----	-----	83.54	100.49	0.000
			0.833	5.587	0.0578	5.7	85.28	81.30	2.422
			5.587	8.752	0.0348	6.3	62.35	57.96	5.587
			8.752	18.248	0.0212	10.4	48.93	35.66	18.248
			18.248	21.413	0.0348	6.3	62.35	58.70	21.413
			21.413	26.167	0.0578	5.7	85.28	82.03	24.578
			26.167	27.000	-----	-----	83.54	101.22	27.000
5	22.06	27.85	0.000	0.833	-----	-----	83.54	101.10	0.000
			0.833	5.587	0.0578	5.7	85.28	81.91	2.422
			5.587	8.752	0.0348	6.3	62.35	58.58	5.587
			8.752	18.248	0.0212	10.4	48.93	35.59	8.752
			18.248	21.413	0.0348	6.3	62.35	58.08	21.413
			21.413	26.167	0.0578	5.7	85.28	81.42	24.578
			26.167	27.000	-----	-----	83.54	100.61	27.000
6	22.06	27.85	0.000	0.833	-----	-----	83.54	100.24	0.000
			0.833	5.587	0.0578	5.7	85.28	81.04	2.422
			5.587	8.752	0.0348	6.3	62.35	57.71	5.587
			8.752	18.248	0.0212	10.4	48.93	35.87	18.248
			18.248	21.413	0.0348	6.3	62.35	58.95	21.413
			21.413	26.167	0.0578	5.7	85.28	82.28	24.578
			26.167	27.000	-----	-----	83.54	101.48	27.000
7	22.13	27.93	0.000	0.833	-----	-----	91.28	103.10	0.000
			0.833	5.587	0.0636	5.2	91.28	83.87	2.427
			5.587	8.752	0.0348	6.3	62.53	60.57	5.587
			8.752	18.248	0.0212	10.4	49.07	37.24	8.752
			18.248	21.413	0.0348	6.3	62.53	56.09	21.413
			21.413	26.167	0.0578	5.7	85.52	79.38	24.573
			26.167	27.000	-----	-----	83.78	98.61	27.000
8	22.13	27.93	0.000	0.833	-----	-----	83.78	92.46	0.000
			0.833	5.591	0.0520	6.3	79.72	74.68	2.427
			5.591	8.754	0.0290	7.6	56.77	53.41	5.591
			8.754	18.246	0.0212	10.4	49.08	43.38	18.246
			18.246	21.409	0.0435	7.6	71.20	66.70	21.409
			21.409	26.167	0.0636	5.2	91.23	90.02	24.573
			26.167	27.000	-----	-----	91.23	109.30	27.000

9	22.13	27.93	0.000	0.833	-----	-----	83.78	90.81	0.000
			0.833	4.642	0.0505	6.5	78.25	73.46	2.427
			4.642	6.856	0.0331	6.6	60.89	58.77	4.642
			6.856	13.250	0.0201	11.0	47.91	44.08	6.856
			13.250	13.500	-----	-----	47.91	1.66	13.250

Slab Shear Capacity:
==========
Units: b, d (in), Xu (ft), PhiVc, Vu(kip)

Span	b	d	Vratio	PhiVc	Vu	Xu
1	346.00	10.69	0.000	333.39	0.00	12.03
2	346.00	10.69	0.461	333.39	79.61	25.53
3	346.00	10.69	0.461	333.39	76.77	1.47
4	346.00	10.69	0.461	333.39	76.04	25.53
5	346.00	10.69	0.461	333.39	75.94	1.47
6	346.00	10.69	0.461	333.39	76.26	25.53
7	346.00	10.69	0.461	333.39	77.64	1.47
8	346.00	10.69	0.461	333.39	82.91	25.53
9	346.00	10.69	0.515	333.39	84.61	1.47

Flexural Transfer of Negative Unbalanced Moment at Supports:
==========
Units: Width (in), Munb (k-ft), As (in^2)

Supp	Width	GammaF*Munb	Comb	Pat	AsReq	AsProv	Additional Bars
1	68.00	5.16	U2	Odd	0.107	1.550	---
2	68.00	23.22	U2	Even	0.485	5.270	---
3	68.00	20.57	U2	Even	0.429	3.276	---
4	68.00	19.85	U2	Even	0.414	2.991	---
5	68.00	19.61	U2	Even	0.409	3.134	---
6	68.00	20.25	U2	Odd	0.423	2.991	---
7	68.00	22.45	U2	Odd	0.469	3.134	---
8	68.00	30.36	U2	Odd	0.635	2.849	---
9	74.00	59.02	U2	Odd	1.241	6.975	---

Flexural Transfer of Positive Unbalanced Moment at Supports:
==========
Units: Width (in), Munb (k-ft), As (in^2)

Supp	Width	GammaF*Munb	Comb	Pat	AsReq	AsProv	Additional Bars
1	68.00	7.38	U2	Even	0.154	1.550	---
2	68.00	0.00	U1	All	0.000	1.550	---
3	68.00	0.00	U1	All	0.000	1.567	---
4	68.00	0.00	U1	All	0.000	1.567	---
5	68.00	0.00	U1	All	0.000	1.567	---
6	68.00	0.00	U1	All	0.000	1.567	---
7	68.00	0.00	U1	All	0.000	1.567	---
8	68.00	0.00	U1	All	0.000	1.567	---
9	74.00	0.00	U1	All	0.000	0.000	---

Punching Shear Around Columns:
==========
Units: Vu (kip), Munb (k-ft), vu (psi), Phi*vc (psi)

Supp	Vu	vu	Munb	Comb	Pat	GammaV	vu	Phi*vc
1	54.88	50.3	-43.98	U2	Odd	0.320	94.4	180.3
2	319.89	146.7	31.04	U2	All	0.400	152.9	180.3
3	381.66	175.0	-8.28	U2	All	0.400	176.7	180.3
4	368.02	168.7	2.14	U2	All	0.400	169.2	180.3
5	372.11	170.6	-0.30	U2	All	0.400	170.7	180.3
6	369.36	169.4	-0.93	U2	All	0.400	169.5	180.3
7	376.27	172.5	4.04	U2	All	0.400	173.3	180.3
8	351.25	161.0	-15.28	U2	All	0.400	164.1	180.3
9	386.30	153.5	55.23	U2	All	0.400	162.5	180.3

Punching Shear Around Drops:
==========
Units: Vu (kip), vu (psi), Phi*vc (psi)

Supp	Vu	Comb	Pat	vu	Phi*vc
1	51.29	U2	Odd	30.8	171.1
2	312.04	U2	All	93.8	171.1
3	373.81	U2	All	112.4	171.1
4	360.16	U2	All	108.3	171.1
5	364.25	U2	All	109.5	171.1
6	361.50	U2	All	108.7	171.1
7	368.42	U2	All	110.7	171.1
8	343.39	U2	All	103.2	171.1
9	378.85	U2	All	113.9	171.1

Maximum Deflections:
==========
Units: Dz (in)

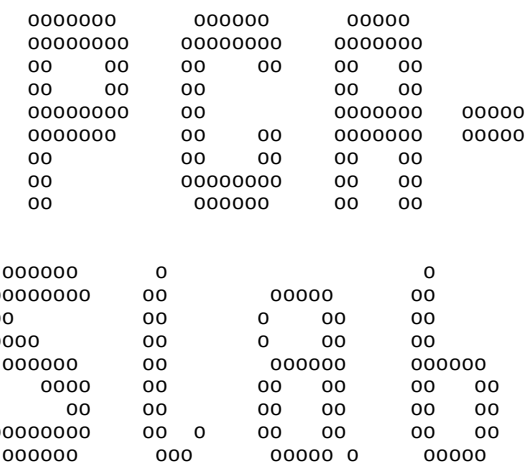
Frame	Column Strip	Middle Strip

Span	Dz(DEAD)	Dz(LIVE)	Dz(TOTAL)	Dz(DEAD)	Dz(LIVE)	Dz(TOTAL)	Dz(DEAD)	Dz(LIVE)	Dz(TOTAL)
1	0.017	0.008	0.025	0.019	0.010	0.029	0.015	0.008	0.023
2	-0.211	-0.154	-0.365	-0.238	-0.174	-0.413	-0.173	-0.126	-0.299
3	-0.131	-0.139	-0.269	-0.148	-0.157	-0.304	-0.107	-0.113	-0.220
4	-0.151	-0.144	-0.295	-0.171	-0.163	-0.334	-0.124	-0.118	-0.242
5	-0.149	-0.144	-0.292	-0.168	-0.162	-0.330	-0.122	-0.118	-0.239
6	-0.140	-0.141	-0.280	-0.158	-0.159	-0.317	-0.114	-0.115	-0.229
7	-0.181	-0.155	-0.336	-0.204	-0.176	-0.380	-0.148	-0.127	-0.275
8	-0.041	-0.051	-0.092	-0.049	-0.062	-0.111	-0.028	-0.035	-0.063
9	-0.611	-0.321	-0.932	-0.795	-0.418	-1.213	-0.324	-0.170	-0.495

Material Takeoff:
==========

Reinforcement in the Direction of Analysis

Top Bars:	7668.3 lb	<=>	35.50 lb/ft	<=>	1.183 lb/ft^2
Bottom Bars:	6227.9 lb	<=>	28.83 lb/ft	<=>	0.961 lb/ft^2
Stirrups:	2818.9 lb	<=>	13.05 lb/ft	<=>	0.435 lb/ft^2
Total Steel:	16715.1 lb	<=>	77.38 lb/ft	<=>	2.579 lb/ft^2
Concrete:	7082.5 ft^3	<=>	32.79 ft^3/ft	<=>	1.093 ft^3/ft^2



pcaSlab v1.51 (TM)
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[1] INPUT ECHO

General Information:

File name: P:\Thesis\North-South.slb
Project: Iceplex
Frame: North-South Engineer: Megan Kohut
Code: ACI 318-02 Mode: Design Reinforcement Database: ASTM A615
Number of supports = 13
Floor System: Two-Way

Live load pattern ratio = 75%
Minimum free edge for punching shear = 10 times slab thickness
Deflections are based on cracked section properties.
In negative moment regions, Ig and Mcr DO NOT include flange/slab contribution (if available)
Compression reinforcement calculations NOT selected.

Material Properties:

	Slabs|Beams	Columns	
wc =	110	110	lb/ft3
f'c =	5	5	ksi
Ec =	2692.1	2692.1	ksi
fr =	0.45078	0.45078	ksi

fy = 60 ksi, Bars are not epoxy-coated
fyv = 60 ksi
Es = 29000 ksi

Reinforcement Database:

Units: Db (in), Ab (in^2), Wb (lb/ft)

Size	Db	Ab	Wb	Size	Db	Ab	Wb
#3	0.38	0.11	0.38	#4	0.50	0.20	0.67
#5	0.63	0.31	1.04	#6	0.75	0.44	1.50
#7	0.88	0.60	2.04	#8	1.00	0.79	2.67
#9	1.13	1.00	3.40	#10	1.27	1.27	4.30
#11	1.41	1.56	5.31	#14	1.69	2.25	7.65

#18	2.26	4.00	13.60

Span Data:

Slabs: L1, wL, wR (ft); t, Hmin (in)

Span	Loc	L1	t	wL	wR	Hmin
1	Int	30.000	12.00	13.500	13.500	10.97
2	Int	30.000	12.00	13.500	13.500	11.09
3	Int	30.000	12.00	13.500	13.500	11.09
4	Int	30.000	12.00	13.500	13.500	11.09
5	Int	30.000	12.00	13.500	13.500	11.09
6	Int	30.000	12.00	13.500	13.500	11.09
7	Int	30.000	12.00	13.500	13.500	11.09
8	Int	30.000	12.00	13.500	13.500	11.09
9	Int	30.000	12.00	13.500	13.500	11.09
10	Int	30.000	12.00	13.500	13.500	11.09
11	Int	30.000	12.00	13.500	13.500	11.02
12	Int	14.500	12.00	13.500	13.500	5.00

Ribs and Longitudinal Beams: b, h, Sp (in)

	Ribs			Beams	
Span	b	h	Sp	b	h
1	0.00	0.00	0.00	14.00	24.00
2	0.00	0.00	0.00	14.00	24.00
3	0.00	0.00	0.00	14.00	24.00
4	0.00	0.00	0.00	14.00	24.00
5	0.00	0.00	0.00	14.00	24.00
6	0.00	0.00	0.00	14.00	24.00
7	0.00	0.00	0.00	14.00	24.00
8	0.00	0.00	0.00	14.00	24.00
9	0.00	0.00	0.00	14.00	24.00
10	0.00	0.00	0.00	14.00	24.00
11	0.00	0.00	0.00	14.00	24.00
12	0.00	0.00	0.00	14.00	24.00

Support Data:

Columns: c1a, c2a, c1b, c2b (in); Ha, Hb (ft)

Supp	c1a	c2a	Ha	c1b	c2b	Hb	Red%
1	14.00	14.00	12.500	14.00	14.00	11.500	100
2	14.00	14.00	12.500	14.00	14.00	11.500	100
3	14.00	14.00	12.500	14.00	14.00	11.500	100
4	14.00	14.00	12.500	14.00	14.00	11.500	100
5	14.00	14.00	12.500	14.00	14.00	11.500	100
6	14.00	14.00	12.500	14.00	14.00	11.500	100
7	14.00	14.00	12.500	14.00	14.00	11.500	100
8	14.00	14.00	12.500	14.00	14.00	11.500	100
9	14.00	14.00	12.500	14.00	14.00	11.500	100
10	14.00	14.00	12.500	14.00	14.00	11.500	100
11	14.00	14.00	12.500	14.00	14.00	11.500	100
12	14.00	14.00	12.500	14.00	14.00	11.500	100
13	14.00	14.00	12.500	14.00	14.00	11.500	100

Drop Panels: h (in); L1, L2, W1, W2 (ft)

Supp	h	L1	L2	W1	W2
1	8.00	0.000	2.000	2.000	2.000 *c d
2	10.00	4.000	4.000	4.000	4.000 *c d
3	8.00	2.000	2.000	2.000	2.000 *c d
4	8.00	2.000	2.000	2.000	2.000 *c d
5	8.00	2.000	2.000	2.000	2.000 *c d
6	8.00	2.000	2.000	2.000	2.000 *c d
7	8.00	2.000	2.000	2.000	2.000 *c d
8	8.00	2.000	2.000	2.000	2.000 *c d
9	8.00	2.000	2.000	2.000	2.000 *c d
10	8.00	2.000	2.000	2.000	2.000 *c d
11	8.00	2.000	2.000	2.000	2.000 *c d
12	8.00	2.000	2.000	2.000	2.000 *c d
13	8.00	1.000	0.000	1.000	1.000 *c d

*c- Invalid drop. Drop thickness will not be used for flexural design.
*d- Excessive drop thickness will not be used for flexural design.

