



Northeast Site Solutions
Victoria Masse
420 Main Street #2, Sturbridge, MA 01566
860-306-2326
victoria@northeastsitesolutions.com

July 12, 2022

Members of the Siting Council
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Notice of Exempt Modification
555 Main Street, Stamford CT 06901
Latitude: 41.05353500
Longitude: -73.53557900
T-Mobile Site#: CT11410A_Anchor & L600

Dear Ms. Bachman:

T-Mobile currently maintains six (9) antennas at the 210-foot level and 203-foot level of the existing 231.6-foot lattice tower on a rooftop located at 555 Main Street, Stamford CT 06901. The 231.6-foot lattice tower and property are owned by Frontier Communications. T-Mobile now intends to install (6) new 600/700/1900/2500 MHz antenna. The new antennas would be installed at the 210-foot level and 203-foot level of the tower. This modification includes B2, B5 hardware that is both 4G (LTE), and 5G capable.

T-Mobile Planned Modifications:

Remove:
(23) Coax

Remove and Replace:

(3) Air21 KRC118023 B2A/B4P Antenna (Remove) – (3) AIR6449 B41 2500 MHz Antenna (Replace)
(3) Andrew LNX-6516DS Antenna (Remove) – (3) RFS APXVAALL24 600/700/1900 MHz Antenna (Replace)
(3) Mount Frame (Remove) – (3) Site Pro 1 VFA12-HD Mount Frame (Replace)
(3) RRUS 11 B12 (Remove) – (3) Ericsson Radio 4480 B71 + B85 (Replace)

Install New:

(3) RRU 4415 B25
(6) Hybrid Lines
(3) Commscope SDX1926Q-43

Existing to Remain:

(3) Air32 KRD901146 B66A-B2A 1900/2100 MHz Antenna
(3) Generic Twin TMA
(6) Hybrid Line



Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Caroline Simmons, Mayor of the City of Stamford and James Lunney III, Chief Zoning Enforcement Officer for the City of Stamford, as well as the property owner and the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing structure.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Victoria Masse

Victoria Masse
Mobile: 860-306-2326
Fax: 413-521-0558
Office: 420 Main Street, Unit 2, Sturbridge MA 01566
Email: victoria@northeastsitesolutions.com

Attachments:



cc: Caroline Simmons
Stamford Government Center
888 Washington Boulevard
Stamford, CT 06901

James Lunney III, Chief Zoning Enforcement Officer
Stamford Government Center
888 Washington Boulevard
Stamford, CT 06901

Southern NE Telephone c/o
Frontier Communications - as property and tower owner
PO Box 2629
Addison, TX 75001-2629

Southern NE Telephone c/o
Frontier Communications - as property and tower owner
401 Merritt 7
Norwalk, CT 06851-1000

Exhibit A

Original Facility Approval

Victoria Masse <victoria@northeastsitesolutions.com>

T-Mobile Original Zoning Approval Request for 555 E Main Street, Stamford CT (CT11410A)

Judge, Mary <MJudge@stamfordct.gov>
To: Victoria Masse <victoria@northeastsitesolutions.com>

Tue, Jul 12, 2022 at 2:08 PM

We do not have the tower plans for 555 E. Main Street. We have permit plans to replace or add antennas only.

Mary Judge

From: Victoria Masse <victoria@northeastsitesolutions.com>
Sent: Tuesday, July 12, 2022 1:31 PM
To: Zoning Enforcement <ZoningEnforcement@StamfordCT.gov>
Cc: Deborah Chase <deborah@northeastsitesolutions.com>
Subject: Re: T-Mobile Original Zoning Approval Request for 555 E Main Street, Stamford CT (CT11410A)

Good Afternoon,

I am reaching out to see if you have been able to locate the original approval of the Tower build.

Thank you

On Wed, Jul 6, 2022 at 4:48 PM Victoria Masse <victoria@northeastsitesolutions.com> wrote:

Good Afternoon,

I am reaching out on behalf of T-Mobile regarding their proposed antenna upgrades on an existing tower on a rooftop located at 555 E Main Street.

Currently we are working with T-Mobile to file with the Connecticut Siting Council, part of the Siting Council's filing requirements is that we provide the original zoning approval of the tower build. It does not appear that the council has this on their website so that is why I am reaching out to you for this information.

I have attached the property card for your reference.

If you could review your records for any approvals of when this tower was originally approved to be built with the height that the tower was originally approved for that would be greatly appreciated.

Please let me know if you have any questions or need any additional information, I can be reached at 860-306-2326.

Thank you

--

Victoria Masse

Zoning & Permitting Specialist

Notary Public

Mobile: 860-306-2326

Office: 420 Main Street Unit 1 Box 2 Sturbridge, MA 01566

Email: victoria@northeastsitesolutions.com



--

Victoria Masse

Zoning & Permitting Specialist

Notary Public

Mobile: 860-306-2326

Office: 420 Main Street Unit 1 Box 2 Sturbridge, MA 01566

Email: victoria@northeastsitesolutions.com



Exhibit B

Property Card

555 EAST MAIN STREET

Location	555 EAST MAIN STREET	Mblu	002/ 1816/ / /
Acct#	002-1816	Owner	SOUTHERN NEW ENGLAND TELE CO
Assessment	\$6,095,090	Appraisal	\$8,707,260
PID	7839	Building Count	1

Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2018	\$2,085,780	\$6,621,480	\$8,707,260
Assessment			
Valuation Year	Improvements	Land	Total
2018	\$1,460,050	\$4,635,040	\$6,095,090

Owner of Record

Owner	SOUTHERN NEW ENGLAND TELE CO	Sale Price	\$0
Co-Owner		Book & Page	1251/ 284
Address	401 MERRITT 7 C/O TAX DEPT NORWALK, CT 06851	Sale Date	02/28/1972
		Instrument	25

Ownership History

Ownership History				
Owner	Sale Price	Book & Page	Instrument	Sale Date
SOUTHERN NEW ENGLAND TELE CO	\$0	1251/ 284	25	02/28/1972

Building Information

Building 1 : Section 1

Year Built: 1949
Living Area: 99,506

Building Attributes	
Field	Description
STYLE	Off/Warehouse
MODEL	Comm/Ind
Grade	C+
Stories:	6
Occupancy	1
Exterior Wall 1	Brick
Exterior Wall 2	Stucco Mas
Roof Structure	Flat
Roof Cover	T&G/Rubber
Interior Wall 1	Drywall/Plaste
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	
Heating Fuel	Gas/LP
Heating Type	Forced Air-Duc
AC Type	None
Bldg Use	Commercial MDL-94
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	300C
Heat/AC	None
Frame Type	FireProofSteel
Baths/Plumbing	Average
Ceiling/Wall	Sus-Ceil&Wall
Rooms/Prtns	Average
Wall Height	16
% Comn Wall	9

Building Photo



(http://images.vgsi.com/photos/StamfordCTPhotos//\00\13\04\20.jpg)

Building Layout

BAS[15243]

FUS[84263]

UBM[16131]

(http://images.vgsi.com/photos/StamfordCTPhotos//Sketches/78

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
FUS	Upper Story, Finished	84,263	84,263
BAS	First Floor	15,243	15,243
UBM	Basement, Unfinished	16,131	0
		115,637	99,506

Extra Features

Extra Features	Legend
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Code	Description	Size	Value	Bldg #
EL2	Elev Pass	24 STOPS	\$216,000	1

Land

Land Use		Land Line Valuation	
Use Code	300C	Size (Acres)	1.19
Description	Industrial MDL-94	Depth	
Zone	CCN	Assessed Value	\$4,635,040
Neighborhood	1000	Appraised Value	\$6,621,480
Alt Land Appr Category	No		

Outbuildings

Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
AP1	Fence Chn Lk			3510 L.F.	\$30,270	1
FC5	Shed Conc Blk			320 S.F.	\$5,040	1
LP4	Pavng Asphlt			8000 S.F	\$9,600	1
CEL2	Cell - Roof Top			1 SITES	\$138,750	1

Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2018	\$2,085,780	\$6,621,480	\$8,707,260
2017	\$2,085,780	\$6,621,480	\$8,707,260
2016	\$2,382,080	\$6,675,340	\$9,057,420

Assessment			
Valuation Year	Improvements	Land	Total
2018	\$1,460,050	\$4,635,040	\$6,095,090
2017	\$1,460,050	\$4,635,040	\$6,095,090
2016	\$1,667,460	\$4,672,740	\$6,340,200

Stamford, CT Tax Maps

555 EAST MAIN STREET

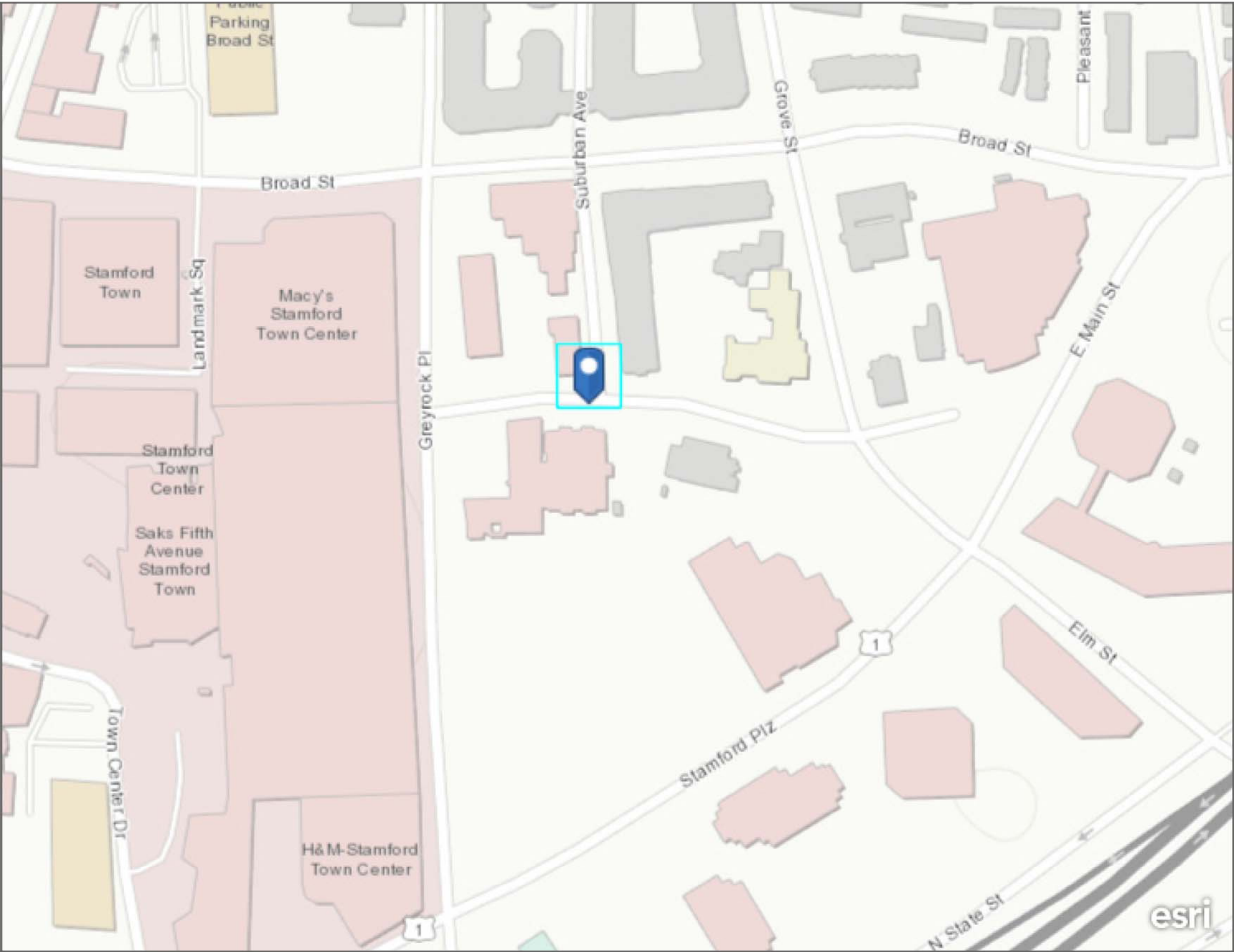


Exhibit C

Construction Drawings

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MODIFICATION OF EXISTING WIRELESS FACILITY BY



T-MOBILE NORTHEAST LLC

PROJECT TITLE: ANCHOR

SITE NUMBER: CT11410A

SITE NAME: STAMFORD / DWTN

SITE ADDRESS: 555 E MAIN STREET STAMFORD, CT, 06901

RF CONFIGURATION: 67E5997DB_2XAIR+1OP (U21 MARKET)

APPLICANT:

T-Mobile
T-MOBILE NORTHEAST LLC

35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

PROJECT MANAGER

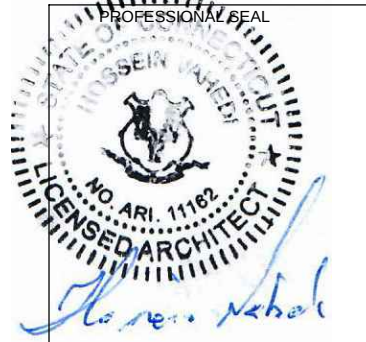


420 MAIN STREET, BLDG 4
STURBRIDGE, MA 01566
203-275-6669

CONSULTANT:



462 WALNUT STREET, SUITE 1
NEWTON, MA 02460
617-212-3123



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PRINTED SIZES ARE DEEMED "NOT TO SCALE".

REV	DESCRIPTION	DATE
A	PRELIMINARY	11/29/21
0	FINAL ISSUED	12/29/21
1	REVISED PER COMMENTS	01/12/22

SITE NUMBER: CT11410A

SITE NAME: STAMFORD / DWTN

SITE ADDRESS: 555 E MAIN STREET
STAMFORD, CT, 06901

SHEET TITLE:

T-1: TITLE SHEET

PROJECT NOTES:

- THIS IS AN UNMANNED TELECOMMUNICATION FACILITY AND NOT FOR HUMAN HABITATION:
HANDICAPPED ACCESS IS NOT REQUIRED.
POTABLE WATER OR SANITARY SERVICE IS NOT REQUIRED.
NO OUTDOOR STORAGE OR ANY SOLID WASTE RECEPTACLES REQUIRED.
- DEVELOPMENT AND USE OF THE SITE WILL CONFORM TO ALL APPLICABLE CODES,
ORDINANCES AND SPECIFICATIONS.

CODE COMPLIANCE:

ALL WORK SHALL COMPLY WITH THE CURRENT NATIONAL AND CONNECTICUT STATE
BUILDING AND LIFE SAFETY CODES, SUPPLEMENTS AND AMENDMENTS INCLUDING BUT NOT
LIMITED TO THE LATEST EDITION OF:

CONNECTICUT STATE BUILDING CODE (CSBC).

ANSI/TIA-222-G STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND
ANTENNAS.

NATIONAL ELECTRICAL CODE (NEC) FOR POWER AND GROUNDING REQUIREMENTS.

OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA).

NFPA - NATIONAL FIRE PROTECTION ASSOCIATION.

CONTRACTOR'S NOTES:

CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON THE
JOB SITE. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING
OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK. FAILURE TO NOTIFY
THE ARCHITECT/ENGINEER PLACES THE RESPONSIBILITY ON THE CONTRACTOR TO
CORRECT THE DISCREPANCIES AT THE CONTRACTOR'S EXPENSE.

REFER TO STRUCTURAL ANALYSIS REPORT:

MOUNT STRUCTURAL ANALYSIS REPORT - DATED 05/28/2021 BY EFI GLOBAL INC.
STRUCTURAL ANALYSIS REPORT ROOFTOP - DATED 11/16/2021 BY TOWER ENGINEERING
PROFESSIONALS.

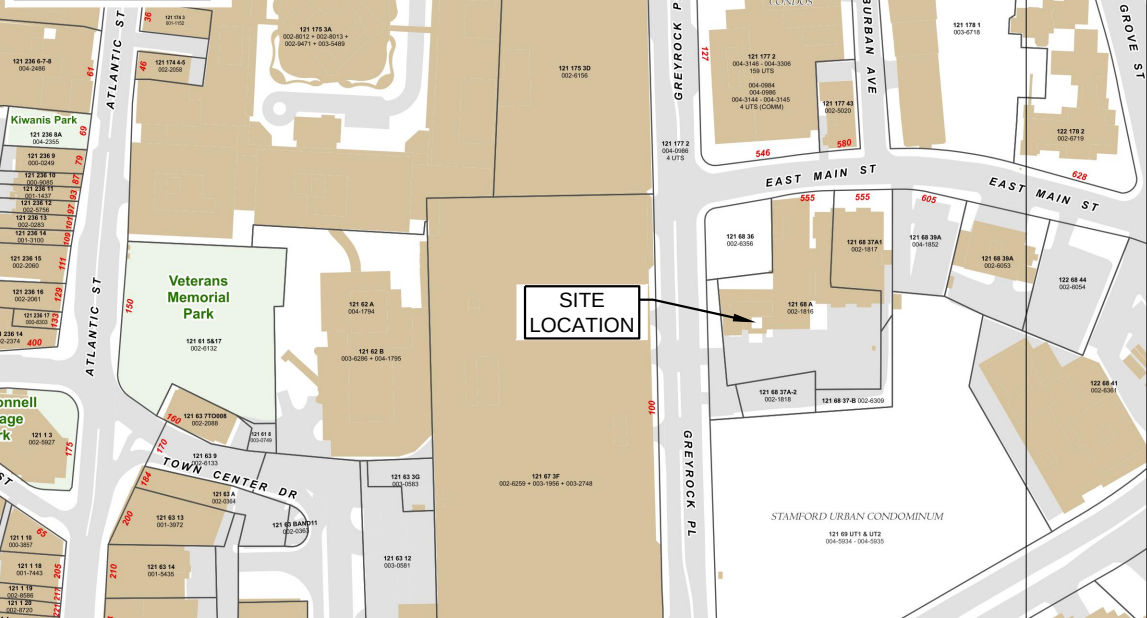
APPROVALS:

FSA CM	DATE
RF ENGINEER	DATE
FOP	DATE
T-MOBILE ENGINEERING AND DEVELOPMENT	DATE
	DATE
	DATE

SITE IMAGE:



SITE VICINITY :



PROJECT SUMMARY:

THE PROPOSED PROJECT SCOPE WILL CONSIST OF:

UPGRADE EXISTING 6201 CABINET INTERNALLY.
INSTALL A POWER 6230 UNIT INSIDE A 19 INCH RACK ASSEMBLY.
REPLACE (6) OF (9) EXISTING ANTENNAS.
REMOVE (3) EXISTING AND ADD (6) REMOTE RADIO UNITS AT THE ANTENNAS.
INSTALL (3) DIPLEXERS AT THE ANTENNAS.
KEEP (6) AND REMOVE EXCESS COAXIAL LINES, REMOVE ALL EXISTING HCS AND
ADD (6) 6X24 HCS LINES.

PROJECT INFORMATION:

ADDRESS:	555 E MAIN STREET STAMFORD, CT, 06901
COORDINATES:	41°03'12.45" N, 73°32'08.44" W
STRUCTURE TYPE:	SELF SUPPORT TOWER ON ROOF OF BUILDING
JURISDICTION:	CITY OF STAMFORD CONNECTICUT

PROJECT TEAM:

APPLICANT:	T-MOBILE NORTHEAST, LLC. 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 860-692-7100
LANDLORD:	FRONTIER COMMUNICATIONS 805 CENTRAL EXPRESSWAY SOUTH ALLEN, TX 75013 CONTACT: KELLEY STEWART KELLEY.STEWART@FTR.COM 214-437-8156
PROJECT MANAGER:	NORTHEAST SITE SOLUTIONS 420 MAIN STREET, BLDG 4 STURBRIDGE, MA 01566 CONTACT: SHELDON FREINCLE SHELDON@NORTHEASTSITESOLUTIONS.COM 201-776-8521
CONSULTANTS:	FORESITE LLC 462 WALNUT ST NEWTON, MA 02460 CONTACT: SAEED MOSSAVAT SMOSSAVAT@FORESITELLC.COM

SHEET INDEX:

T-1:	TITLE SHEET
N-1:	GENERAL NOTES
A-1:	PLANS
A-2:	ELEVATION AND MOUNTING DETAILS
A-3:	ANTENNA LAYOUT PLANS
A-4:	ANTENNA AND EQUIPMENT SPECIFICATIONS
E-1:	ELECTRICAL AND GROUNDING DETAILS

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GENERAL NOTES:

1.

THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.
2.

THE ARCHITECT/ENGINEER HAS MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.
3.

THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE CLIENT'S REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK.
5.

THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS.
6.

THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S / VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.
7.

THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS DURING CONSTRUCTION.
8.

THE CONTRACTOR SHALL COMPLY WITH ALL PERTINENT SECTIONS OF THE BASIC STATE BUILDING CODE, LATEST EDITION, AND ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJEC
9.

THE CONTRACTOR SHALL NOTIFY THE CLIENT'S REPRESENTATIVE IN WRITING WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE CLIENT'S REPRESENTATIVE.
10.

THE WORK SHALL CONFORM TO THE CODES AND STANDARDS OF THE FOLLOWING AGENCIES AS FURTHER CITED HEREIN:

A.

ASTM: AMERICAN SOCIETY FOR TESTING AND MATERIALS, AS PUBLISHED IN "COMPILATION OF ASTM STANDARDS BUILDING CODES" OR LATEST EDITION.

B.

AWS: AMERICAN WELDING SOCIETY INC. AS PUBLISHED IN "STANDARD D1.1-08, STRUCTURAL WELDING CODE" OR LATEST EDITION.

C.

AISC: AMERICAN INSTITUTE FOR STEEL CONSTRUCTION AS PUBLISHED IN "CODE FOR STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES"; "SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" (LATEST EDITION).
11.

BOLTING:

A.

BOLTS SHALL BE CONFORMING TO ASTM A325 HIGH STRENGTH, HOT DIP GALVANIZED WITH ASTM A153 HEAVY HEX TYPE NUTS.

B.

BOLTS SHALL BE 3/4"Ø MINIMUM (UNLESS OTHERWISE NOTED)

C.

ALL CONNECTIONS SHALL BE 2 BOLTS MINIMUM.
12.

FABRICATION:

A.

FABRICATION OF STEEL SHALL CONFORM TO THE AISC AND AWS STANDARDS AND CODES (LATEST EDITION).

B.

ALL STRUCTURAL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 (LATEST EDITION), UNLESS OTHERWISE NOTED.
13.

ERECTION OF STEEL:

A.

PROVIDE ALL ERECTION EQUIPMENT, BRACING, PLANKING, FIELD BOLTS, NUTS, WASHERS, DRIFT PINS, AND SIMILAR MATERIALS WHICH DO NOT FORM A PART OF THE COMPLETED CONSTRUCTION BUT ARE NECESSARY FOR ITS PROPER ERECTION.

B.

ERECT AND ANCHOR ALL STRUCTURAL STEEL IN ACCORDANCE WITH AISC REFERENCE STANDARDS. ALL WORK SHALL BE ACCURATELY SET TO ESTABLISHED LINES AND ELEVATIONS AND RIGIDLY FASTENED IN PLACE WITH SUITABLE ATTACHMENTS TO THE CONSTRUCTION OF THE BUILDING.

C.

TEMPORARY BRACING, GUYING AND SUPPORT SHALL BE PROVIDED TO KEEP THE STRUCTURE SAFE AND ALIGNED AT ALL TIMES DURING CONSTRUCTION, AND TO PREVENT DANGER TO PERSONS AND PROPERTY. CHECK ALL TEMPORARY LOADS AND STAY WITHIN SAFE CAPACITY OF ALL BUILDING COMPONENTS.
14.

ANTENNA INSTALLATION:

A.

INSTALL ANTENNAS AS INDICATED ON DRAWINGS AND CLIENT'S REPRESENTATIVE SPECIFICATIONS.

B.

INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED ON DRAWINGS.

- C.

INSTALL COAXIAL / FIBER CABLES AND TERMINATIONS BETWEEN ANTENNAS AND EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. WEATHERPROOF ALL CONNECTORS BETWEEN THE ANTENNA AND EQUIPMENT PER MANUFACTURER'S REQUIREMENTS.

15.

ANTENNA AND COAXIAL / FIBER CABLE GROUNDING:

- A.

ALL EXTERIOR #6 GREEN GROUND WIRE "DAISY CHAIN" CONNECTIONS ARE TO BE WEATHER SEALED WITH ANDREWS CONNECTOR/SPLICE WEATHERPROOFING KIT TYPE #221213 OR EQUAL.

- B.

ALL COAXIAL / FIBER CABLE GROUNDING KITS ARE TO BE INSTALLED ON STRAIGHT RUNS OF COAXIAL / FIBER CABLE (NOT WITHIN BENDS).

16.

RELATED WORK, FURNISH THE FOLLOWING WORK AS SPECIFIED UNDER CONSTRUCTION DOCUMENTS, BUT COORDINATE WITH OTHER TRADES PRIOR TO BID:

- A.

FLASHING OF OPENING INTO OUTSIDE WALLS

- B.

SEALING AND CAULKING ALL OPENINGS

- C.

PAINTING

- D.

CUTTING AND PATCHING

17.

REQUIREMENTS OF REGULATORY AGENCIES:

- A.

FURNISH U.L. LISTED EQUIPMENT WHERE SUCH LABEL IS AVAILABLE. INSTALL IN CONFORMANCE WITH U.L. STANDARDS WHERE APPLICABLE.

- B.

INSTALL ANTENNA, ANTENNA CABLES, GROUNDING SYSTEM IN ACCORDANCE WITH DRAWINGS AND SPECIFICATION IN EFFECT AT PROJECT LOCATION AND RECOMMENDATIONS OF STATE AND LOCAL BUILDING CODES, AND SPECIAL CODES HAVING JURISDICTION OVER SPECIFIC PORTIONS OF WORK. THIS WORK INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:

- C.

TIA-EIA - 222 (LATEST EDITION). STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES.

- D.

FAA - FEDERAL AVIATION ADMINISTRATION ADVISORY CIRCULAR AC 70/7460-IH, OBSTRUCTION MARKING AND LIGHTING.

- E.

FCC - FEDERAL COMMUNICATIONS COMMISSION RULES AND REGULATIONS FORM 715, OBSTRUCTION MARKING AND LIGHTING SPECIFICATION FOR ANTENNA STRUCTURES AND FORM 715A, HIGH INTENSITY OBSTRUCTION LIGHTING SPECIFICATIONS FOR ANTENNA STRUCTURES.

- F.

AISC - AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 BOLTS (LATEST EDITION).

- G.

NEC - NATIONAL ELECTRICAL CODE - ON TOWER LIGHTING KITS.

- H.

UL - UNDERWRITER'S LABORATORIES APPROVED ELECTRICAL PRODUCTS.

- I.

IN ALL CASES, PART 77 OF THE FAA RULES AND PARTS 17 AND 22 OF THE FCC RULES ARE APPLICABLE AND IN THE EVENT OF CONFLICT, SUPERSEDE ANY OTHER STANDARDS OR SPECIFICATIONS.

- J.

2018 LIFE SAFETY CODE NFPA - 101.

APPLICANT:



T-MOBILE NORTHEAST LLC

35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

PROJECT MANAGER

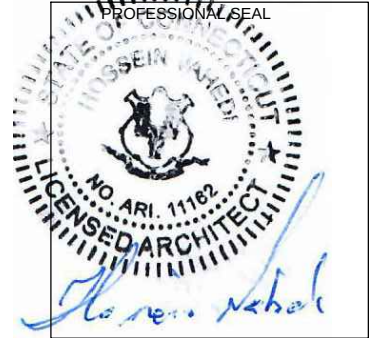


420 MAIN STREET, BLDG 4
STURBRIDGE, MA 01566
203-275-6669

CONSULTANT:



462 WALNUT STREET, SUITE 1
NEWTON, MA 02460
617-212-3123



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REV	DESCRIPTION	DATE
A	PRELIMINARY	11/29/21
0	FINAL ISSUED	12/29/21
1	REVISED PER COMMENTS	01/12/22

SITE NUMBER: CT11410A

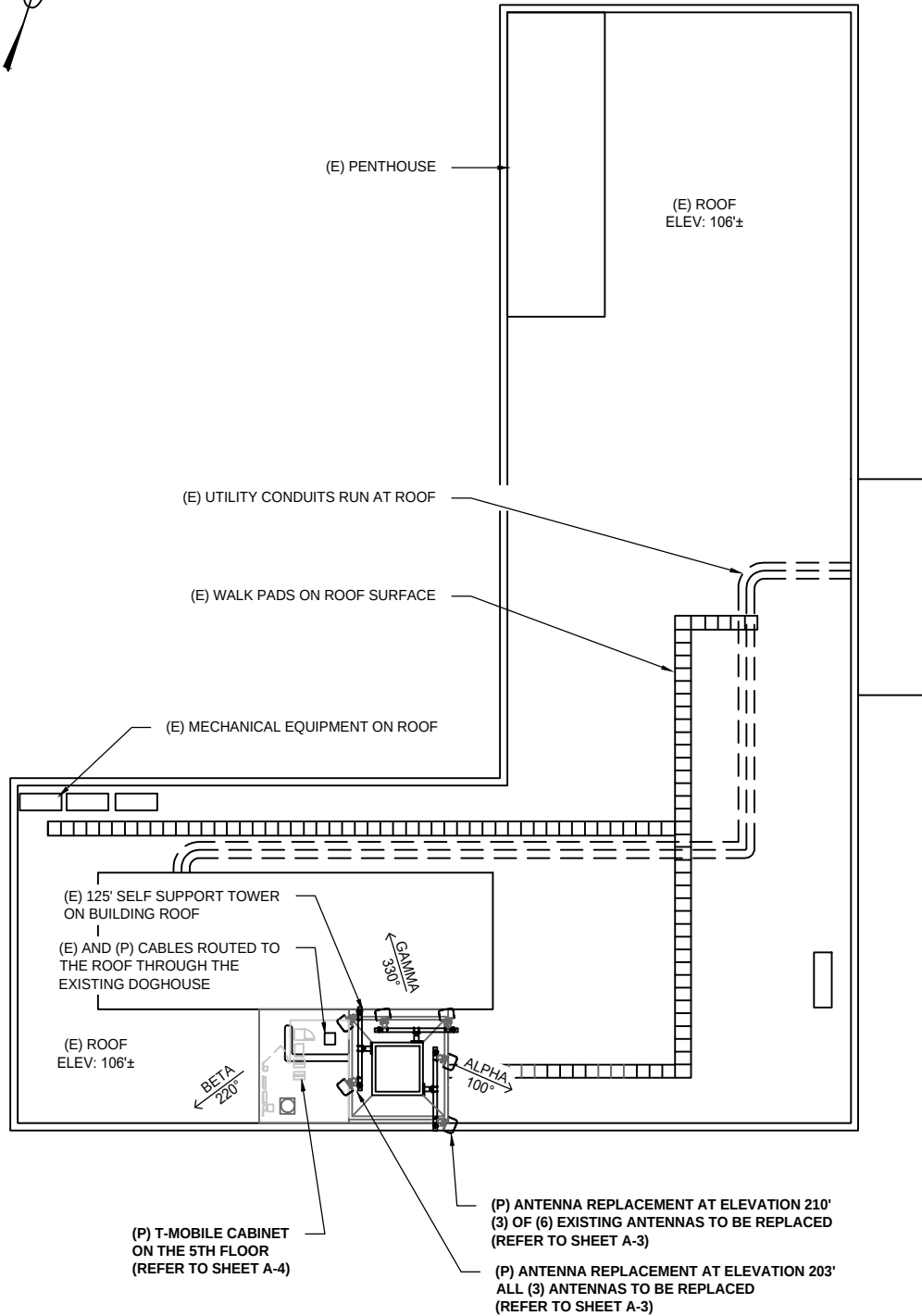
SITE NAME: STAMFORD / DWTN

SITE ADDRESS: 555 E MAIN STREET
STAMFORD, CT, 06901

SHEET TITLE:

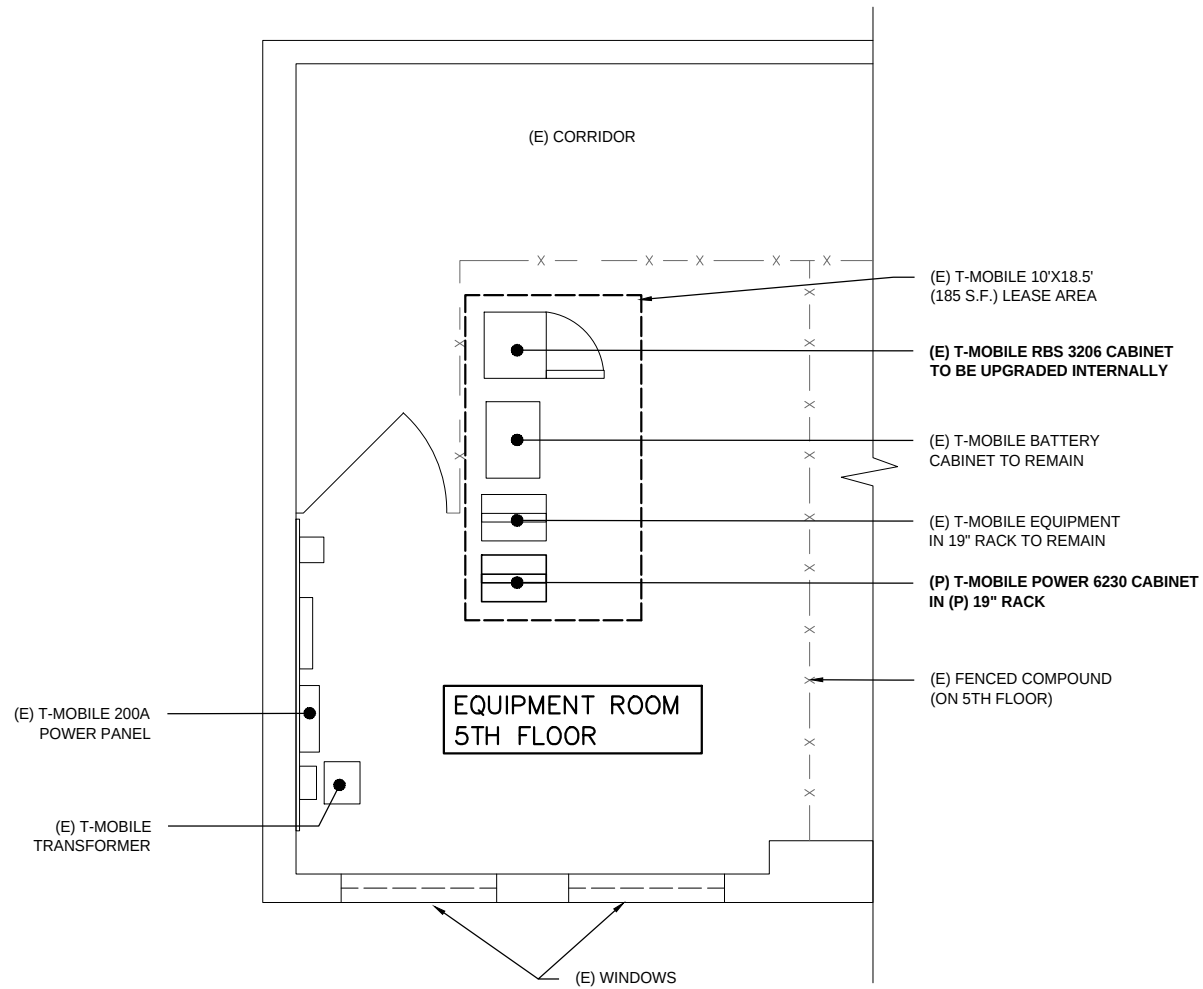
N-1: GENERAL NOTES

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ROOF PLAN
SCALE: 1" = 30'

1
A-1



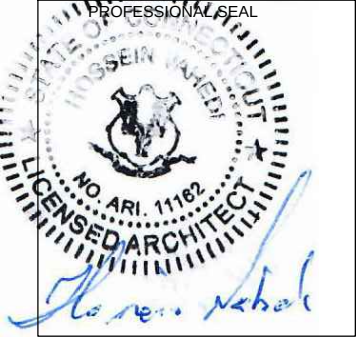
**EQUIPMENT ROOM
(5TH FLOOR)**
SCALE: 1/8" = 1'-0"

2
A-1

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

PROJECT MANAGER

420 MAIN STREET, BLDG 4
STURBRIDGE, MA 01566
203-275-6669

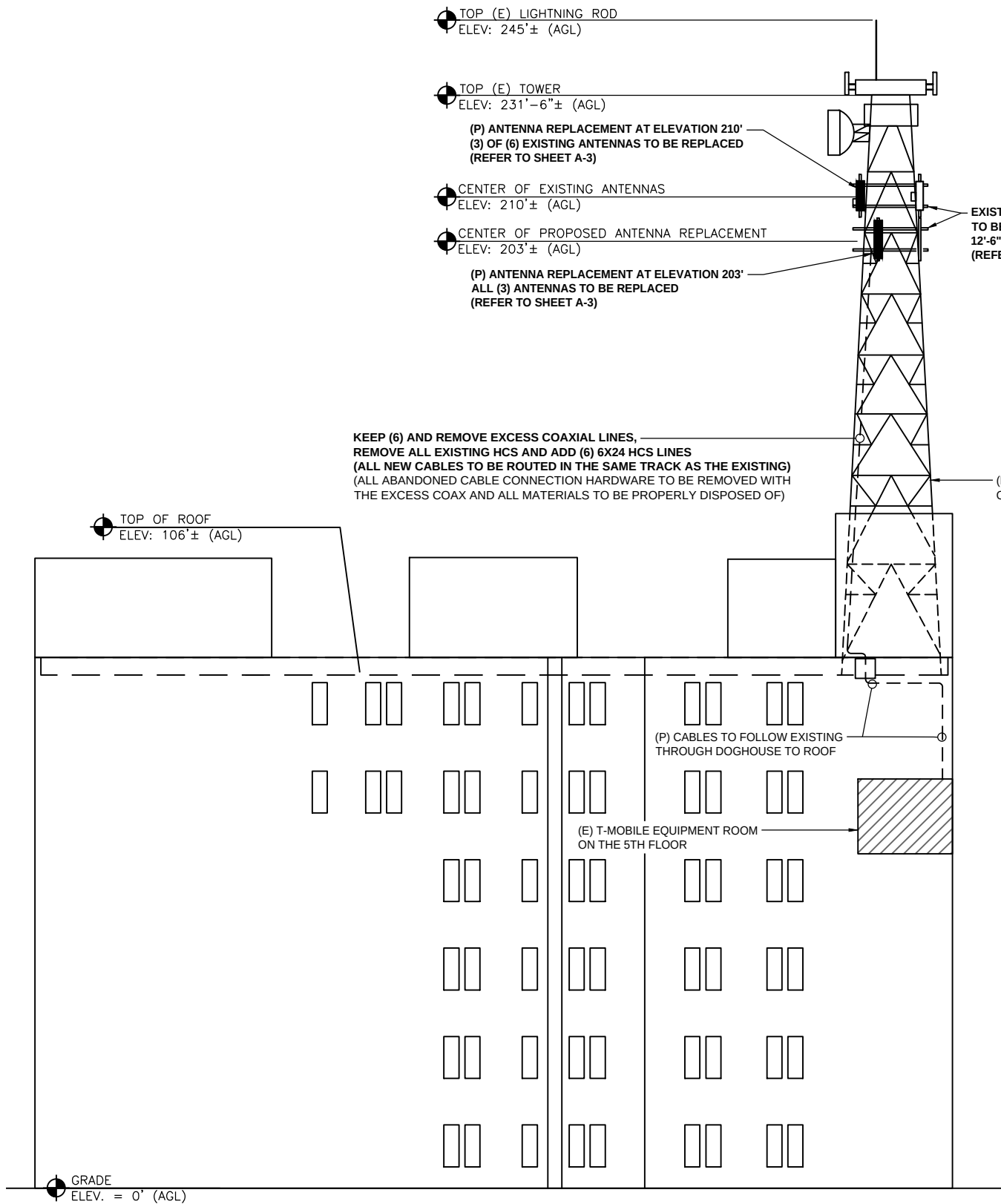
CONSULTANT:
FORESITE LLC
Architects . Engineers . Surveyors
462 WALNUT STREET, SUITE 1
NEWTON, MA 02460
617-212-3123

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1	REVISED PER COMMENTS	01/12/22

SITE NUMBER: CT11410A
SITE NAME: STAMFORD / DWTN
SITE ADDRESS: 555 E MAIN STREET
STAMFORD, CT, 06901

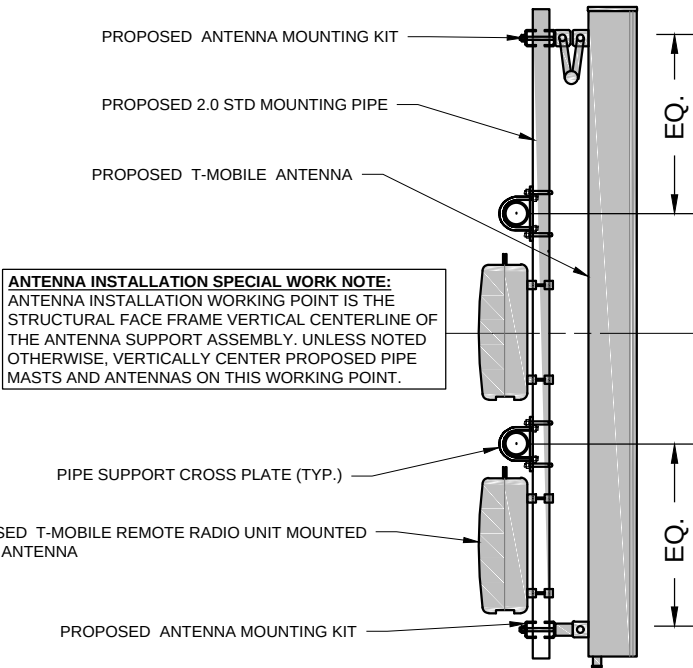
SHEET TITLE:
A-1: PLANS

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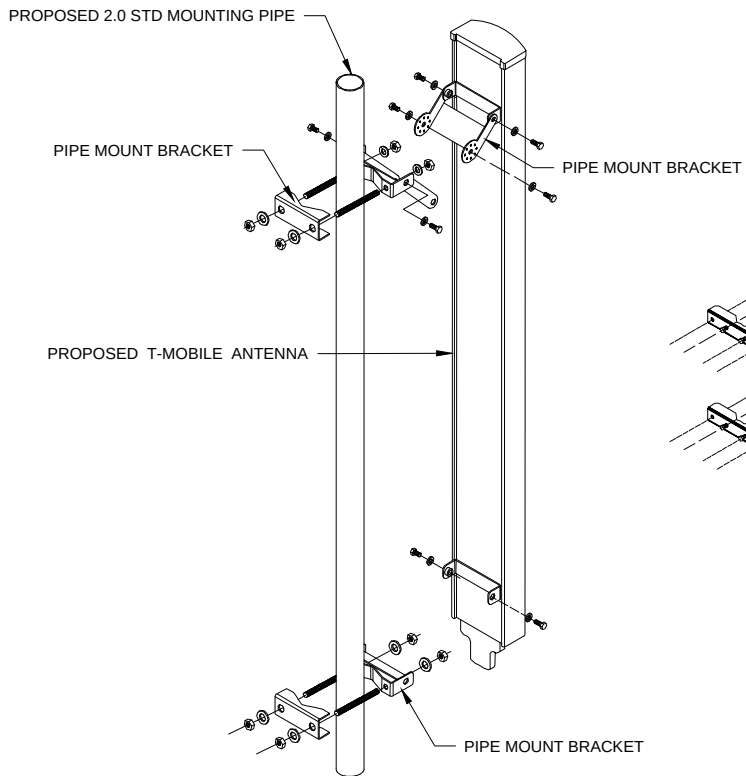
ELEVATION
SCALE: 1"=30'

1
A-2



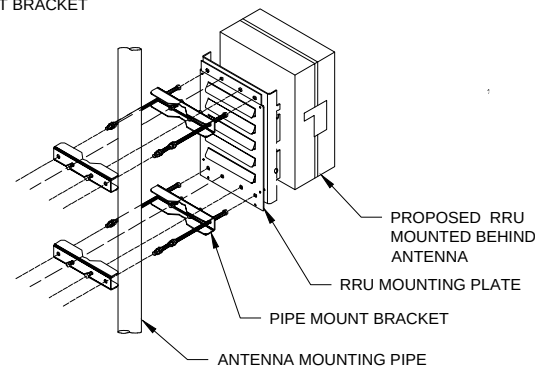
ANTENNA ELEVATION
N.T.S

2
A-2



ANTENNA MOUNT DETAIL
N.T.S

3
A-2



RRU MOUNT DETAIL
N.T.S

4
A-2

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

PROJECT MANAGER
NORTHEAST
SITE SOLUTIONS
Turning Wireless Development
420 MAIN STREET, BLDG 4
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CONSULTANT:
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Architects . Engineers . Surveyors
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617-212-3123
PROFESSIONAL SEAL
STATE OF MASSACHUSETTS
JOSSEIN NABEDI
LICENSED ARCHITECT
NO. ARI. 11162
10/29/2022

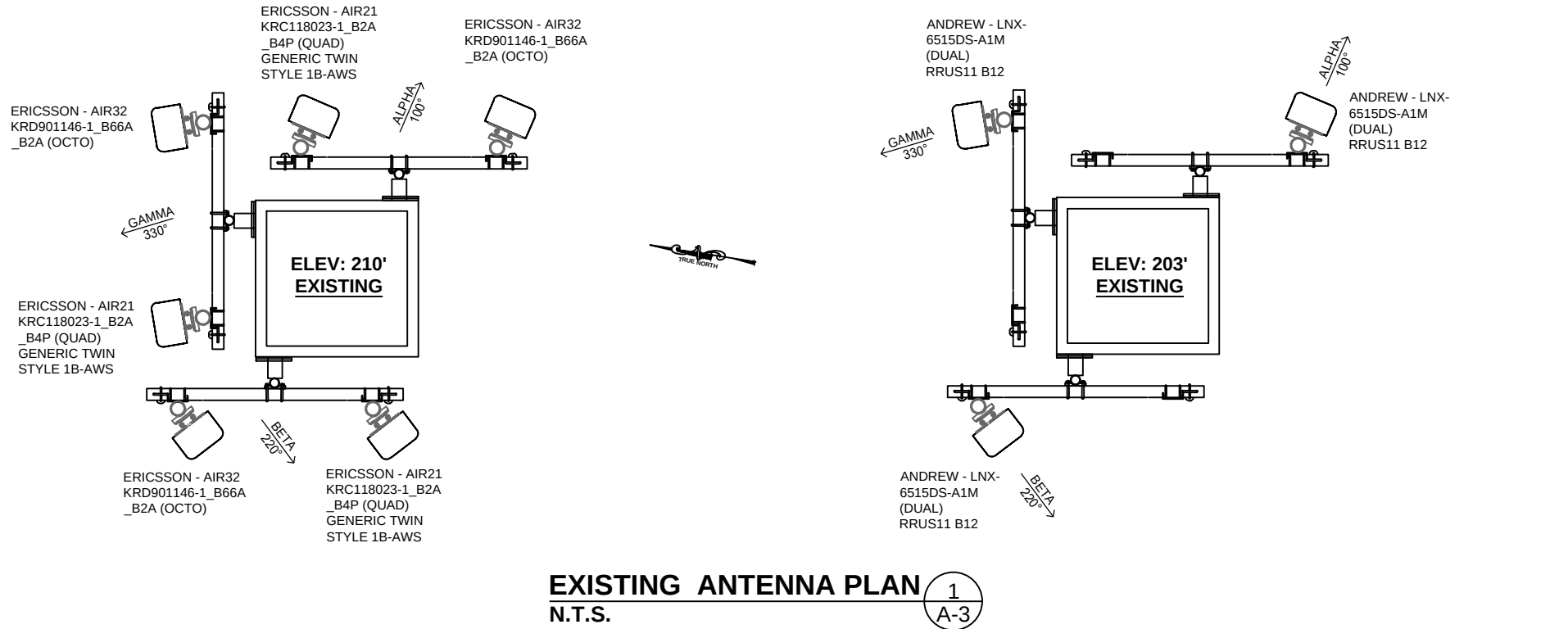
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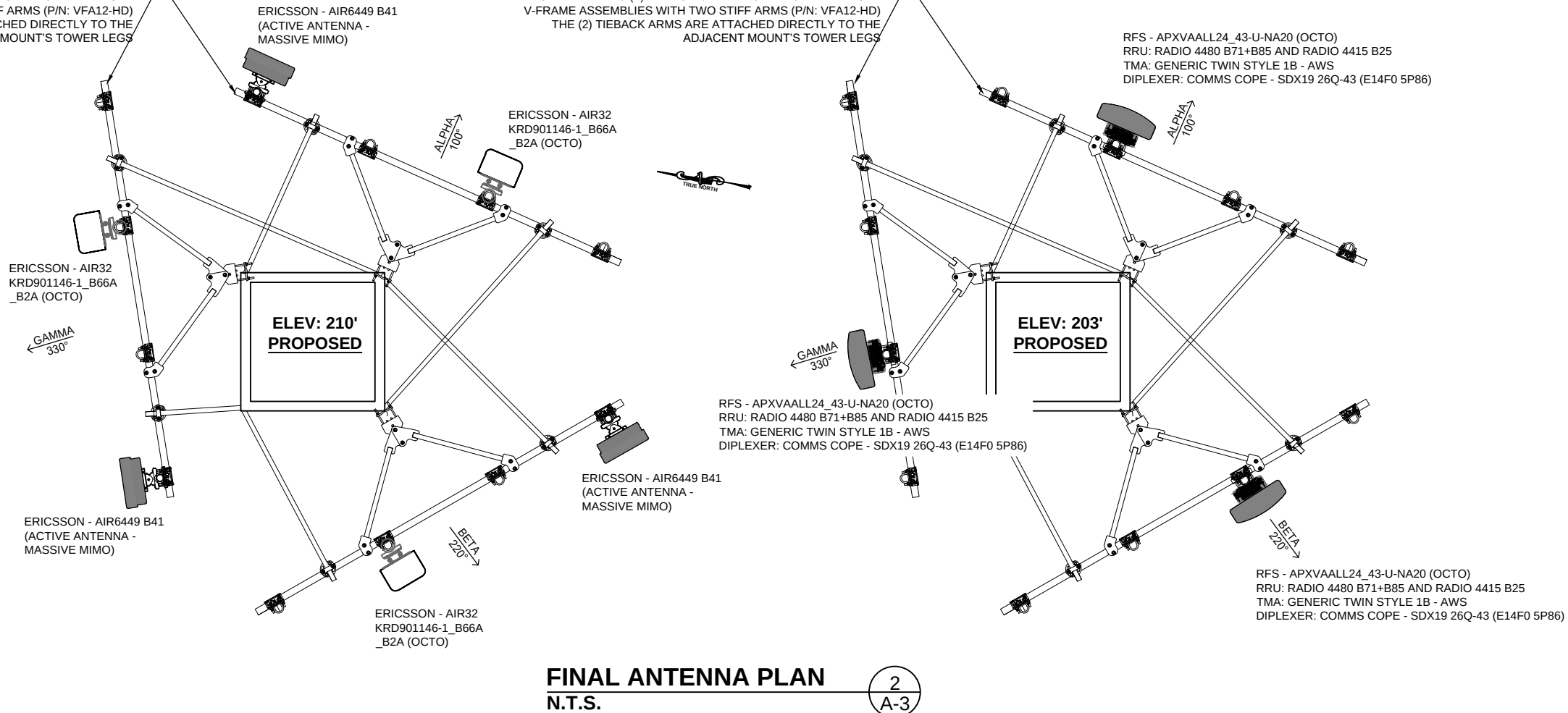
SHEET TITLE:
A-2: ELEVATION AND ANTENNA
MOUNTING DETAILS

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THE EXISTING SECTOR MOUNTS AT EACH SECTOR SHOULD BE REPLACED WITH TWO (2) VALMONT/SITE PRO 1 12'-6" HEAVY DUTY V-FRAME ASSEMBLIES WITH TWO STIFF ARMS (P/N: VFA12-HD) THE (2) TIEBACK ARMS ARE ATTACHED DIRECTLY TO THE ADJACENT MOUNT'S TOWER LEGS

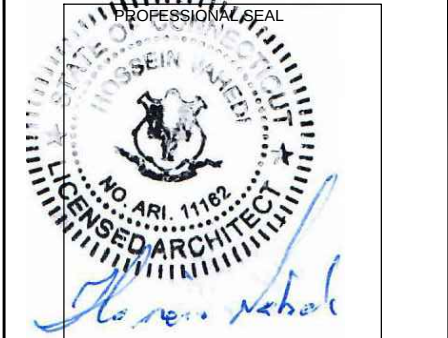
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APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
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860-692-7100

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Turning Wireless Development
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CONSULTANT:
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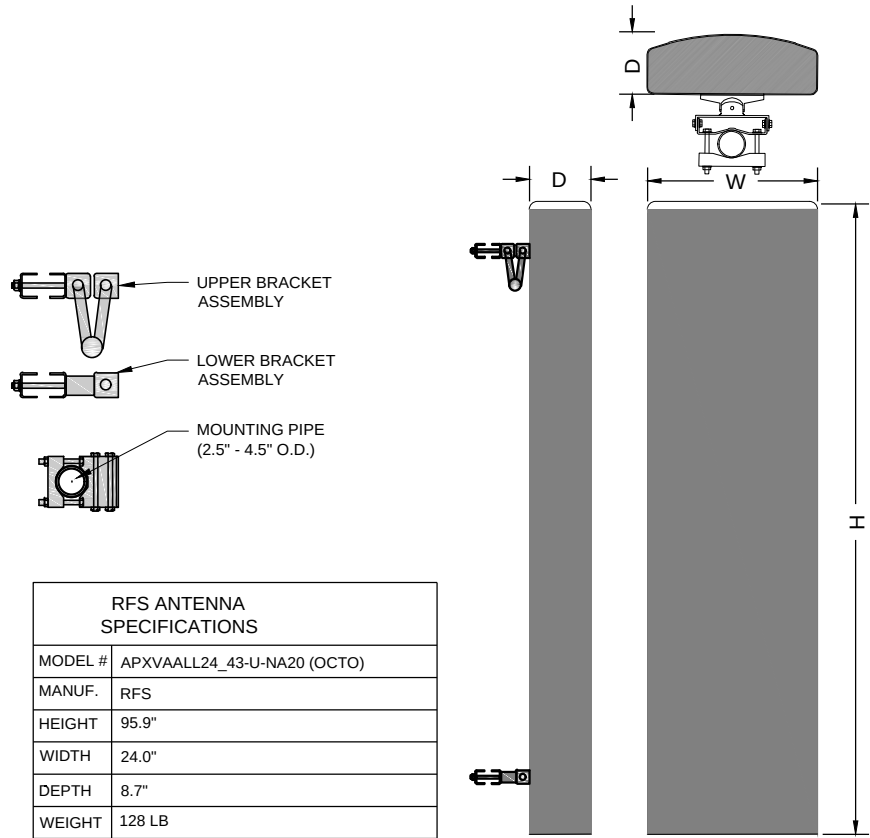
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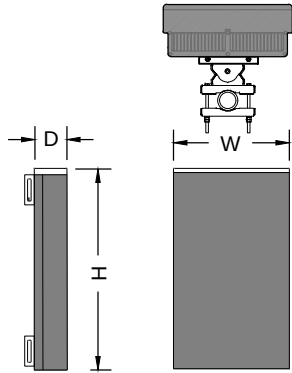
SHEET TITLE:
A-3: ANTENNA LAYOUT PLANS

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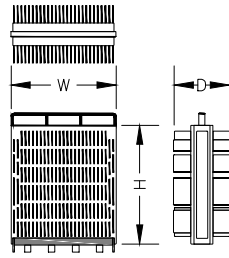
RFS ANTENNA SPECIFICATIONS	
MODEL #	APXVAALL24_43-U-NA20 (OCTO)
MANUF.	RFS
HEIGHT	95.9"
WIDTH	24.0"
DEPTH	8.7"
WEIGHT	128 LB

RFS ANTENNA
N.T.S. 1
A-4



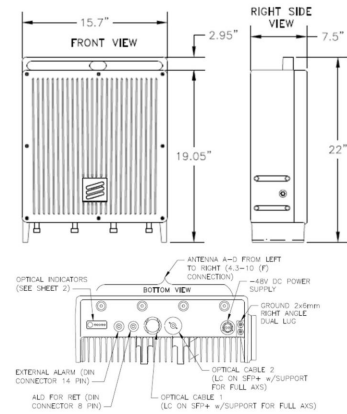
ERICSSON ANTENNA SPECIFICATIONS	
MODEL #	AIR6449 B41
MANUF.	ERICSSON
HEIGHT	33.1"
WIDTH	20.5"
DEPTH	8.3"
WEIGHT	103 LB

ERICSSON ANTENNA
N.T.S. 2
A-4



REMOTE RADIO UNIT SPECIFICATIONS	
MODEL #	RADIO 4415 B25
MANUF.	ERICSSON
HEIGHT	14.9"
WIDTH	13.2"
DEPTH	5.4"
WEIGHT	46.3 LB

REMOTE RADIO UNIT
N.T.S. 3
A-4



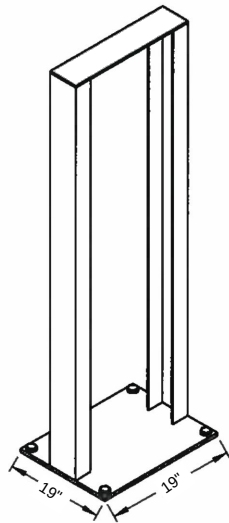
RRU SPECIFICATIONS	
MODEL #	4480 B71
MANUF.	ERICSSON
LENGTH	22.0"
WIDTH	15.7"
DEPTH	7.5"
WEIGHT	93.0 LB

REMOTE RADIO UNIT
N.T.S. 4
A-4



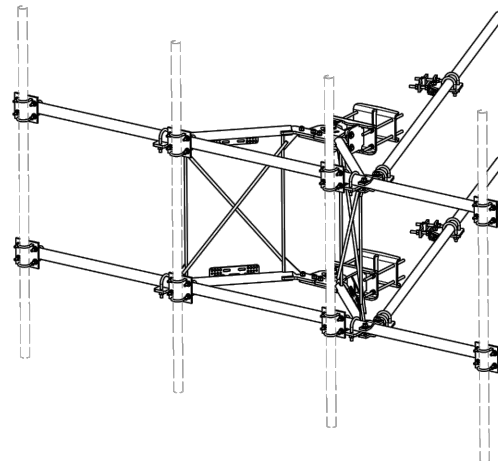
BATTERY CABINET SPECIFICATIONS	
MODEL #	POWER 6230
MANUF.	ERICSSON
HEIGHT	19"
WIDTH	26"
DEPTH	26"
WEIGHT	200 LBS

BATTERY SYSTEM
N.T.S. 5
A-4



NOTE: CONTRACTOR SHALL SECURE RACK AS PER MANUFACTURER RECOMMENDATIONS

INDOOR EQUIPMENT RACK
N.T.S. 6
A-4



VALMONT/SITE PRO 1 12'-6" HEAVY DUTY V-FRAME ASSEMBLY WITH TWO STIFF ARMS (P/N: VFA12-HD), WITH (4) 96" LONG 2.0 STD MOUNT PIPES ARE EQUALLY SPACED ALONG THE FACE

NEW SECTOR MOUNT
N.T.S. 7
A-4

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
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CONSULTANT:
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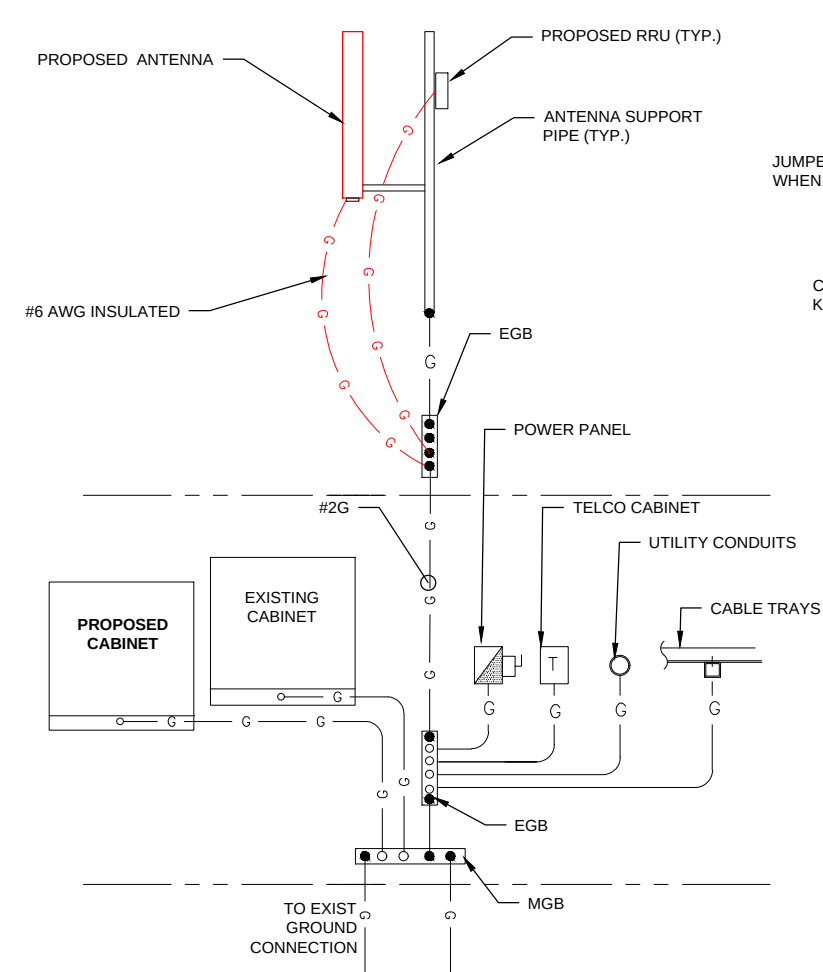
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SITE NAME: STAMFORD / DWTN
SITE ADDRESS: 555 E MAIN STREET
STAMFORD, CT, 06901

SHEET TITLE:
A-4: ANTENNA AND EQUIPMENT SPECS

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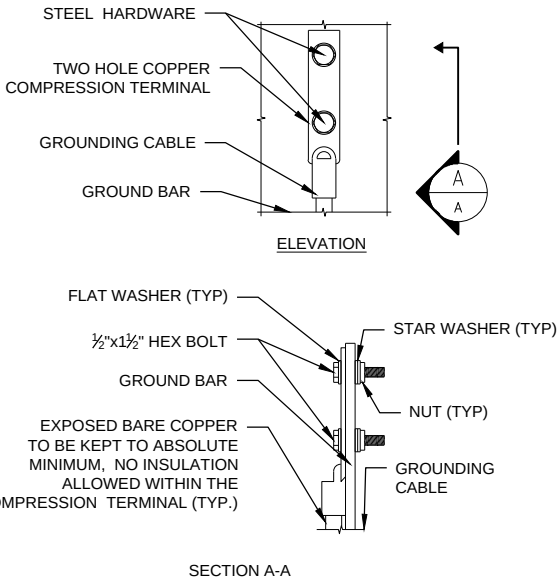
ELECTRICAL & GROUNDING NOTES

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.I. APPROVED OR LISTED AND PRODUCED PER SPECIFICATION REQUIREMENTS.
3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATION INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
4. GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
5. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) ND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
6. RIGID STEEL CONDUITS SHALL BE GROUNDED AT BOTH ENDS.
7. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THIN INSULATION.
8. RUN ELECTRICAL CONDUIT OR CABLING BETWEEN ELECTRICAL ROOM AND PROPOSED CELL SITE ARE PEDESTAL AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
9. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROPOSED CELL SITE TELECOM CABINET AND RBS CABINET AS INDICATED ON DRAWING A -1. PROVIDE FULL LENGTH PULL ROPE INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
10. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NAME 3R ENCLOSURE.
11. GROUNDING SHALL COMPLY WITH NEC ART. 250.
12. GROUNDING COAX CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURES COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
13. USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSTALLATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE GROUND.
14. ALL GROUND CONNECTION TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
15. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AS RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY BOND ANY METER OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
16. CONNECTIONS TO MGB SHALL BE ARRANGED IN THREE MAIN GROUPS: SURGE PROCEDURES (COAXIAL CABLE GROUND KITS, TELCO AND POWER PANEL GROUND); (GROUNDING ELECTRODE RING OR BUILDING STEEL); NON-SURGING OBJECTS (EGB GROUND IN RBS UNIT).
17. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
18. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTION.
19. BOND ANTENNA MOUNTING BRACKETS, COAXIAL CABLE GROUND KITS, AND ALNA TO EGB PLACED NEAR THE ANTENNA LOCATION.
20. BOND ANTENNA EGB'S AND MGB TO WATER MAIN.
21. TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION.
22. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
23. VERIFY PROPOSED SERVICE UPGRADE WITH LOCAL UTILITY COMPANY PRIOR TO CONSTRUCTION.



GROUNDING RISER DIAGRAM
N.T.S.

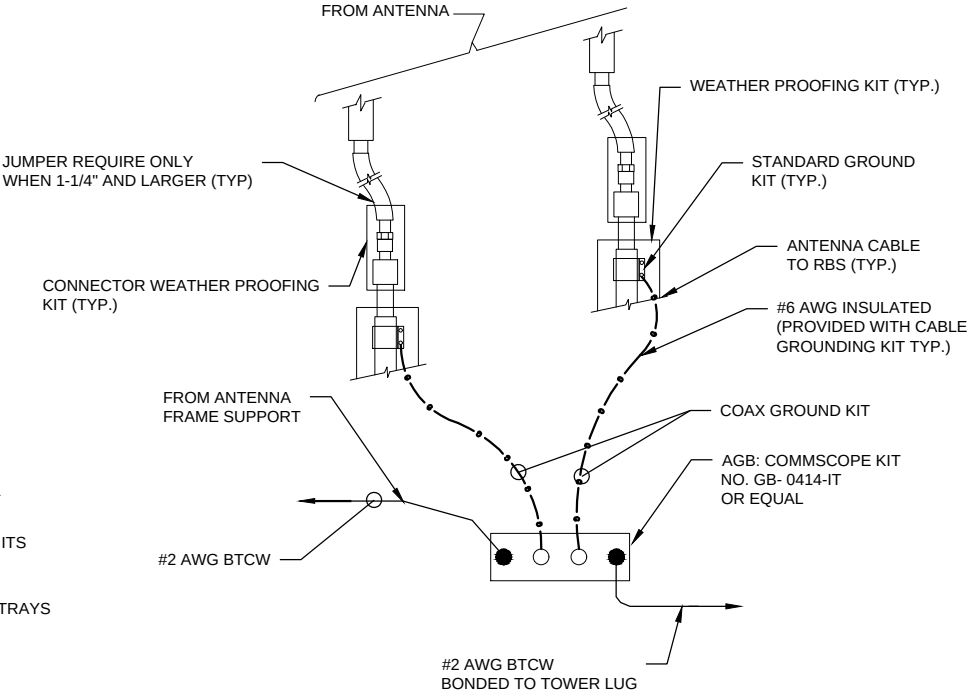
1
E-1



- NOTES:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
 2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

TYPICAL GROUND BAR CONNECTIONS DETAIL
N.T.S.