Transverse Beams: b, h, Ecc (in)

Supp	b	h	Ecc
1	14.00	24.00	0.00
2	14.00	24.00	0.00
3	14.00	24.00	0.00
4	14.00	24.00	0.00
5	14.00	24.00	0.00
6	14.00	24.00	0.00
7	14.00	24.00	0.00
8	14.00	24.00	0.00
9	14.00	24.00	0.00

10	14.00	24.00	0.00
11	14.00	24.00	0.00
12	14.00	24.00	0.00
13	14.00	24.00	0.00

Boundary Conditions: Kz (kip/in); Kry (kip-in/rad)

Supp	Spring Kz	Spring Kry	Far End A	Far End B
1	0	0	Fixed	Fixed
2	0	0	Fixed	Fixed
3	0	0	Fixed	Fixed
4	0	0	Fixed	Fixed
5	0	0	Fixed	Fixed
6	0	0	Fixed	Fixed
7	0	0	Fixed	Fixed
8	0	0	Fixed	Fixed
9	0	0	Fixed	Fixed
10	0	0	Fixed	Fixed
11	0	0	Fixed	Fixed
12	0	0	Fixed	Fixed
13	0	0	Fixed	Fixed

Load Data:
==========

Load Cases and Combinations:

Case Type	SELF DEAD	Dead DEAD	Live LIVE	Wind LATERAL	EQ LATERAL
U1	1.400	1.400	0.000	0.000	0.000
U2	1.200	1.200	1.600	0.000	0.000
U3	1.200	1.200	1.600	0.800	0.000
U4	1.200	1.200	1.600	-0.800	0.000
U5	1.200	1.200	1.000	1.600	0.000
U6	1.200	1.200	1.000	-1.600	0.000
U7	0.900	0.900	0.000	1.600	0.000
U8	0.900	0.900	0.000	-1.600	0.000
U9	1.200	1.200	1.000	0.000	1.000
U10	1.200	1.200	1.000	0.000	-1.000
U11	0.900	0.900	0.000	0.000	1.000
U12	0.900	0.900	0.000	0.000	-1.000

Span Loads:

Span	Case	Wa
Area Loads - Wa (lb/ft2):		
1	Dead	132
2	Dead	132
3	Dead	132
4	Dead	132
5	Dead	132
6	Dead	132
7	Dead	132
8	Dead	132
9	Dead	132
11	Dead	132
12	Dead	132
12	Live	100
11	Live	100
10	Live	100
9	Live	100
8	Live	100
7	Live	100
6	Live	100
5	Live	100
4	Live	100
3	Live	100
2	Live	100
1	Live	100

Support Loads: --- NONE ---

Support Displacements: --- NONE ---

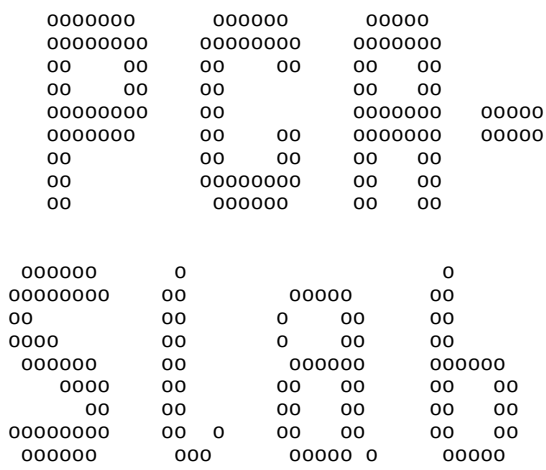
Lateral Load Effects - M (k-ft):

Span	Case	Mleft	Mright
1	EQ	0	0
2	EQ	0	0
3	EQ	0	0
4	EQ	0	0
5	EQ	0	0
6	EQ	0	0
7	EQ	0	0
8	EQ	0	0
9	EQ	0	0
10	EQ	0	0
11	EQ	0	0
12	EQ	0	0

13	EQ	0	0
1	Wind	0	0
2	Wind	0	0
3	Wind	0	0
4	Wind	0	0
5	Wind	0	0
6	Wind	0	0
7	Wind	0	0
8	Wind	0	0
9	Wind	0	0
10	Wind	0	0
11	Wind	0	0
12	Wind	0	0

Reinforcement Criteria:
==========

	Top bars Min	Top bars Max	Bottom bars Min	Bottom bars Max	Stirrups Min	Stirrups Max	
Slabs and Ribs:							
Bar Size	#5	#8	#5	#8			
Bar spacing	1.00	18.00	1.00	18.00			in
Reinf ratio	0.14	5.00	0.14	5.00			%
Cover	1.50		1.50				in
Beams:							
Bar Size	#5	#8	#5	#8	#3	#5	
Bar spacing	1.00	18.00	1.00	18.00	6.00	18.00	in
Reinf ratio	0.14	5.00	0.14	5.00			%
Cover	1.50		1.50				in



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[2] DESIGN RESULTS

Top Reinforcement:

Units: Width (ft), Mmax (k-ft), Xmax (ft), As (in^2), Sp (in)

Span	Strip	Zone	Width	Mmax	Xmax	AsMin	AsMax	SpReq	AsReq	Bars	
1	Column	Left	12.33	80.15	0.583	3.197	32.040	13.455	1.763	11-#5	
		Middle	12.33	0.00	15.000	0.000	32.040	0.000	0.000	---	
		Right	12.33	552.11	29.417	3.197	32.040	3.524	12.812	42-#5	
	Middle	Left	13.50	5.14	0.583	3.499	35.070	13.500	0.112	12-#5	
		Middle	13.50	0.00	15.000	0.000	35.070	0.000	0.000	---	
		Right	13.50	289.47	29.417	3.499	35.070	7.714	6.495	21-#5	
	Beam	Left	1.17	56.31	0.583	0.760	6.601	4.986	0.571	3-#5	
		Middle	1.17	0.00	15.000	0.000	6.601	0.000	0.000	---	
		Right	1.17	387.89	29.417	1.092	6.564	3.265	4.337	8-#7	2L
2	Column	Left	12.33	531.18	0.583	3.197	32.040	3.524	12.294	42-#5	
		Middle	12.33	15.09	10.675	3.197	32.040	13.455	0.330	11-#5	
		Right	12.33	353.72	29.417	3.197	32.040	5.481	8.017	27-#5	
	Middle	Left	13.50	278.49	0.583	3.499	35.070	7.714	6.241	21-#5	
		Middle	13.50	7.91	10.675	3.499	35.070	13.500	0.173	12-#5	
		Right	13.50	185.45	29.417	3.499	35.070	11.571	4.118	14-#5	
	Beam	Left	1.17	373.19	0.583	1.092	6.564	3.265	4.153	8-#7	2L
		Middle	1.17	10.60	10.675	0.432	6.564	9.795	0.107	2-#7	
		Right	1.17	248.51	29.417	1.092	6.564	2.449	2.665	5-#7	
3	Column	Left	12.33	359.50	0.583	3.197	32.040	5.481	8.153	27-#5	
		Middle	12.33	0.00	15.000	0.000	32.040	0.000	0.000	---	
		Right	12.33	399.08	29.417	3.197	32.040	4.933	9.092	30-#5	
	Middle	Left	13.50	188.48	0.583	3.499	35.070	11.571	4.186	14-#5	
		Middle	13.50	0.00	15.000	0.000	35.070	0.000	0.000	---	
		Right	13.50	209.23	29.417	3.499	35.070	10.125	4.657	16-#5	
	Beam	Left	1.17	252.57	0.583	1.092	6.564	2.449	2.712	5-#7	

		Middle	1.17	0.00	15.000	0.000	6.601	0.000	0.000	---
		Right	1.17	280.38	29.417	1.092	6.564	1.959	3.034	6-#7
4	Column	Left	12.33	396.86	0.583	3.197	32.040	4.933	9.039	30-#5
		Middle	12.33	0.00	15.000	0.000	32.040	0.000	0.000	---
		Right	12.33	386.08	29.417	3.197	32.040	5.103	8.783	29-#5
	Middle	Left	13.50	208.07	0.583	3.499	35.070	10.125	4.630	16-#5
		Middle	13.50	0.00	15.000	0.000	35.070	0.000	0.000	---
		Right	13.50	202.41	29.417	3.499	35.070	10.800	4.502	15-#5
	Beam	Left	1.17	278.82	0.583	1.092	6.564	1.959	3.016	6-#7
		Middle	1.17	0.00	15.000	0.000	6.601	0.000	0.000	---
		Right	1.17	271.25	29.417	1.092	6.564	2.449	2.928	5-#7
5	Column	Left	12.33	386.65	0.583	3.197	32.040	5.103	8.796	29-#5
		Middle	12.33	0.00	15.000	0.000	32.040	0.000	0.000	---
		Right	12.33	388.95	29.417	3.197	32.040	5.103	8.851	29-#5
	Middle	Left	13.50	202.71	0.583	3.499	35.070	10.800	4.509	15-#5
		Middle	13.50	0.00	15.000	0.000	35.070	0.000	0.000	---
		Right	13.50	203.92	29.417	3.499	35.070	10.800	4.536	15-#5
	Beam	Left	1.17	271.65	0.583	1.092	6.564	2.449	2.933	5-#7
		Middle	1.17	0.00	15.000	0.000	6.601	0.000	0.000	---
		Right	1.17	273.26	29.417	1.092	6.564	2.449	2.952	5-#7
6	Column	Left	12.33	388.73	0.583	3.197	32.040	5.103	8.846	29-#5
		Middle	12.33	0.00	15.000	0.000	32.040	0.000	0.000	---
		Right	12.33	389.77	29.417	3.197	32.040	5.103	8.870	29-#5
	Middle	Left	13.50	203.80	0.583	3.499	35.070	10.800	4.533	15-#5
		Middle	13.50	0.00	15.000	0.000	35.070	0.000	0.000	---
		Right	13.50	204.35	29.417	3.499	35.070	10.800	4.546	15-#5
	Beam	Left	1.17	273.11	0.583	1.092	6.564	2.449	2.950	5-#7
		Middle	1.17	0.00	15.000	0.000	6.601	0.000	0.000	---
		Right	1.17	273.84	29.417	1.092	6.564	2.449	2.958	5-#7
7	Column	Left	12.33	390.15	0.583	3.197	32.040	5.103	8.880	29-#5
		Middle	12.33	0.00	15.000	0.000	32.040	0.000	0.000	---
		Right	12.33	383.44	29.417	3.197	32.040	5.103	8.720	29-#5
	Middle	Left	13.50	204.55	0.583	3.499	35.070	10.800	4.550	15-#5
		Middle	13.50	0.00	15.000	0.000	35.070	0.000	0.000	---
		Right	13.50	201.03	29.417	3.499	35.070	10.800	4.471	15-#5
	Beam	Left	1.17	274.10	0.583	1.092	6.564	2.449	2.961	5-#7
		Middle	1.17	0.00	15.000	0.000	6.601	0.000	0.000	---
		Right	1.17	269.39	29.417	1.092	6.564	2.449	2.906	5-#7
8	Column	Left	12.33	382.03	0.583	3.197	32.040	5.103	8.687	29-#5
		Middle	12.33	0.00	15.000	0.000	32.040	0.000	0.000	---
		Right	12.33	409.52	29.417	3.197	32.040	4.774	9.342	31-#5
	Middle	Left	13.50	200.29	0.583	3.499	35.070	10.800	4.454	15-#5
		Middle	13.50	0.00	15.000	0.000	35.070	0.000	0.000	---
		Right	13.50	214.70	29.417	3.499	35.070	10.125	4.781	16-#5
	Beam	Left	1.17	268.40	0.583	1.092	6.564	2.449	2.895	5-#7
		Middle	1.17	0.00	15.000	0.000	6.601	0.000	0.000	---
		Right	1.17	287.72	29.417	1.092	6.564	1.959	3.121	6-#7
9	Column	Left	12.33	415.10	0.583	3.197	32.040	4.774	9.475	31-#5
		Middle	12.33	0.00	15.000	0.000	32.040	0.000	0.000	---
		Right	12.33	305.01	29.417	3.197	32.040	6.435	6.874	23-#5
	Middle	Left	13.50	217.63	0.583	3.499	35.070	10.125	4.848	16-#5
		Middle	13.50	0.00	15.000	0.000	35.070	0.000	0.000	---
		Right	13.50	159.91	29.417	3.499	35.070	13.500	3.542	12-#5
	Beam	Left	1.17	291.63	0.583	1.092	6.564	1.959	3.167	6-#7
		Middle	1.17	0.00	15.000	0.000	6.601	0.000	0.000	---
		Right	1.17	214.28	29.417	1.095	6.582	1.977	2.270	6-#6
10	Column	Left	12.33	290.80	0.583	3.197	32.040	6.435	6.544	23-#5
		Middle	12.33	47.83	19.325	3.197	32.040	13.455	1.049	11-#5
		Right	12.33	315.77	29.417	3.197	32.040	5.920	7.126	25-#5
	Middle	Left	13.50	152.46	0.583	3.499	35.070	13.500	3.374	12-#5
		Middle	13.50	25.08	19.325	3.499	35.070	13.500	0.548	12-#5
		Right	13.50	165.55	29.417	3.499	35.070	12.462	3.669	13-#5
	Beam	Left	1.17	204.30	0.583	1.095	6.582	1.977	2.158	6-#6
		Middle	1.17	33.60	19.325	0.452	6.582	9.884	0.340	2-#6
		Right	1.17	221.85	29.417	1.095	6.582	1.977	2.355	6-#6

11	Column	Left	12.33	333.77	0.583	3.197	32.040	5.920	7.547	25-#5
		Middle	12.33	0.00	15.000	0.000	32.040	0.000	0.000	---
		Right	6.08	337.74	29.417	1.577	15.803	2.808	7.970	26-#5
	Middle	Left	13.50	174.99	0.583	3.499	35.070	12.462	3.881	13-#5
		Middle	13.50	0.00	15.000	0.000	35.070	0.000	0.000	---
		Right	19.75	177.07	29.417	5.119	51.307	9.115	3.907	26-#5
	Beam	Left	1.17	234.49	0.583	1.095	6.582	1.977	2.497	6-#6
		Middle	1.17	0.00	15.000	0.000	6.601	0.000	0.000	---
		Right	1.17	237.29	29.417	1.092	6.564	1.959	2.537	6-#7
12	Column	Left	6.08	51.76	0.583	1.577	15.803	2.808	1.141	26-#5
		Middle	6.08	19.44	5.250	1.577	15.803	12.167	0.426	6-#5
		Right	6.08	3.99	9.250	1.577	15.803	12.167	0.087	6-#5
	Middle	Left	19.75	357.17	0.583	5.119	51.307	9.115	7.977	26-#5
		Middle	19.75	134.13	5.250	5.119	51.307	13.941	2.951	17-#5
		Right	19.75	27.55	9.250	5.119	51.307	13.941	0.602	17-#5
	Beam	Left	1.17	293.30	0.583	1.092	6.564	1.959	3.186	6-#7
		Middle	1.17	110.14	5.250	1.092	6.564	9.795	1.139	2-#7
		Right	1.17	22.62	9.250	0.432	6.564	9.795	0.229	2-#7

Top Bar Details:

Units: Length (ft)

		Left				Continuous		Right			
Span	Strip	Bars	Length	Bars	Length	Bars	Length	Bars	Length	Bars	Length
1	Column	11-#5	10.10	---		---		21-#5	11.05	21-#5	6.35
	Middle	12-#5	6.93	---		---		21-#5	11.05	---	
	Beam	3-#5	3.61	---		---		4-#7	11.50	4-#7	5.49
2	Column	16-#5	10.10	15-#5	6.35	11-#5	30.00	8-#5	10.10	8-#5	6.35
	Middle	9-#5	6.93	---		12-#5	30.00	2-#5	6.93	---	
	Beam	3-#7	7.92	3-#7	4.39	2-#7	30.00	2-#7	6.49	1-#7	4.00
3	Column	14-#5	10.10	13-#5	6.35	---		15-#5	10.30	15-#5	6.35
	Middle	14-#5	9.52	---		---		16-#5	10.30	---	
	Beam	3-#7	10.72	2-#7	5.22	---		3-#7	11.99	3-#7	6.13
4	Column	15-#5	10.56	15-#5	6.35	---		15-#5	10.30	14-#5	6.35
	Middle	16-#5	10.56	---		---		15-#5	10.30	---	
	Beam	3-#7	12.23	3-#7	6.11	---		3-#7	11.74	2-#7	5.75
5	Column	15-#5	10.30	14-#5	6.35	---		15-#5	10.30	14-#5	6.35
	Middle	15-#5	10.30	---		---		15-#5	10.30	---	
	Beam	3-#7	11.74	2-#7	5.76	---		3-#7	11.76	2-#7	5.80
6	Column	15-#5	10.30	14-#5	6.35	---		15-#5	10.30	14-#5	6.35
	Middle	15-#5	10.30	---		---		15-#5	10.30	---	
	Beam	3-#7	11.76	2-#7	5.80	---		3-#7	11.77	2-#7	5.82
7	Column	15-#5	10.30	14-#5	6.35	---		15-#5	10.30	14-#5	6.35
	Middle	15-#5	10.30	---		---		15-#5	10.30	---	
	Beam	3-#7	11.77	2-#7	5.82	---		3-#7	11.71	2-#7	5.68
8	Column	15-#5	10.30	14-#5	6.35	---		16-#5	10.82	15-#5	6.35
	Middle	15-#5	10.30	---		---		16-#5	10.82	---	
	Beam	3-#7	11.70	2-#7	5.66	---		3-#7	12.61	3-#7	6.41
9	Column	16-#5	10.30	15-#5	6.35	---		12-#5	10.10	11-#5	6.35
	Middle	16-#5	10.30	---		---		12-#5	7.96	---	
	Beam	3-#7	12.15	3-#7	6.45	---		3-#6	8.24	3-#6	4.41
10	Column	6-#5	10.10	6-#5	6.35	11-#5	30.00	7-#5	10.10	7-#5	6.35
	Middle	---		---		12-#5	30.00	1-#5	6.93	---	
	Beam	2-#6	6.55	2-#6	3.60	2-#6	30.00	2-#6	7.12	2-#6	4.26
11	Column	13-#5	10.10	12-#5	6.35	---		13-#5	10.10	13-#5	6.35
	Middle	13-#5	8.48	---		---		26-#5	7.96	---	
	Beam	3-#6	8.96	3-#6	4.93	---		3-#7	9.08	3-#7	4.73
12	Column	10-#5	4.98	10-#5	3.25	6-#5	14.50	---		---	
	Middle	9-#5	3.71	---		17-#5	14.50	---		---	
	Beam	2-#7	8.72	2-#7	5.55	2-#7	14.50	---		---	

Bottom Reinforcement:

Units: Width (ft), Mmax (k-ft), Xmax (ft), As (in^2), Sp (in)

Span	Strip	Width	Mmax	Xmax	AsMin	AsMax	SpReq	AsReq	Bars
1	Column	12.33	265.79	12.000	3.197	32.040	7.400	5.964	20-#5
	Middle	13.50	205.80	12.000	3.499	35.070	10.800	4.579	15-#5
	Beam	1.17	186.73	12.000	1.098	6.601	1.662	1.957	7-#5

2	Column	12.33	158.61	16.000	3.197	32.040	12.333	3.518	12-#5
	Middle	13.50	122.81	16.000	3.499	35.070	13.500	2.710	12-#5
	Beam	1.17	111.43	16.000	1.098	6.601	3.324	1.146	4-#5
3	Column	12.33	199.71	14.740	3.197	32.040	9.867	4.449	15-#5
	Middle	13.50	154.64	14.740	3.499	35.070	13.500	3.423	12-#5
	Beam	1.17	140.31	14.740	1.098	6.601	2.493	1.453	5-#5
4	Column	12.33	189.80	15.000	3.197	32.040	10.571	4.224	14-#5
	Middle	13.50	146.96	15.000	3.499	35.070	13.500	3.251	12-#5
	Beam	1.17	133.34	15.000	1.098	6.601	2.493	1.379	5-#5
5	Column	12.33	192.44	15.000	3.197	32.040	10.571	4.284	14-#5
	Middle	13.50	149.01	15.000	3.499	35.070	13.500	3.297	12-#5
	Beam	1.17	135.20	15.000	1.098	6.601	2.493	1.399	5-#5
6	Column	12.33	191.33	15.000	3.197	32.040	10.571	4.258	14-#5
	Middle	13.50	148.15	15.000	3.499	35.070	13.500	3.277	12-#5
	Beam	1.17	134.42	15.000	1.098	6.601	2.493	1.390	5-#5
7	Column	12.33	193.43	15.000	3.197	32.040	10.571	4.306	14-#5
	Middle	13.50	149.77	15.000	3.499	35.070	13.500	3.314	12-#5
	Beam	1.17	135.89	15.000	1.098	6.601	2.493	1.406	5-#5
8	Column	12.33	185.38	14.740	3.197	32.040	10.571	4.123	14-#5
	Middle	13.50	143.54	14.740	3.499	35.070	13.500	3.174	12-#5
	Beam	1.17	130.24	14.740	1.098	6.601	2.493	1.346	5-#5
9	Column	12.33	217.52	15.780	3.197	32.040	9.250	4.855	16-#5
	Middle	13.50	168.42	15.780	3.499	35.070	12.462	3.733	13-#5
	Beam	1.17	152.82	15.780	1.098	6.601	1.994	1.588	6-#5
10	Column	12.33	87.24	14.740	3.197	32.040	13.455	1.920	11-#5
	Middle	13.50	67.55	14.740	3.499	35.070	13.500	1.483	12-#5
	Beam	1.17	61.29	14.740	0.828	6.601	4.986	0.623	3-#5
11	Column	12.33	220.86	14.480	3.197	32.040	9.250	4.931	16-#5
	Middle	13.50	171.01	14.480	3.499	35.070	12.462	3.792	13-#5
	Beam	1.17	155.16	14.480	1.098	6.601	1.994	1.613	6-#5
12	Column	6.08	6.52	10.500	1.577	15.803	12.167	0.142	6-#5
	Middle	19.75	44.98	10.500	5.119	51.307	13.941	0.984	17-#5
	Beam	1.17	36.94	10.500	0.496	6.601	9.972	0.373	2-#5

Bottom Bar Details:
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Units: Start (ft), Length (ft)

		Long Bars			Short Bars		
Span	Strip	Bars	Start	Length	Bars	Start	Length
1	Column	20-#5	0.00	30.00	---		
	Middle	12-#5	0.00	30.00	3-#5	4.50	21.00
	Beam	4-#5	0.00	30.00	3-#5	3.91	16.74
2	Column	12-#5	0.00	30.00	---		
	Middle	12-#5	0.00	30.00	---		
	Beam	4-#5	0.00	30.00	---		
3	Column	15-#5	0.00	30.00	---		
	Middle	12-#5	0.00	30.00	---		
	Beam	4-#5	0.00	30.00	1-#5	9.38	10.78
4	Column	14-#5	0.00	30.00	---		
	Middle	12-#5	0.00	30.00	---		
	Beam	4-#5	0.00	30.00	1-#5	10.35	9.41
5	Column	14-#5	0.00	30.00	---		
	Middle	12-#5	0.00	30.00	---		
	Beam	4-#5	0.00	30.00	1-#5	10.08	9.81
6	Column	14-#5	0.00	30.00	---		
	Middle	12-#5	0.00	30.00	---		
	Beam	4-#5	0.00	30.00	1-#5	10.17	9.64
7	Column	14-#5	0.00	30.00	---		
	Middle	12-#5	0.00	30.00	---		
	Beam	4-#5	0.00	30.00	1-#5	10.07	9.95
8	Column	14-#5	0.00	30.00	---		
	Middle	12-#5	0.00	30.00	---		
	Beam	4-#5	0.00	30.00	1-#5	10.46	8.69
9	Column	16-#5	0.00	30.00	---		
	Middle	12-#5	0.00	30.00	1-#5	4.50	21.00
	Beam	4-#5	0.00	30.00	2-#5	9.36	12.73
10	Column	11-#5	0.00	30.00	---		

	Middle	12-#5	0.00	30.00	---		
	Beam	3-#5	0.00	30.00	---		
11	Column	16-#5	0.00	30.00	---		
	Middle	12-#5	0.00	30.00	1-#5	4.50	21.00
	Beam	4-#5	0.00	30.00	2-#5	7.88	13.14
12	Column	6-#5	0.00	14.50	---		
	Middle	17-#5	0.00	14.50	---		
	Beam	2-#5	0.00	14.50	---		

Flexural Capacity:
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Units: From, To (ft), As (in^2), PhiMn (k-ft)

Span	Strip	From	To	AsTop	AsBot	PhiMn-	PhiMn+
1	Column	0.000	0.583	3.41	6.20	-153.83	275.98
		0.583	9.099	3.41	6.20	-153.83	275.98
		9.099	10.099	0.00	6.20	0.00	275.98
		10.099	10.675	0.00	6.20	0.00	275.98
		10.675	15.000	0.00	6.20	0.00	275.98
		15.000	18.948	0.00	6.20	0.00	275.98
		18.948	19.325	0.00	6.20	0.00	275.98
		19.325	19.992	0.00	6.20	0.00	275.98
		19.992	23.649	6.51	6.20	-289.35	275.98
		23.649	24.693	6.51	6.20	-289.35	275.98
		24.693	29.417	13.02	6.20	-560.50	275.98
		29.417	30.000	13.02	6.20	-560.50	275.98
	Middle	0.000	0.583	3.72	3.72	-167.83	167.83
		0.583	4.500	3.72	3.72	-167.83	167.83
		4.500	5.544	3.72	3.72	-167.83	167.83
		5.544	5.927	3.72	4.65	-167.83	208.93
		5.927	6.927	0.00	4.65	0.00	208.93
		6.927	10.675	0.00	4.65	0.00	208.93
		10.675	15.000	0.00	4.65	0.00	208.93
		15.000	18.948	0.00	4.65	0.00	208.93
		18.948	19.325	0.00	4.65	0.00	208.93
		19.325	20.006	0.00	4.65	0.00	208.93
		20.006	24.456	6.51	4.65	-290.13	208.93
		24.456	25.500	6.51	3.72	-290.13	167.83
		25.500	29.417	6.51	3.72	-290.13	167.83
		29.417	30.000	6.51	3.72	-290.13	167.83
	Beam	0.000	0.583	0.93	1.24	-90.89	120.32
		0.583	2.613	0.93	1.24	-90.89	120.32
		2.613	3.613	0.00	1.24	0.00	120.32
		3.613	3.908	0.00	1.24	0.00	120.32
		3.908	5.707	0.00	1.24	0.00	120.32
		5.707	10.675	0.00	2.17	0.00	205.98
		10.675	15.000	0.00	2.17	0.00	205.98
		15.000	18.503	0.00	2.17	0.00	205.98
		18.503	18.847	0.00	2.17	0.00	205.98
		18.847	19.325	0.00	1.24	0.00	120.32
		19.325	20.646	0.00	1.24	0.00	120.32
		20.646	20.750	0.00	1.24	0.00	120.32
		20.750	24.513	2.40	1.24	-225.21	120.32
		24.513	26.760	2.40	1.24	-225.21	120.32
		26.760	29.417	4.80	1.24	-424.27	120.32
		29.417	30.000	4.80	1.24	-424.27	120.32
2	Column	0.000	0.583	13.02	3.72	-560.50	167.57
		0.583	5.349	13.02	3.72	-560.50	167.57
		5.349	6.351	8.37	3.72	-368.68	167.57
		6.351	9.097	8.37	3.72	-368.68	167.57
		9.097	10.099	3.41	3.72	-153.83	167.57
		10.099	10.675	3.41	3.72	-153.83	167.57
		10.675	15.000	3.41	3.72	-153.83	167.57
		15.000	19.325	3.41	3.72	-153.83	167.57
		19.325	19.901	3.41	3.72	-153.83	167.57
		19.901	20.917	3.41	3.72	-153.83	167.57
		20.917	23.649	5.89	3.72	-262.57	167.57
		23.649	24.665	5.89	3.72	-262.57	167.57
		24.665	29.417	8.37	3.72	-368.68	167.57
		29.417	30.000	8.37	3.72	-368.68	167.57
	Middle	0.000	0.583	6.51	3.72	-290.13	167.83
		0.583	5.910	6.51	3.72	-290.13	167.83
		5.910	6.927	3.72	3.72	-167.83	167.83
		6.927	10.675	3.72	3.72	-167.83	167.83
		10.675	15.000	3.72	3.72	-167.83	167.83
		15.000	19.325	3.72	3.72	-167.83	167.83
		19.325	23.073	3.72	3.72	-167.83	167.83
		23.073	24.079	3.72	3.72	-167.83	167.83
		24.079	29.417	4.34	3.72	-195.27	167.83
		29.417	30.000	4.34	3.72	-195.27	167.83
	Beam	0.000	0.583	4.80	1.24	-424.27	120.32
		0.583	2.241	4.80	1.24	-424.27	120.32
		2.241	4.393	3.00	1.24	-277.42	120.32
		4.393	5.763	3.00	1.24	-277.42	120.32