3
E-1



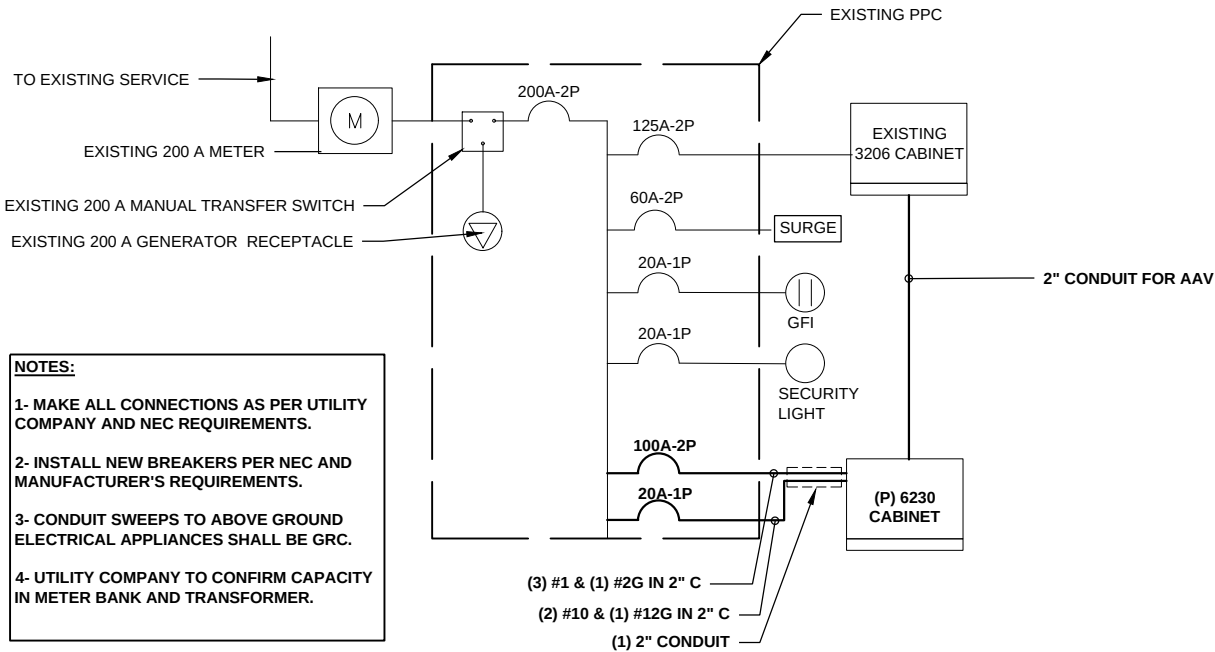
- NOTES:
1. INSTALL CABLE GROUND KIT ABOVE HORIZONTAL BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO AGB/EGB

TOWER TOP CABLE GROUNDING DETAIL
N.T.S.

2
E-1

SPECIAL CONTRACTOR'S NOTES:

CONTRACTOR TO VERIFY THE POWER FEED & PHASE OF METER BANK AND THAT THE EXISTING AND PROPOSED CONDUITS AND WIRE SIZES ARE ADEQUATE FOR THE PROPOSED LOADING IN ACCORDANCE WITH NEC AND INCLUDE ELECTRICAL UPGRADES IN THE SCOPE OF WORK AS REQUIRED.



NOTES:

- 1- MAKE ALL CONNECTIONS AS PER UTILITY COMPANY AND NEC REQUIREMENTS.
- 2- INSTALL NEW BREAKERS PER NEC AND MANUFACTURER'S REQUIREMENTS.
- 3- CONDUIT SWEEPS TO ABOVE GROUND ELECTRICAL APPLIANCES SHALL BE GRC.
- 4- UTILITY COMPANY TO CONFIRM CAPACITY IN METER BANK AND TRANSFORMER.

TYPICAL ONE LINE DIAGRAM
N.T.S.

4
E-1

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

PROJECT MANAGER
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420 MAIN STREET, BLDG 4
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STATE OF CONNECTICUT
JOSSEIN WHEAT
NO. ARI. 11162
LICENSED ARCHITECT
Foresite LLC

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SITE ADDRESS: 555 E MAIN STREET
STAMFORD, CT, 06901

SHEET TITLE:
E-1: ELECTRICAL & GROUNDING DETAIL

Exhibit D

Structural Analysis Report

Building Structural Analysis Report

Everest Site ID: 638283
Everest Site Name: Stamford #1 CO
T-Mobile Site ID: CT11410A

Site Address: 555 Main St
Stamford, CT 06901

Client:



Carrier:



Date: 06/17/2022

Scope of Work:

Centerline Communications was authorized by Everest Infrastructure Partners to perform an analysis of the building structure to determine its capacity to support the proposed T-Mobile equipment/appurtenances listed in this report.

Proposed T-Mobile Appurtenances (Tower):

- (3) Ericsson Air 6449 B41 Panel Antenna
- (3) APXVAALL24_43-U-NA20 Panel Antenna
- (3) Ericsson 4480 B71+B25 RRU
- (3) Ericsson 4415 B25 RRU

Existing T-Mobile Appurtenances (Tower):

- (3) Ericsson Air 32 KRD901146-1_B66A_B2A
- (3) Ericsson Generic Twin Style 1B-AWS

Proposed T-Mobile Equipment (5th Floor):

- (1) Power 6230 Cabinet
- (1) 19" Rack

Existing T-Mobile Equipment (5th Floor):

- (1) RBS 3206 Equipment Cabinet
- (1) Battery Cabinet
- (1) 19" Rack
- (1) Transformer

Design Criteria:**Design Codes:**

2018 Connecticut State Building Code

2015 International Building Code

ASCE 7-10

TIA-222-G Standards

Ultimate Design Wind Speed (V_{ult})	120 mph
Wind Speed with Ice	50 mph
Ice Thickness	0.75 in.
Ground Snow Load	30 psf
Exposure Category	B
Topographic Category	1
Risk Category	II
Site Soil Class (Assumed)	D – Stiff Soil
Seismic Design Category	B
Spectral Response Acceleration Parameter at a Short Periods, S_s	0.179 g
Spectral Response Acceleration Parameter at a Period of 1 Second, S_1	0.064 g

***Refer to calculations for additional design criteria.**

Conclusion:

Original building plans were not available and could not be obtained for our reference. A limited survey and mapping of the building columns supporting the tower was performed on June 1, 2022. The tower support frame is being supported by (2) exterior columns and (2) interior columns as shown in the attached partial roof plan. Since the reinforced concrete column properties and reinforcement are unknown, it is assumed that the building columns meet the minimum ACI code requirements.

The results of the analysis concluded that the existing building structure *is adequate* to support the proposed T-Mobile equipment loading.

	Stress Ratio	Overall Result
6 th Floor Column (Interior)	49.3%	PASS
5 th Floor Column (Interior)	65.2%	PASS
4 th Floor Column (Interior)	76.2%	PASS
3 rd Floor Column (Interior)	92.3%	PASS
2 nd Floor Column (Interior)	70.8%	PASS
1 st Floor Column (Interior)	80.9%	PASS
G Floor Column (Interior)	90.9%	PASS
6 th Floor Column (Exterior)	46.0%	PASS
5 th Floor Column (Exterior)	54.4%	PASS
4 th Floor Column (Exterior)	59.0%	PASS
3 rd Floor Column (Exterior)	66.9%	PASS
2 nd Floor Column (Exterior)	50.0%	PASS
1 st Floor Column (Exterior)	55.4%	PASS
G Floor Column (Exterior)	60.7%	PASS

Reference Documents:

- Mapping Report by Centerline Communications, dated June 17, 2022
- Construction Drawings by Foresite LLC, dated December 29, 2021
- Structural Analysis by Tower Engineering Professionals, dated November 16, 2021

Assumptions and Limitations:

- The tower and structures were built and maintained with the manufacturer's specifications.
- The calculations performed by Centerline Communications are limited to the structural members in these calculations only.
- The analysis is only for the equipment loading listed in the report.
- The calculation assumes all structural members to be in good condition i.e. no damage, rust, or other defects.

Photos:



Existing Building and Tower



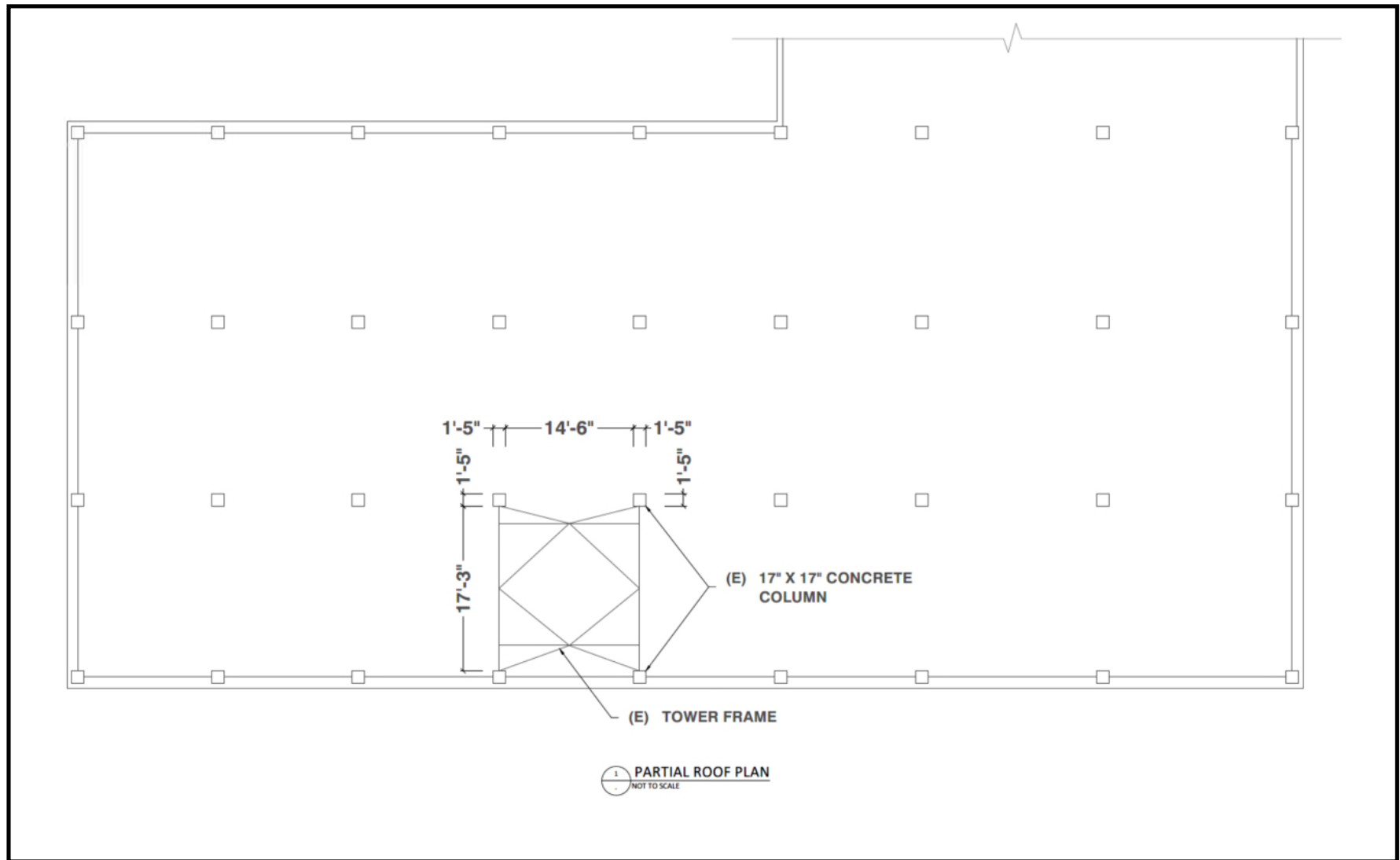
Existing Tower

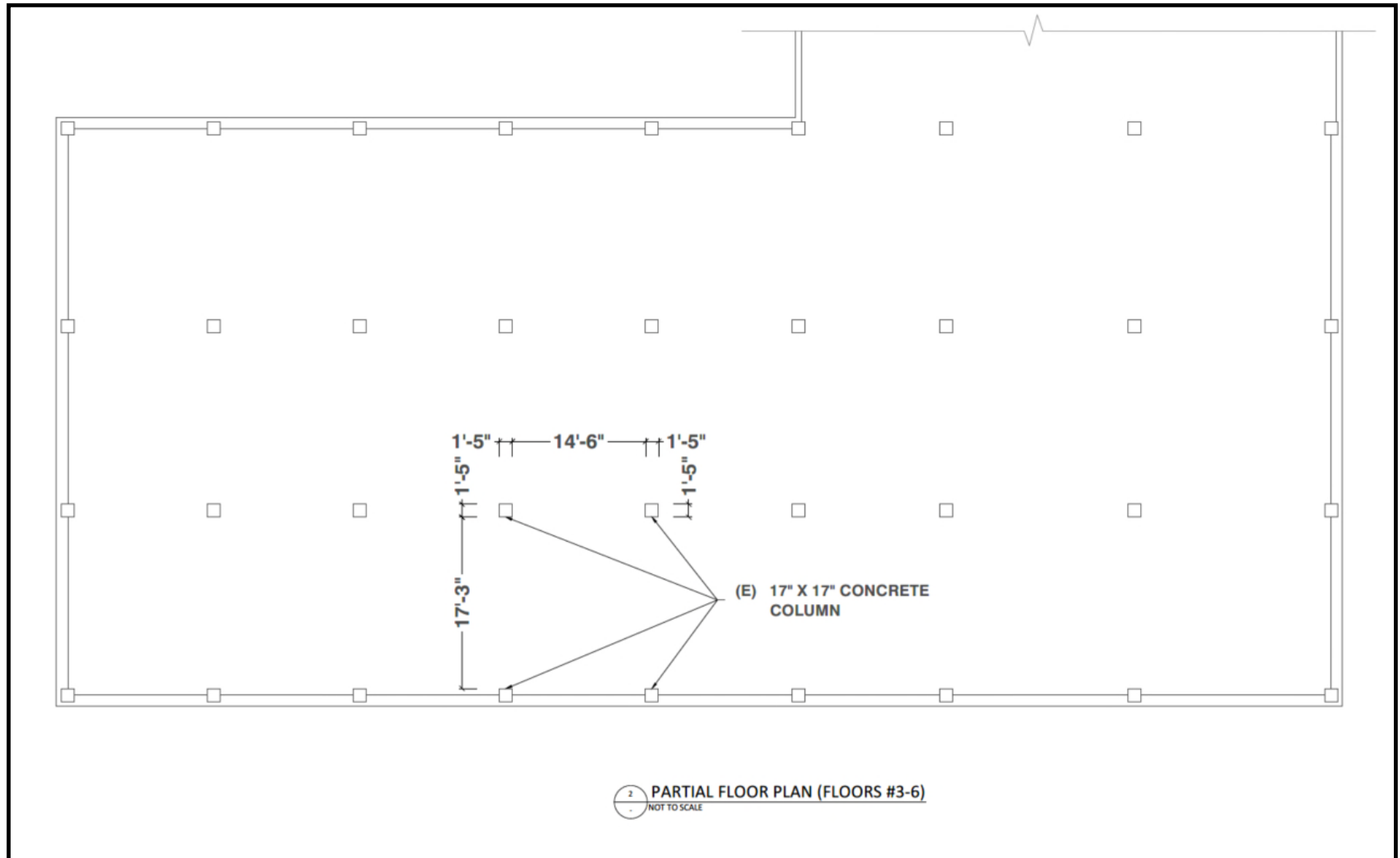


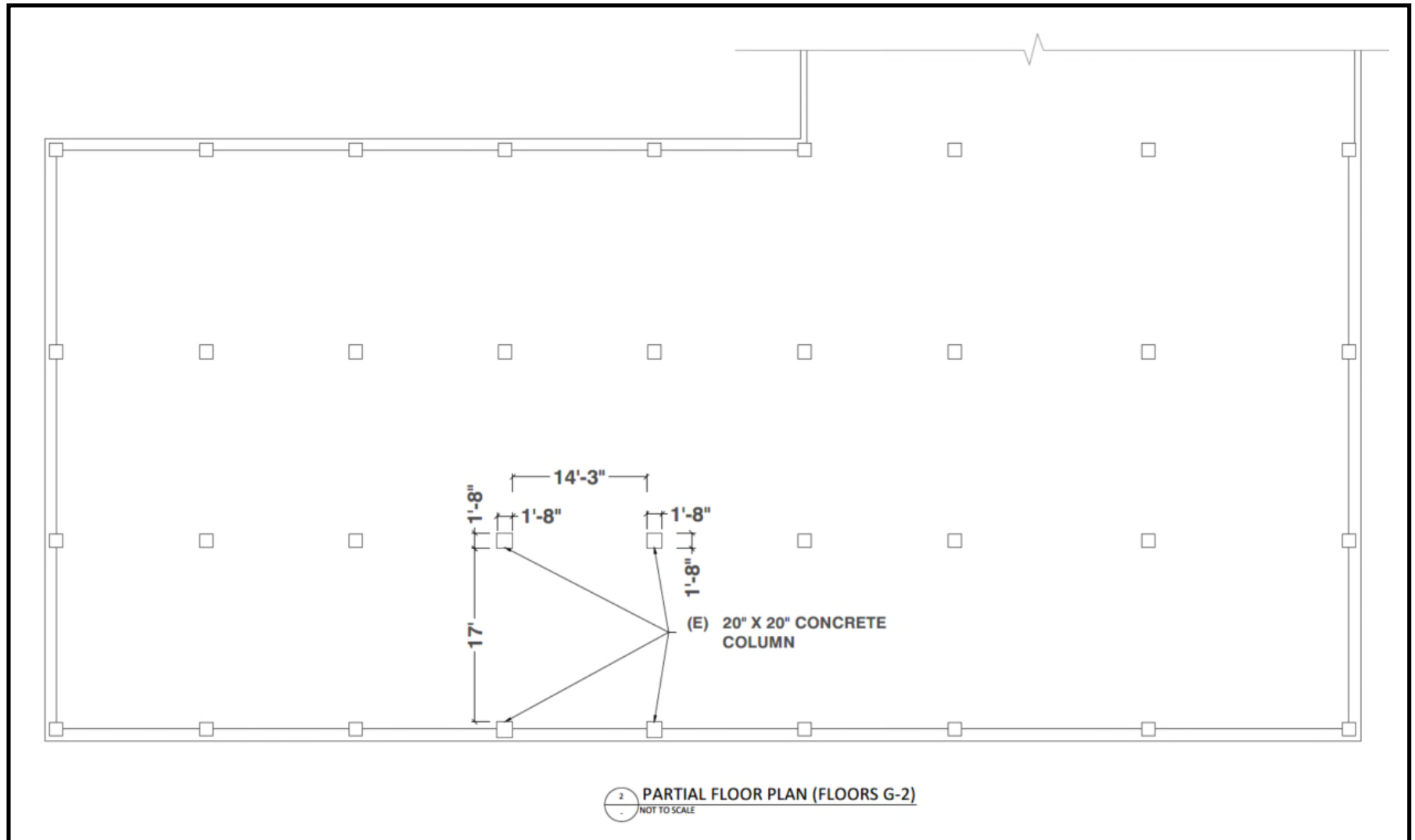
Building Construction (Interior Column)



Building Construction (Exterior Column)









Building Column Calculations (Interior)

Date: 06-17-2022
Project Name: Stamford #1 CO
Site ID: 638283
Designed By: AA Checked By: DC

Check Building Columns:

Interior Column at Tower:

Load Breakdown:

Tributary Area: $((18.67 \text{ ft}/2) + (18.67 \text{ ft}/2)) * ((16.0 \text{ ft}/2) + (16.0 \text{ ft}/2))$
= 298.72 ft²

Live Loads

→ Snow 30 psf x 298.7 ft²
= **8.96 kips**

→ Service 20 psf x 298.7 ft²
(Roof) **5.97 kips**

→ Service 100 psf x 298.7 ft²
(Typical Floor) **29.87 kips**

Dead Load

→ Roof 100 psf x 298.7 ft²
= **29.87 kips**

***Assume 8" concrete deck (150 pcf)**

→ Floor 125 psf x 298.7 ft²
(Typical Floor) **37.34 kips**

***Assume 10" concrete deck (150 pcf)**

Date: 06-17-2022
 Project Name: Stamford #1 CO
 Site ID: 638283
 Designed By: AA Checked By: DC

Column Loading (Unfactor Loads)

	<u>Snow Load</u> <u>(Kips.)</u>	<u>Live Load</u> <u>(Kips.)</u>	<u>Dead Load</u> <u>(Kips.)</u>	<u>Dead Load</u> <u>Column (Kips.)</u>	<u>Total Load</u> <u>(Kips.)</u>
Tower Load	-	150.19	14.70	-	164.89
Roof	8.96	5.97	29.87	-	44.81
Total=	8.96	156.16	44.57	0.00	209.70
Sixth Floor (17"x17")	0.00	29.87	37.34	4.34	71.55
Total=	8.96	186.03	81.91	4.34	281.25
Fifth Floor (17"x17")	0.00	29.87	37.34	4.34	71.55
Total=	8.96	215.91	119.25	8.68	352.80
Fourth Floor (17"x17")	0.00	29.87	37.34	4.34	71.55
Total=	8.96	245.78	156.59	13.02	424.35
Third Floor (17"x17")	0.00	29.87	37.34	4.94	72.16
Total=	8.96	275.65	193.93	17.97	496.51
Second Floor (20"x20")	0.00	29.87	37.34	6.49	73.70
Total=	8.96	305.52	231.27	24.46	570.21
First Floor (20"x20")	0.00	29.87	37.34	6.01	73.22
Total=	8.96	335.39	268.61	30.47	643.43
G Floor (20"x20")					

***Reference the structural analysis by Foresite LLC, dated December 29, 2021 for tower reactions.**

Concrete Column

File: 638283 Interior Column Analysis.ec6
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Centerline Communications

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DESCRIPTION: Sixth Floor Column

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10

Load Combinations Used : IBC 2015

General Information

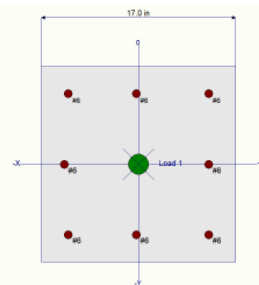
f'_c : Concrete 28 day strength = 4.0 ksi
E = 3,605.0 ksi
Density = 150.0 pcf
 β = 0.850
 f_y - Main Rebar = 60.0 ksi
E - Main Rebar = 29,000.0 ksi
Allow. Reinforcing Limits *ASTM A615 Bars Used*
Min. Reinf. = 1.0 %
Max. Reinf. = 8.0 %

Overall Column Height = 14.420 ft
End Fixity **Top & Bottom Pinned**
Brace condition for deflection (buckling) along columns :
X-X (width) axis :
Unbraced Length for buckling ABOUT Y-Y Axis = 14.420 ft, K = 1.0
Y-Y (depth) axis :
Unbraced Length for buckling ABOUT X-X Axis = 14.420 ft, K = 1.0

Column Cross Section

Column Dimensions : 17.0in Square Column, Column Edge to Rebar Edge Cover = 2.0in

Column Reinforcing : 4 - #6 bars @ corners,, 1 - #6 bars top & bottom between corner bars, 1 - #6 bars left & right between corner bars



Applied Loads

Entered loads are factored per load combinations specified by user.

Column self weight included : 4,341.02 lbs * Dead Load Factor

AXIAL LOADS ...

Roof + Tower Loads: Axial Load at 14.420 ft above base, D = 44.570, LR = 5.970, L = 150.190, S = 8.960 k

BENDING LOADS ...

Tower Load: Lat. Point Load at 14.420 ft creating Mx-x, W = 14.375 k

DESIGN SUMMARY

Load Combination **+1.20D+1.60L+0.50S**
Location of max.above base **14.323 ft**
Maximum Stress Ratio : 0.493 : 1
Ratio = $(P_u^2 + M_u^2)^{.5} / (\phi P_n^2 + \phi M_n^2)^{.5}$
 P_u = 303.477 k $\phi * P_n$ = 614.55 k
 M_{u-x} = 0.0 k-ft $\phi * M_{n-x}$ = 0.0 k-ft
 M_{u-y} = 28.072 k-ft $\phi * M_{n-y}$ = 55.969 k-ft
 M_u Angle = 90.0 deg
 M_u at Angle = 28.072 k-ft ϕM_n at Angle = 56.998 k-ft

P_n & M_n values located at P_u-M_u vector intersection with capacity curve

Column Capacities ...

P_nmax : Nominal Max. Compressive Axial Capacity **1,181.83 k**
P_nmin : Nominal Min. Tension Axial Capacity **k**
 ϕP_n , max : Usable Compressive Axial Capacity **614.55 k**
 ϕP_n , min : Usable Tension Axial Capacity **k**

Maximum SERVICE Load Reactions ...

Top along Y-Y **0.0 k** Bottom along Y-Y **0.0 k**
Top along X-X **14.375 k** Bottom along X-X **0.0 k**

Maximum SERVICE Load Deflections ...

Along Y-Y **0.0 in** at **0.0 ft** above base
for load combination :
Along X-X **0.0 in** at **0.0 ft** above base
for load combination :

General Section Information . ϕ = 0.650 β = 0.850 θ = 0.80

ρ : % Reinforcing **1.218 %** Rebar % Ok
Reinforcing Area **3.520 in²**
Concrete Area **289.0 in²**

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base ft	Axial Load k		Bending Analysis k-ft						Utilization	
	X-X	Y-Y		Pu	φ * Pn	δ x	δ x * Mux	δ y	δ y * Muy	Alpha (deg)	δ Mu	φ Mn	Ratio
+1.40D	M2,min		14.32	68.48	614.55			1.000	6.33	90.000	6.33	57.00	0.111

Concrete Column

File: 638283 Interior Column Analysis.ec6
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Lic. #: KW-06013597

DESCRIPTION: Sixth Floor Column

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base ft	Axial Load k		Bending Analysis k-ft					Utilization		
	X-X	Y-Y		Pu	ϕ * Pn	δ x	δ x * Mu _x	δ y	δ y * Mu _y	Alpha (deg)	δ Mu	ϕ Mn	Ratio
+1.40D	M2,min		14.32	68.48	614.55	1.000	6.33			0.000	6.33	57.06	0.111
+1.20D+0.50Lr+1.60L		M2,min	14.32	301.98	614.55			1.000	27.93	90.000	27.93	57.00	0.491
+1.20D+0.50Lr+1.60L	M2,min		14.32	301.98	614.55	1.000	27.93			0.000	27.93	57.06	0.490
+1.20D+1.60L+0.50S		M2,min	14.32	303.48	614.55			1.000	28.07	90.000	28.07	57.00	0.493
+1.20D+1.60L+0.50S	M2,min		14.32	303.48	614.55	1.000	28.07			0.000	28.07	57.06	0.493
+1.20D+1.60Lr+0.50L		M2,min	14.32	143.34	614.55			1.000	13.26	90.000	13.26	57.00	0.233
+1.20D+1.60Lr+0.50L	M2,min		14.32	143.34	614.55	1.000	13.26			0.000	13.26	57.06	0.233
+1.20D+1.60Lr+0.50W		M2,min	14.32	68.25	614.55			1.000	6.31	90.000	6.31	57.00	0.111
+1.20D+1.60Lr+0.50W	M2,min		14.32	68.25	614.55	1.000	6.31			0.000	6.31	57.06	0.111
+1.20D+0.50L+1.60S		M2,min	14.32	148.12	614.55			1.000	13.70	90.000	13.70	57.00	0.241
+1.20D+0.50L+1.60S	M2,min		14.32	148.12	614.55	1.000	13.70			0.000	13.70	57.06	0.241
+1.20D+1.60S+0.50W		M2,min	14.32	73.03	614.55			1.000	6.76	90.000	6.76	57.00	0.119
+1.20D+1.60S+0.50W	M2,min		14.32	73.03	614.55	1.000	6.76			0.000	6.76	57.06	0.119
+1.20D+0.50Lr+0.50L+W		M2,min	14.32	136.77	614.55			1.000	12.65	90.000	12.65	57.00	0.222
+1.20D+0.50Lr+0.50L+W	M2,min		14.32	136.77	614.55	1.000	12.65			0.000	12.65	57.06	0.222
+1.20D+0.50L+0.50S+W		M2,min	14.32	138.27	614.55			1.000	12.79	90.000	12.79	57.00	0.225
+1.20D+0.50L+0.50S+W	M2,min		14.32	138.27	614.55	1.000	12.79			0.000	12.79	57.06	0.225
+1.20D+0.50L+0.70S		M2,min	14.32	140.06	614.55			1.000	12.96	90.000	12.96	57.00	0.228
+1.20D+0.50L+0.70S	M2,min		14.32	140.06	614.55	1.000	12.96			0.000	12.96	57.06	0.227
+0.90D+W		M2,min	14.32	44.02	614.55			1.000	4.07	90.000	4.07	57.00	0.072
+0.90D+W	M2,min		14.32	44.02	614.55	1.000	4.07			0.000	4.07	57.06	0.071
+0.90D		M2,min	14.32	44.02	614.55			1.000	4.07	90.000	4.07	57.00	0.072
+0.90D	M2,min		14.32	44.02	614.55	1.000	4.07			0.000	4.07	57.06	0.071

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top		@ Base	@ Top
D Only						48.911					
+D+L						199.101					
+D+Lr						54.881					
+D+S						57.871					
+D+0.750Lr+0.750L						166.031					
+D+0.750L+0.750S						168.274					
+D+0.60W					8.625	48.911					
+D+0.750Lr+0.750L+0.450W					6.469	166.031					
+D+0.750L+0.750S+0.450W					6.469	168.274					
+0.60D+0.60W					8.625	29.347					
+0.60D						29.347					
Lr Only						5.970					
L Only						150.190					
S Only						8.960					
W Only					14.375						

Maximum Moment Reactions

Note: Only non-zero reactions are listed.

Load Combination	Moment About X-X Axis			Moment About Y-Y Axis	
	@ Base	@ Top		@ Base	@ Top
D Only			k-ft		k-ft
+D+L			k-ft		k-ft
+D+Lr			k-ft		k-ft
+D+S			k-ft		k-ft
+D+0.750Lr+0.750L			k-ft		k-ft
+D+0.750L+0.750S			k-ft		k-ft
+D+0.60W			k-ft		k-ft
+D+0.750Lr+0.750L+0.450W			k-ft		k-ft
+D+0.750L+0.750S+0.450W			k-ft		k-ft
+0.60D+0.60W			k-ft		k-ft
+0.60D			k-ft		k-ft

Concrete Column

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Centerline Communications

Lic. # : KW-06013597

DESCRIPTION: Sixth Floor Column

Note: Only non-zero reactions are listed.