		5.763	7.915	1.20	1.24	-115.87	120.32
		7.915	10.675	1.20	1.24	-115.87	120.32
		10.675	15.000	1.20	1.24	-115.87	120.32
		15.000	19.325	1.20	1.24	-115.87	120.32
		19.325	23.510	1.20	1.24	-115.87	120.32
		23.510	25.997	1.20	1.24	-115.87	120.32
		25.997	26.456	1.20	1.24	-115.87	120.32
		26.456	28.944	2.40	1.24	-225.21	120.32
		28.944	29.417	3.00	1.24	-277.42	120.32
		29.417	30.000	3.00	1.24	-277.42	120.32
3	Column	0.000	0.583	8.37	4.65	-368.68	208.53
		0.583	5.317	8.37	4.65	-368.68	208.53
		5.317	6.351	4.34	4.65	-194.92	208.53
		6.351	9.066	4.34	4.65	-194.92	208.53
		9.066	10.099	0.00	4.65	0.00	208.53
		10.099	10.675	0.00	4.65	0.00	208.53
		10.675	15.000	0.00	4.65	0.00	208.53
		15.000	19.325	0.00	4.65	0.00	208.53
		19.325	19.698	0.00	4.65	0.00	208.53
		19.698	20.735	0.00	4.65	0.00	208.53
		20.735	23.649	4.65	4.65	-208.53	208.53
		23.649	24.686	4.65	4.65	-208.53	208.53
		24.686	29.417	9.30	4.65	-407.78	208.53
		29.417	30.000	9.30	4.65	-407.78	208.53
	Middle	0.000	0.583	4.34	3.72	-195.27	167.83
		0.583	8.499	4.34	3.72	-195.27	167.83
		8.499	9.522	0.00	3.72	0.00	167.83
		9.522	10.675	0.00	3.72	0.00	167.83
		10.675	15.000	0.00	3.72	0.00	167.83
		15.000	19.325	0.00	3.72	0.00	167.83
		19.325	19.698	0.00	3.72	0.00	167.83
		19.698	20.698	0.00	3.72	0.00	167.83
		20.698	29.417	4.96	3.72	-222.56	167.83
		29.417	30.000	4.96	3.72	-222.56	167.83
	Beam	0.000	0.583	3.00	1.24	-277.42	120.32
		0.583	2.227	3.00	1.24	-277.42	120.32
		2.227	5.224	1.80	1.24	-171.35	120.32
		5.224	7.720	1.80	1.24	-171.35	120.32
		7.720	9.384	0.00	1.24	0.00	120.32
		9.384	10.630	0.00	1.24	0.00	120.32
		10.630	10.675	0.00	1.55	0.00	149.31
		10.675	10.718	0.00	1.55	0.00	149.31
		10.718	15.000	0.00	1.55	0.00	149.31
		15.000	18.006	0.00	1.55	0.00	149.31
		18.006	18.915	0.00	1.55	0.00	149.31
		18.915	19.325	0.00	1.24	0.00	120.32
		19.325	20.162	0.00	1.24	0.00	120.32
		20.162	21.500	0.00	1.24	0.00	120.32
		21.500	23.869	1.80	1.24	-171.35	120.32
		23.869	27.364	1.80	1.24	-171.35	120.32
		27.364	29.417	3.60	1.24	-328.01	120.32
		29.417	30.000	3.60	1.24	-328.01	120.32
4	Column	0.000	0.583	9.30	4.34	-407.78	194.92
		0.583	5.320	9.30	4.34	-407.78	194.92
		5.320	6.351	4.65	4.34	-208.53	194.92
		6.351	9.531	4.65	4.34	-208.53	194.92
		9.531	10.562	0.00	4.34	0.00	194.92
		10.562	10.675	0.00	4.34	0.00	194.92
		10.675	15.000	0.00	4.34	0.00	194.92
		15.000	19.325	0.00	4.34	0.00	194.92
		19.325	19.698	0.00	4.34	0.00	194.92
		19.698	20.734	0.00	4.34	0.00	194.92
		20.734	23.649	4.65	4.34	-208.53	194.92
		23.649	24.686	4.65	4.34	-208.53	194.92
		24.686	29.417	8.99	4.34	-394.79	194.92
		29.417	30.000	8.99	4.34	-394.79	194.92
	Middle	0.000	0.583	4.96	3.72	-222.56	167.83
		0.583	9.562	4.96	3.72	-222.56	167.83
		9.562	10.562	0.00	3.72	0.00	167.83
		10.562	10.675	0.00	3.72	0.00	167.83
		10.675	15.000	0.00	3.72	0.00	167.83
		15.000	19.325	0.00	3.72	0.00	167.83
		19.325	19.698	0.00	3.72	0.00	167.83
		19.698	20.725	0.00	3.72	0.00	167.83
		20.725	29.417	4.65	3.72	-208.93	167.83
		29.417	30.000	4.65	3.72	-208.93	167.83
	Beam	0.000	0.583	3.60	1.24	-328.01	120.32
		0.583	2.638	3.60	1.24	-328.01	120.32
		2.638	6.111	1.80	1.24	-171.35	120.32
		6.111	8.760	1.80	1.24	-171.35	120.32
		8.760	10.353	0.00	1.24	0.00	120.32
		10.353	10.675	0.00	1.24	0.00	120.32
		10.675	11.535	0.00	1.24	0.00	120.32
		11.535	12.233	0.00	1.55	0.00	149.31
		12.233	15.000	0.00	1.55	0.00	149.31

		15.000	18.263	0.00	1.55	0.00	149.31
		18.263	18.584	0.00	1.55	0.00	149.31
		18.584	19.325	0.00	1.24	0.00	120.32
		19.325	19.766	0.00	1.24	0.00	120.32
		19.766	21.500	0.00	1.24	0.00	120.32
		21.500	24.247	1.80	1.24	-171.35	120.32
		24.247	27.483	1.80	1.24	-171.35	120.32
		27.483	29.417	3.00	1.24	-277.42	120.32
		29.417	30.000	3.00	1.24	-277.42	120.32
5	Column	0.000	0.583	8.99	4.34	-394.79	194.92
		0.583	5.313	8.99	4.34	-394.79	194.92
		5.313	6.351	4.65	4.34	-208.53	194.92
		6.351	9.264	4.65	4.34	-208.53	194.92
		9.264	10.302	0.00	4.34	0.00	194.92
		10.302	10.675	0.00	4.34	0.00	194.92
		10.675	15.000	0.00	4.34	0.00	194.92
		15.000	19.325	0.00	4.34	0.00	194.92
		19.325	19.698	0.00	4.34	0.00	194.92
		19.698	20.742	0.00	4.34	0.00	194.92
		20.742	23.649	4.65	4.34	-208.53	194.92
		23.649	24.694	4.65	4.34	-208.53	194.92
		24.694	29.417	8.99	4.34	-394.79	194.92
		29.417	30.000	8.99	4.34	-394.79	194.92
	Middle	0.000	0.583	4.65	3.72	-208.93	167.83
		0.583	9.274	4.65	3.72	-208.93	167.83
		9.274	10.302	0.00	3.72	0.00	167.83
		10.302	10.675	0.00	3.72	0.00	167.83
		10.675	15.000	0.00	3.72	0.00	167.83
		15.000	19.325	0.00	3.72	0.00	167.83
		19.325	19.698	0.00	3.72	0.00	167.83
		19.698	20.733	0.00	3.72	0.00	167.83
		20.733	29.417	4.65	3.72	-208.93	167.83
		29.417	30.000	4.65	3.72	-208.93	167.83
	Beam	0.000	0.583	3.00	1.24	-277.42	120.32
		0.583	2.517	3.00	1.24	-277.42	120.32
		2.517	5.759	1.80	1.24	-171.35	120.32
		5.759	8.500	1.80	1.24	-171.35	120.32
		8.500	10.085	0.00	1.24	0.00	120.32
		10.085	10.675	0.00	1.24	0.00	120.32
		10.675	11.285	0.00	1.24	0.00	120.32
		11.285	11.742	0.00	1.55	0.00	149.31
		11.742	15.000	0.00	1.55	0.00	149.31
		15.000	18.237	0.00	1.55	0.00	149.31
		18.237	18.692	0.00	1.55	0.00	149.31
		18.692	19.325	0.00	1.24	0.00	120.32
		19.325	19.892	0.00	1.24	0.00	120.32
		19.892	21.500	0.00	1.24	0.00	120.32
		21.500	24.203	1.80	1.24	-171.35	120.32
		24.203	27.465	1.80	1.24	-171.35	120.32
		27.465	29.417	3.00	1.24	-277.42	120.32
		29.417	30.000	3.00	1.24	-277.42	120.32
6	Column	0.000	0.583	8.99	4.34	-394.79	194.92
		0.583	5.307	8.99	4.34	-394.79	194.92
		5.307	6.351	4.65	4.34	-208.53	194.92
		6.351	9.258	4.65	4.34	-208.53	194.92
		9.258	10.302	0.00	4.34	0.00	194.92
		10.302	10.675	0.00	4.34	0.00	194.92
		10.675	15.000	0.00	4.34	0.00	194.92
		15.000	19.325	0.00	4.34	0.00	194.92
		19.325	19.698	0.00	4.34	0.00	194.92
		19.698	20.745	0.00	4.34	0.00	194.92
		20.745	23.649	4.65	4.34	-208.53	194.92
		23.649	24.696	4.65	4.34	-208.53	194.92
		24.696	29.417	8.99	4.34	-394.79	194.92
		29.417	30.000	8.99	4.34	-394.79	194.92
	Middle	0.000	0.583	4.65	3.72	-208.93	167.83
		0.583	9.268	4.65	3.72	-208.93	167.83
		9.268	10.302	0.00	3.72	0.00	167.83
		10.302	10.675	0.00	3.72	0.00	167.83
		10.675	15.000	0.00	3.72	0.00	167.83
		15.000	19.325	0.00	3.72	0.00	167.83
		19.325	19.698	0.00	3.72	0.00	167.83
		19.698	20.735	0.00	3.72	0.00	167.83
		20.735	29.417	4.65	3.72	-208.93	167.83
		29.417	30.000	4.65	3.72	-208.93	167.83
	Beam	0.000	0.583	3.00	1.24	-277.42	120.32
		0.583	2.535	3.00	1.24	-277.42	120.32
		2.535	5.795	1.80	1.24	-171.35	120.32
		5.795	8.500	1.80	1.24	-171.35	120.32
		8.500	10.171	0.00	1.24	0.00	120.32
		10.171	10.675	0.00	1.24	0.00	120.32
		10.675	11.363	0.00	1.24	0.00	120.32
		11.363	11.760	0.00	1.55	0.00	149.31
		11.760	15.000	0.00	1.55	0.00	149.31
		15.000	18.230	0.00	1.55	0.00	149.31

		18.230	18.620	0.00	1.55	0.00	149.31
		18.620	19.325	0.00	1.24	0.00	120.32
		19.325	19.813	0.00	1.24	0.00	120.32
		19.813	21.500	0.00	1.24	0.00	120.32
		21.500	24.179	1.80	1.24	-171.35	120.32
		24.179	27.449	1.80	1.24	-171.35	120.32
		27.449	29.417	3.00	1.24	-277.42	120.32
		29.417	30.000	3.00	1.24	-277.42	120.32
7	Column	0.000	0.583	8.99	4.34	-394.79	194.92
		0.583	5.303	8.99	4.34	-394.79	194.92
		5.303	6.351	4.65	4.34	-208.53	194.92
		6.351	9.254	4.65	4.34	-208.53	194.92
		9.254	10.302	0.00	4.34	0.00	194.92
		10.302	10.675	0.00	4.34	0.00	194.92
		10.675	15.000	0.00	4.34	0.00	194.92
		15.000	19.325	0.00	4.34	0.00	194.92
		19.325	19.698	0.00	4.34	0.00	194.92
		19.698	20.727	0.00	4.34	0.00	194.92
		20.727	23.649	4.65	4.34	-208.53	194.92
		23.649	24.678	4.65	4.34	-208.53	194.92
		24.678	29.417	8.99	4.34	-394.79	194.92
		29.417	30.000	8.99	4.34	-394.79	194.92
	Middle	0.000	0.583	4.65	3.72	-208.93	167.83
		0.583	9.264	4.65	3.72	-208.93	167.83
		9.264	10.302	0.00	3.72	0.00	167.83
		10.302	10.675	0.00	3.72	0.00	167.83
		10.675	15.000	0.00	3.72	0.00	167.83
		15.000	19.325	0.00	3.72	0.00	167.83
		19.325	19.698	0.00	3.72	0.00	167.83
		19.698	20.718	0.00	3.72	0.00	167.83
		20.718	29.417	4.65	3.72	-208.93	167.83
		29.417	30.000	4.65	3.72	-208.93	167.83
	Beam	0.000	0.583	3.00	1.24	-277.42	120.32
		0.583	2.551	3.00	1.24	-277.42	120.32
		2.551	5.825	1.80	1.24	-171.35	120.32
		5.825	8.500	1.80	1.24	-171.35	120.32
		8.500	10.070	0.00	1.24	0.00	120.32
		10.070	10.675	0.00	1.24	0.00	120.32
		10.675	11.276	0.00	1.24	0.00	120.32
		11.276	11.773	0.00	1.55	0.00	149.31
		11.773	15.000	0.00	1.55	0.00	149.31
		15.000	18.287	0.00	1.55	0.00	149.31
		18.287	18.812	0.00	1.55	0.00	149.31
		18.812	19.325	0.00	1.24	0.00	120.32
		19.325	20.018	0.00	1.24	0.00	120.32
		20.018	21.500	0.00	1.24	0.00	120.32
		21.500	24.322	1.80	1.24	-171.35	120.32
		24.322	27.535	1.80	1.24	-171.35	120.32
		27.535	29.417	3.00	1.24	-277.42	120.32
		29.417	30.000	3.00	1.24	-277.42	120.32
8	Column	0.000	0.583	8.99	4.34	-394.79	194.92
		0.583	5.326	8.99	4.34	-394.79	194.92
		5.326	6.351	4.65	4.34	-208.53	194.92
		6.351	9.277	4.65	4.34	-208.53	194.92
		9.277	10.302	0.00	4.34	0.00	194.92
		10.302	10.675	0.00	4.34	0.00	194.92
		10.675	15.000	0.00	4.34	0.00	194.92
		15.000	19.178	0.00	4.34	0.00	194.92
		19.178	19.325	0.00	4.34	0.00	194.92
		19.325	20.209	0.00	4.34	0.00	194.92
		20.209	23.649	4.96	4.34	-222.10	194.92
		23.649	24.680	4.96	4.34	-222.10	194.92
		24.680	29.417	9.61	4.34	-420.74	194.92
		29.417	30.000	9.61	4.34	-420.74	194.92
	Middle	0.000	0.583	4.65	3.72	-208.93	167.83
		0.583	9.286	4.65	3.72	-208.93	167.83
		9.286	10.302	0.00	3.72	0.00	167.83
		10.302	10.675	0.00	3.72	0.00	167.83
		10.675	15.000	0.00	3.72	0.00	167.83
		15.000	19.178	0.00	3.72	0.00	167.83
		19.178	19.325	0.00	3.72	0.00	167.83
		19.325	20.200	0.00	3.72	0.00	167.83
		20.200	29.417	4.96	3.72	-222.56	167.83
		29.417	30.000	4.96	3.72	-222.56	167.83
	Beam	0.000	0.583	3.00	1.24	-277.42	120.32
		0.583	2.465	3.00	1.24	-277.42	120.32
		2.465	5.665	1.80	1.24	-171.35	120.32
		5.665	8.500	1.80	1.24	-171.35	120.32
		8.500	10.465	0.00	1.24	0.00	120.32
		10.465	10.675	0.00	1.24	0.00	120.32
		10.675	11.619	0.00	1.24	0.00	120.32
		11.619	11.700	0.00	1.55	0.00	149.31
		11.700	15.000	0.00	1.55	0.00	149.31
		15.000	17.387	0.00	1.55	0.00	149.31
		17.387	17.996	0.00	1.55	0.00	149.31

		17.996	19.151	0.00	1.24	0.00	120.32
		19.151	19.325	0.00	1.24	0.00	120.32
		19.325	20.980	0.00	1.24	0.00	120.32
		20.980	23.589	1.80	1.24	-171.35	120.32
		23.589	27.182	1.80	1.24	-171.35	120.32
		27.182	29.417	3.60	1.24	-328.01	120.32
		29.417	30.000	3.60	1.24	-328.01	120.32
9	Column	0.000	0.583	9.61	4.96	-420.74	222.10
		0.583	5.305	9.61	4.96	-420.74	222.10
		5.305	6.351	4.96	4.96	-222.10	222.10
		6.351	9.256	4.96	4.96	-222.10	222.10
		9.256	10.302	0.00	4.96	0.00	222.10
		10.302	10.675	0.00	4.96	0.00	222.10
		10.675	15.000	0.00	4.96	0.00	222.10
		15.000	19.325	0.00	4.96	0.00	222.10
		19.325	19.901	0.00	4.96	0.00	222.10
		19.901	20.924	0.00	4.96	0.00	222.10
		20.924	23.649	3.72	4.96	-167.57	222.10
		23.649	24.672	3.72	4.96	-167.57	222.10
		24.672	29.417	7.13	4.96	-315.96	222.10
		29.417	30.000	7.13	4.96	-315.96	222.10
	Middle	0.000	0.583	4.96	3.72	-222.56	167.83
		0.583	4.500	4.96	3.72	-222.56	167.83
		4.500	5.500	4.96	3.72	-222.56	167.83
		5.500	9.265	4.96	4.03	-222.56	181.57
		9.265	10.302	0.00	4.03	0.00	181.57
		10.302	10.675	0.00	4.03	0.00	181.57
		10.675	15.000	0.00	4.03	0.00	181.57
		15.000	19.325	0.00	4.03	0.00	181.57
		19.325	22.038	0.00	4.03	0.00	181.57
		22.038	23.048	0.00	4.03	0.00	181.57
		23.048	24.500	3.72	4.03	-167.83	181.57
		24.500	25.500	3.72	3.72	-167.83	167.83
		25.500	29.417	3.72	3.72	-167.83	167.83
		29.417	30.000	3.72	3.72	-167.83	167.83
	Beam	0.000	0.583	3.60	1.24	-328.01	120.32
		0.583	2.806	3.60	1.24	-328.01	120.32
		2.806	6.452	1.80	1.24	-171.35	120.32
		6.452	8.500	1.80	1.24	-171.35	120.32
		8.500	9.357	0.00	1.24	0.00	120.32
		9.357	10.675	0.00	1.24	0.00	120.32
		10.675	10.776	0.00	1.24	0.00	120.32
		10.776	12.146	0.00	1.86	0.00	177.86
		12.146	15.000	0.00	1.86	0.00	177.86
		15.000	19.325	0.00	1.86	0.00	177.86
		19.325	20.667	0.00	1.86	0.00	177.86
		20.667	21.764	0.00	1.24	0.00	120.32
		21.764	22.086	0.00	1.24	0.00	120.32
		22.086	23.840	0.00	1.24	0.00	120.32
		23.840	25.586	1.32	1.24	-127.47	120.32
		25.586	27.662	1.32	1.24	-127.47	120.32
		27.662	29.417	2.64	1.24	-247.03	120.32
		29.417	30.000	2.64	1.24	-247.03	120.32
10	Column	0.000	0.583	7.13	3.41	-315.96	153.83
		0.583	5.351	7.13	3.41	-315.96	153.83
		5.351	6.351	5.27	3.41	-235.64	153.83
		6.351	9.099	5.27	3.41	-235.64	153.83
		9.099	10.099	3.41	3.41	-153.83	153.83
		10.099	10.675	3.41	3.41	-153.83	153.83
		10.675	15.000	3.41	3.41	-153.83	153.83
		15.000	19.325	3.41	3.41	-153.83	153.83
		19.325	19.901	3.41	3.41	-153.83	153.83
		19.901	20.901	3.41	3.41	-153.83	153.83
		20.901	23.649	5.58	3.41	-249.13	153.83
		23.649	24.649	5.58	3.41	-249.13	153.83
		24.649	29.417	7.75	3.41	-342.40	153.83
		29.417	30.000	7.75	3.41	-342.40	153.83
	Middle	0.000	0.583	3.72	3.72	-167.83	167.83
		0.583	10.675	3.72	3.72	-167.83	167.83
		10.675	15.000	3.72	3.72	-167.83	167.83
		15.000	19.325	3.72	3.72	-167.83	167.83
		19.325	23.073	3.72	3.72	-167.83	167.83
		23.073	24.073	3.72	3.72	-167.83	167.83
		24.073	29.417	4.03	3.72	-181.57	167.83
		29.417	30.000	4.03	3.72	-181.57	167.83
	Beam	0.000	0.583	2.64	0.93	-247.03	90.89
		0.583	1.625	2.64	0.93	-247.03	90.89
		1.625	3.598	1.76	0.93	-168.20	90.89
		3.598	4.576	1.76	0.93	-168.20	90.89
		4.576	6.549	0.88	0.93	-85.86	90.89
		6.549	10.675	0.88	0.93	-85.86	90.89
		10.675	15.000	0.88	0.93	-85.86	90.89
		15.000	19.325	0.88	0.93	-85.86	90.89
		19.325	22.878	0.88	0.93	-85.86	90.89
		22.878	25.031	0.88	0.93	-85.86	90.89

		25.031	25.742	1.76	0.93	-168.20	90.89
		25.742	27.896	1.76	0.93	-168.20	90.89
		27.896	29.417	2.64	0.93	-247.03	90.89
		29.417	30.000	2.64	0.93	-247.03	90.89
11	Column	0.000	0.583	7.75	4.96	-342.40	222.10
		0.583	5.318	7.75	4.96	-342.40	222.10
		5.318	6.351	4.03	4.96	-181.26	222.10
		6.351	9.066	4.03	4.96	-181.26	222.10
		9.066	10.099	0.00	4.96	0.00	222.10
		10.099	10.675	0.00	4.96	0.00	222.10
		10.675	15.000	0.00	4.96	0.00	222.10
		15.000	19.325	0.00	4.96	0.00	222.10
		19.325	19.901	0.00	4.96	0.00	222.10
		19.901	21.069	0.00	4.96	0.00	222.10
		21.069	23.649	4.03	4.96	-177.68	222.10
		23.649	24.817	4.03	4.96	-177.68	222.10
		24.817	29.417	8.06	4.96	-341.23	222.10
		29.417	30.000	8.06	4.96	-341.23	222.10
	Middle	0.000	0.583	4.03	3.72	-181.57	167.83
		0.583	4.500	4.03	3.72	-181.57	167.83
		4.500	5.500	4.03	3.72	-181.57	167.83
		5.500	7.460	4.03	4.03	-181.57	181.57
		7.460	8.482	0.00	4.03	0.00	181.57
		8.482	10.675	0.00	4.03	0.00	181.57
		10.675	15.000	0.00	4.03	0.00	181.57
		15.000	19.325	0.00	4.03	0.00	181.57
		19.325	22.038	0.00	4.03	0.00	181.57
		22.038	23.038	0.00	4.03	0.00	181.57
		23.038	24.500	8.06	4.03	-360.79	181.57
		24.500	25.500	8.06	3.72	-360.79	167.83
		25.500	29.417	8.06	3.72	-360.79	167.83
		29.417	30.000	8.06	3.72	-360.79	167.83
	Beam	0.000	0.583	2.64	1.24	-247.03	120.32
		0.583	2.644	2.64	1.24	-247.03	120.32
		2.644	4.928	1.32	1.24	-127.47	120.32
		4.928	6.680	1.32	1.24	-127.47	120.32
		6.680	7.878	0.00	1.24	0.00	120.32
		7.878	8.964	0.00	1.24	0.00	120.32
		8.964	9.320	0.00	1.24	0.00	120.32
		9.320	10.675	0.00	1.86	0.00	177.86
		10.675	15.000	0.00	1.86	0.00	177.86
		15.000	19.325	0.00	1.86	0.00	177.86
		19.325	19.573	0.00	1.86	0.00	177.86
		19.573	20.919	0.00	1.24	0.00	120.32
		20.919	21.015	0.00	1.24	0.00	120.32
		21.015	23.840	0.00	1.24	0.00	120.32
		23.840	25.269	1.80	1.24	-171.35	120.32
		25.269	28.191	1.80	1.24	-171.35	120.32
		28.191	29.417	3.60	1.24	-328.01	120.32
		29.417	30.000	3.60	1.24	-328.01	120.32
12	Column	0.000	0.583	8.06	1.86	-341.23	83.76
		0.583	2.251	8.06	1.86	-341.23	83.76
		2.251	3.251	4.96	1.86	-216.68	83.76
		3.251	3.984	4.96	1.86	-216.68	83.76
		3.984	4.984	1.86	1.86	-83.76	83.76
		4.984	5.250	1.86	1.86	-83.76	83.76
		5.250	7.250	1.86	1.86	-83.76	83.76
		7.250	9.250	1.86	1.86	-83.76	83.76
		9.250	13.917	1.86	1.86	-83.76	83.76
		13.917	14.500	1.86	1.86	-83.76	83.76
	Middle	0.000	0.583	8.06	5.27	-360.79	237.87
		0.583	2.660	8.06	5.27	-360.79	237.87
		2.660	3.710	5.27	5.27	-237.87	237.87
		3.710	5.250	5.27	5.27	-237.87	237.87
		5.250	7.250	5.27	5.27	-237.87	237.87
		7.250	9.250	5.27	5.27	-237.87	237.87
		9.250	13.917	5.27	5.27	-237.87	237.87
		13.917	14.500	5.27	5.27	-237.87	237.87
	Beam	0.000	0.583	3.60	0.62	-328.01	61.03
		0.583	1.884	3.60	0.62	-328.01	61.03
		1.884	5.052	2.40	0.62	-225.21	61.03
		5.052	5.250	1.20	0.62	-115.87	61.03
		5.250	5.553	1.20	0.62	-115.87	61.03
		5.553	7.250	1.20	0.62	-115.87	61.03
		7.250	8.721	1.20	0.62	-115.87	61.03
		8.721	9.250	1.20	0.62	-115.87	61.03
		9.250	13.917	1.20	0.62	-115.87	61.03
		13.917	14.500	1.20	0.62	-115.87	61.03

Longitudinal Beam Shear Reinforcement Required:

Units: d (in), Start, End, Xu (ft), PhiVc, Vu (kip), Av/s (in^2/in)