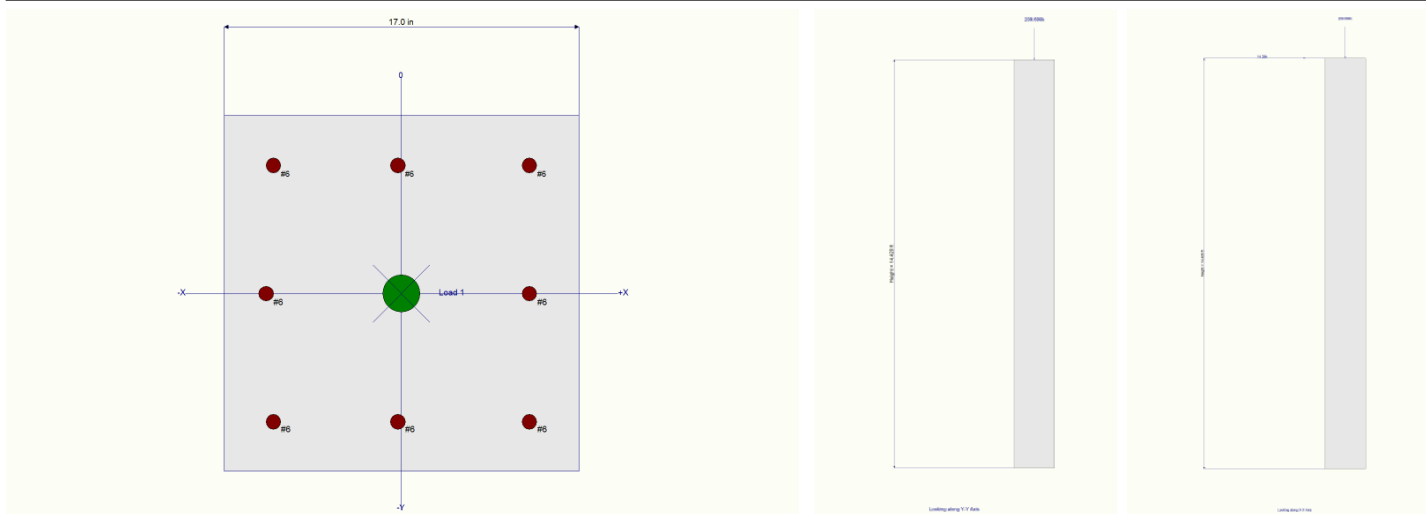
Maximum Moment Reactions

Load Combination	Moment About X-X Axis		Moment About Y-Y Axis	
	@ Base	@ Top	@ Base	@ Top
Lr Only		k-ft		k-ft
L Only		k-ft		k-ft
S Only		k-ft		k-ft
W Only		k-ft		k-ft

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
D Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+L	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+Lr	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+S	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750L+0.750S	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.60W	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L+0.450W	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750L+0.750S+0.450W	0.0000	in	0.000	ft	0.000	in	0.000	ft
+0.60D+0.60W	0.0000	in	0.000	ft	0.000	in	0.000	ft
+0.60D	0.0000	in	0.000	ft	0.000	in	0.000	ft
Lr Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
L Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
S Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
W Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

Sketches



Interaction Diagrams

Concrete Column

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DESCRIPTION: **Sixth Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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DESCRIPTION: **Sixth Floor Column**

Concrete Column P-M Interaction Diagram



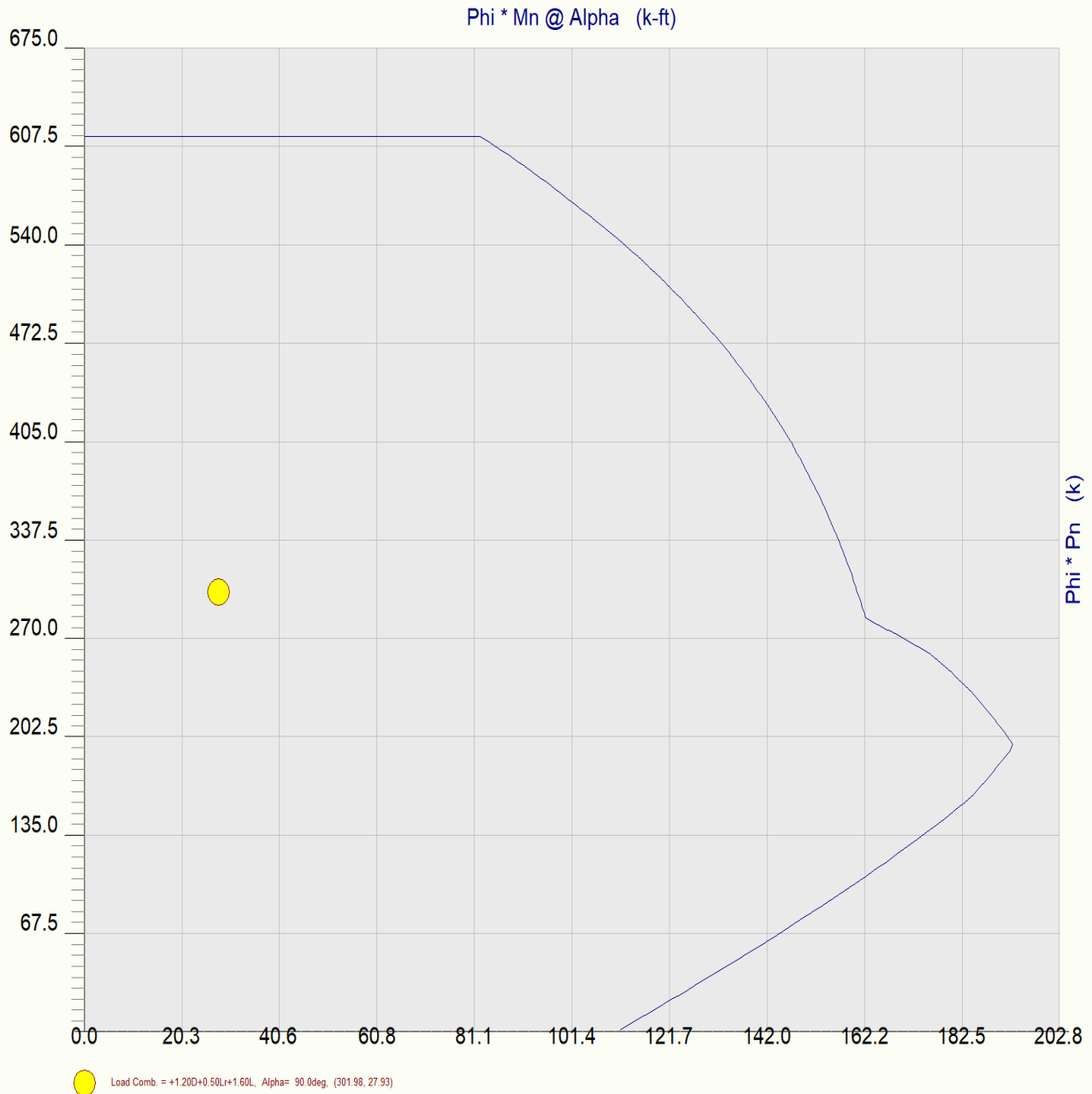
Concrete Column

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DESCRIPTION: **Sixth Floor Column**

Concrete Column P-M Interaction Diagram



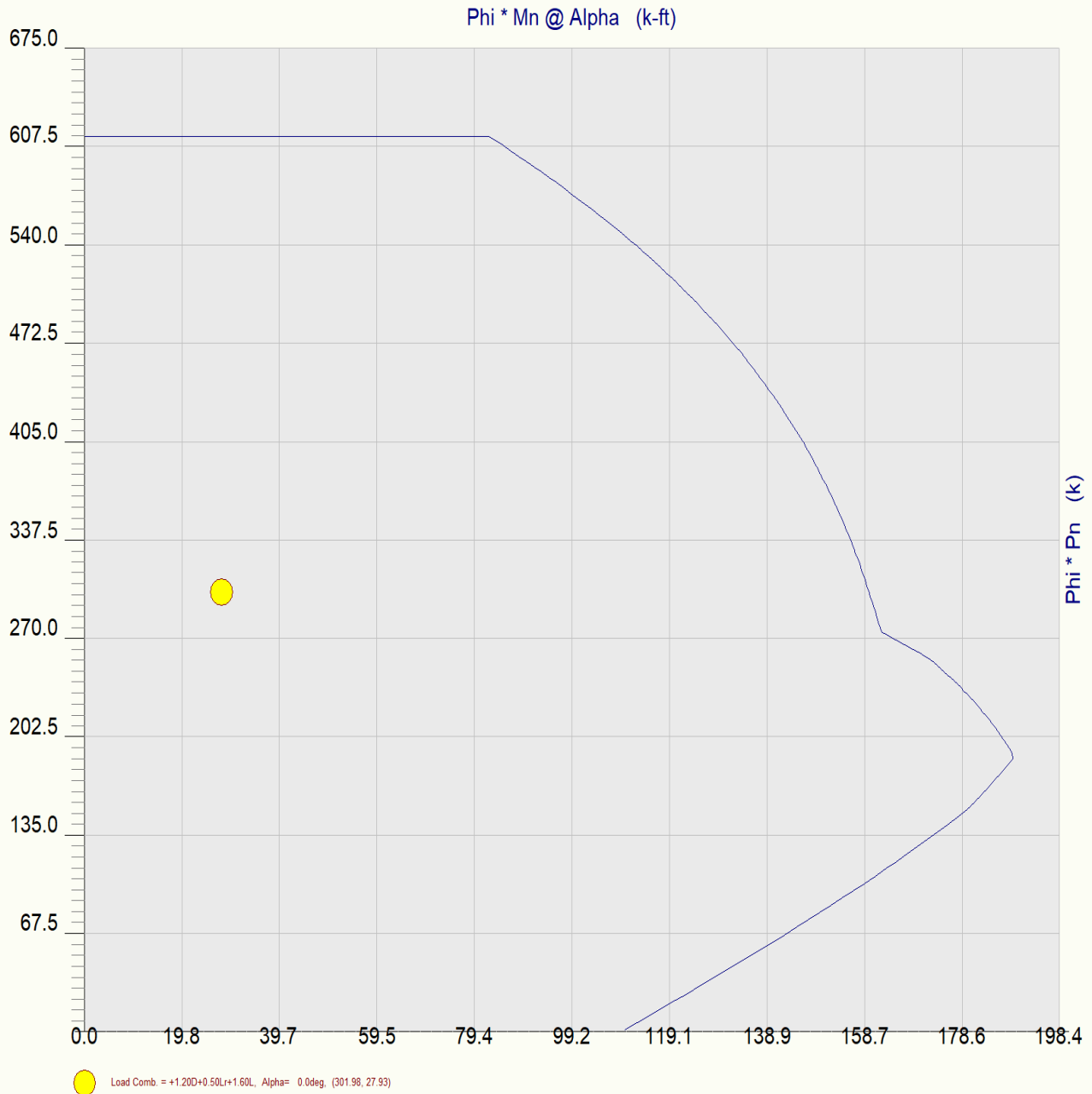
Concrete Column

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DESCRIPTION: **Sixth Floor Column**

Concrete Column P-M Interaction Diagram



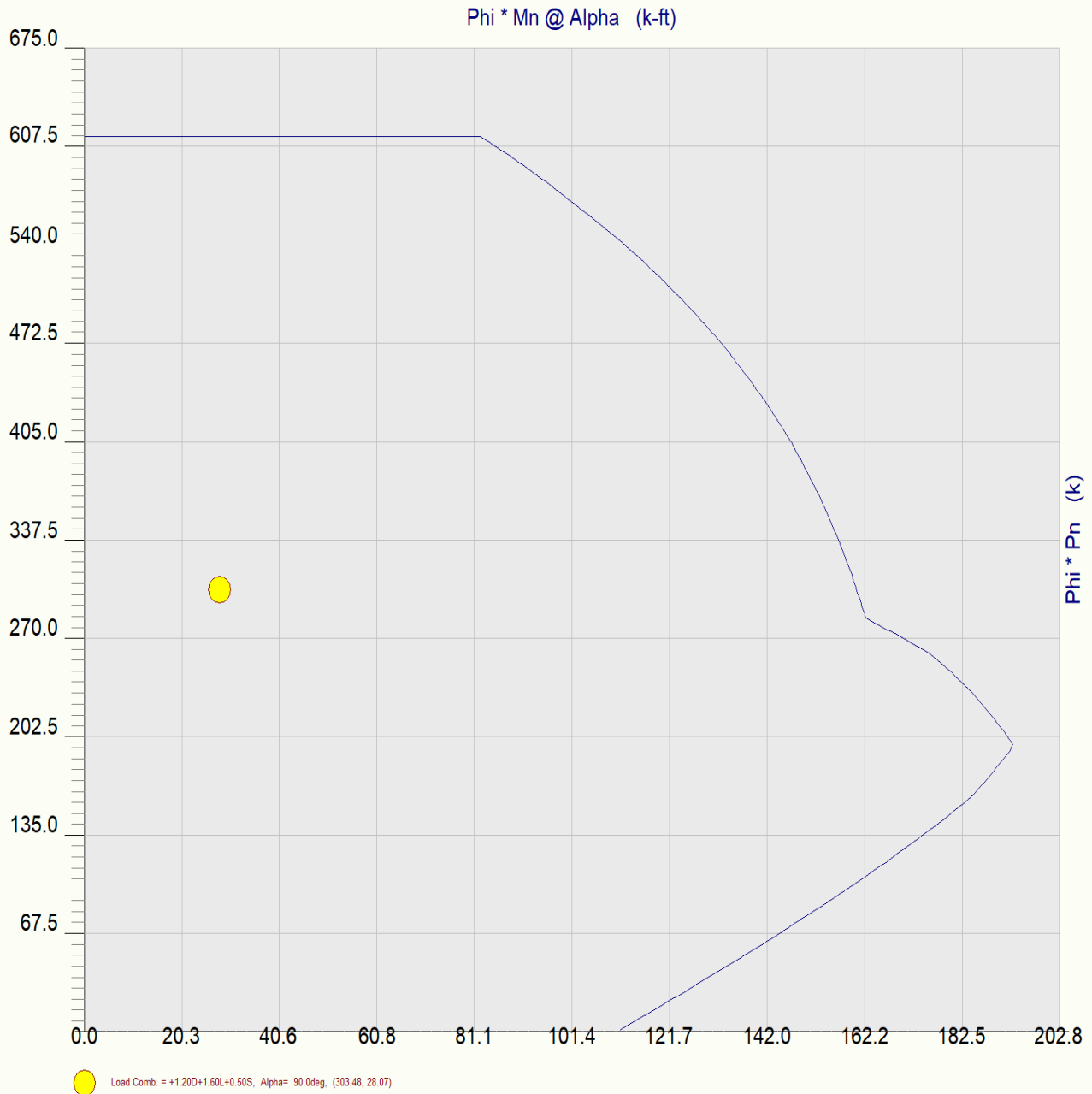
Concrete Column

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DESCRIPTION: **Sixth Floor Column**

Concrete Column P-M Interaction Diagram



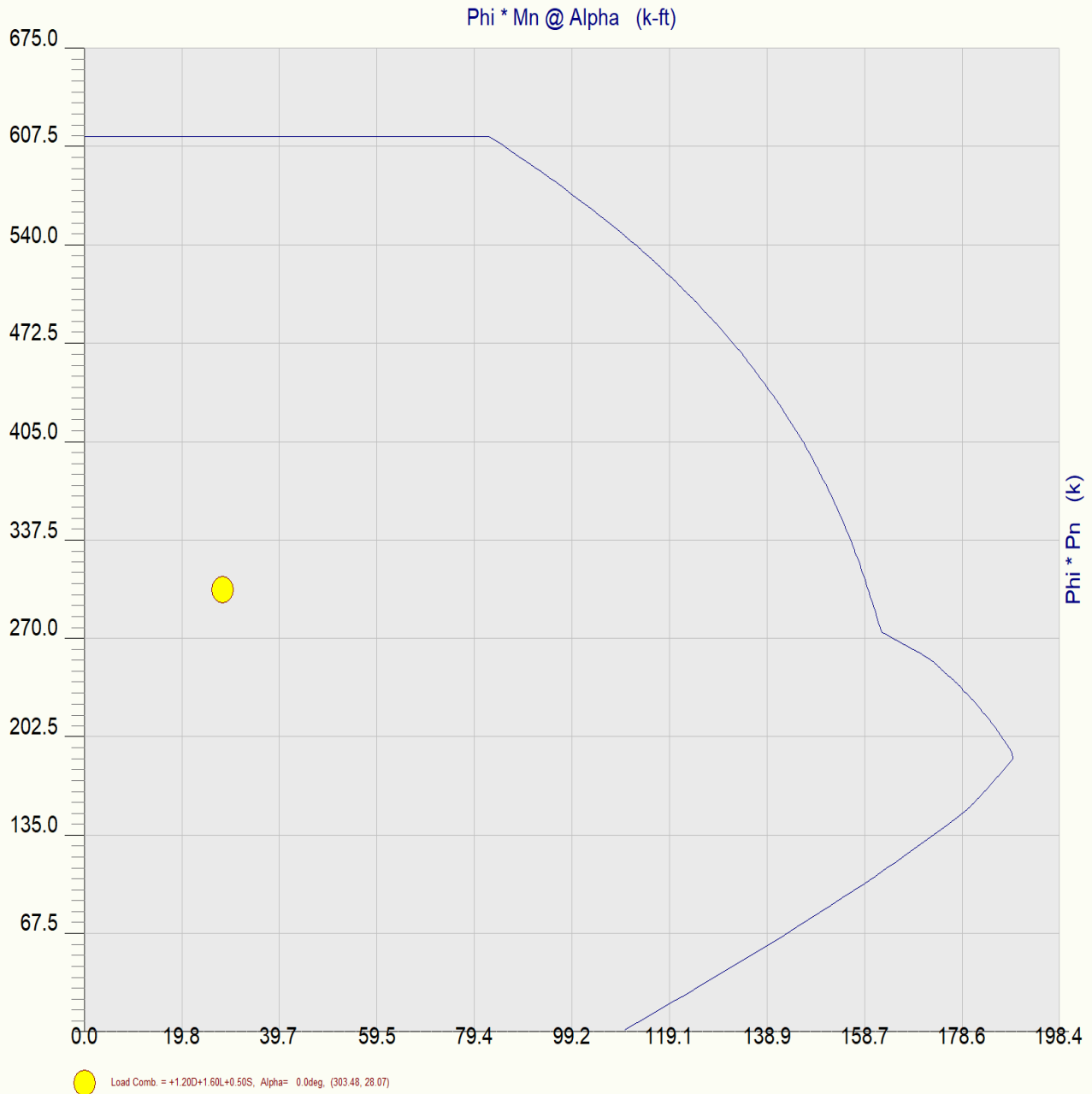
Concrete Column

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DESCRIPTION: **Sixth Floor Column**

Concrete Column P-M Interaction Diagram



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DESCRIPTION: **Sixth Floor Column**

Concrete Column P-M Interaction Diagram



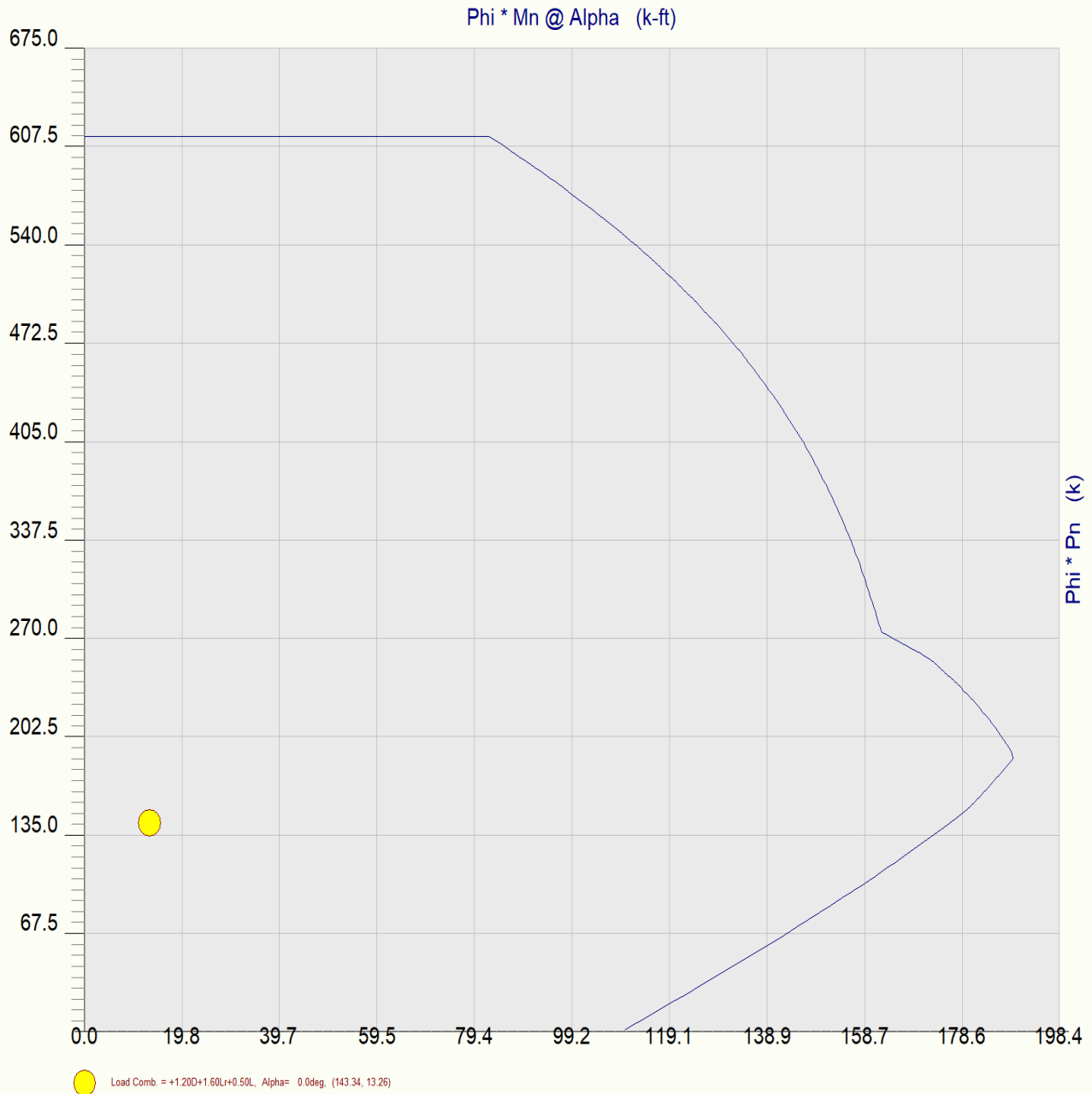
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DESCRIPTION: **Sixth Floor Column**

Concrete Column P-M Interaction Diagram



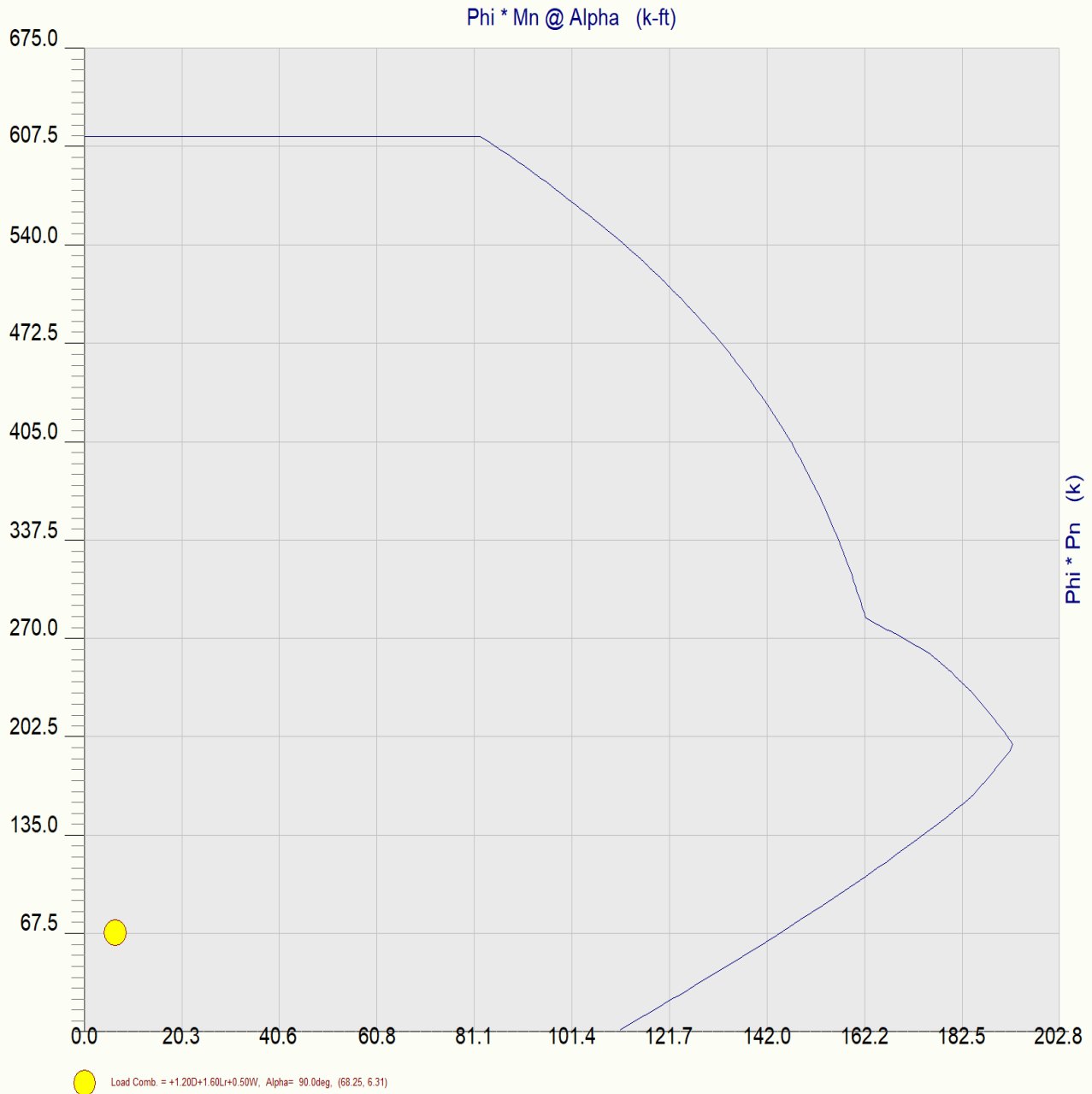
Concrete Column

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DESCRIPTION: **Sixth Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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DESCRIPTION: **Sixth Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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DESCRIPTION: **Sixth Floor Column**

Concrete Column P-M Interaction Diagram



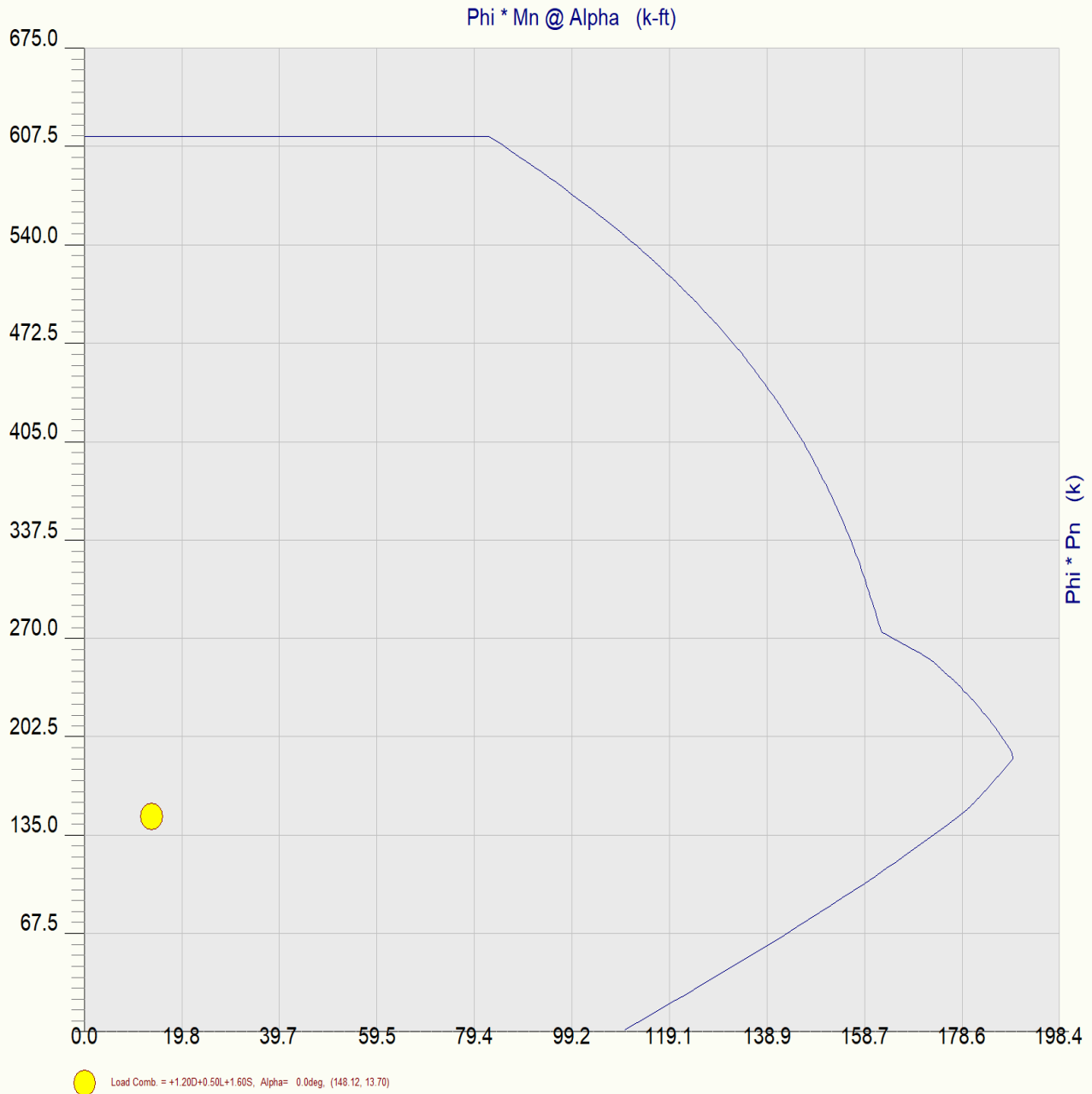
Concrete Column

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DESCRIPTION: **Sixth Floor Column**

Concrete Column P-M Interaction Diagram



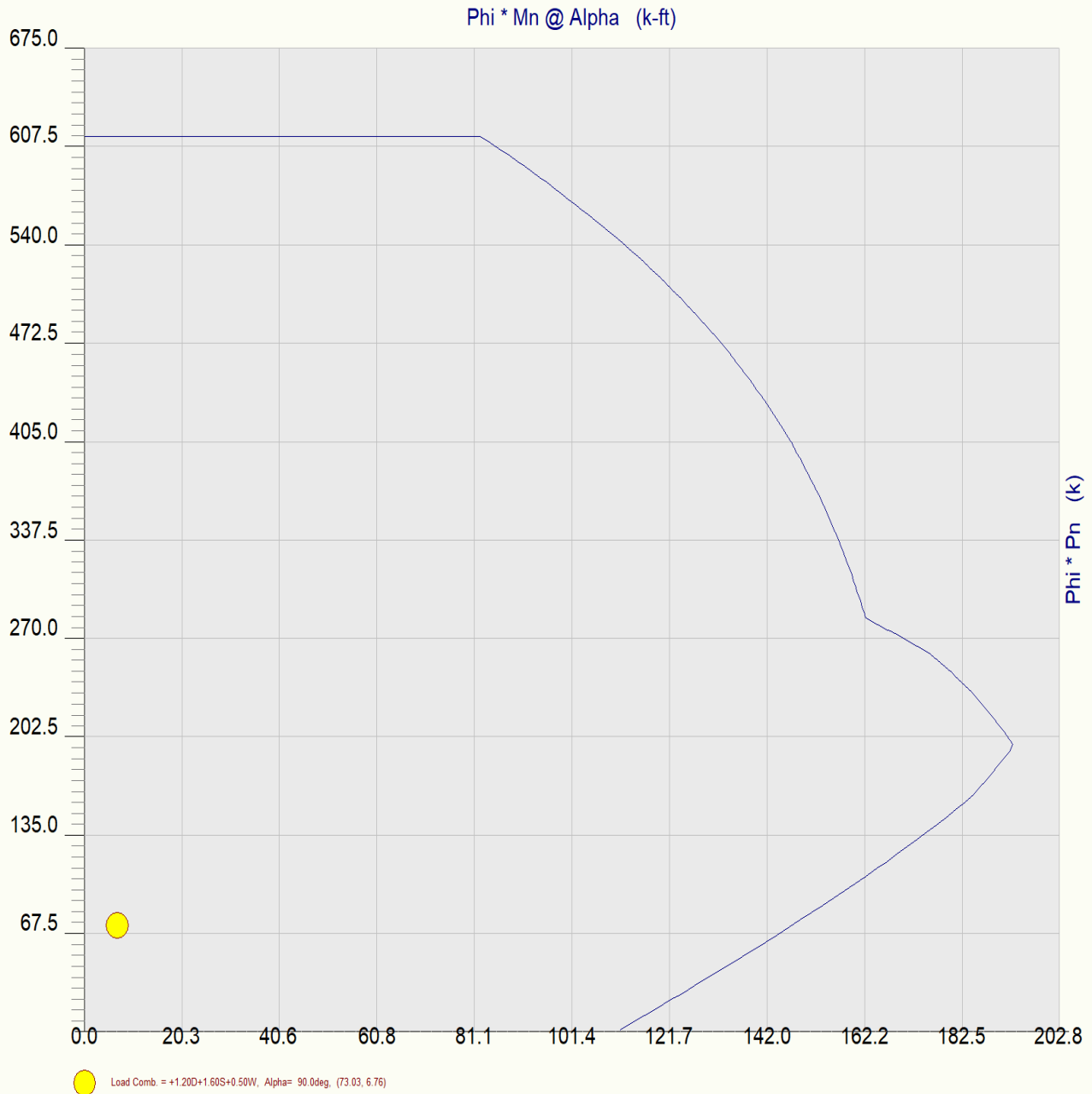
Concrete Column

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DESCRIPTION: **Sixth Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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Centerline Communications

Lic. # : KW-06013597

DESCRIPTION: **Sixth Floor Column**

Concrete Column P-M Interaction Diagram



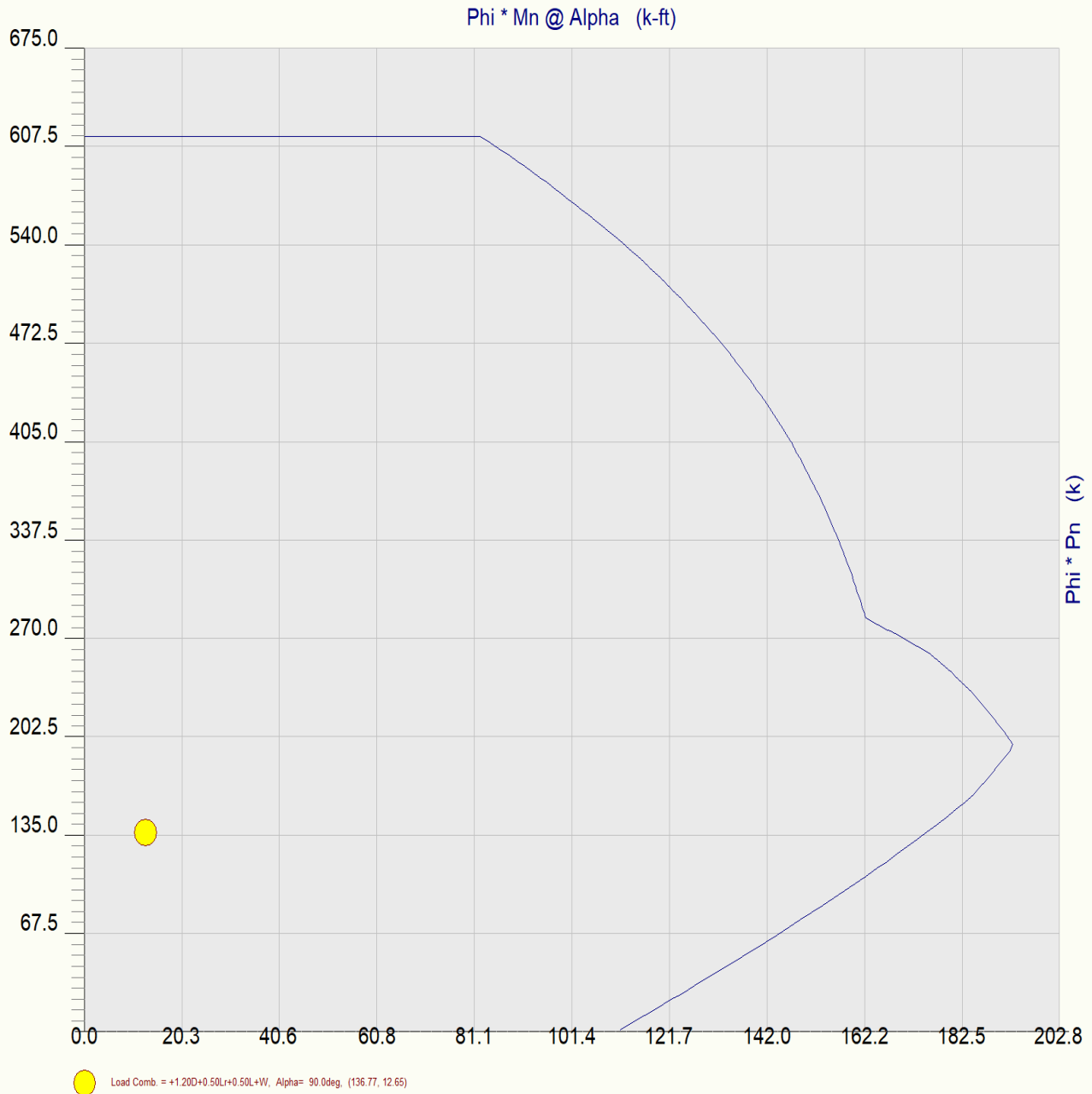
Concrete Column

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DESCRIPTION: **Sixth Floor Column**