Span	d	PhiVc	Start	End	Vu	Xu	Av/s
1	22.06	27.85	2.422	6.016	56.81	2.422	0.0292

			6.016	9.609	35.32	6.016	0.0124
			9.609	13.203	15.52	9.609	0.0124
			13.203	16.797	29.13	16.797	0.0124
			16.797	20.391	50.62	20.391	0.0229
			20.391	23.984	72.10	23.984	0.0446
			23.984	27.578	94.08	27.578	0.0667
2	22.06	27.85	2.422	6.016	82.54	2.422	0.0551
			6.016	9.609	60.56	6.016	0.0330
			9.609	13.203	39.08	9.609	0.0124
			13.203	16.797	18.48	13.203	0.0124
			16.797	20.391	27.77	20.391	0.0124
			20.391	23.984	47.37	23.984	0.0197
			23.984	27.578	68.35	27.578	0.0408
3	22.06	27.85	2.422	6.016	73.56	2.422	0.0460
			6.016	9.609	52.08	6.016	0.0244
			9.609	13.203	31.26	9.609	0.0124
			13.203	16.797	13.80	16.797	0.0000
			16.797	20.391	33.86	20.391	0.0124
			20.391	23.984	55.35	23.984	0.0277
			23.984	27.578	76.83	27.578	0.0493
4	22.06	27.85	2.422	6.016	75.60	2.422	0.0481
			6.016	9.609	54.12	6.016	0.0265
			9.609	13.203	32.65	9.609	0.0124
			13.203	16.797	13.01	13.203	0.0000
			16.797	20.391	32.09	20.391	0.0124
			20.391	23.984	53.31	23.984	0.0256
			23.984	27.578	74.79	27.578	0.0473
5	22.06	27.85	2.422	6.016	75.11	2.422	0.0476
			6.016	9.609	53.63	6.016	0.0260
			9.609	13.203	32.30	9.609	0.0124
			13.203	16.797	12.80	16.797	0.0000
			16.797	20.391	32.40	20.391	0.0124
			20.391	23.984	53.80	23.984	0.0261
			23.984	27.578	75.28	27.578	0.0478
6	22.06	27.85	2.422	6.016	75.16	2.422	0.0477
			6.016	9.609	53.67	6.016	0.0260
			9.609	13.203	32.30	9.609	0.0124
			13.203	16.797	12.80	16.797	0.0000
			16.797	20.391	32.40	20.391	0.0124
			20.391	23.984	53.75	23.984	0.0261
			23.984	27.578	75.24	27.578	0.0477
7	22.06	27.85	2.422	6.016	75.45	2.422	0.0479
			6.016	9.609	53.96	6.016	0.0263
			9.609	13.203	32.60	9.609	0.0124
			13.203	16.797	13.00	13.203	0.0000
			16.797	20.391	32.10	20.391	0.0124
			20.391	23.984	53.46	23.984	0.0258
			23.984	27.578	74.95	27.578	0.0474
8	22.06	27.85	2.422	6.016	74.17	2.422	0.0467
			6.016	9.609	52.68	6.016	0.0250
			9.609	13.203	31.34	9.609	0.0124
			13.203	16.797	13.76	16.797	0.0000
			16.797	20.391	33.36	20.391	0.0124
			20.391	23.984	54.74	23.984	0.0271
			23.984	27.578	76.23	27.578	0.0487
9	22.06	27.85	2.422	6.016	79.33	2.422	0.0519
			6.016	9.609	57.84	6.016	0.0302
			9.609	13.203	36.39	9.609	0.0124
			13.203	16.797	16.79	13.203	0.0124
			16.797	20.391	28.30	20.391	0.0124
			20.391	23.984	49.59	23.984	0.0219
			23.984	27.578	71.07	27.578	0.0435
10	22.13	27.93	2.427	6.019	48.13	2.427	0.0203
			6.019	9.612	34.11	6.019	0.0124
			9.612	13.204	20.53	9.612	0.0124
			13.204	16.796	9.44	16.796	0.0000
			16.796	20.388	21.96	20.388	0.0124
			20.388	23.981	35.98	23.981	0.0124
			23.981	27.573	50.00	27.573	0.0222
11	22.06	27.85	2.422	6.016	75.05	2.422	0.0475
			6.016	9.609	53.56	6.016	0.0259
			9.609	13.203	32.08	9.609	0.0124
			13.203	16.797	13.06	16.797	0.0000
			16.797	20.391	32.66	20.391	0.0124
			20.391	23.984	53.86	23.984	0.0262
			23.984	27.578	75.35	27.578	0.0478

12	22.06	27.85	2.422	4.836	114.33	2.422	0.0871
			4.836	7.250	84.60	4.836	0.0572
			7.250	9.664	54.87	7.250	0.0272
			9.664	12.078	33.09	9.664	0.0124

Longitudinal Beam Shear Reinforcement Details:
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Units: spacing & distance (in).

Span	Size Stirrups (2 legs each unless otherwise noted)
1	#3 9 @ 6.9 + 12 @ 10.8 + 5 @ 8.6 + 7 @ 6.2 [3L] + 14 @ 4.8 [3L]
2	#3 11 @ 5.7 [3L] + 7 @ 6.2 + 12 @ 10.8 + 4 @ 10.8 + 9 @ 7.8 [3L]
3	#3 9 @ 6.9 [3L] + 5 @ 8.6 + 5 @ 10.8 + <-- 43.1 --> + 4 @ 10.8 + 6 @ 7.2 + 11 @ 6.2 [3L]
4	#3 10 @ 6.2 [3L] + 6 @ 7.2 + 5 @ 10.8 + <-- 43.1 --> + 4 @ 10.8 + 6 @ 7.2 + 11 @ 6.2 [3L]
5	#3 10 @ 6.2 [3L] + 6 @ 7.2 + 5 @ 10.8 + <-- 43.1 --> + 4 @ 10.8 + 6 @ 7.2 + 11 @ 6.2 [3L]
6	#3 10 @ 6.2 [3L] + 6 @ 7.2 + 5 @ 10.8 + <-- 43.1 --> + 4 @ 10.8 + 6 @ 7.2 + 11 @ 6.2 [3L]
7	#3 10 @ 6.2 [3L] + 6 @ 7.2 + 5 @ 10.8 + <-- 43.1 --> + 4 @ 10.8 + 6 @ 7.2 + 11 @ 6.2 [3L]
8	#3 9 @ 6.9 [3L] + 6 @ 7.2 + 5 @ 10.8 + <-- 43.1 --> + 4 @ 10.8 + 6 @ 7.2 + 11 @ 6.2 [3L]
9	#3 11 @ 5.7 [3L] + 7 @ 6.2 + 12 @ 10.8 + 5 @ 8.6 + 10 @ 6.9 [3L]
10	#3 6 @ 10.4 + 9 @ 10.8 + <-- 43.1 --> + 8 @ 10.8 + 8 @ 8.9
11	#3 10 @ 6.2 [3L] + 6 @ 7.2 + 5 @ 10.8 + <-- 43.1 --> + 4 @ 10.8 + 6 @ 7.2 + 11 @ 6.2 [3L]
12	#3 13 @ 3.7 [3L] + 6 @ 4.8 [3L] + 4 @ 7.2 + 6 @ 9.6

Beam Shear Capacity:
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Units: d, Sp (in), Start, End, Xu (ft), PhiVc, PhiVn, Vu (kip), Av/s (in^2/in)

Span	d	PhiVc	Start	End	Av/s	Sp	PhiVn	Vu	Xu
1	22.19	28.00	0.000	0.833	-----	-----	59.79	72.43	0.000
			0.833	6.016	0.0318	6.9	59.79	56.75	2.432
			6.016	16.797	0.0204	10.8	48.38	35.32	6.016
			16.797	20.391	0.0255	8.6	53.47	50.62	20.391
			20.391	23.984	0.0536	6.2	81.49	72.10	23.984
			23.984	29.167	0.0690	4.8	96.88	94.01	27.568
			29.167	30.000	-----	-----	96.88	110.28	30.000
2	22.06	27.85	0.000	0.833	-----	-----	83.54	98.74	0.000
			0.833	6.016	0.0584	5.7	85.80	82.54	2.422
			6.016	9.609	0.0357	6.2	63.30	60.56	6.016
			9.609	20.391	0.0204	10.8	48.11	39.08	9.609
			20.391	23.984	0.0204	10.8	48.11	47.37	23.984
			23.984	29.167	0.0425	7.8	69.99	68.35	27.578
			29.167	30.000	-----	-----	83.54	83.96	30.000
3	22.06	27.85	0.000	0.833	-----	-----	83.54	89.18	0.000
			0.833	6.016	0.0478	6.9	75.26	73.56	2.422
			6.016	9.609	0.0255	8.6	53.17	52.08	6.016
			9.609	13.203	0.0204	10.8	48.11	31.26	9.609
			13.203	16.797	-----	-----	13.92	13.80	16.797
			16.797	20.391	0.0204	10.8	48.11	33.86	20.391
			20.391	23.984	0.0306	7.2	58.24	55.35	23.984
			23.984	29.167	0.0531	6.2	80.53	76.83	27.578
			29.167	30.000	-----	-----	83.54	92.45	30.000
4	22.06	27.85	0.000	0.833	-----	-----	83.54	91.22	0.000
			0.833	6.016	0.0531	6.2	80.53	75.60	2.422
			6.016	9.609	0.0306	7.2	58.24	54.12	6.016
			9.609	13.203	0.0204	10.8	48.11	32.65	9.609
			13.203	16.797	-----	-----	13.92	13.01	13.203
			16.797	20.391	0.0204	10.8	48.11	32.09	20.391
			20.391	23.984	0.0306	7.2	58.24	53.31	23.984
			23.984	29.167	0.0531	6.2	80.53	74.79	27.578
			29.167	30.000	-----	-----	83.54	90.41	30.000
5	22.06	27.85	0.000	0.833	-----	-----	83.54	90.73	0.000
			0.833	6.016	0.0531	6.2	80.53	75.11	2.422
			6.016	9.609	0.0306	7.2	58.24	53.63	6.016
			9.609	13.203	0.0204	10.8	48.11	32.30	9.609
			13.203	16.797	-----	-----	13.92	12.80	16.797
			16.797	20.391	0.0204	10.8	48.11	32.40	20.391
			20.391	23.984	0.0306	7.2	58.24	53.80	23.984
			23.984	29.167	0.0531	6.2	80.53	75.28	27.578
			29.167	30.000	-----	-----	83.54	90.90	30.000
6	22.06	27.85	0.000	0.833	-----	-----	83.54	90.77	0.000
			0.833	6.016	0.0531	6.2	80.53	75.16	2.422
			6.016	9.609	0.0306	7.2	58.24	53.67	6.016
			9.609	13.203	0.0204	10.8	48.11	32.30	9.609
			13.203	16.797	-----	-----	13.92	12.80	16.797

			16.797	20.391	0.0204	10.8	48.11	32.40	20.391
			20.391	23.984	0.0306	7.2	58.24	53.75	23.984
			23.984	29.167	0.0531	6.2	80.53	75.24	27.578
			29.167	30.000	-----	-----	83.54	90.85	30.000
7	22.06	27.85	0.000	0.833	-----	-----	83.54	91.07	0.000
			0.833	6.016	0.0531	6.2	80.53	75.45	2.422
			6.016	9.609	0.0306	7.2	58.24	53.96	6.016
			9.609	13.203	0.0204	10.8	48.11	32.60	9.609
			13.203	16.797	-----	-----	13.92	13.00	13.203
			16.797	20.391	0.0204	10.8	48.11	32.10	20.391
			20.391	23.984	0.0306	7.2	58.24	53.46	23.984
			23.984	29.167	0.0531	6.2	80.53	74.95	27.578
			29.167	30.000	-----	-----	83.54	90.56	30.000
8	22.06	27.85	0.000	0.833	-----	-----	83.54	89.78	0.000
			0.833	6.016	0.0478	6.9	75.26	74.17	2.422
			6.016	9.609	0.0306	7.2	58.24	52.68	6.016
			9.609	13.203	0.0204	10.8	48.11	31.34	9.609
			13.203	16.797	-----	-----	13.92	13.76	16.797
			16.797	20.391	0.0204	10.8	48.11	33.36	20.391
			20.391	23.984	0.0306	7.2	58.24	54.74	23.984
			23.984	29.167	0.0531	6.2	80.53	76.23	27.578
			29.167	30.000	-----	-----	83.54	91.84	30.000
9	22.13	27.93	0.000	0.833	-----	-----	83.78	94.94	0.000
			0.833	6.016	0.0584	5.7	86.04	79.29	2.427
			6.016	9.609	0.0357	6.2	63.48	57.84	6.016
			9.609	20.391	0.0204	10.8	48.24	36.39	9.609
			20.391	23.984	0.0255	8.6	53.32	49.59	23.984
			23.984	29.167	0.0478	6.9	75.48	71.04	27.573
			29.167	30.000	-----	-----	83.78	86.69	30.000
10	22.13	27.93	0.000	0.833	-----	-----	49.04	58.73	0.000
			0.833	6.019	0.0212	10.4	49.04	48.13	2.427
			6.019	13.204	0.0204	10.8	48.25	34.11	6.019
			13.204	16.796	-----	-----	13.96	9.44	16.796
			16.796	23.981	0.0204	10.8	48.25	35.98	23.981
			23.981	29.167	0.0247	8.9	52.56	50.00	27.573
			29.167	30.000	-----	-----	52.56	60.61	30.000
11	22.13	27.93	0.000	0.833	-----	-----	83.78	90.66	0.000
			0.833	6.016	0.0531	6.2	80.76	75.02	2.427
			6.016	9.609	0.0306	7.2	58.40	53.56	6.016
			9.609	13.203	0.0204	10.8	48.24	32.08	9.609
			13.203	16.797	-----	-----	13.96	13.06	16.797
			16.797	20.391	0.0204	10.8	48.24	32.66	20.391
			20.391	23.984	0.0306	7.2	58.40	53.86	23.984
			23.984	29.167	0.0531	6.2	80.76	75.32	27.573
			29.167	30.000	-----	-----	83.78	90.96	30.000
12	22.06	27.85	0.000	0.833	-----	-----	116.52	146.49	0.000
			0.833	4.836	0.0893	3.7	116.52	114.33	2.422
			4.836	7.250	0.0683	4.8	95.71	84.60	4.836
			7.250	9.664	0.0304	7.2	58.01	54.87	7.250
			9.664	13.667	0.0229	9.6	50.58	33.09	9.664
			13.667	14.500	-----	-----	50.58	48.11	14.500

Slab Shear Capacity:
==========

Units: b, d (in), Xu (ft), PhiVc, Vu(kip)

Span	b	d	Vratio	PhiVc	Vu	Xu
1	310.00	10.19	0.515	284.72	106.31	28.57
2	310.00	10.19	0.515	284.72	94.08	1.43
3	310.00	10.19	0.515	284.72	87.75	28.57
4	310.00	10.19	0.515	284.72	86.45	1.43
5	310.00	10.19	0.515	284.72	86.11	28.57
6	310.00	10.19	0.515	284.72	86.06	28.57
7	310.00	10.19	0.515	284.72	86.29	1.43
8	310.00	10.19	0.515	284.72	87.11	28.57
9	310.00	10.19	0.515	284.72	90.40	1.43
10	310.00	10.19	0.515	284.72	57.16	28.57
11	310.00	10.19	0.515	284.72	86.18	28.57
12	310.00	10.19	0.000	284.72	0.00	1.43

Flexural Transfer of Negative Unbalanced Moment at Supports:
==========

Units: Width (in), Munb (k-ft), As (in^2)

Supp	Width	GammaF*Munb	Comb	Pat	AsReq	AsProv	Additional Bars
1	74.00	150.92	U2	Odd	3.400	1.705	6-#5
2	80.00	63.67	U2	Odd	1.406	7.038	---
3	74.00	48.50	U2	Odd	1.069	4.185	---
4	74.00	39.78	U2	Odd	0.875	4.650	---
5	74.00	37.63	U2	Odd	0.827	4.495	---