Concrete Column P-M Interaction Diagram



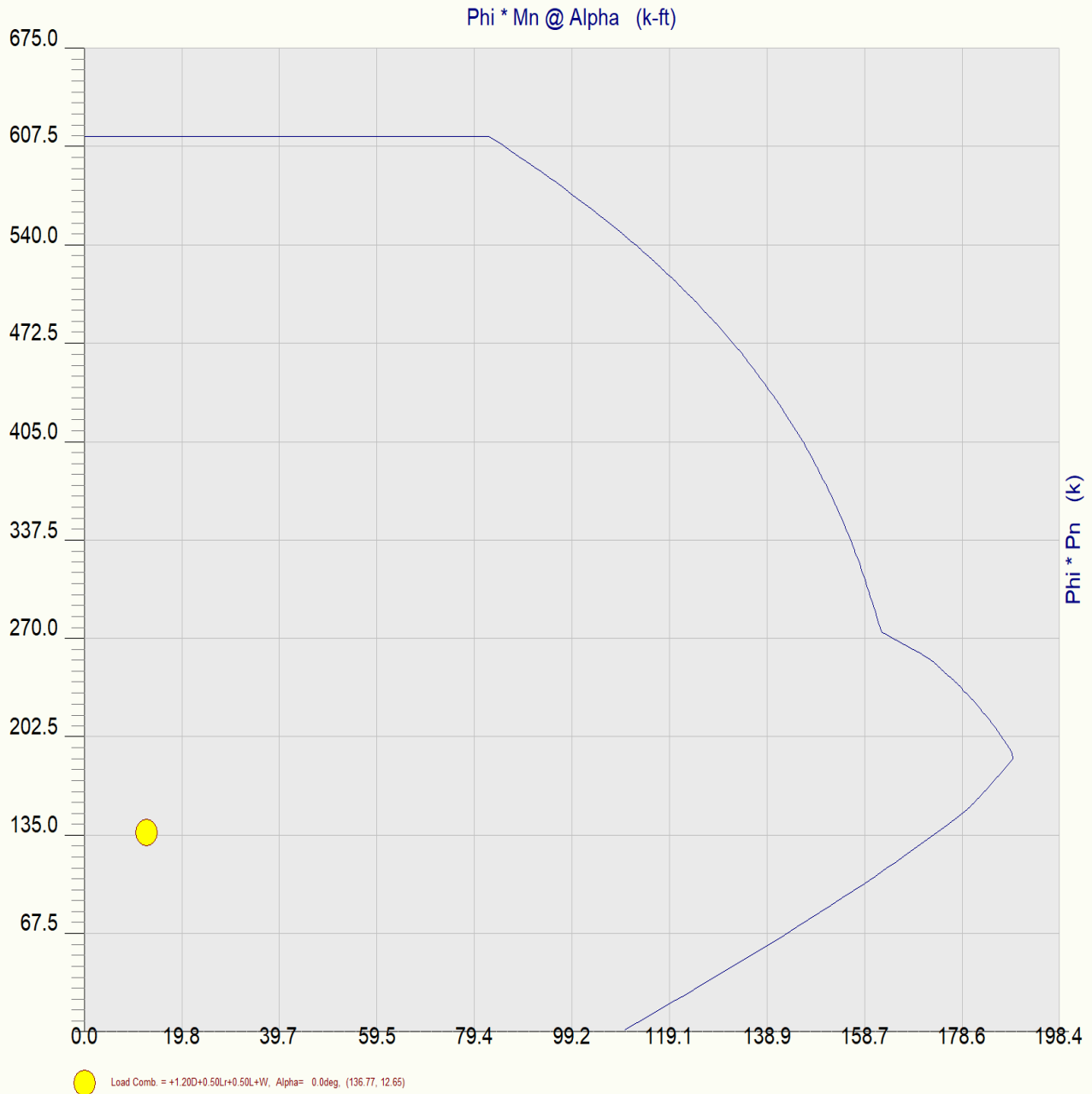
Concrete Column

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DESCRIPTION: **Sixth Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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Centerline Communications

DESCRIPTION: Fifth Floor Column

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

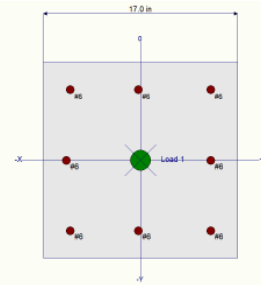
f'_c : Concrete 28 day strength = 4.0 ksi
E = 3,605.0 ksi
Density = 150.0 pcf
 β = 0.850
 f_y - Main Rebar = 60.0 ksi
E - Main Rebar = 29,000.0 ksi
Allow. Reinforcing Limits *ASTM A615 Bars Used*
Min. Reinf. = 1.0 %
Max. Reinf. = 8.0 %

Overall Column Height = 14.420 ft
End Fixity **Top & Bottom Pinned**
Brace condition for deflection (buckling) along columns :
X-X (width) axis :
Unbraced Length for buckling ABOUT Y-Y Axis = 14.420 ft, K = 1.0
Y-Y (depth) axis :
Unbraced Length for buckling ABOUT X-X Axis = 14.420 ft, K = 1.0

Column Cross Section

Column Dimensions : 17.0in Square Column, Column Edge to Rebar Edge Cover = 2.0in

Column Reinforcing : 4 - #6 bars @ corners,, 1 - #6 bars top & bottom between corner bars, 1 - #6 bars left & right between corner bars



Applied Loads

Entered loads are factored per load combinations specified by user.

Column self weight included : 4,341.02 lbs * Dead Load Factor

AXIAL LOADS ...

Roof + Tower Loads: Axial Load at 14.420 ft above base, D = 86.250, LR = 5.970, L = 180.060, S = 8.960 k

DESIGN SUMMARY

Load Combination **+1.20D+1.60L+0.50S**
Location of max. above base **14.323 ft**
Maximum Stress Ratio : 0.652 : 1
Ratio = $(P_u^2 + M_u^2)^{.5} / (\Phi P_n^2 + \Phi M_n^2)^{.5}$
 $P_u = 401.285$ k $\Phi * P_n = 614.55$ k
 $M_u-x = 0.0$ k-ft $\Phi * M_n-x = 0.0$ k-ft
 $M_u-y = 37.119$ k-ft $\Phi * M_n-y = 55.969$ k-ft
 M_u Angle = 90.0 deg
 M_u at Angle = 37.119 k-ft ΦM_n at Angle = 56.998 k-ft

P_n & M_n values located at P_u-M_u vector intersection with capacity curve

Column Capacities ...

P_nmax : Nominal Max. Compressive Axial Capacity **1,181.83** k
P_nmin : Nominal Min. Tension Axial Capacity k
 ΦP_n , max : Usable Compressive Axial Capacity **614.55** k
 ΦP_n , min : Usable Tension Axial Capacity k

Maximum SERVICE Load Reactions . .

Top along Y-Y **0.0** k Bottom along Y-Y **0.0** k
Top along X-X **0.0** k Bottom along X-X **0.0** k

Maximum SERVICE Load Deflections . .

Along Y-Y **0.0** in at **0.0** ft above base
for load combination :
Along X-X **0.0** in at **0.0** ft above base
for load combination :

General Section Information . $\Phi = 0.650$ $\beta = 0.850$ $\theta = 0.80$

ρ : % Reinforcing **1.218** % Rebar % Ok
Reinforcing Area **3.520** in²
Concrete Area **289.0** in²

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base ft	Axial Load k		Bending Analysis k-ft					Utilization		
	X-X	Y-Y		Pu	$\Phi * P_n$	δx	$\delta x * M_{ux}$	δy	$\delta y * M_{uy}$	Alpha (deg)	δM_u	ΦM_n	Ratio
+1.40D		M2,min	14.32	126.83	614.55			1.000	11.73	90.000	11.73	57.00	0.206
+1.40D	M2,min		14.32	126.83	614.55	1.000	11.73			0.000	11.73	57.06	0.206
+1.20D+0.50Lr+1.60L		M2,min	14.32	399.79	614.55			1.000	36.98	90.000	36.98	57.00	0.650

Concrete Column

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Centerline Communications

Lic. #: KW-06013597

DESCRIPTION: Fifth Floor Column

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base ft	Axial Load k		Bending Analysis k-ft								Utilization	
	X-X	Y-Y		Pu	ϕ * Pn	δ x	δ x * Mu _x	δ y	δ y * Mu _y	Alpha (deg)	δ Mu	ϕ Mn	Ratio		
+1.20D+0.50Lr+1.60L	M2,min		14.32	399.79	614.55	1.000	36.98			0.000	36.98	57.06	0.649		
+1.20D+1.60L+0.50S		M2,min	14.32	401.29	614.55			1.000	37.12	90.000	37.12	57.00	0.652		
+1.20D+1.60L+0.50S	M2,min		14.32	401.29	614.55	1.000	37.12			0.000	37.12	57.06	0.652		
+1.20D+1.60Lr+0.50L		M2,min	14.32	208.29	614.55			1.000	19.27	90.000	19.27	57.00	0.338		
+1.20D+1.60Lr+0.50L	M2,min		14.32	208.29	614.55	1.000	19.27			0.000	19.27	57.06	0.338		
+1.20D+1.60Lr		M2,min	14.32	118.26	614.55			1.000	10.94	90.000	10.94	57.00	0.192		
+1.20D+1.60Lr	M2,min		14.32	118.26	614.55	1.000	10.94			0.000	10.94	57.06	0.192		
+1.20D+0.50L+1.60S		M2,min	14.32	213.08	614.55			1.000	19.71	90.000	19.71	57.00	0.346		
+1.20D+0.50L+1.60S	M2,min		14.32	213.08	614.55	1.000	19.71			0.000	19.71	57.06	0.346		
+1.20D+1.60S		M2,min	14.32	123.05	614.55			1.000	11.38	90.000	11.38	57.00	0.200		
+1.20D+1.60S	M2,min		14.32	123.05	614.55	1.000	11.38			0.000	11.38	57.06	0.200		
+1.20D+0.50Lr+0.50L		M2,min	14.32	201.72	614.55			1.000	18.66	90.000	18.66	57.00	0.328		
+1.20D+0.50Lr+0.50L	M2,min		14.32	201.72	614.55	1.000	18.66			0.000	18.66	57.06	0.328		
+1.20D+0.50L+0.50S		M2,min	14.32	203.22	614.55			1.000	18.80	90.000	18.80	57.00	0.330		
+1.20D+0.50L+0.50S	M2,min		14.32	203.22	614.55	1.000	18.80			0.000	18.80	57.06	0.330		
+1.20D+0.50L+0.70S		M2,min	14.32	205.01	614.55			1.000	18.96	90.000	18.96	57.00	0.333		
+1.20D+0.50L+0.70S	M2,min		14.32	205.01	614.55	1.000	18.96			0.000	18.96	57.06	0.333		
+0.90D		M2,min	14.32	81.53	614.55			1.000	7.54	90.000	7.54	57.00	0.132		
+0.90D	M2,min		14.32	81.53	614.55	1.000	7.54			0.000	7.54	57.06	0.132		

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction @ Base	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top		@ Base	@ Top
D Only						90.591					
+D+L						270.651					
+D+Lr						96.561					
+D+S						99.551					
+D+0.750Lr+0.750L						230.114					
+D+0.750L+0.750S						232.356					
+0.60D						54.355					
Lr Only						5.970					
L Only						180.060					
S Only						8.960					

Maximum Moment Reactions

Note: Only non-zero reactions are listed.

Load Combination	Moment About X-X Axis			Moment About Y-Y Axis		
	@ Base	@ Top		@ Base	@ Top	
D Only			k-ft			k-ft
+D+L			k-ft			k-ft
+D+Lr			k-ft			k-ft
+D+S			k-ft			k-ft
+D+0.750Lr+0.750L			k-ft			k-ft
+D+0.750L+0.750S			k-ft			k-ft
+0.60D			k-ft			k-ft
Lr Only			k-ft			k-ft
L Only			k-ft			k-ft
S Only			k-ft			k-ft

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
D Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+L	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+Lr	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+S	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750L+0.750S	0.0000	in	0.000	ft	0.000	in	0.000	ft
+0.60D	0.0000	in	0.000	ft	0.000	in	0.000	ft

Concrete Column

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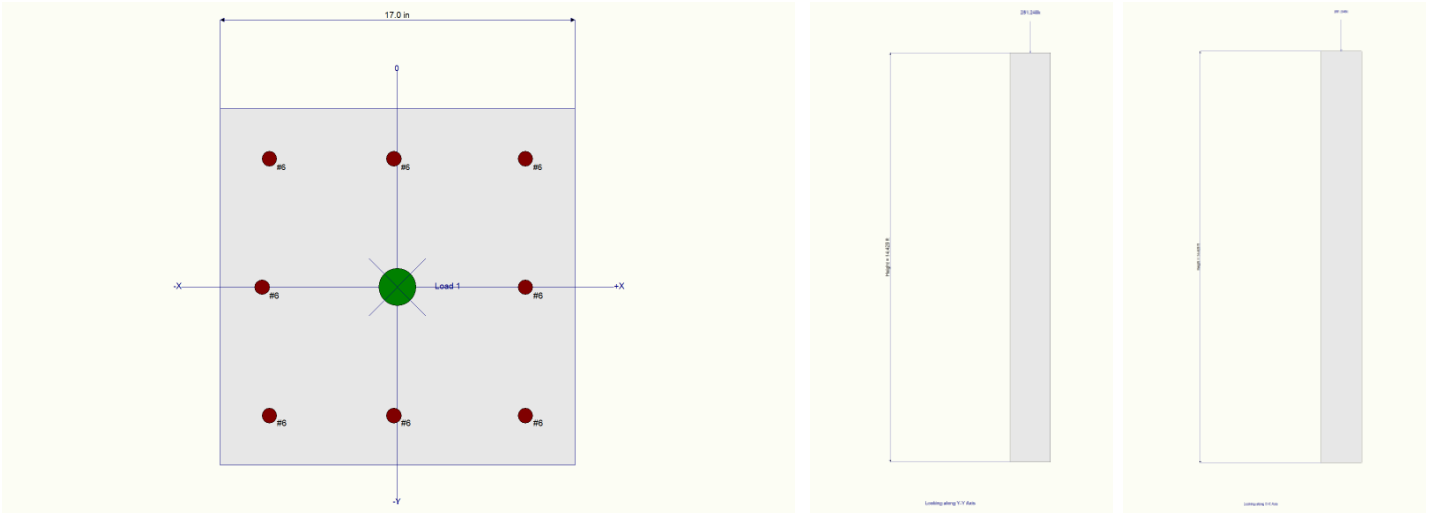
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DESCRIPTION: **Fifth Floor Column**

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
Lr Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
L Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
S Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

Sketches



Interaction Diagrams

Concrete Column

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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram



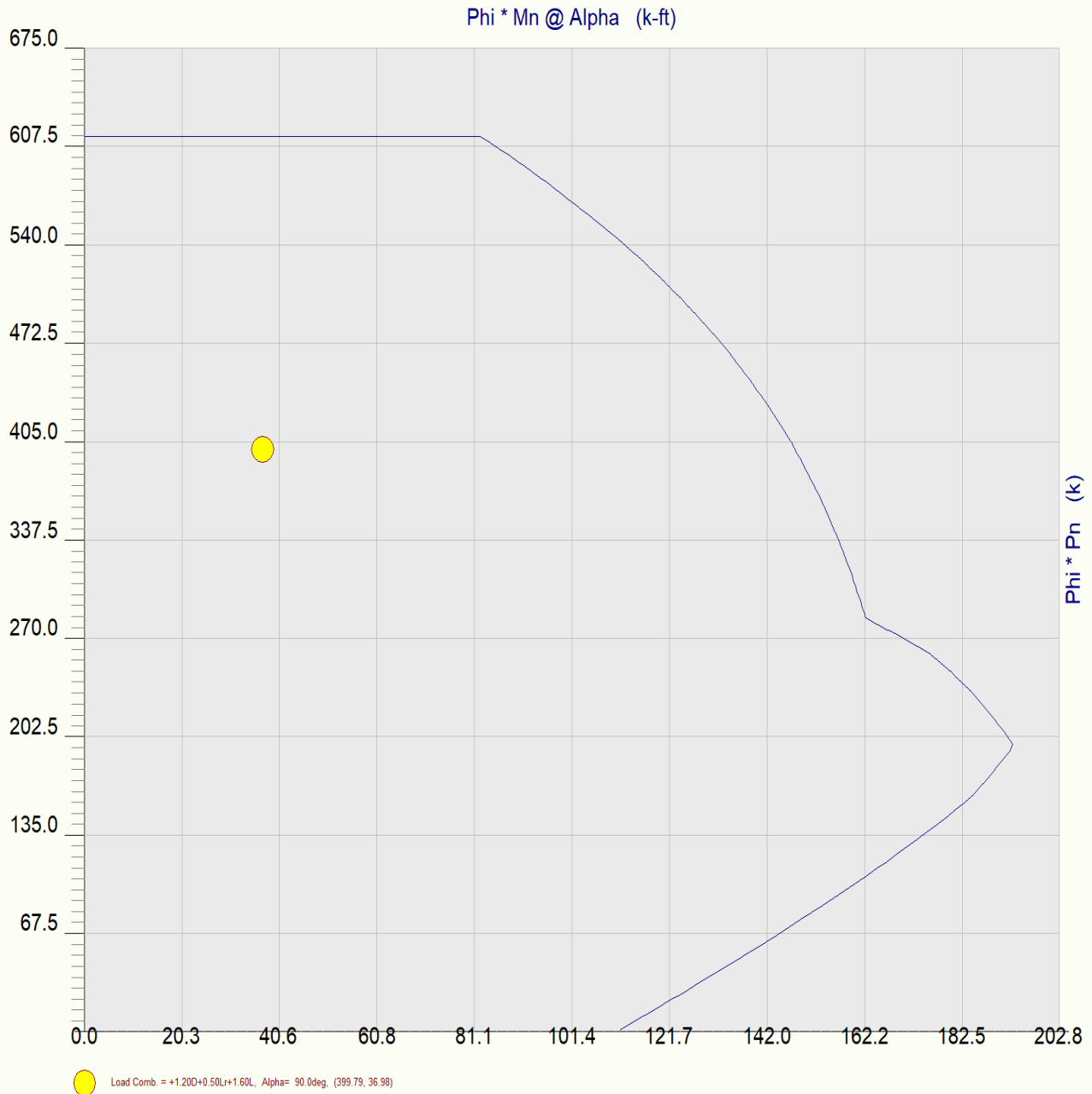
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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram



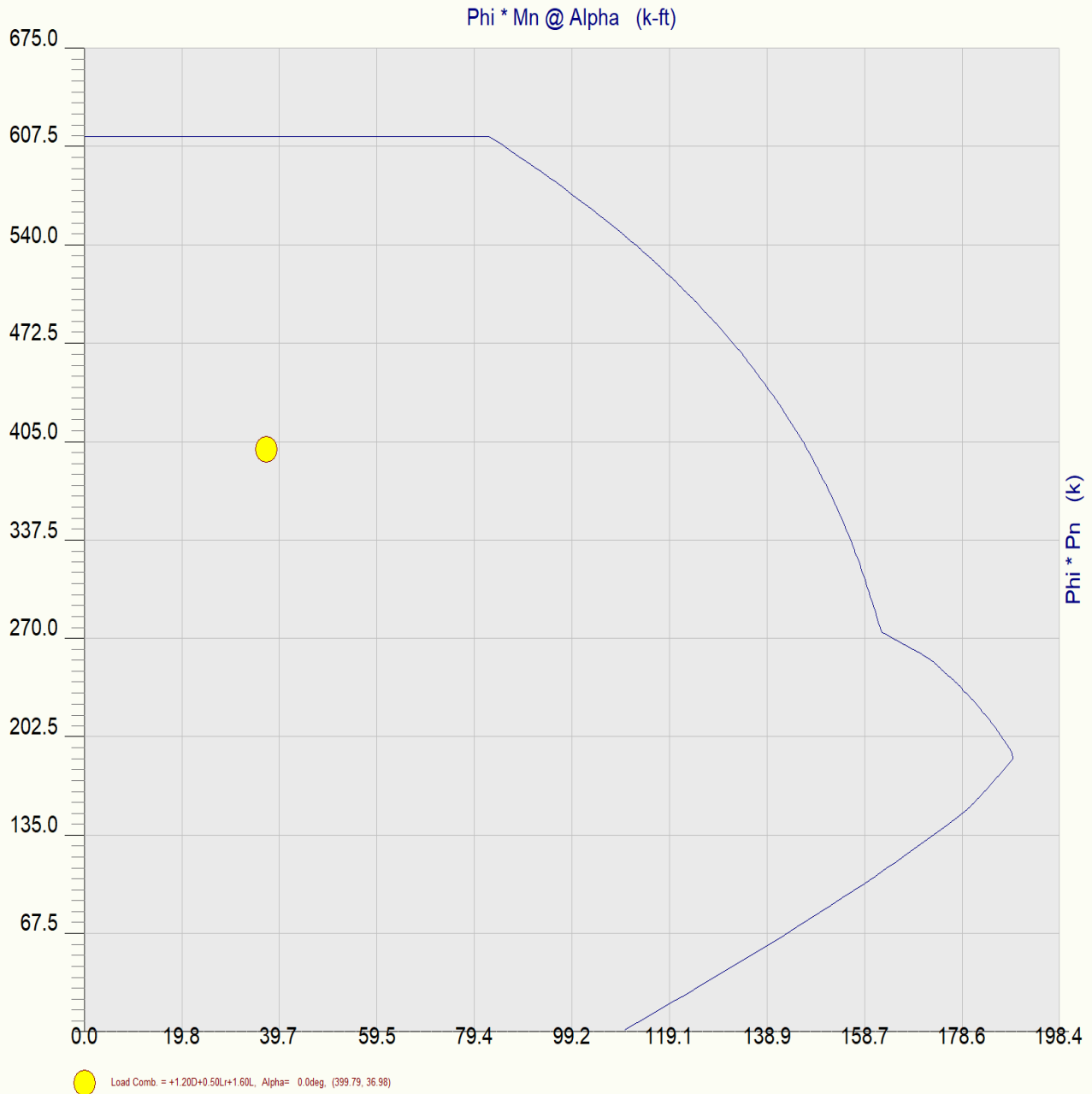
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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram



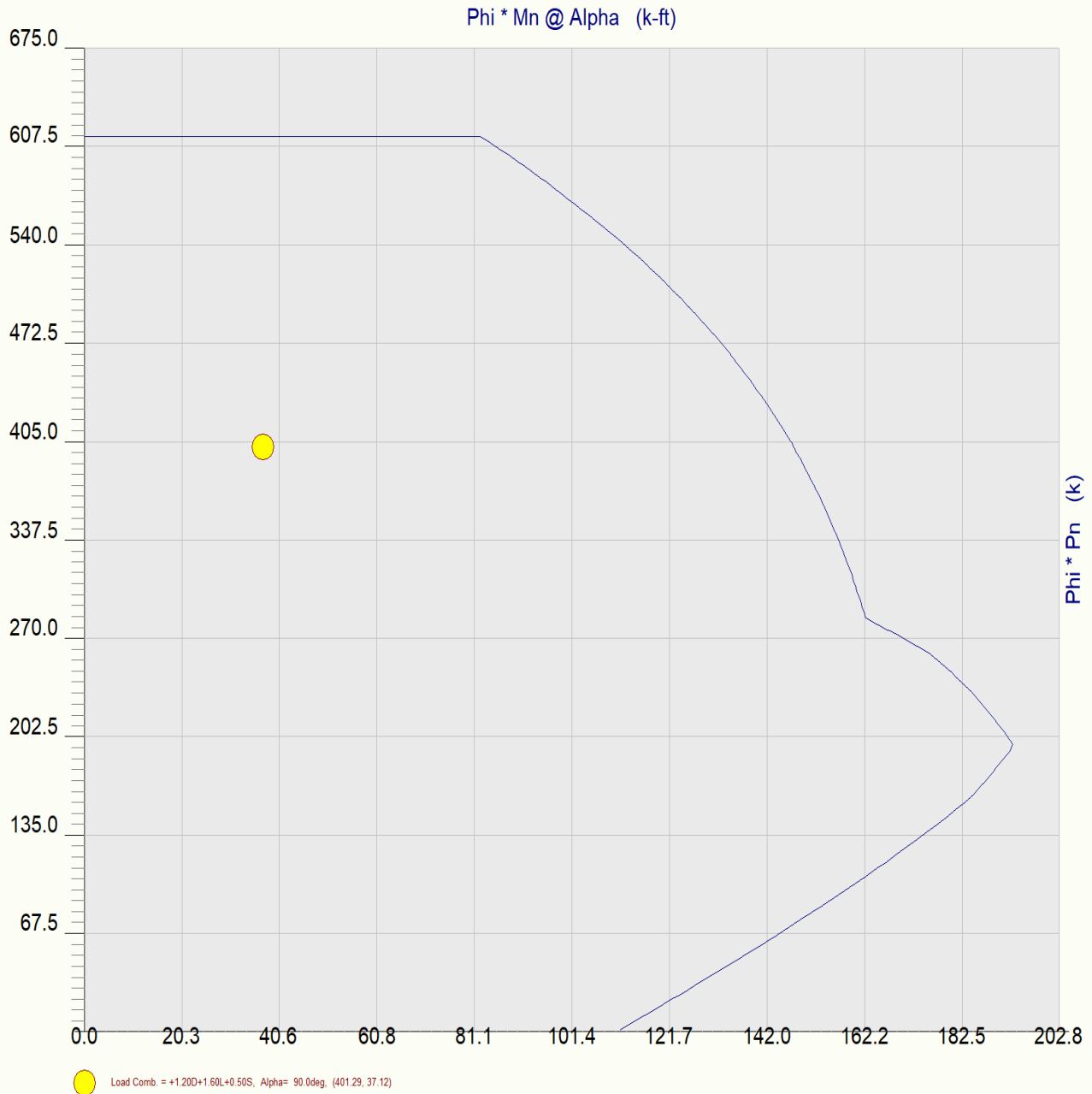
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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram



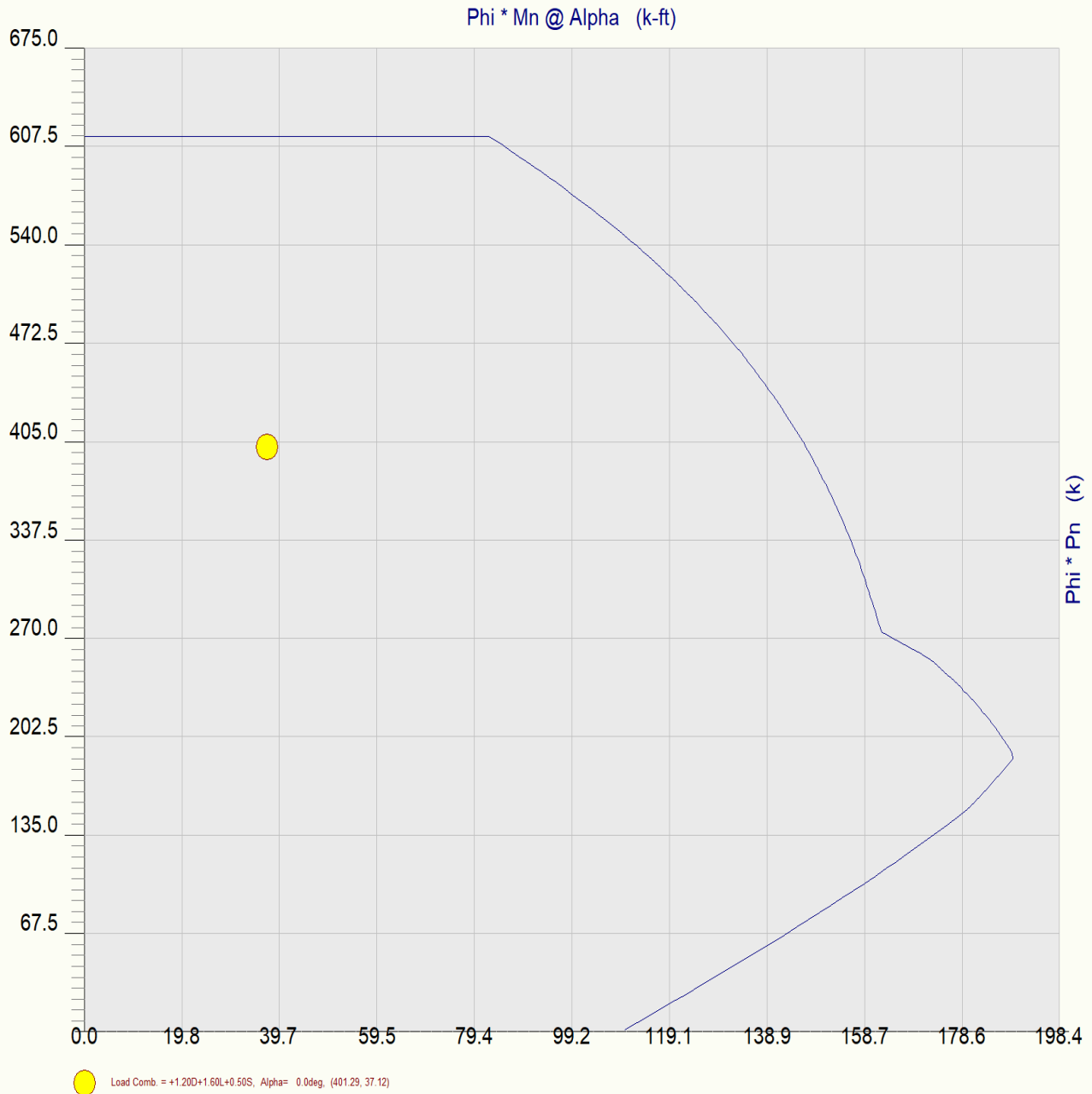
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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram



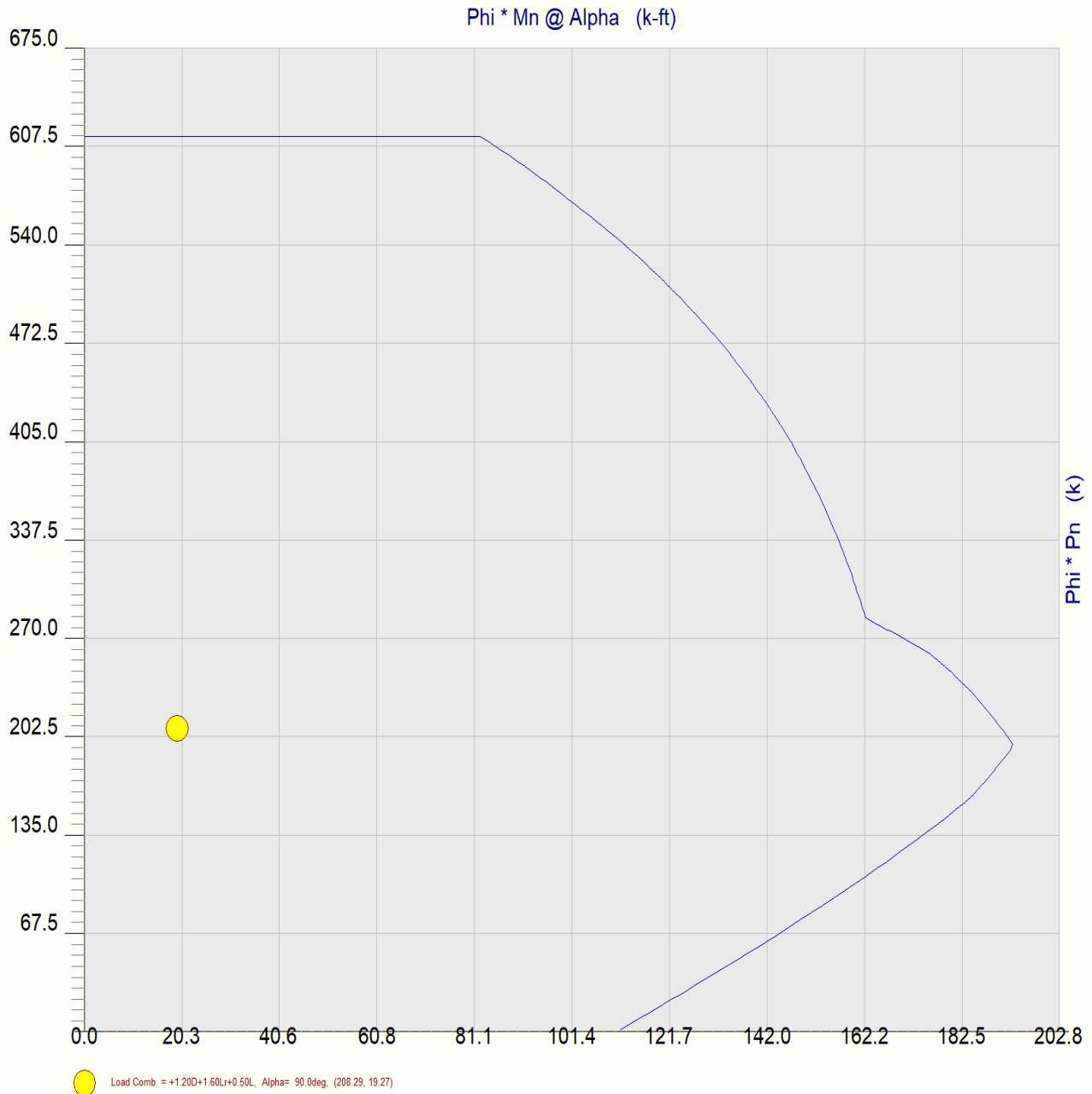
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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram



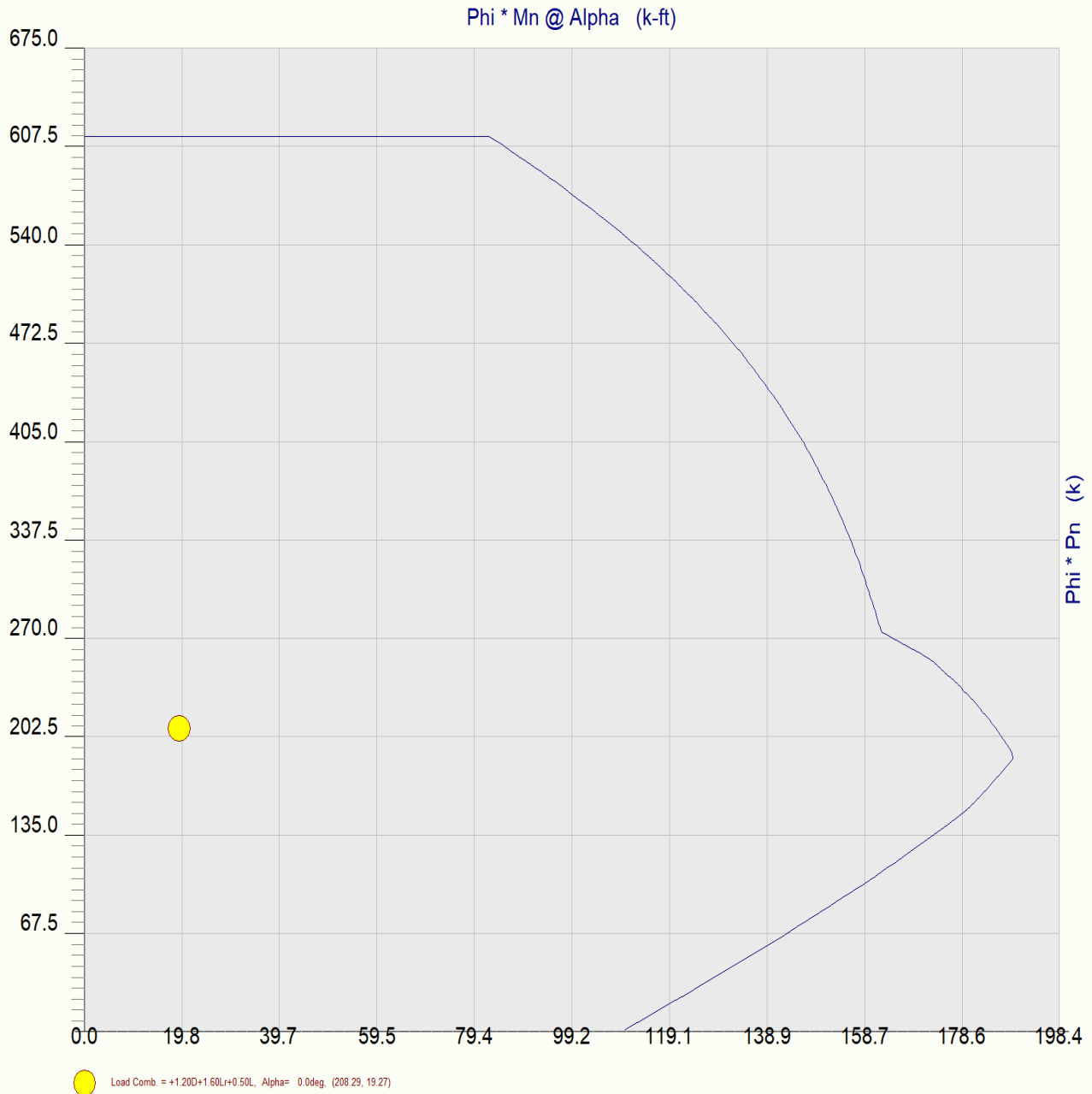
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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram



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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram



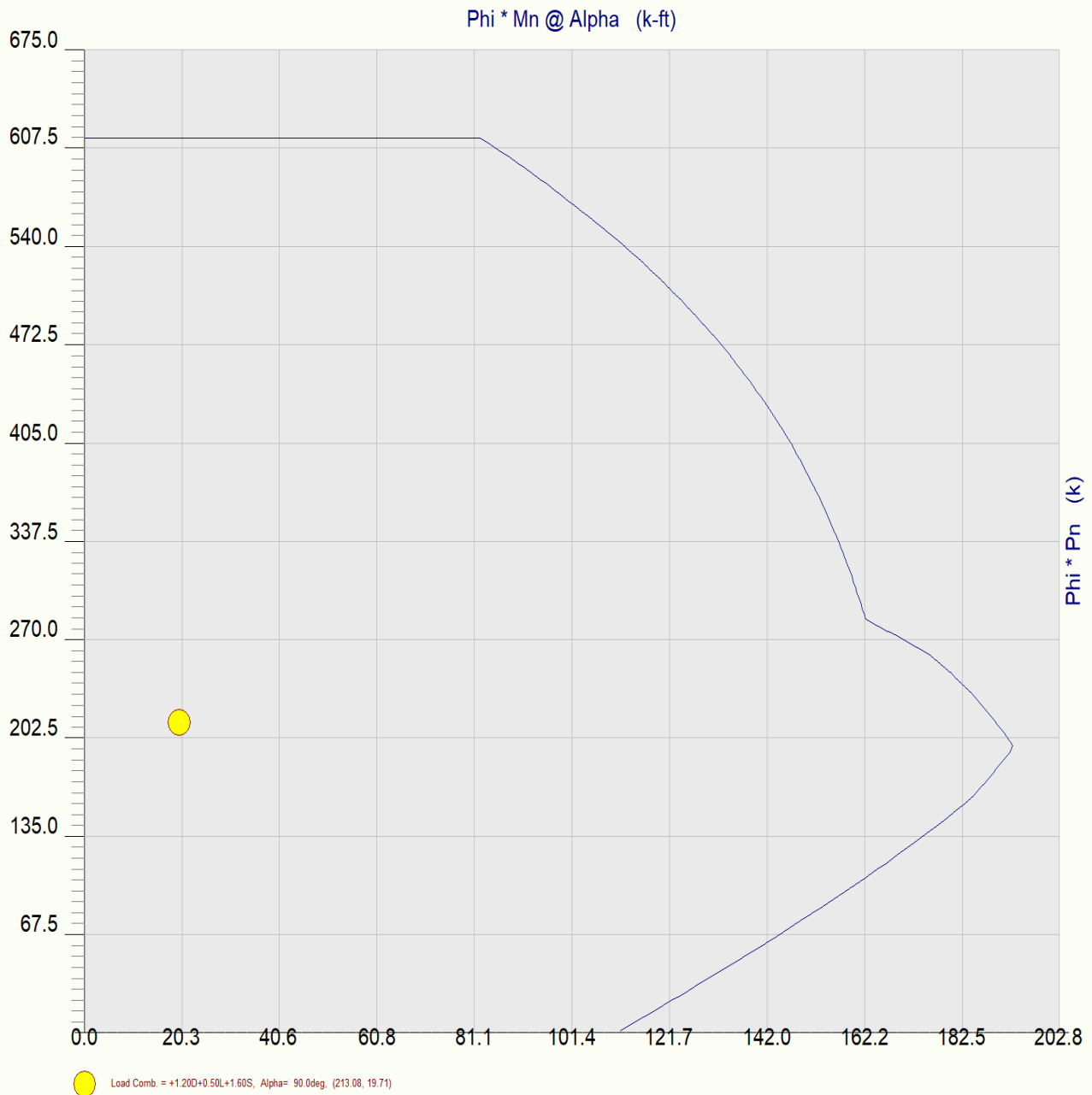
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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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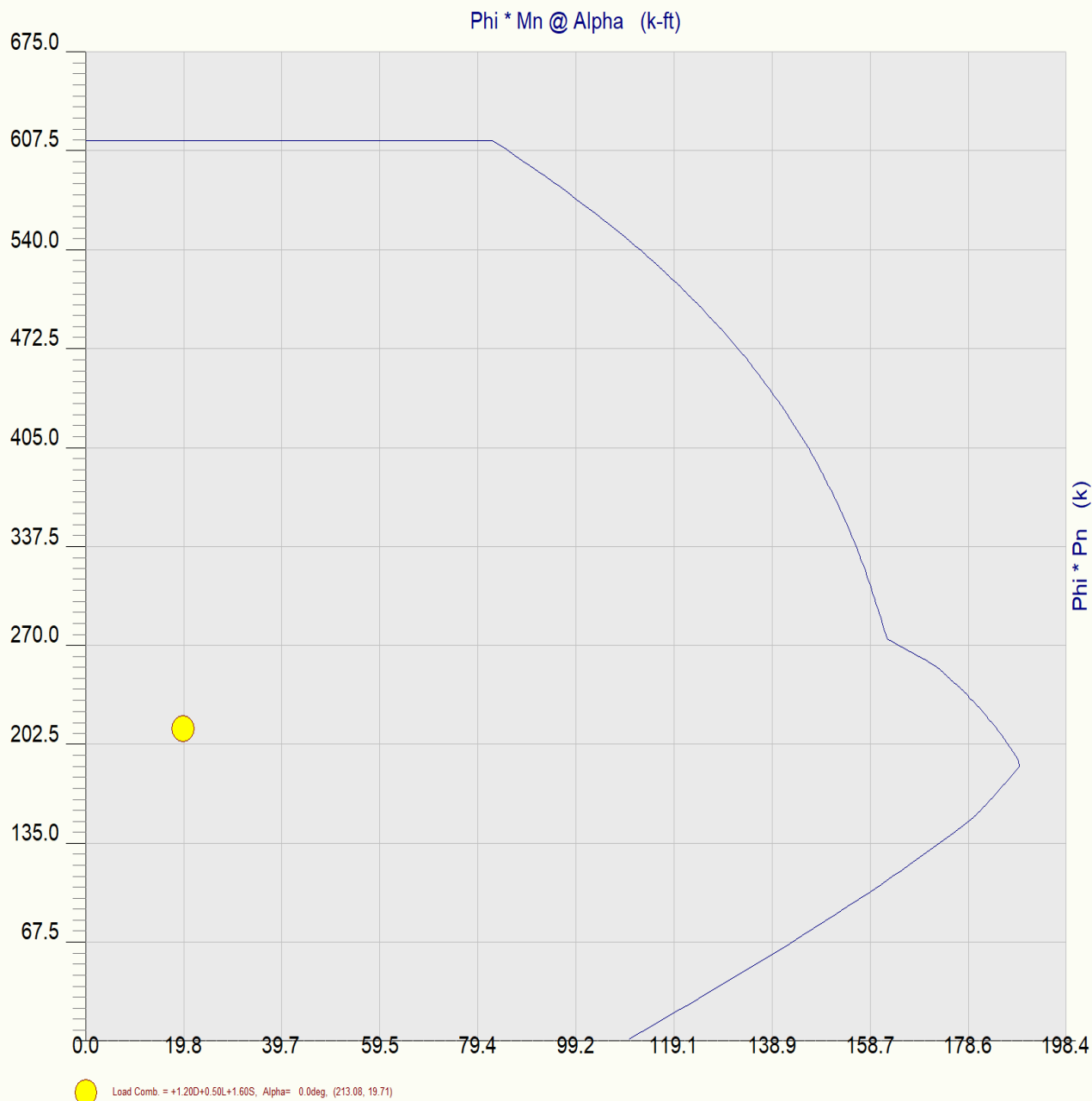
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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram



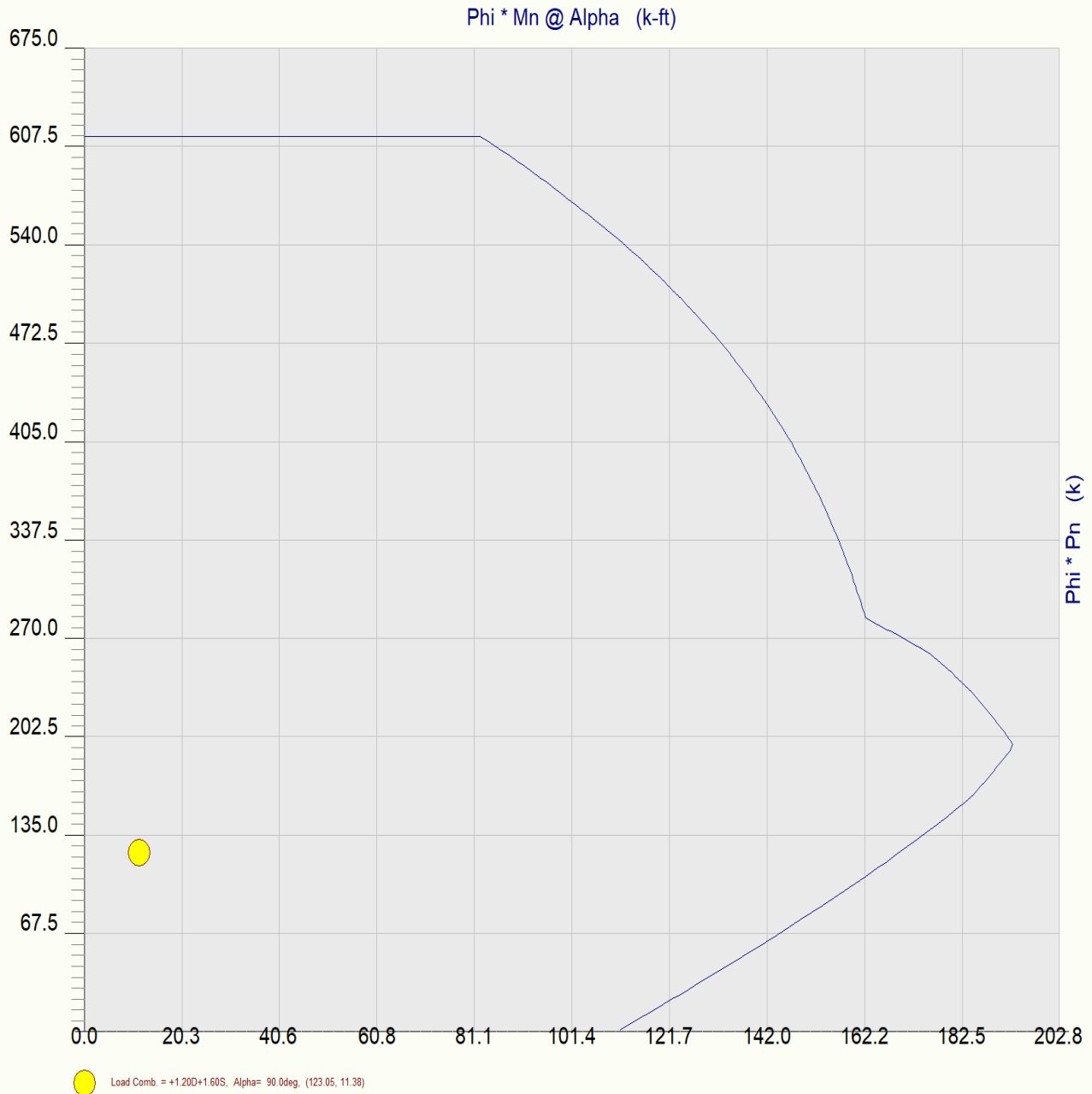
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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram



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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

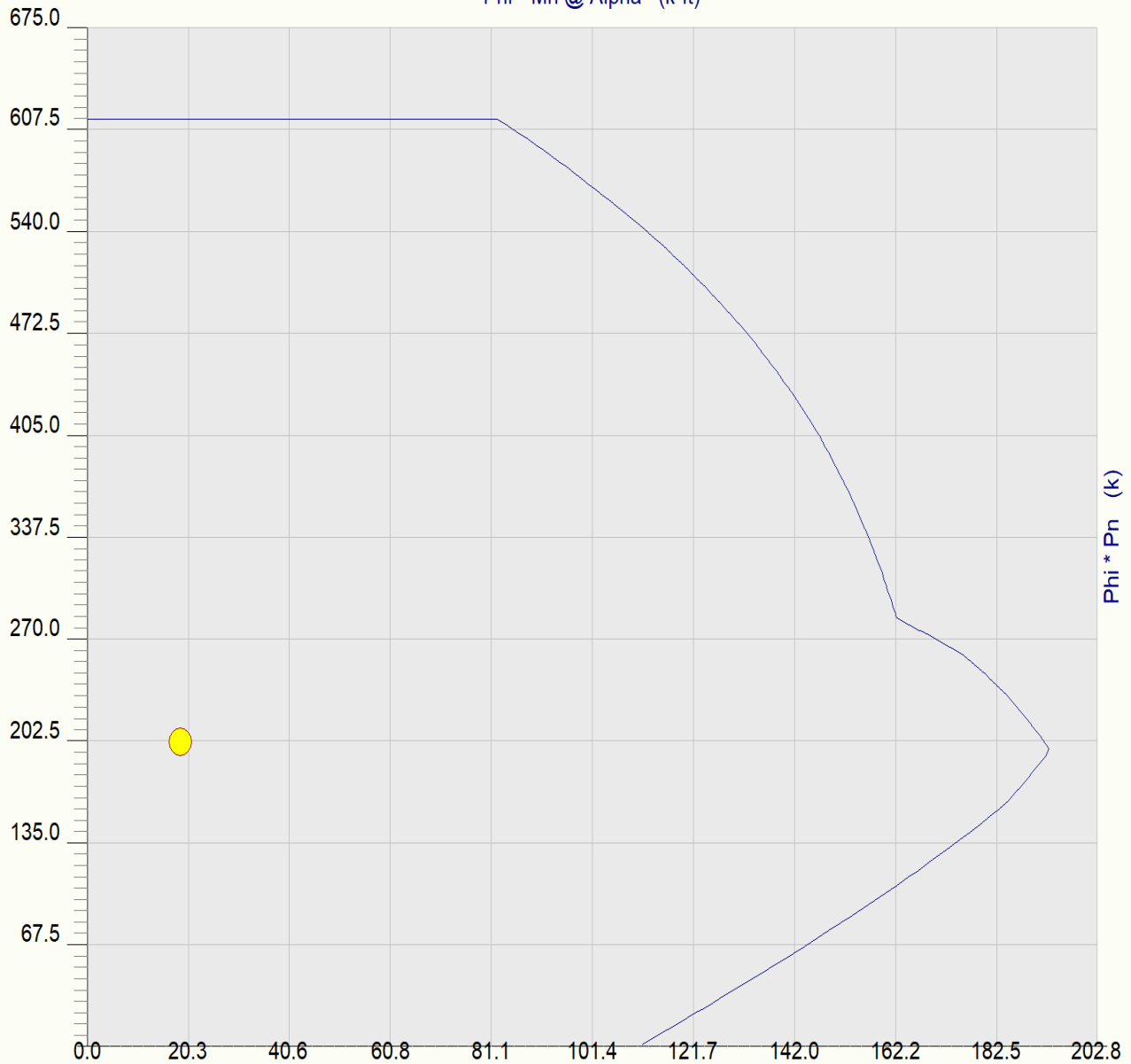
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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram

$\Phi * M_n @ \text{Alpha}$ (k-ft)



Load Comb. = +1.20D+0.50L+0.50L, Alpha= 90.0deg. (201.72, 18.66)

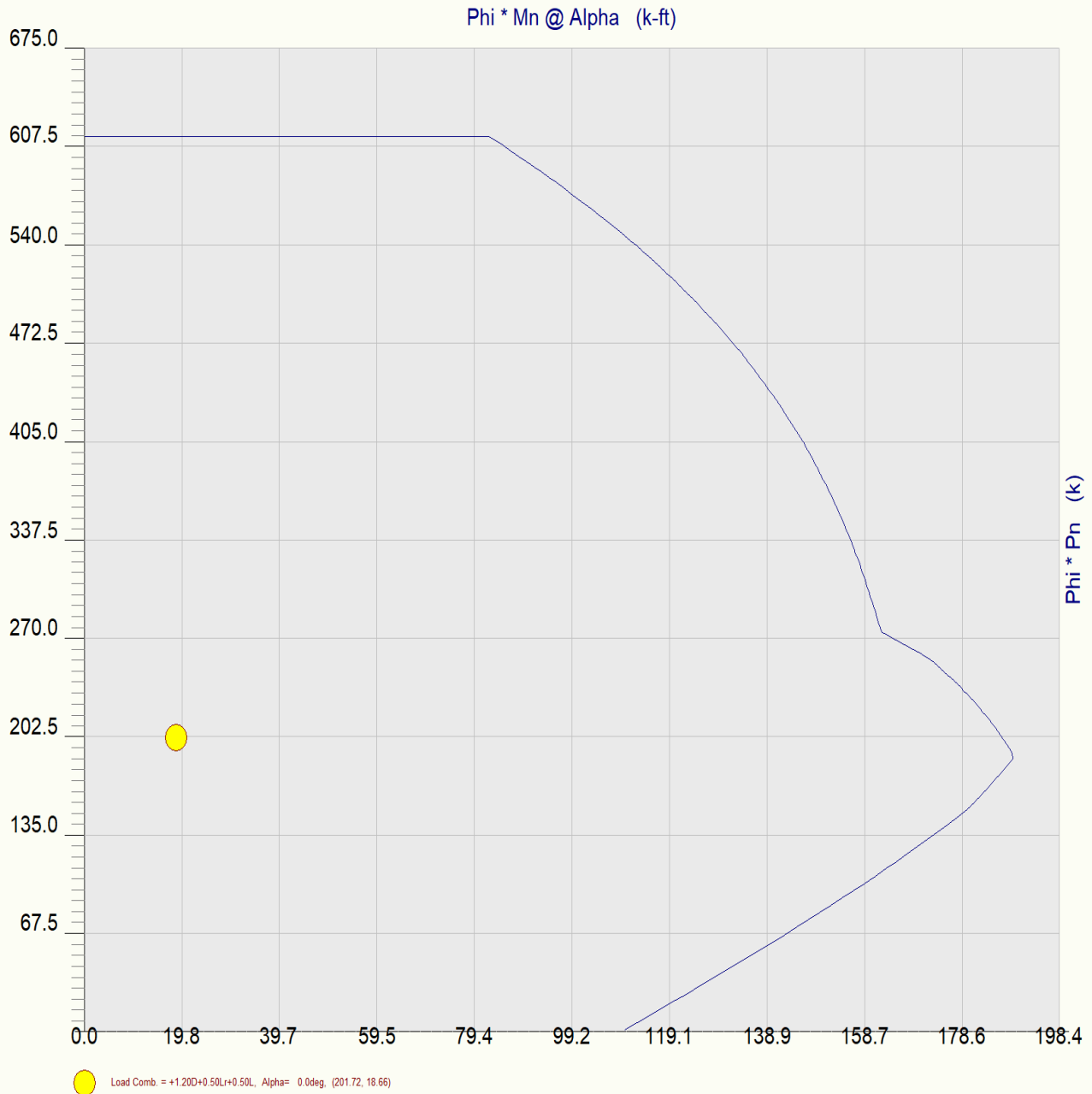
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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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DESCRIPTION: Fourth Floor Column

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

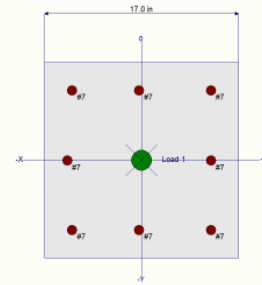
f'_c : Concrete 28 day strength = 4.0 ksi
E = 3,605.0 ksi
Density = 150.0 pcf
 β = 0.850
 f_y - Main Rebar = 60.0 ksi
E - Main Rebar = 29,000.0 ksi
Allow. Reinforcing Limits *ASTM A615 Bars Used*
Min. Reinf. = 1.0 %
Max. Reinf. = 8.0 %

Overall Column Height = 14.420 ft
End Fixity **Top & Bottom Pinned**
Brace condition for deflection (buckling) along columns :
X-X (width) axis :
Unbraced Length for buckling ABOUT Y-Y Axis = 14.420 ft, K = 1.0
Y-Y (depth) axis :
Unbraced Length for buckling ABOUT X-X Axis = 14.420 ft, K = 1.0

Column Cross Section

Column Dimensions : 17.0in Square Column, Column Edge to Rebar Edge Cover = 2.0in

Column Reinforcing : 4 - #7 bars @ corners,, 1 - #7 bars top & bottom between corner bars, 1 - #7 bars left & right between corner bars



Applied Loads

Entered loads are factored per load combinations specified by user.

Column self weight included : 4,341.02 lbs * Dead Load Factor
AXIAL LOADS ...

Roof + Tower Loads: Axial Load at 14.420 ft above base, D = 127.930, LR = 5.970, L = 209.940, S = 8.960 k

DESIGN SUMMARY

Load Combination **+1.20D+1.60L+0.50S**
Location of max. above base **14.323 ft**
Maximum Stress Ratio : 0.762 : 1
Ratio = $(P_u^2 + M_u^2)^{.5} / (\Phi P_n^2 + \Phi M_n^2)^{.5}$
 P_u = 499.109 k $\Phi * P_n$ = 652.23 k
 M_{u-x} = 0.0 k-ft $\Phi * M_{n-x}$ = 0.0 k-ft
 M_{u-y} = 46.168 k-ft $\Phi * M_{n-y}$ = 59.753 k-ft
 M_u Angle = 90.0 deg
 M_u at Angle = 46.168 k-ft ΦM_n at Angle = 60.858 k-ft

P_n & M_n values located at P_u-M_u vector intersection with capacity curve

Column Capacities ...

P_{nmax} : Nominal Max. Compressive Axial Capacity **1,254.28 k**
 P_{nmin} : Nominal Min. Tension Axial Capacity **k**
 ΦP_n , max : Usable Compressive Axial Capacity **652.23 k**
 ΦP_n , min : Usable Tension Axial Capacity **k**

Maximum SERVICE Load Reactions . .

Top along Y-Y **0.0 k** Bottom along Y-Y **0.0 k**
Top along X-X **0.0 k** Bottom along X-X **0.0 k**

Maximum SERVICE Load Deflections . .

Along Y-Y **0.0 in** at **0.0 ft** above base
for load combination :
Along X-X **0.0 in** at **0.0 ft** above base
for load combination :

General Section Information . Φ = 0.650 β = 0.850 θ = 0.80

ρ : % Reinforcing **1.661 %** Rebar % Ok
Reinforcing Area **4.80 in²**
Concrete Area **289.0 in²**

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from		Axial Load		Bending Analysis k-ft						Utilization	
	X-X	Y-Y	base	ft	Pu	ϕ * Pn	δ x	δ x * Mux	δ y	δ y * Muy	Alpha (deg)	δ Mu	ϕ Mn	Ratio
+1.40D	M2,min	M2,min	14.32	185.18	652.23				1.000	17.13	90.000	17.13	60.86	0.283
+1.40D			14.32	185.18	652.23		1.000	17.13			0.000	17.13	60.91	0.282
+1.20D+0.50Lr+1.60L		M2,min	14.32	497.61	652.23				1.000	46.03	90.000	46.03	60.86	0.759

Concrete Column

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DESCRIPTION: Fourth Floor Column

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base ft	Axial Load k		Bending Analysis k-ft						Utilization	
	X-X	Y-Y		Pu	ϕ * Pn	δ x	δ x * Mu _x	δ y	δ y * Mu _y	Alpha (deg)	δ Mu	ϕ Mn	Ratio
+1.20D+0.50Lr+1.60L	M2,min		14.32	497.61	652.23	1.000	46.03			0.000	46.03	60.91	0.759
+1.20D+1.60L+0.50S		M2,min	14.32	499.11	652.23			1.000	46.17	90.000	46.17	60.86	0.762
+1.20D+1.60L+0.50S	M2,min		14.32	499.11	652.23	1.000	46.17			0.000	46.17	60.91	0.761
+1.20D+1.60Lr+0.50L		M2,min	14.32	273.25	652.23			1.000	25.28	90.000	25.28	60.86	0.417
+1.20D+1.60Lr+0.50L	M2,min		14.32	273.25	652.23	1.000	25.28			0.000	25.28	60.91	0.417
+1.20D+1.60Lr		M2,min	14.32	168.28	652.23			1.000	15.57	90.000	15.57	60.86	0.257
+1.20D+1.60Lr	M2,min		14.32	168.28	652.23	1.000	15.57			0.000	15.57	60.91	0.257
+1.20D+0.50L+1.60S		M2,min	14.32	278.03	652.23			1.000	25.72	90.000	25.72	60.86	0.424
+1.20D+0.50L+1.60S	M2,min		14.32	278.03	652.23	1.000	25.72			0.000	25.72	60.91	0.424
+1.20D+1.60S		M2,min	14.32	173.06	652.23			1.000	16.01	90.000	16.01	60.86	0.264
+1.20D+1.60S	M2,min		14.32	173.06	652.23	1.000	16.01			0.000	16.01	60.91	0.264
+1.20D+0.50Lr+0.50L		M2,min	14.32	266.68	652.23			1.000	24.67	90.000	24.67	60.86	0.407
+1.20D+0.50Lr+0.50L	M2,min		14.32	266.68	652.23	1.000	24.67			0.000	24.67	60.91	0.407
+1.20D+0.50L+0.50S		M2,min	14.32	268.18	652.23			1.000	24.81	90.000	24.81	60.86	0.409
+1.20D+0.50L+0.50S	M2,min		14.32	268.18	652.23	1.000	24.81			0.000	24.81	60.91	0.409
+1.20D+0.50L+0.70S		M2,min	14.32	269.97	652.23			1.000	24.97	90.000	24.97	60.86	0.412
+1.20D+0.50L+0.70S	M2,min		14.32	269.97	652.23	1.000	24.97			0.000	24.97	60.91	0.412
+0.90D		M2,min	14.32	119.04	652.23			1.000	11.01	90.000	11.01	60.86	0.182
+0.90D	M2,min		14.32	119.04	652.23	1.000	11.01			0.000	11.01	60.91	0.182

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top		@ Base	@ Top
D Only						132.271					
+D+L						342.211					
+D+Lr						138.241					
+D+S						141.231					
+D+0.750Lr+0.750L						294.204					
+D+0.750L+0.750S						296.446					
+0.60D						79.363					
Lr Only						5.970					
L Only						209.940					
S Only						8.960					

Maximum Moment Reactions

Note: Only non-zero reactions are listed.