6	74.00	37.19	U2	Odd	0.817	4.495	---
7	74.00	37.48	U2	Odd	0.824	4.495	---
8	74.00	39.18	U2	Odd	0.862	4.495	---
9	74.00	46.08	U2	Odd	1.015	4.805	---
10	74.00	73.73	U2	Odd	1.633	3.565	---
11	74.00	74.85	U2	Odd	1.658	3.875	---
12	74.00	51.96	U2	Odd	1.146	8.060	---
13	74.00	4.51	U2	Even	0.099	1.860	---

Flexural Transfer of Positive Unbalanced Moment at Supports:

Units: Width (in), Munb (k-ft), As (in^2)

Supp	Width	GammaF*Munb	Comb	Pat	AsReq	AsProv	Additional Bars
1	74.00	0.00	U1	All	0.000	3.100	---
2	80.00	0.00	U1	All	0.000	2.011	---
3	74.00	0.00	U1	All	0.000	1.860	---
4	74.00	0.00	U1	All	0.000	2.170	---
5	74.00	0.00	U1	All	0.000	2.170	---
6	74.00	0.00	U1	All	0.000	2.170	---
7	74.00	0.00	U1	All	0.000	2.170	---
8	74.00	0.00	U1	All	0.000	2.170	---
9	74.00	0.00	U1	All	0.000	2.170	---
10	74.00	0.00	U1	All	0.000	1.705	---
11	74.00	0.00	U1	All	0.000	1.705	---
12	74.00	0.00	U1	All	0.000	1.860	---
13	74.00	17.77	U2	Odd	0.389	1.860	---

Punching Shear Around Columns:

Units: Vu (kip), Munb (k-ft), vu (psi), Phi*vc (psi)

Supp	Vu	vu	Munb	Comb	Pat	GammaV	vu	Phi*vc
1	147.55	122.1	71.82	U2	All	0.320	144.1	180.3
2	426.81	153.8	-60.49	U2	All	0.400	162.2	180.3
3	353.37	146.3	25.54	U2	All	0.400	150.7	180.3
4	375.05	155.2	-6.40	U2	All	0.400	156.3	180.3
5	369.83	153.1	1.66	U2	All	0.400	153.4	180.3
6	370.94	153.5	-0.65	U2	All	0.400	153.6	180.3
7	371.44	153.7	1.11	U2	All	0.400	153.9	180.3
8	368.20	152.4	-4.06	U2	All	0.400	153.1	180.3
9	381.47	157.9	16.13	U2	All	0.400	160.7	180.3
10	296.82	122.9	-64.48	U2	All	0.400	134.0	180.3
11	308.88	127.8	75.45	U2	All	0.400	140.9	180.3
12	330.58	136.8	-73.70	U2	All	0.400	149.5	180.3
13	47.26	51.4	28.50	U2	Even	0.320	85.5	180.3

Punching Shear Around Drops:

Units: Vu (kip), vu (psi), Phi*vc (psi)

Supp	Vu	Comb	Pat	vu	Phi*vc
1	143.86	U2	All	90.4	167.9
2	395.13	U2	All	69.6	132.7
3	345.99	U2	All	108.7	167.9
4	367.67	U2	All	115.5	167.9
5	362.46	U2	All	113.8	167.9
6	363.57	U2	All	114.2	167.9
7	364.07	U2	All	114.3	167.9
8	360.83	U2	All	113.3	167.9
9	374.10	U2	All	117.5	167.9
10	290.74	U2	All	91.3	167.9
11	302.79	U2	All	95.1	167.9
12	323.21	U2	All	101.5	167.9
13	46.42	U2	Even	48.0	180.3

Maximum Deflections:

Units: Dz (in)

	Frame			Column Strip			Middle Strip		
Span	Dz(DEAD)	Dz(LIVE)	Dz(TOTAL)	Dz(DEAD)	Dz(LIVE)	Dz(TOTAL)	Dz(DEAD)	Dz(LIVE)	Dz(TOTAL)
1	-0.423	-0.229	-0.653	-0.496	-0.268	-0.764	-0.292	-0.158	-0.451
2	-0.114	-0.127	-0.242	-0.125	-0.140	-0.265	-0.096	-0.108	-0.204
3	-0.262	-0.175	-0.437	-0.287	-0.192	-0.479	-0.221	-0.148	-0.369
4	-0.233	-0.173	-0.406	-0.256	-0.189	-0.445	-0.197	-0.146	-0.343
5	-0.243	-0.176	-0.418	-0.266	-0.192	-0.458	-0.205	-0.148	-0.353
6	-0.239	-0.176	-0.416	-0.262	-0.193	-0.455	-0.202	-0.149	-0.351
7	-0.247	-0.174	-0.422	-0.271	-0.191	-0.462	-0.209	-0.147	-0.356
8	-0.210	-0.177	-0.387	-0.230	-0.194	-0.424	-0.178	-0.149	-0.327
9	-0.359	-0.160	-0.519	-0.394	-0.175	-0.568	-0.303	-0.135	-0.438
10	0.070	-0.056	0.047	0.077	-0.061	0.052	0.059	-0.047	0.040
11	-0.404	-0.171	-0.575	-0.443	-0.188	-0.630	-0.341	-0.145	-0.485
12	0.027	0.010	0.037	0.027	0.010	0.037	0.029	0.010	0.040

Material Takeoff:

Reinforcement in the Direction of Analysis

Top Bars:	12153.8	lb	<=>	35.28	lb/ft	<=>	1.307 lb/ft^2
Bottom Bars:	11136.9	lb	<=>	32.33	lb/ft	<=>	1.197 lb/ft^2
Stirrups:	3603.6	lb	<=>	10.46	lb/ft	<=>	0.387 lb/ft^2
Total Steel:	26894.3	lb	<=>	78.07	lb/ft	<=>	2.891 lb/ft^2
Concrete:	10208.3	ft^3	<=>	29.63	ft^3/ft	<=>	1.097 ft^3/ft^2

Waffle Slab

WAFFLE FLAT SLAB SYSTEM 30″ X 30″ Voids: 6″ Ribs @ 36″

f'_c = 4,000 psi
Grade 60 Bars

SQUARE EDGE PANELS: Total Depth = 15 in. Rib Depth = 12 in. Total Slab Depth = 3 in.

SQUARE INTERIOR PANELS: Total Depth = 15 in. Rib Depth = 12 in. Total Slab Depth = 3 in.

Span c.-c. Columns $\ell_1 = \ell_2$ (ft)	Factored Super-imposed Load (psf)	Edge: (1) Steel (psf)	Edge: Square Edge Column $c_1 = c_2$ (in.)	Edge: Square Edge Column γ_f	Edge: Square Edge Column (2) Stirrups	Edge: Column Strip Top Edge No.-size +	Edge: Column Strip Bottom No. Ribs	Edge: Column Strip Bottom Bars per Rib	Edge: Column Strip Top Interior No.-size	Edge: Middle Strip Bottom No. Ribs	Edge: Middle Strip Bottom Long Bars	Edge: Middle Strip Bottom Short Bars	Edge: Middle Strip Top Interior No.-size	Moments −M Edge (ft-k)	Moments +M Bot. (ft-k)	Moments −M Int. (ft-k)	Interior: (1) Steel (psf)	Interior: Square Interior Column $c_1 = c_2$ (in.)	Interior: Square Interior Column (2) Stirrups	Interior: Column Strip Bottom No. Ribs	Interior: Column Strip Bottom Bars per Rib	Interior: Column Strip Top Interior No.-size	Interior: Middle Strip Bottom No. Ribs	Interior: Middle Strip Bottom Long Bars	Interior: Middle Strip Bottom Short Bars	Interior: Middle Strip Top Interior No.-size
21'-0" D= 9.500 RIB NOT ON COLUMN LINE 0.720 CF/SF	50	1.84	12	0.674		15-#5+ 0	4	2-#4	15-#5	3	#4	#4	6-#5	51	101	136	1.82	12		4	2-#4	15-#5	3	#4	#4	6-#5
	100	1.84	12	0.700		15-#5+ 0	4	2-#4	15-#5	3	#4	#4	6-#5	64	134	173	1.82	12		4	2-#4	15-#5	3	#4	#4	6-#5
	150	1.95	12	0.726		15-#5+ 0	4	1-#4 and 1-#5	15-#5	3	#4	#5	6-#5	78	182	210	1.82	12		4	2-#4	15-#5	3	#4	#4	6-#5
	200	2.01	12	0.752		15-#5+ 0	4	2-#5	15-#5	3	#4	#5	6-#5	92	226	247	1.82	12		4	2-#4	15-#5	3	#4	#4	6-#5
	300	2.42	12	0.803		15-#5+ 0	4	2-#6	15-#5	3	#5	#6	6-#5	119	311	320	2.11	12		4	2-#5	15-#5	3	#4	#5	6-#5
	400	2.77	12 •	0.855		15-#5+ 0	4	1-#6 and 1-#7	16-#5	3	#6	#7	6-#5	146	395	394	2.35	12	4 S 6 1	4	1-#5 and 1-#6	15-#5	3	#5	#5	6-#5
	500	3.29	12 •	0.637		15-#5+ 0	4	1-#7 and 1-#8	14-#6	3	#7	#7	6-#5	173	477	467	2.73	12 •	4 S 6 1	4	2-#6	18-#5	3	#5	#6	6-#5
24'-0" D= 9.500 RIB NOT ON COLUMN LINE 0.692 CF/SF	50	1.87	12	0.750		18-#5+ 0	4	2-#4	18-#5	4	#4	#4	7-#5	75	150	203	1.85	12		4	2-#4	18-#5	4	#4	#4	7-#5
	100	1.92	12	0.779		18-#5+ 0	4	1-#4 and 1-#5	18-#5	4	#4	#4	7-#5	96	200	258	1.86	12		4	2-#4	18-#5	4	#4	#4	7-#5
	150	2.14	12	0.807		18-#5+ 0	4	1-#5 and 1-#6	18-#5	4	#4	#5	7-#5	117	271	314	1.95	12		4	1-#4 and 1-#5	18-#5	4	#4	#4	7-#5
	200	2.32	12	0.835		18-#5+ 0	4	2-#6	18-#5	4	#5	#5	7-#5	137	337	369	2.05	12		4	2-#5	18-#5	4	#4	#4	7-#5
	300	2.97	12 •	0.892		18-#5+ 0	4	1-#7 and 1-#8	20-#5	4	#6	#6	7-#5	178	466	480	2.49	12 •	4 S 6 1	4	2-#6	18-#5	4	#5	#5	7-#5
	400	3.44	12 •	0.637		18-#5+ 0	4	2-#8	17-#6	4	#6	#7	8-#5	220	593	591	2.97	12 •	4 S 6 1	4	1-#6 and 1-#7	16-#6	4	#5	#6	7-#5
	500	4.31	15 •	0.633		18-#5+ 0	4	2-#9	20-#6	4	#7	#8	7-#6	258	709	695	3.76	12 •	4 S 6 1	4	1-#7 and 1-#8	19-#6	4	#6	#6	9-#5
27'-0" D= 9.500 RIB NOT ON COLUMN LINE 0.673 CF/SF	50	1.96	13	0.776		20-#5+ 0	4	2-#5	20-#5	5	#4	#4	8-#5	106	213	286	1.86	13		4	2-#4	20-#5	5	#4	#4	8-#5
	100	2.06	13	0.809		20-#5+ 0	4	1-#5 and 1-#6	20-#5	5	#4	#4	8-#5	136	277	366	1.94	13		4	1-#4 and 1-#5	20-#5	5	#4	#4	8-#5
	150	2.35	13	0.843		20-#5+ 0	4	1-#6 and 1-#7	20-#5	5	#4	#5	8-#5	165	380	445	2.13	13	4 S 6 1	4	1-#5 and 1-#6	20-#5	5	#4	#4	8-#5
	200	2.76	13 •	0.876		20-#5+ 0	4	1-#7 and 1-#8	21-#5	5	#5	#6	8-#5	195	474	524	2.33	13	4 S 6 1	4	2-#6	20-#5	5	#4	#5	8-#5
	300	3.54	13 •	0.635		20-#5+ 0	4	1-#8 and 1-#9	20-#6	5	#6	#7	9-#5	254	658	683	2.99	13 •	4 S 6 1	4	2-#7	26-#5	5	#5	#5	8-#5
	400	4.50	17 •	0.630		20-#5+ 1	4	1-#9 and 1-#10	25-#6	5	#7	#7	8-#6	309	827	831	4.05	13 •	4 S 6 2	4	2-#8	23-#6	5	#6	#6	8-#6
	500	5.06	21 •	0.626	4 S 6 1	20-#5+ 1	4	2-#10	29-#6	5	#7	#8	9-#6	356	921	958	4.58	18 •	4 S 6 2	4	1-#8 and 1-#9	27-#6	5	#6	#6	9-#6
30'-0" D=12.500 RIB ON COLUMN LINE 0.705 CF/SF	50	1.96	15	0.782		22-#5+ 0	5	2-#5	22-#5	5	#4	#4	9-#5	148	296	399	1.85	15		5	2-#4	22-#5	5	#4	#4	9-#5
	100	2.24	15	0.829		22-#5+ 1	5	2-#6	22-#5	5	#4	#5	9-#5	188	377	507	2.03	15		5	2-#5	22-#5	5	#4	#4	9-#5
	150	2.68	15 •	0.882		22-#5+ 4	5	2-#7	25-#5	5	#5	#6	9-#5	229	512	616	2.28	15		5	1-#5 and 1-#6	23-#5	5	#4	#5	9-#5
	200	3.18	15 •	0.924		22-#5+ 7	5	1-#7 and 1-#8	21-#6	5	#6	#6	10-#5	269	640	724	2.84	15 •	4 S 6 1	5	1-#6 and 1-#7	28-#5	5	#5	#5	9-#5
	300	4.36	19 •	0.628		22-#5+ 3	5	2-#9	28-#6	5	#7	#8	9-#6	345	881	930	3.86	15 •	4 S 6 1	5	1-#7 and 1-#8	26-#6	5	#6	#6	12-#5
	400	5.04	23 •	0.625	4 S 6 1	22-#5+ 5	5	1-#9 and 1-#10	34-#6	5	#8	#8	11-#6	414	1010	1114	4.53	20 •	4 S 6 2	5	2-#8	31-#6	5	#6	#7	10-#6
33'-0" D=12.500 RIB ON COLUMN LINE 0.687 CF/SF	50	2.25	16	0.814		25-#5+ 0	5	2-#6	25-#5	6	#4	#5	10-#5	196	391	526	2.06	16		5	2-#5	25-#5	6	#4	#4	10-#5
	100	2.46	16 •	0.868		25-#5+ 2	5	1-#6 and 1-#7	28-#5	6	#5	#5	10-#5	249	499	671	2.16	16	4 S 6 1	5	1-#5 and 1-#6	25-#5	6	#4	#4	10-#5
	150	3.18	16 •	0.917		25-#5+ 5	5	2-#8	24-#6	6	#6	#6	11-#5	303	662	816	2.69	16 •	4 S 6 1	5	1-#6 and 1-#7	31-#5	6	#4	#5	10-#5
	200	3.76	18 •	0.629		25-#5+ 2	5	1-#8 and 1-#9	28-#6	6	#6	#7	13-#5	355	827	956	3.35	16 •	4 S 6 1	5	2-#7	26-#6	6	#5	#6	12-#5
	300	4.96	24 •	0.624	4 S 6 1	25-#5+ 5	5	2-#10	37-#6	6	#7	#8	12-#6	451	1066	1213	4.39	19 •	4 S 6 2	5	2-#8	35-#6	6	#6	#6	11-#6
36'-0" D=12.500 RIB ON COLUMN LINE 0.673 CF/SF	50	2.34	18	0.825		27-#5+ 1	5	1-#6 and 1-#7	28-#5	7	#4	#5	11-#5	251	502	676	2.14	18		5	1-#5 and 1-#6	27-#5	7	#4	#4	11-#5
	100	2.89	18 •	0.893		27-#5+ 6	5	1-#7 and 1-#8	26-#6	7	#5	#5	12-#5	321	642	864	2.64	18 •	4 S 6 1	5	1-#6 and 1-#7	33-#5	7	#4	#5	11-#5
	150	3.60	19 •	0.628		27-#5+ 3	5	1-#8 and 1-#9	31-#6	7	#6	#6	10-#6	389	798	1049	3.24	18 •	4 S 6 1	5	2-#7	29-#6	7	#5	#5	13-#5
	200	4.36	23 •	0.625	4 S 6 1	27-#5+ 4	5	1-#9 and 1-#10	37-#6	7	#6	#7	12-#6	454	1003	1223	3.99	18 •	4 S 6 2	5	2-#8	35-#6	7	#5	#6	11-#6
39'-0" D=15.500 RIB NOT ON COLUMN LINE 0.697 CF/SF	50	2.72	19 •	0.877		29-#5+ 8	6	2-#7	36-#5	7	#5	#6	12-#5	325	649	874	2.37	19		6	1-#5 and 1-#6	33-#5	7	#4	#5	12-#5
	100	3.46	20 •	0.916		29-#5+11	6	2-#8	33-#6	7	#6	#6	15-#5	412	825	1110	3.13	19 •	4 S 6 1	6	1-#6 and 1-#7	31-#6	7	#5	#5	14-#5
	150	4.03	24 •	0.624		29-#5+ 7	6	1-#8 and 1-#9	40-#6	7	#6	#7	13-#6	496	992	1336	3.73	19 •	4 S 6 1	6	2-#7	38-#6	7	#5	#6	12-#6