Load Combination	Moment About X-X Axis			Moment About Y-Y Axis		
	@ Base	@ Top		@ Base	@ Top	
D Only			k-ft			k-ft
+D+L			k-ft			k-ft
+D+Lr			k-ft			k-ft
+D+S			k-ft			k-ft
+D+0.750Lr+0.750L			k-ft			k-ft
+D+0.750L+0.750S			k-ft			k-ft
+0.60D			k-ft			k-ft
Lr Only			k-ft			k-ft
L Only			k-ft			k-ft
S Only			k-ft			k-ft

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
D Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+L	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+Lr	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+S	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750L+0.750S	0.0000	in	0.000	ft	0.000	in	0.000	ft
+0.60D	0.0000	in	0.000	ft	0.000	in	0.000	ft

Concrete Column

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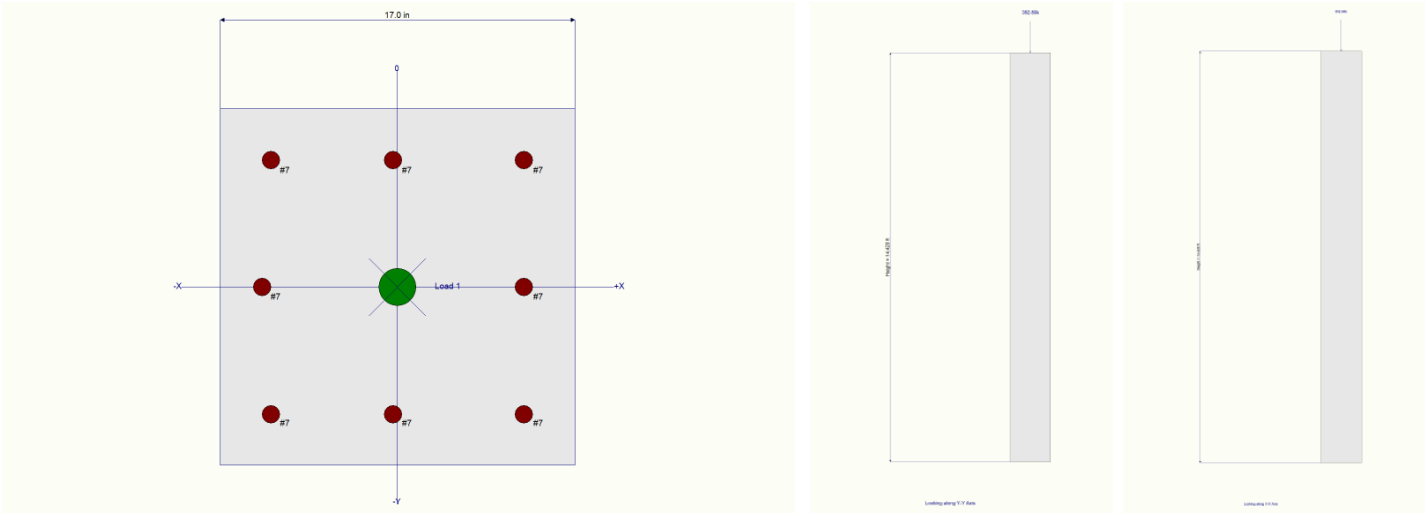
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DESCRIPTION: **Fourth Floor Column**

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
Lr Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
L Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
S Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

Sketches



Interaction Diagrams

Concrete Column

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DESCRIPTION: **Fourth Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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DESCRIPTION: **Fourth Floor Column**

Concrete Column P-M Interaction Diagram



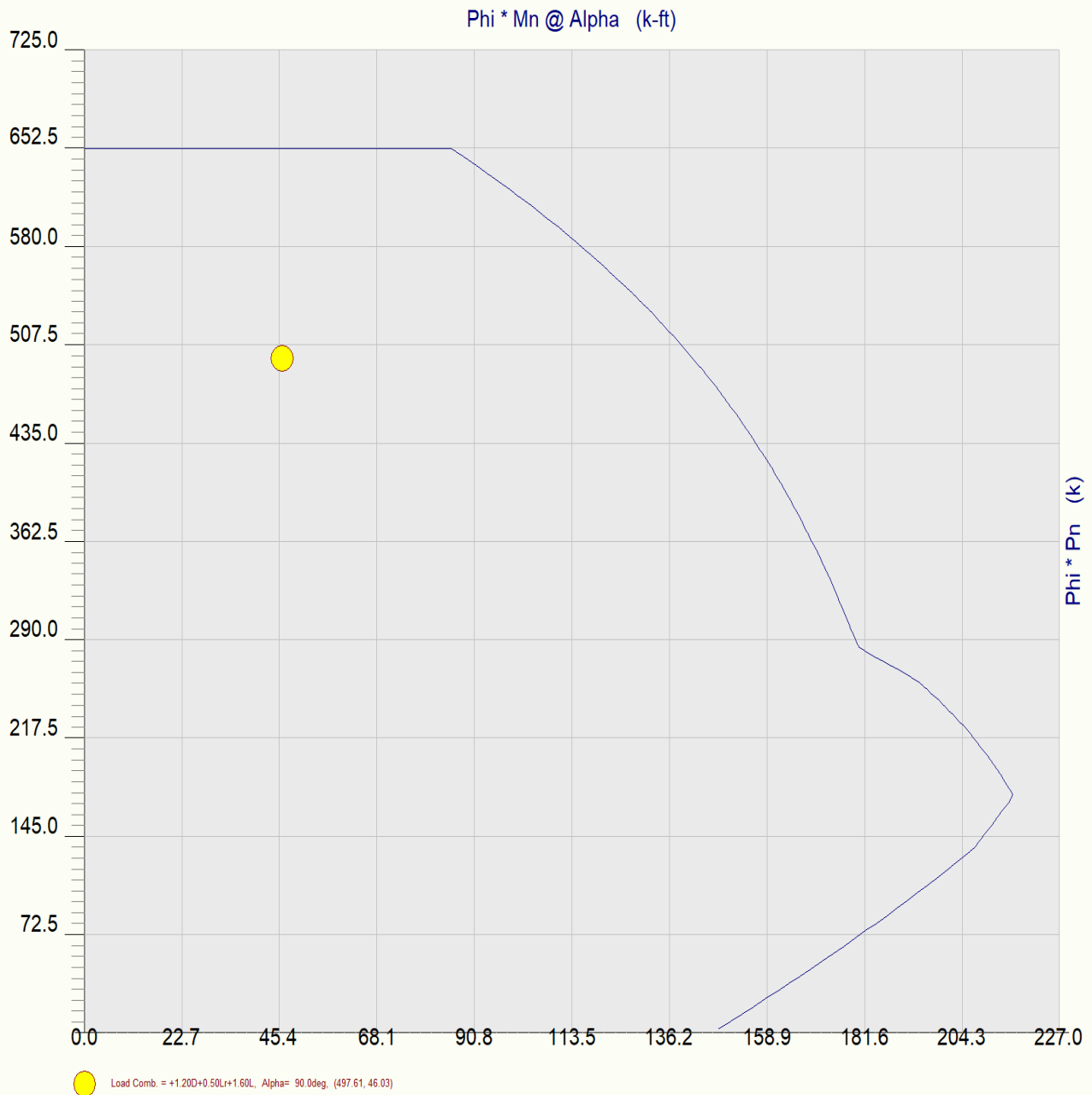
Concrete Column

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Concrete Column P-M Interaction Diagram



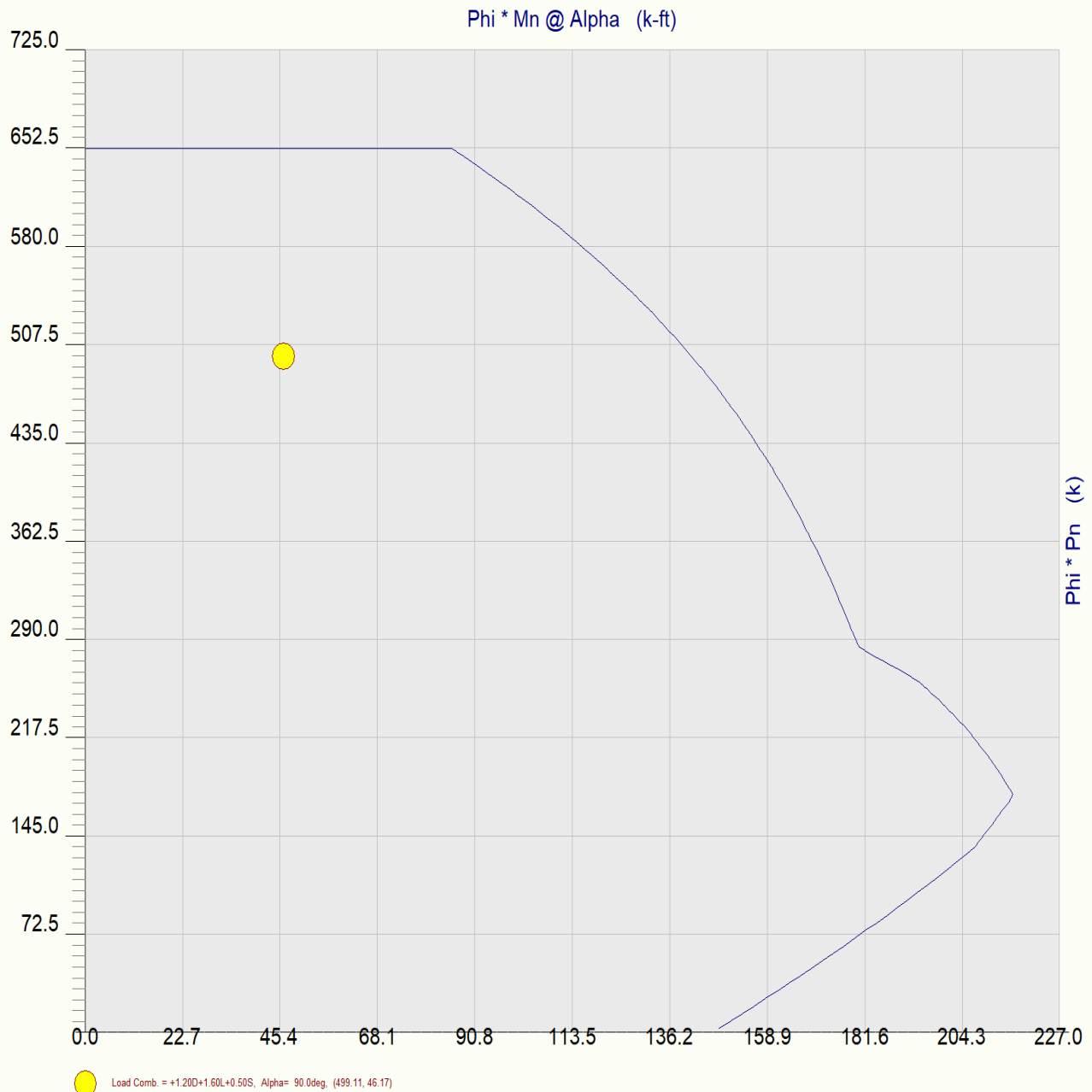
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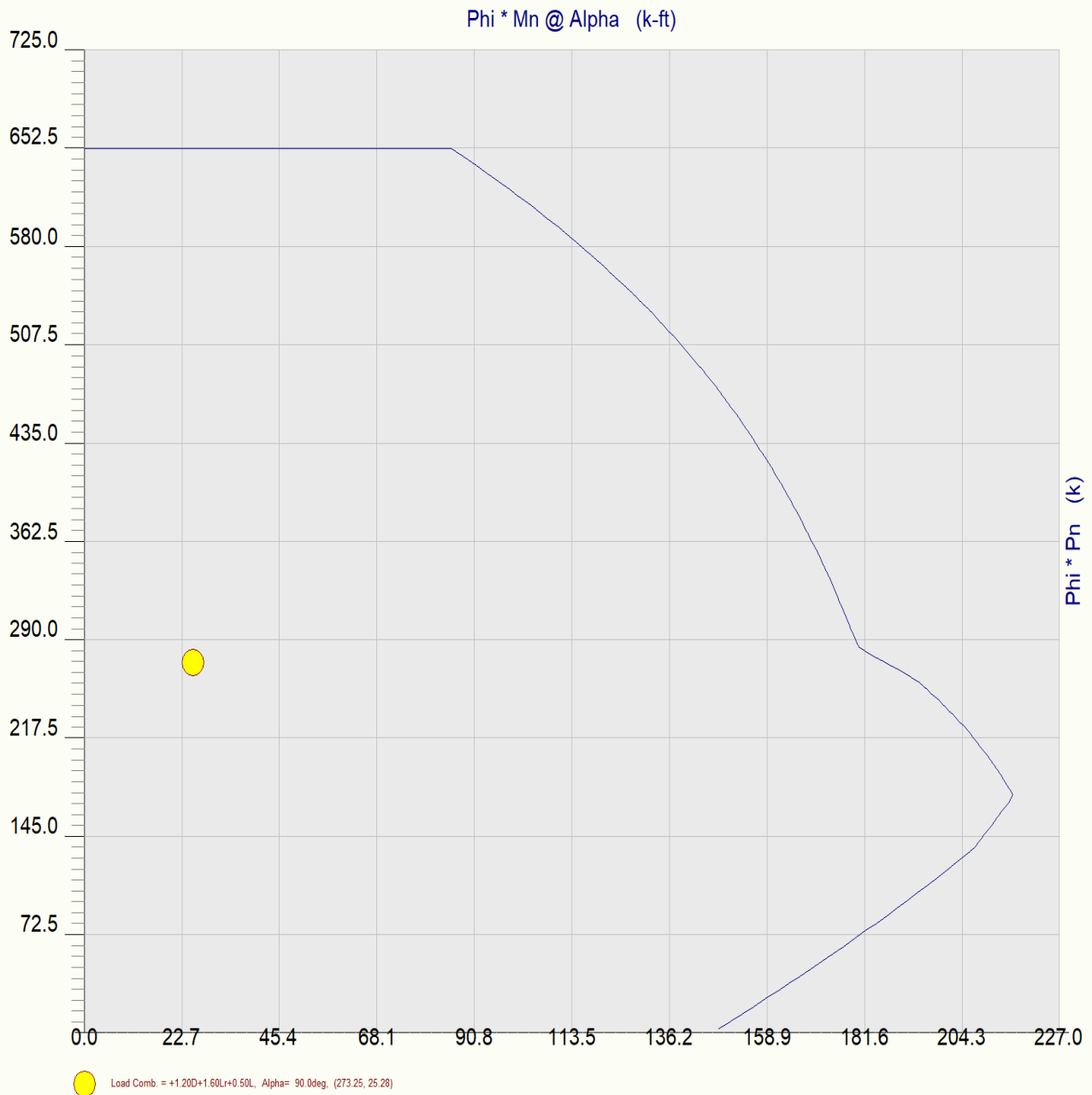
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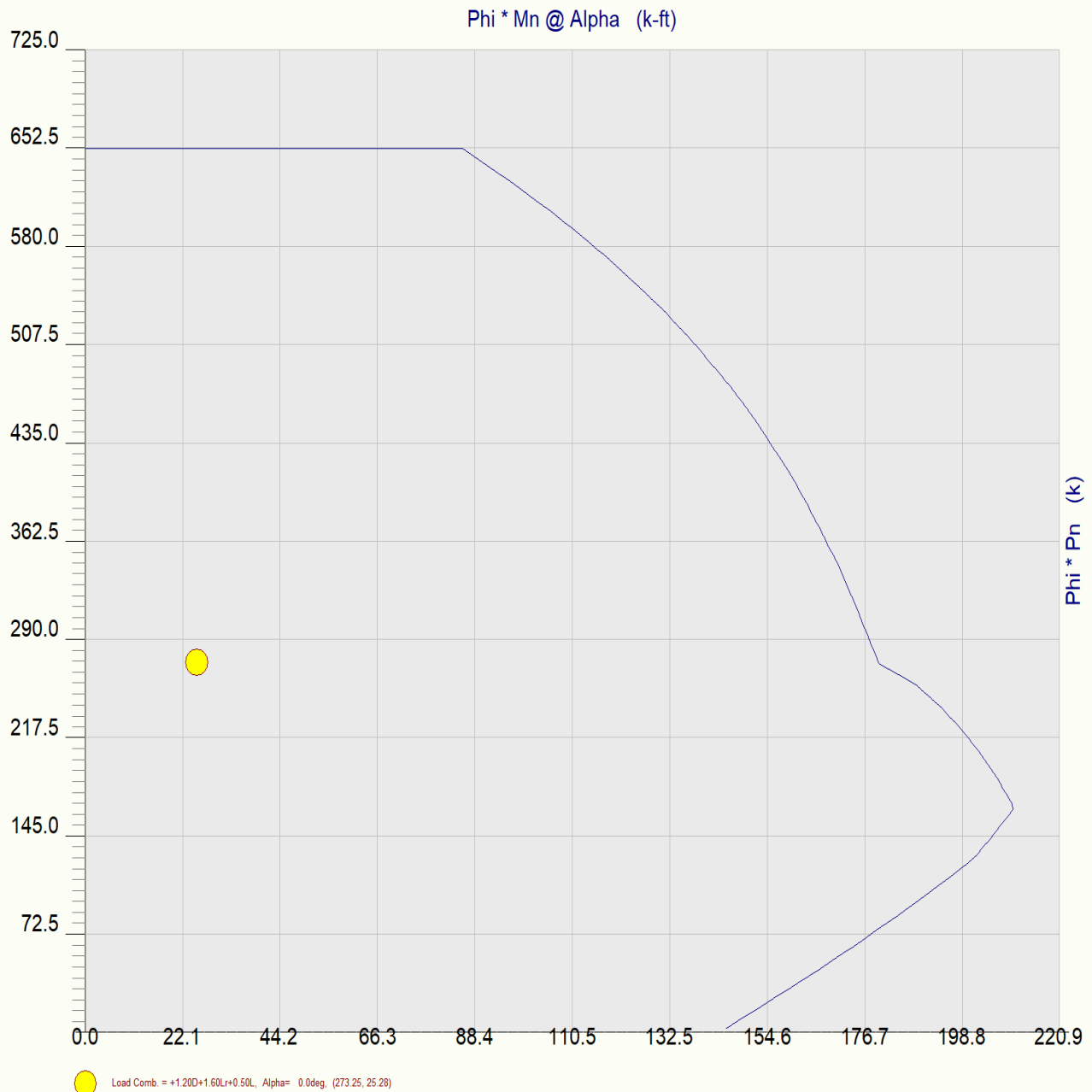
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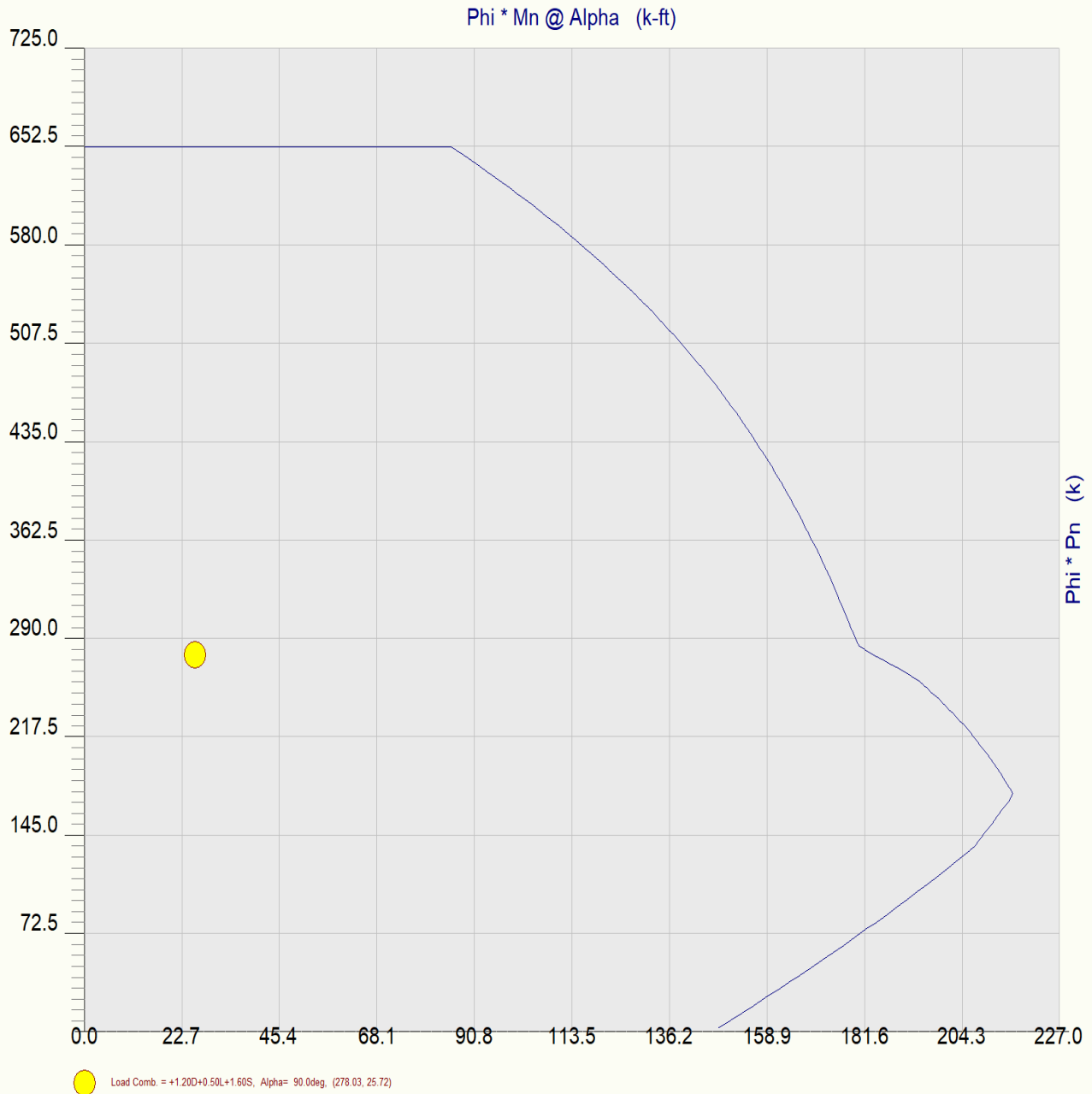
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Concrete Column P-M Interaction Diagram



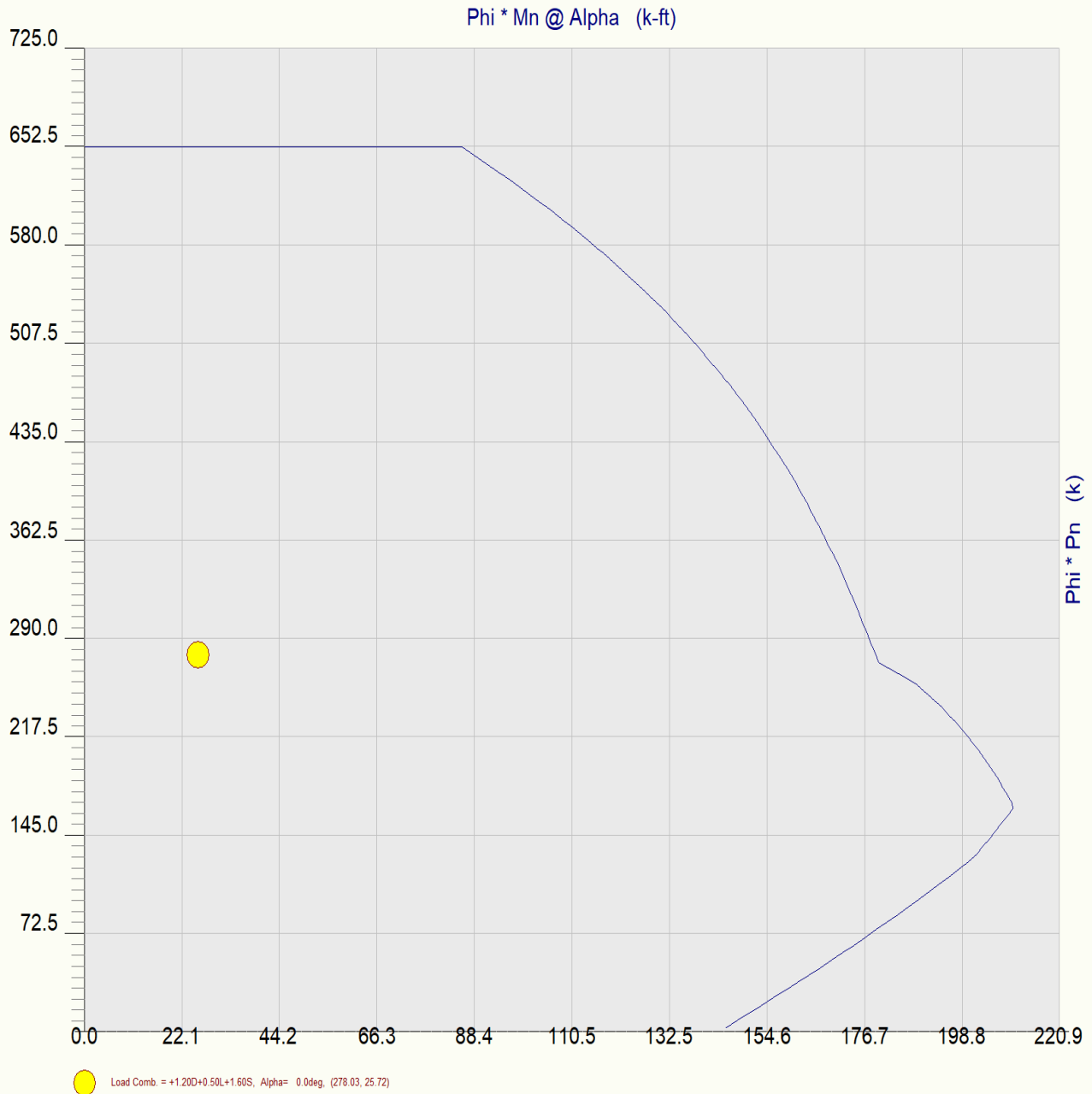
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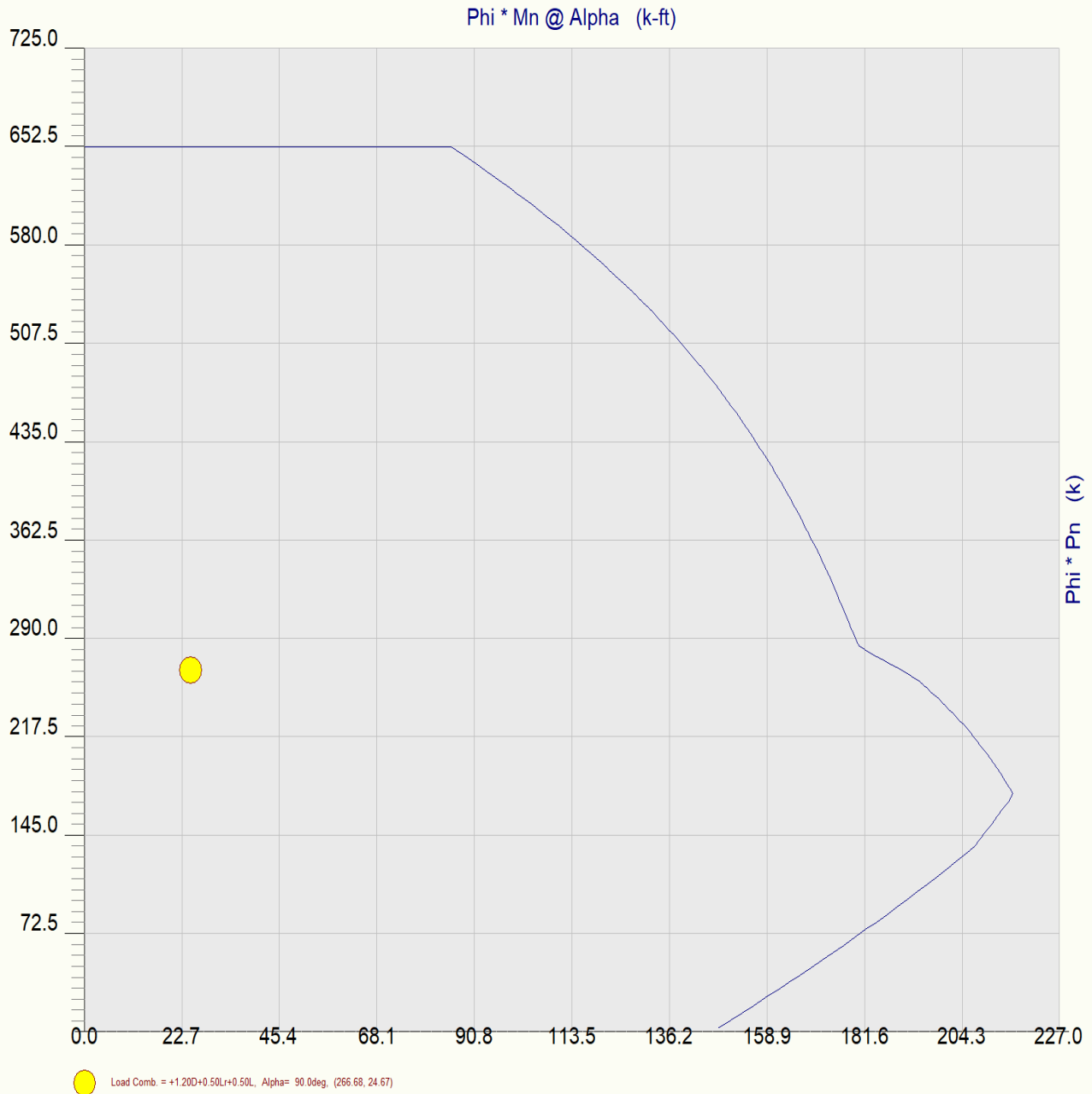
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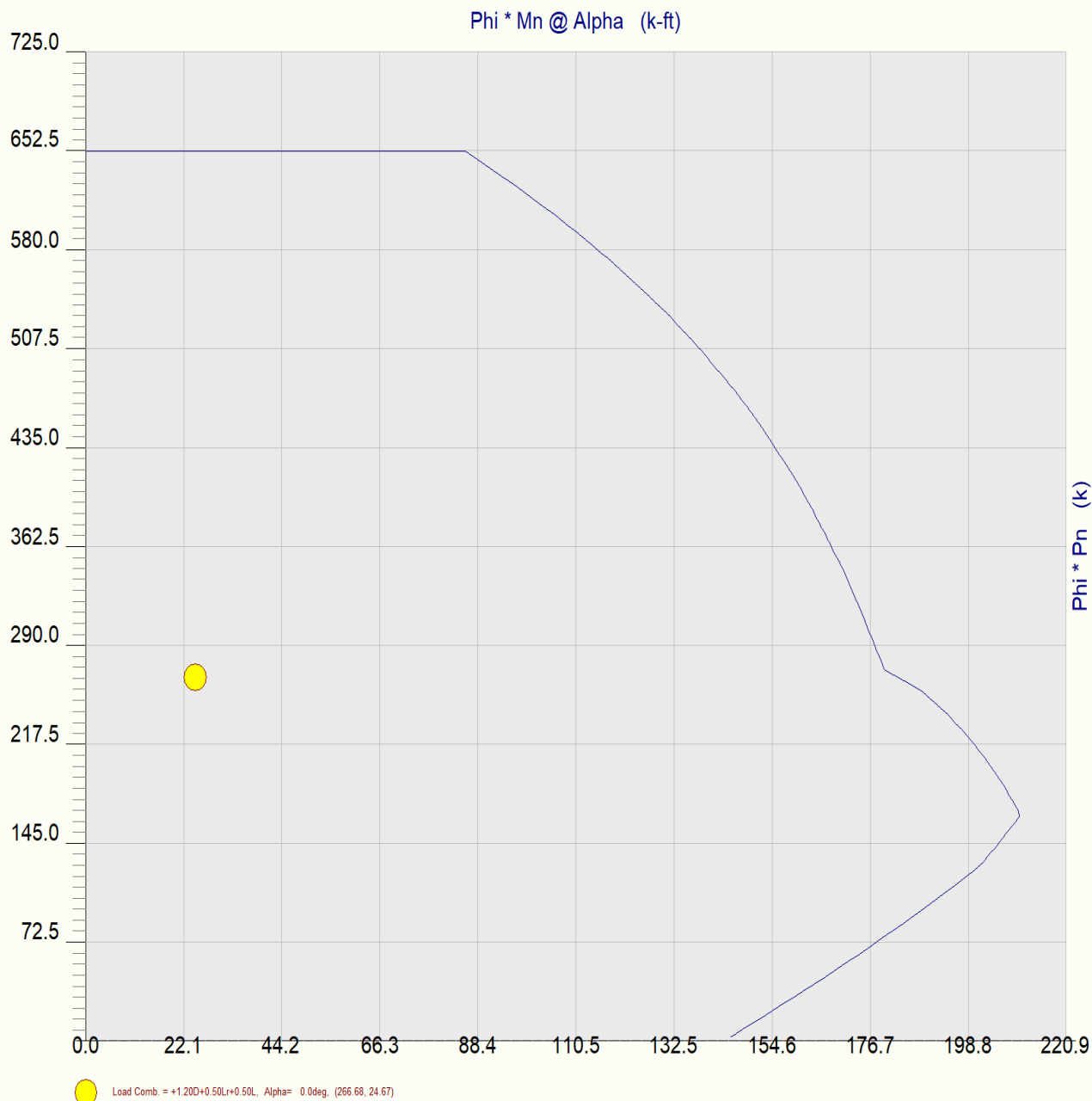
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DESCRIPTION: **Fourth Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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DESCRIPTION: Third Floor Column

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

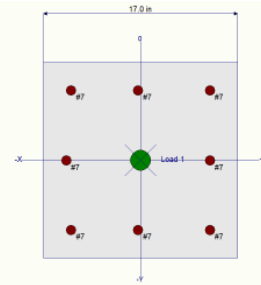
f'_c : Concrete 28 day strength = 4.0 ksi
E = 3,605.0 ksi
Density = 150.0 pcf
 β = 0.850
 f_y - Main Rebar = 60.0 ksi
E - Main Rebar = 29,000.0 ksi
Allow. Reinforcing Limits *ASTM A615 Bars Used*
Min. Reinf. = 1.0 %
Max. Reinf. = 8.0 %

Overall Column Height = 16.420 ft
End Fixity **Top & Bottom Pinned**
Brace condition for deflection (buckling) along columns :
X-X (width) axis :
Unbraced Length for buckling ABOUT Y-Y Axis = 16.420 ft, K = 1.0
Y-Y (depth) axis :
Unbraced Length for buckling ABOUT X-X Axis = 16.420 ft, K = 1.0

Column Cross Section

Column Dimensions : 17.0in Square Column, Column Edge to Rebar Edge Cover = 2.0in

Column Reinforcing : 4 - #7 bars @ corners,, 1 - #7 bars top & bottom between corner bars, 1 - #7 bars left & right between corner bars



Applied Loads

Entered loads are factored per load combinations specified by user.

Column self weight included : 4,943.10 lbs * Dead Load Factor

AXIAL LOADS ...

Roof + Tower Loads: Axial Load at 16.420 ft above base, D = 169.610, LR = 5.970, L = 239.810, S = 8.960 k

DESIGN SUMMARY

Load Combination **+1.20D+1.60L+0.50S**
Location of max. above base **16.310 ft**
Maximum Stress Ratio : 0.923 : 1
Ratio = $(P_u^2 + M_u^2)^{0.5} / (\Phi P_n^2 + \Phi M_n^2)^{0.5}$
 P_u = 597.64 k $\Phi * P_n$ = 652.23 k
 M_{u-x} = 0.0 k-ft $\Phi * M_{n-x}$ = 0.0 k-ft
 M_{u-y} = 66.301 k-ft $\Phi * M_{n-y}$ = 70.572 k-ft
 M_u Angle = 90.0 deg
 M_u at Angle = 66.301 k-ft ΦM_n at Angle = 71.587 k-ft

P_n & M_n values located at P_u-M_u vector intersection with capacity curve

Column Capacities ...

P_{nmax} : Nominal Max. Compressive Axial Capacity **1,254.28 k**
 P_{nmin} : Nominal Min. Tension Axial Capacity **k**
 ΦP_n , max : Usable Compressive Axial Capacity **652.23 k**
 ΦP_n , min : Usable Tension Axial Capacity **k**

Maximum SERVICE Load Reactions ...

Top along Y-Y **0.0 k** Bottom along Y-Y **0.0 k**
Top along X-X **0.0 k** Bottom along X-X **0.0 k**

Maximum SERVICE Load Deflections ...