See the notes on Page 11-19.

Waffle Slab

1

Check Deflection of Waffle slab. (Reference CRSI 2002)

$$\Delta = K \frac{wL^4}{E_c t_e^3}$$

w: service load, psf
L: span of panel, ft
t_e: equivalent avg. thickness
K: coefficient (ratio of spans)

$K: \frac{30}{27} = 1.11 \Rightarrow K = 0.0532$

$t_e = 11.74"$

$w = 100psf\ (LL) + 132\ psf\ (SDL) = 232\ psf$

$\Delta = 0.0532 \frac{(232)(30)^4}{(3.5e6)(11.74)^3} = 0.001765"$

$L/480$ limitation $= 30(12)/480 = 0.75" > \Delta$ OK ✓

Calculate Weight:

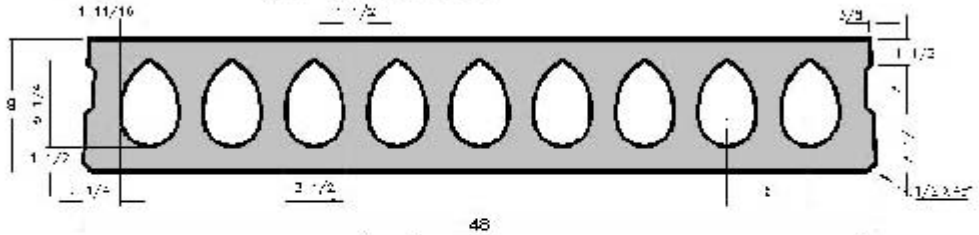
using $t_e = 11.74"$.

$150\ pcf \times \frac{11.74"}{12} = 147\ psf$

Hollow Core Plank

SPANCRETE

3.4 ULTRALIGHT LOAD TABLES
8" thick
1.00" strand cover



48

No Structural Topping
Dead Load Weight of Slab = 61 psf

FIRE RATINGS (Hours)

Code	Restrained	Unrestrained
Rational Design	1	1
SBC/UBC	2	1
UL	2	3/4
DILHR 51.045 Table 2	1	1

Section Properties

A = 251 in² | Yt = 3.99 in | b = 15.4 in
I = 1817 in⁴ | Yb = 4.01 in | wt = 61 psf

Mn ft-k/ft	10.64	14.41	18.98	24.65	30.11	31.5	34.38
Series	1.0F-8508	1.0F-8606	1.0F-8706	1.0F-8708	1.0F-8710	1.0F-8808	1.0F-8712
Span in feet	Allowable Superimposed Load in Pounds per Square Foot						
13	246	351	478	569			
14	205	296	405	522			
15	172	251	347	462	481		
16	145	215	299	403	446	434	
17	123	184	259	351	408	405	
18	104	159	225	308	368	378	389
19	88	138	197	271	334	343	365
20	75	119	173	240	304	313	334
21	63	103	152	213	271	286	306
22	53	90	134	189	242	256	281
23	44	78	119	169	218	230	255
24		67	105	151	196	207	231
25		58	93	135	176	187	209
26		50	82	121	159	169	189
27			72	109	144	153	172
28			64	98	130	139	156
29			56	88	118	126	142
30			49	79	107	114	129
31			46	70	97	104	118
32				63	88	95	108
33				56	80	86	98
34				50	72	78	90
35					65	71	82
36					59	64	75
37					53	58	68
38						52	62
39							56
40							51

2 Inch Bonded Structural Topping
Dead Load Weight of Slab with Topping = 86 psf

FIRE RATINGS (Hours)

Code	Restrained	Unrestrained
Rational Design	1	1
SBC/UBC	3	1
UL	2	3/4
DILHR 51.045 Table 2	1	1

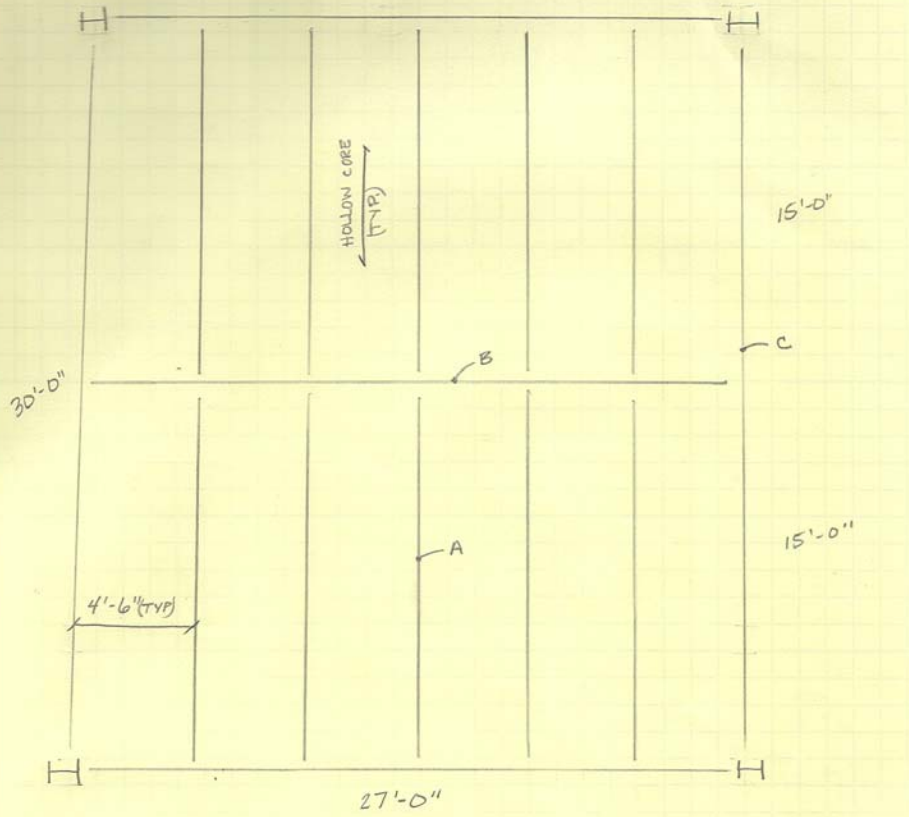
Section Properties

A = 336 in² | Yt = 4.63 in | B = 15.4 in
I = 3425 in⁴ | Yb = 5.27 in | wt = 86 psf

Mn ft-k/ft	13.78	18.69	24.67	32.09	39.1	41.18	45.71
Series	1.0F-8508 T	1.0F-8606 T	1.0F-8706 T	1.0F-8708 T	1.0F-8710 T	1.0F-8808 T	1.0F-8712 T
Span in feet	Allowable Superimposed Load in Pounds per Square Foot						
15	217	320	445	491			
16	182	273	383	456			
17	153	233	331	425			
18	129	201	287	395			
19	109	173	251	347	373		
20		149	219	307	351		
21		129	192	272	331		
22		111	169	241	309		
23			149	215	277	294	
24			131	191	249	266	280
25			115	171	224	239	266
26				153	201	216	246
27				136	182	194	219
28				122	163	173	196
29				109	144	154	175
30					128	137	157
31					113	121	140
32					99	107	125
33					87	94	111
34						82	99
35							87
							77

1-1 1/2" Camber | 1 1/2" or more Camber

HOLLOW CORE



w_{SDL} = 132 psf

w_{LL} = 100 psf

$w_{DL,\ Hollow\ core}$ = 86 psf

$w_{DL,\ steel}$ = 8 psf

$w_u = 1.2(132 + 86 + 8) + 1.6(100) = 430$ psf

$\Delta_{LL} \leq L/480$

$\Delta_{TL} \leq L/240$

Design of A

2

$\Delta_{LL} = L/480 = \frac{15(12)}{480} = 0.375"$

$\Delta_{TL} = L/240 = \frac{15(12)}{240} = 0.75"$

$\frac{5(0.45)(15)^4(1728)}{384(29000)I_{req}} = 0.375"$ $\quad I_{req} = 47.1 \text{ in}^4$

Try W10x12
$I_x = 53.8$
$\phi M_n = 46.9 \text{ ft·k}$
$\phi V_n = 56.3 \text{ k}$

$M_u = \frac{wL^2}{8} = \frac{(0.43)(4.5)(15)^2}{8} = 54.4$ X

Try W12x16
$I_x = 103$
$\phi M_n = 75.4 \text{ ft·k}$
$\phi V_n = 79.1 \text{ k}$

$V_u = \frac{wL}{2} = \frac{0.43(4.5)(15)}{2} = 14.5 \text{ k}$ ✓

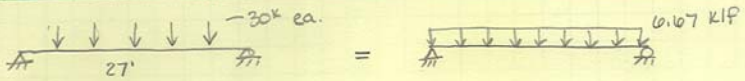
$\Delta_{TL} = 0.75" \geq \frac{5(0.43 \times 4.5)(15)^4(1728)}{384(29000)(103)} = 0.738"$ OK

controls Δ

W12x16

Design of B

3



$M_u = \frac{wL^2}{8} = \frac{6.67(27)^2}{8} = 608 \text{ ft·K}$

$V_u = \frac{wL}{2} = \frac{6.67(27)}{2} = 90 \text{ K}$

Try W24×68
$\phi M_n = 664$
$\phi V_n = 295$
$I_x = 1830$

$\Delta_{TL} = \frac{L}{240} = \frac{27(12)}{240} = 1.35"$

$1.5 = \frac{5(6.67)(27)^4(1728)}{384(29000)(1830)} \leq 1.35$ X

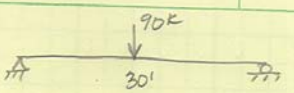
Try 24×76
$I_x = 2100$

$1.31 \leq \frac{5(6.67)(27)^4(1728)}{384(29000)(2100)} \leq 1.35$ OK ✓

W24×76

Design of C:

4



$\Delta_{TL} = L/240 = 1.5"$

$M_u = \frac{PL}{4} = \frac{90(30)}{4} = 675\ ft \cdot K$

$V_u = \frac{P}{2} = 45^K$

$\Delta_{max} = \frac{PL^3}{48EI} = \frac{90(30)^3(1728)}{48(29000)I_{req}} = 1.5$

$I_{req} = 252\ in^4$

W24x76
$I_x = 2100$
$\phi M_n = 750$
$\phi V_n = 316^K$

W24x76

Double T

SPANCRETE

1.4 Double tee load tables
8'-0" x 20"
Double tee topped

1.0

Revised 10/94

2 Inch Bonded Structural Topping
Dead Load Weight of Tee with Topping = 75 psf

SECTION PROPERTIES
A = 517 in.²
I = 17,397 in.⁴
Y_t = 5.87 in.
Y_b = 16.13 in.

ϕM_n ft - k	237	345	447	548							
SERIES	8DT20-C48H	8DT20-C68H	8DT20-C88H	8DT20-C108H							
Span in Feet	ALLOWABLE SUPERIMPOSED LOAD IN POUNDS PER SQUARE FOOT										
20	297										
22	235										
24	187										
26	150	248									
28	120	205	283								
30	97	170	234								
32	77	142	206								
34	61	118	168								
36	48	98	141								
38	36	80	117								
40		65	97	121							
42		46	80	102							
44		32	65	85							
46			53	71							
48			40	57							
50				45							
52				35							

1" - 1 ½" Camber
1 ½" or More Camber

Inverted T Beam

SPANCRETE

3.4 Inverted tee beams for tees

3.0
Beams and Columns

Issued 1094