Along Y-Y **0.0 in** at **0.0 ft** above base
for load combination :
Along X-X **0.0 in** at **0.0 ft** above base
for load combination :

General Section Information . Φ = 0.650 β = 0.850 θ = 0.80

ρ : % Reinforcing **1.661 %** Rebar % Ok
Reinforcing Area **4.80 in²**
Concrete Area **289.0 in²**

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from		Axial Load		Bending Analysis k-ft						Utilization	
	X-X	Y-Y	base	ft	Pu	ϕ * Pn	δ x	δ x * Mux	δ y	δ y * Muy	Alpha (deg)	δ Mu	ϕ Mn	Ratio
+1.40D	M2,min	M2,min	16.31		244.37	652.23			1.000	22.60	90.000	22.60	60.86	0.373
+1.40D			16.31		244.37	652.23	1.000	22.60			0.000	22.60	60.91	0.373
+1.20D+0.50Lr+1.60L		M2,min	16.31		596.14	652.23			1.196	65.97	90.000	65.97	71.59	0.919

Concrete Column

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DESCRIPTION: Third Floor Column

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base ft	Axial Load k		Bending Analysis k-ft								Utilization	
	X-X	Y-Y		Pu	ϕ * Pn	δ x	δ x * Mu _x	δ y	δ y * Mu _y	Alpha (deg)	δ Mu	ϕ Mn	Ratio		
+1.20D+0.50Lr+1.60L	M2,min		16.31	596.14	652.23	1.196	65.97			0.000	65.97	71.60	0.919		
+1.20D+1.60L+0.50S		M2,min	16.31	597.64	652.23			1.199	66.30	90.000	66.30	71.59	0.923		
+1.20D+1.60L+0.50S	M2,min		16.31	597.64	652.23	1.199	66.30			0.000	66.30	71.60	0.922		
+1.20D+1.60Lr+0.50L		M2,min	16.31	338.92	652.23			1.000	31.35	90.000	31.35	60.86	0.517		
+1.20D+1.60Lr+0.50L	M2,min		16.31	338.92	652.23	1.000	31.35			0.000	31.35	60.91	0.517		
+1.20D+1.60Lr		M2,min	16.31	219.02	652.23			1.000	20.26	90.000	20.26	60.86	0.334		
+1.20D+1.60Lr	M2,min		16.31	219.02	652.23	1.000	20.26			0.000	20.26	60.91	0.334		
+1.20D+0.50L+1.60S		M2,min	16.31	343.70	652.23			1.000	31.79	90.000	31.79	60.86	0.524		
+1.20D+0.50L+1.60S	M2,min		16.31	343.70	652.23	1.000	31.79			0.000	31.79	60.91	0.524		
+1.20D+1.60S		M2,min	16.31	223.80	652.23			1.000	20.70	90.000	20.70	60.86	0.341		
+1.20D+1.60S	M2,min		16.31	223.80	652.23	1.000	20.70			0.000	20.70	60.91	0.341		
+1.20D+0.50Lr+0.50L		M2,min	16.31	332.35	652.23			1.000	30.74	90.000	30.74	60.86	0.507		
+1.20D+0.50Lr+0.50L	M2,min		16.31	332.35	652.23	1.000	30.74			0.000	30.74	60.91	0.507		
+1.20D+0.50L+0.50S		M2,min	16.31	333.85	652.23			1.000	30.88	90.000	30.88	60.86	0.509		
+1.20D+0.50L+0.50S	M2,min		16.31	333.85	652.23	1.000	30.88			0.000	30.88	60.91	0.509		
+1.20D+0.50L+0.70S		M2,min	16.31	335.64	652.23			1.000	31.05	90.000	31.05	60.86	0.512		
+1.20D+0.50L+0.70S	M2,min		16.31	335.64	652.23	1.000	31.05			0.000	31.05	60.91	0.512		
+0.90D		M2,min	16.31	157.10	652.23			1.000	14.53	90.000	14.53	60.86	0.240		
+0.90D	M2,min		16.31	157.10	652.23	1.000	14.53			0.000	14.53	60.91	0.240		

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction @ Base	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top		@ Base	@ Top
D Only						174.553					
+D+L						414.363					
+D+Lr						180.523					
+D+S						183.513					
+D+0.750Lr+0.750L						358.888					
+D+0.750L+0.750S						361.131					
+0.60D						104.732					
Lr Only						5.970					
L Only						239.810					
S Only						8.960					

Maximum Moment Reactions

Note: Only non-zero reactions are listed.

Load Combination	Moment About X-X Axis			Moment About Y-Y Axis		
	@ Base	@ Top		@ Base	@ Top	
D Only			k-ft			k-ft
+D+L			k-ft			k-ft
+D+Lr			k-ft			k-ft
+D+S			k-ft			k-ft
+D+0.750Lr+0.750L			k-ft			k-ft
+D+0.750L+0.750S			k-ft			k-ft
+0.60D			k-ft			k-ft
Lr Only			k-ft			k-ft
L Only			k-ft			k-ft
S Only			k-ft			k-ft

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
D Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+L	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+Lr	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+S	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750L+0.750S	0.0000	in	0.000	ft	0.000	in	0.000	ft
+0.60D	0.0000	in	0.000	ft	0.000	in	0.000	ft

Concrete Column

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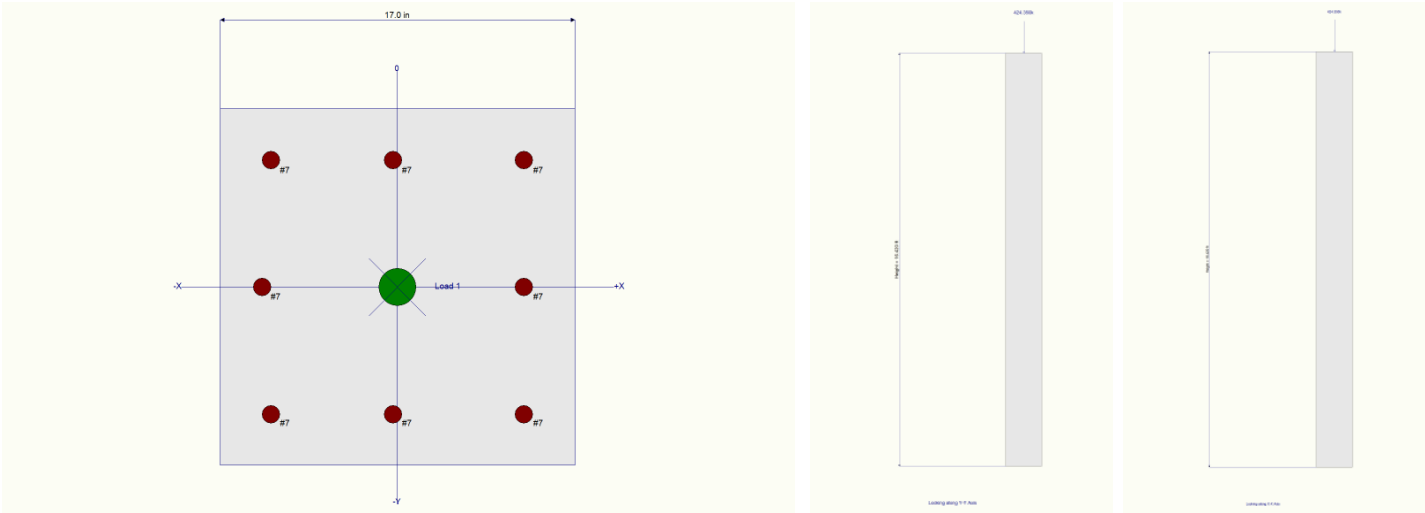
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DESCRIPTION: Third Floor Column

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
Lr Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
L Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
S Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

Sketches



Interaction Diagrams

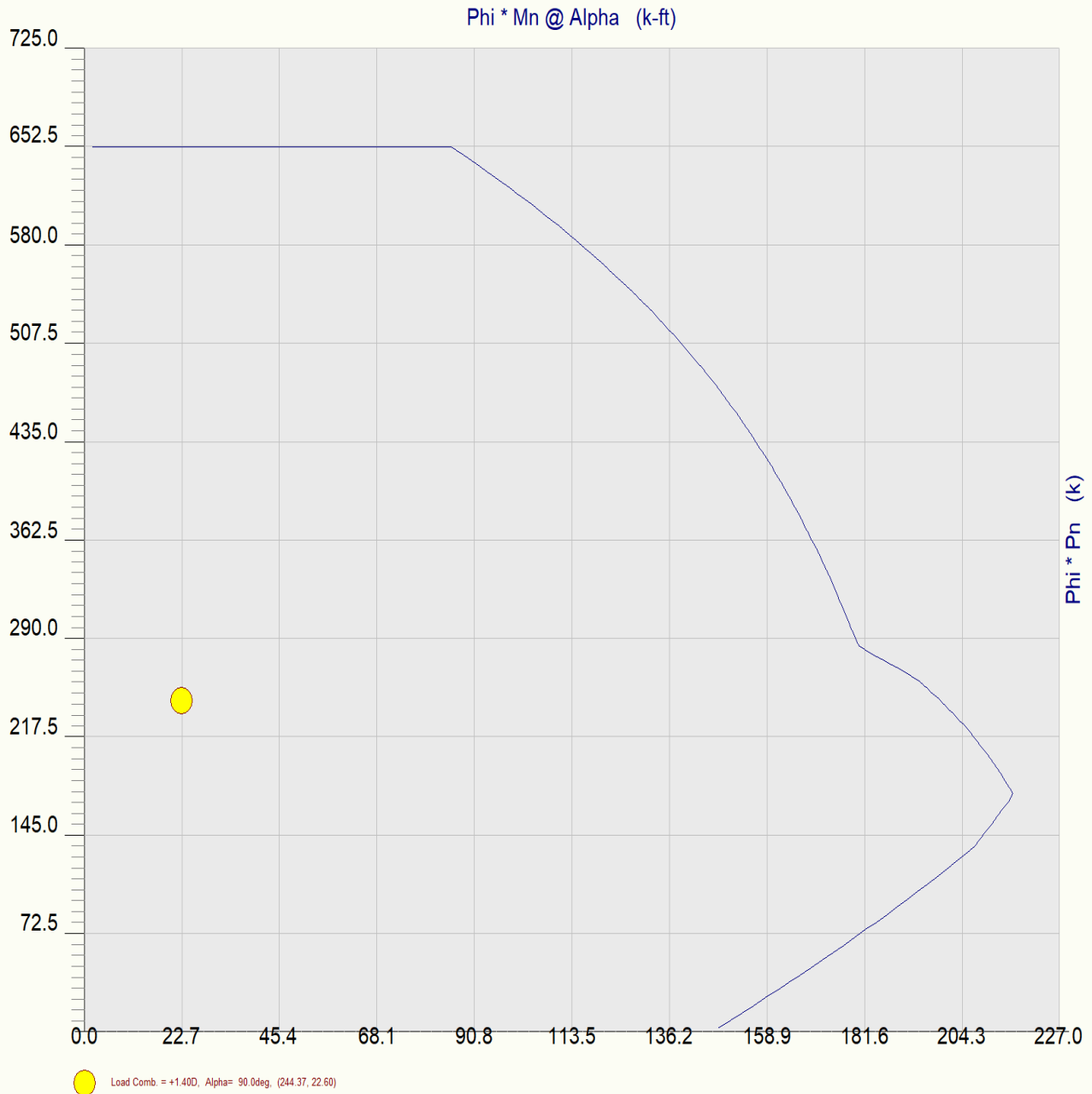
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Concrete Column P-M Interaction Diagram



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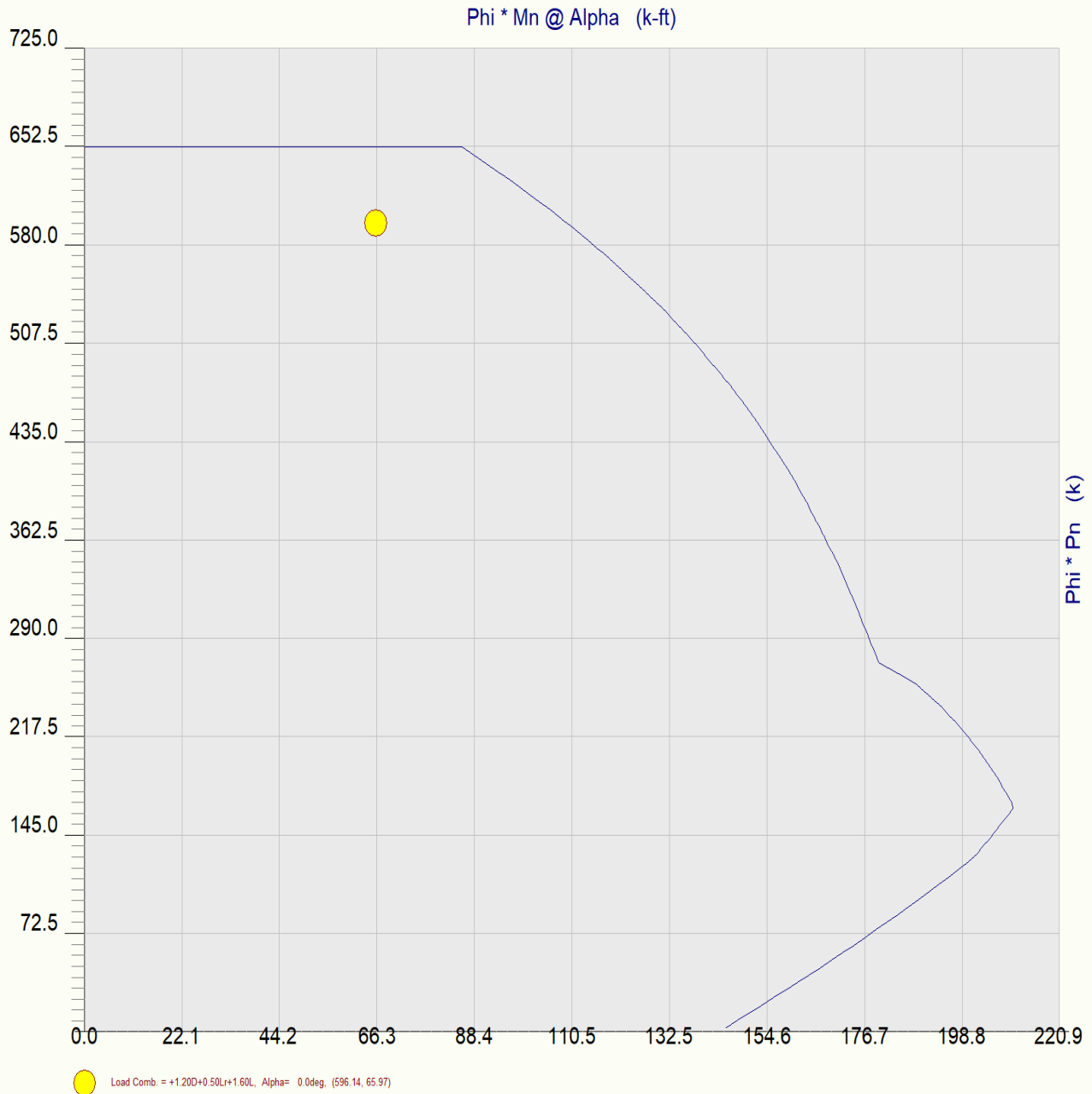
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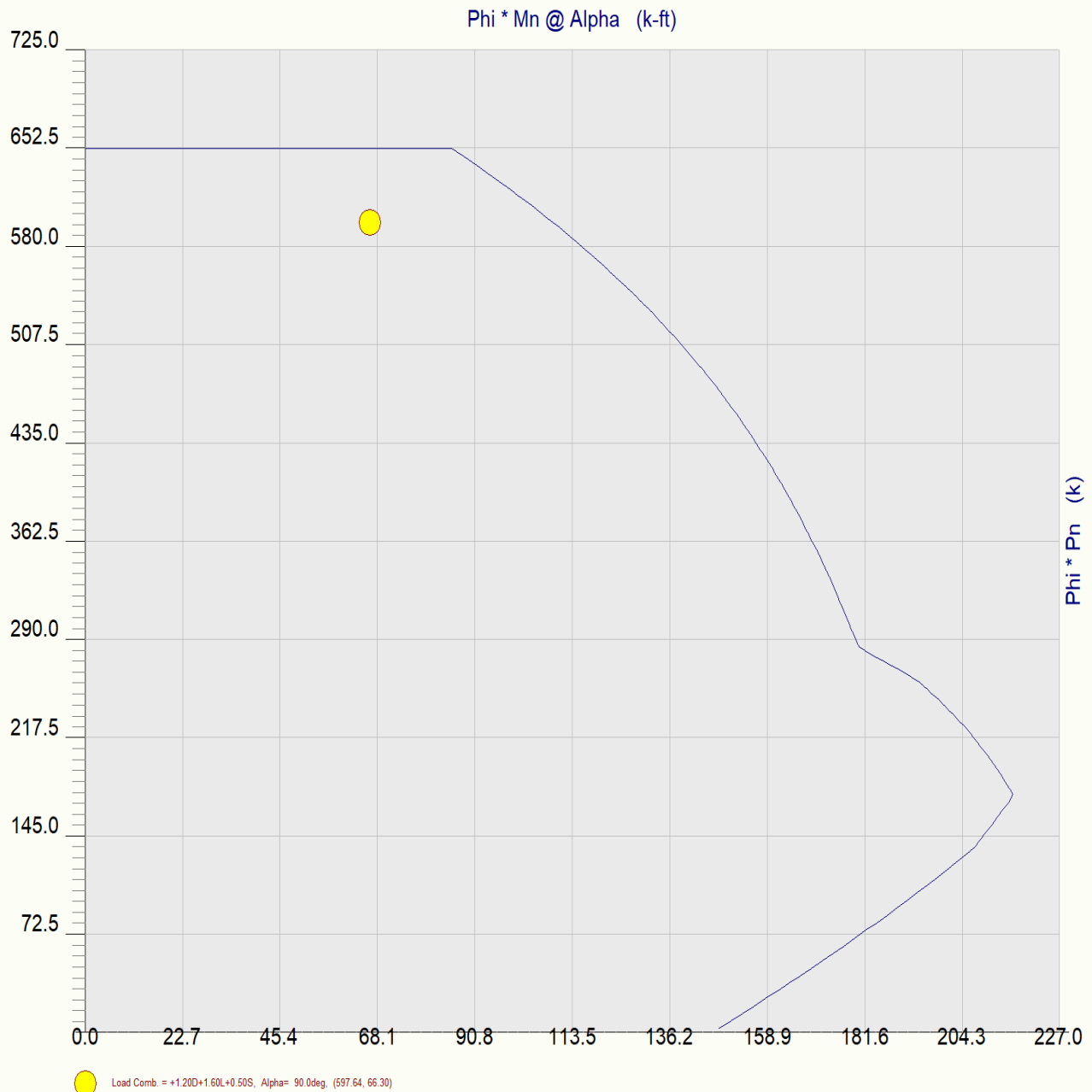
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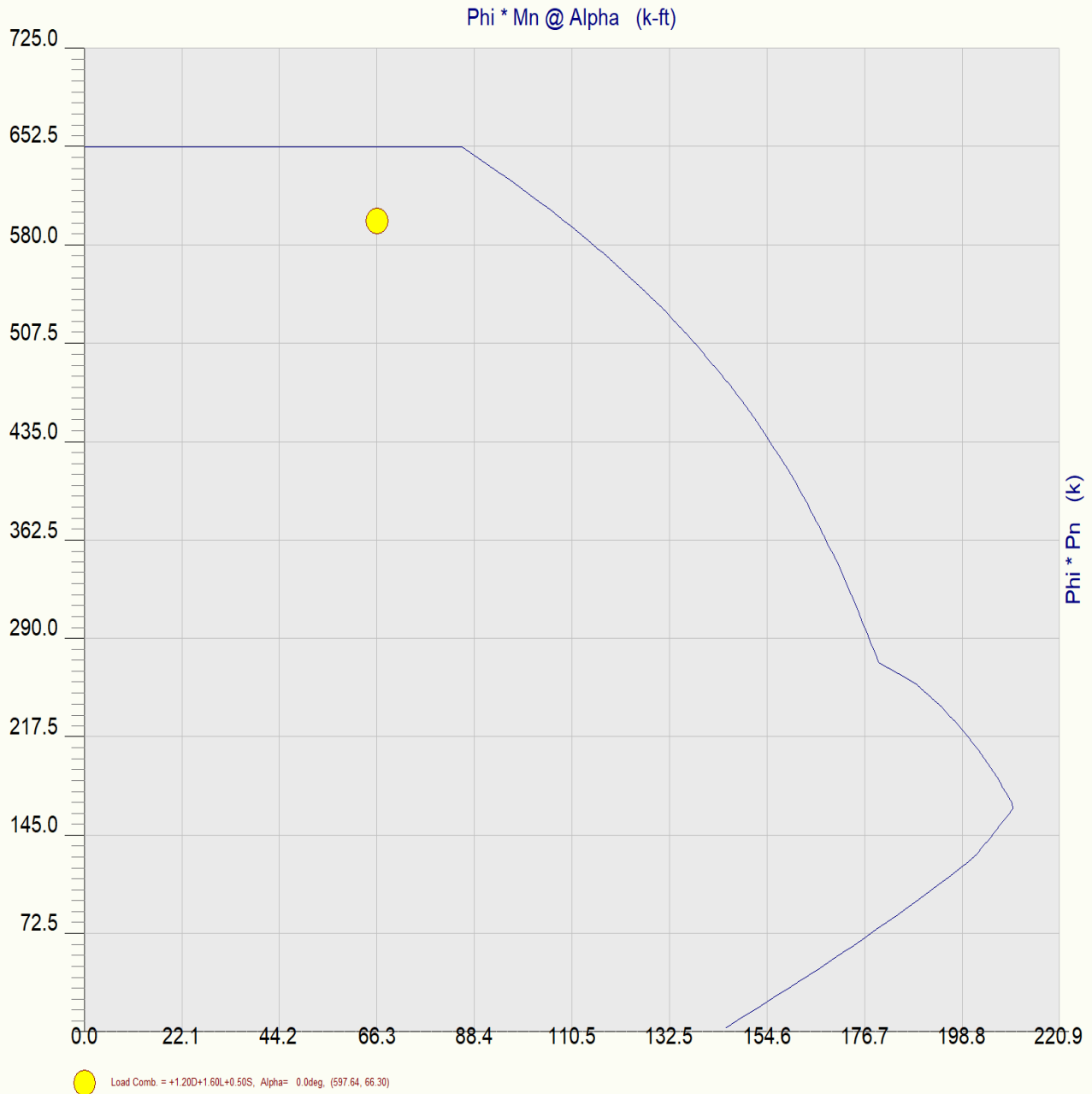
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Concrete Column P-M Interaction Diagram



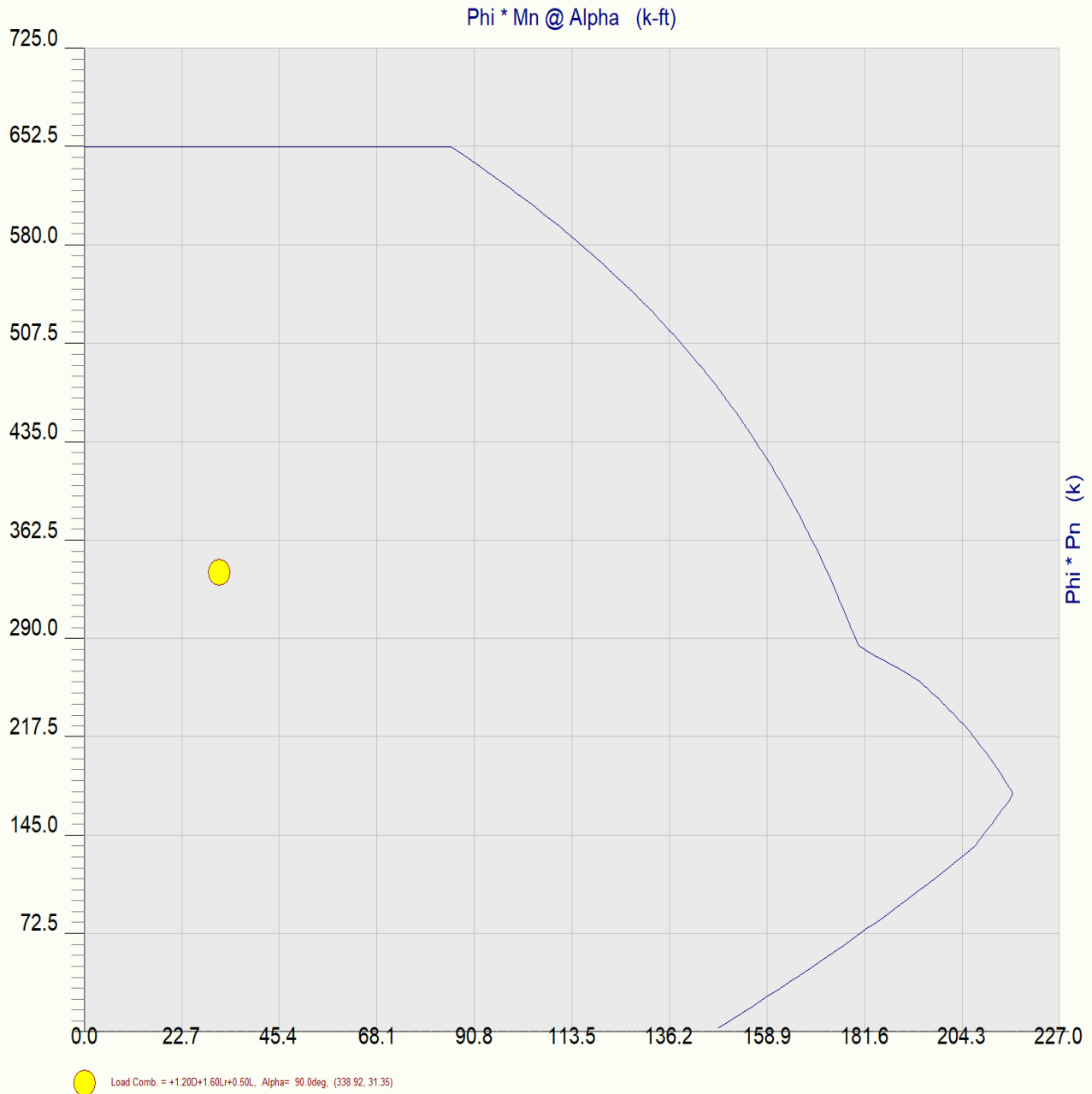
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Concrete Column P-M Interaction Diagram



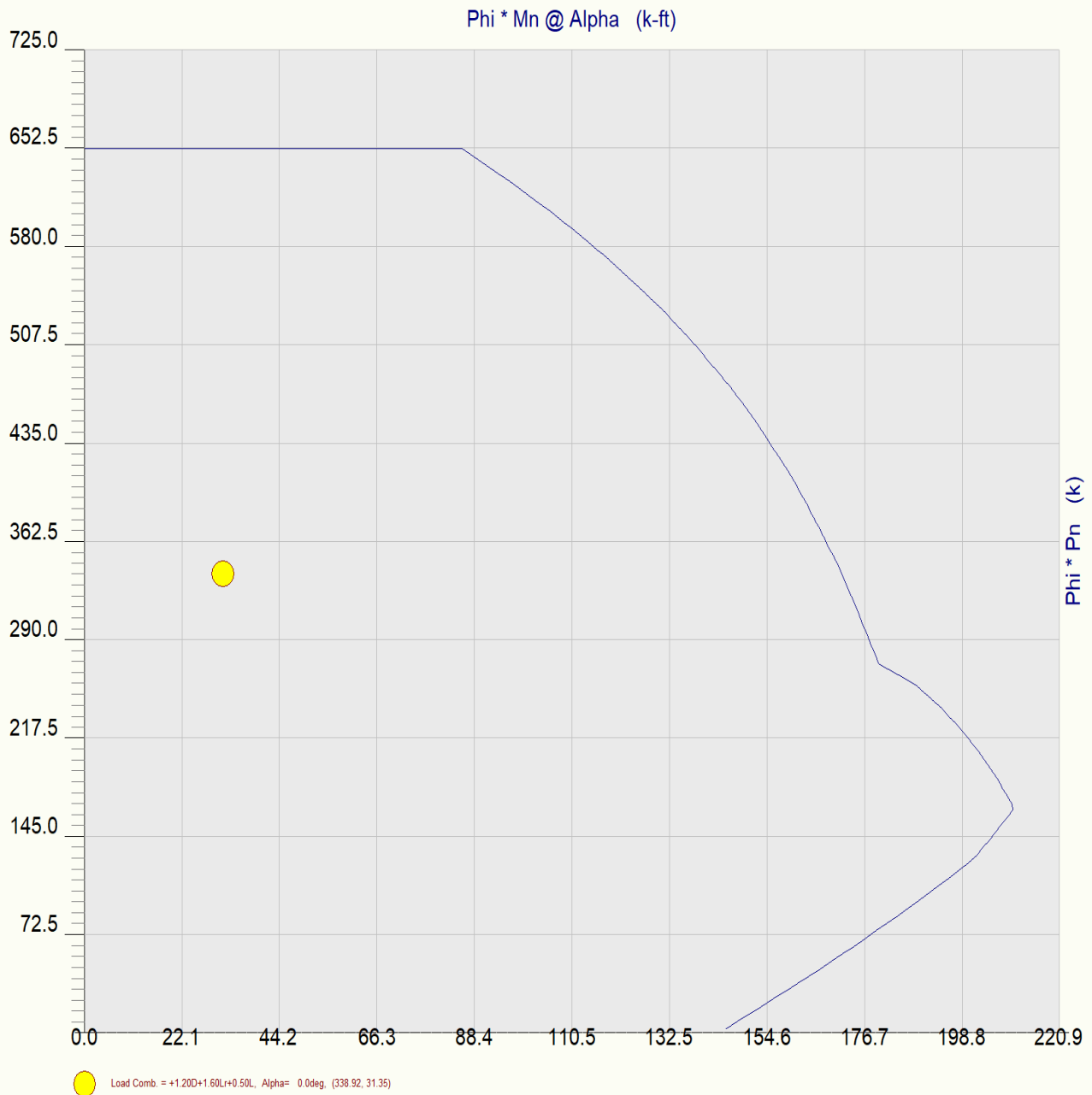
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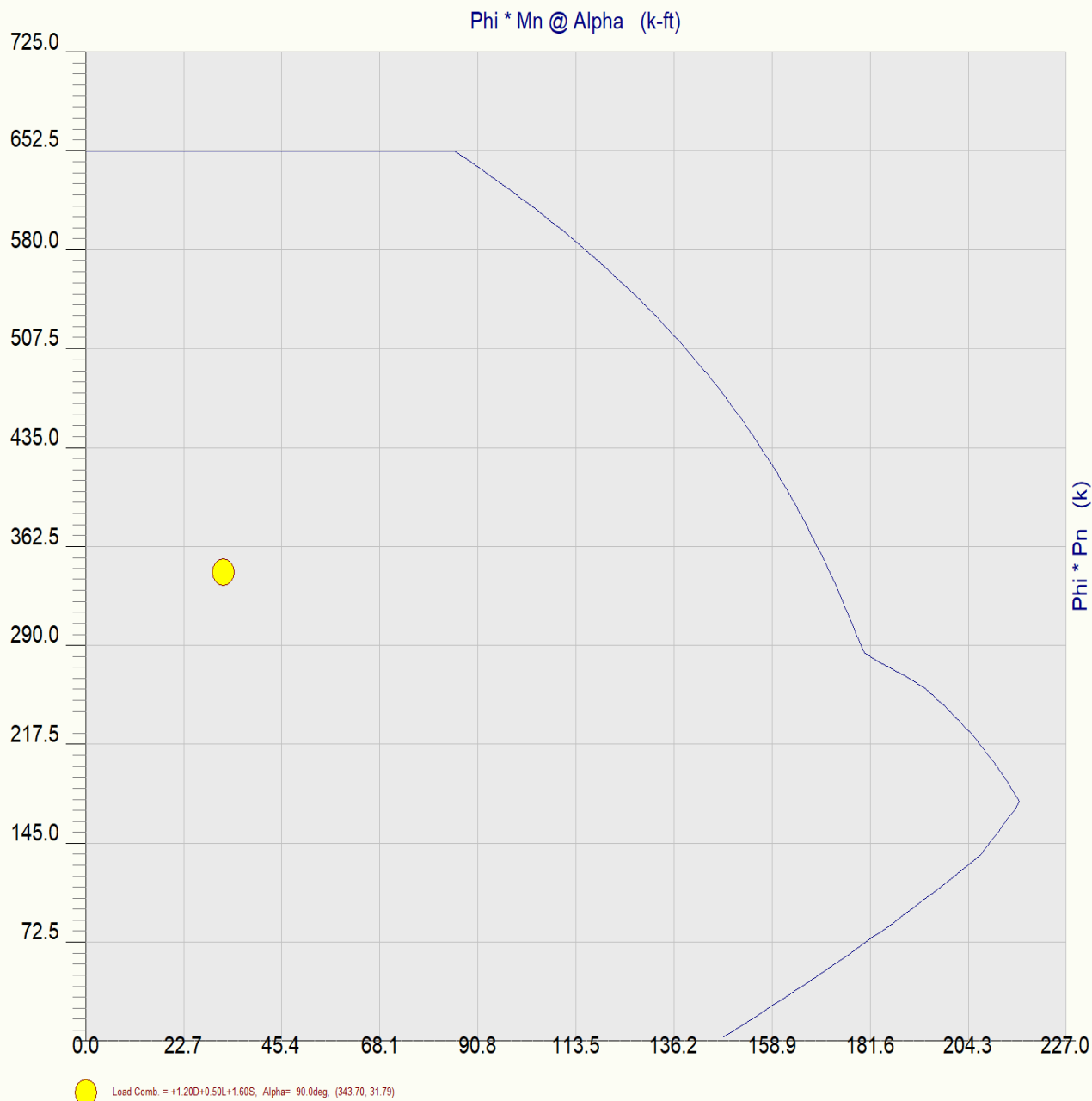
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Centerline Communications

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Concrete Column P-M Interaction Diagram



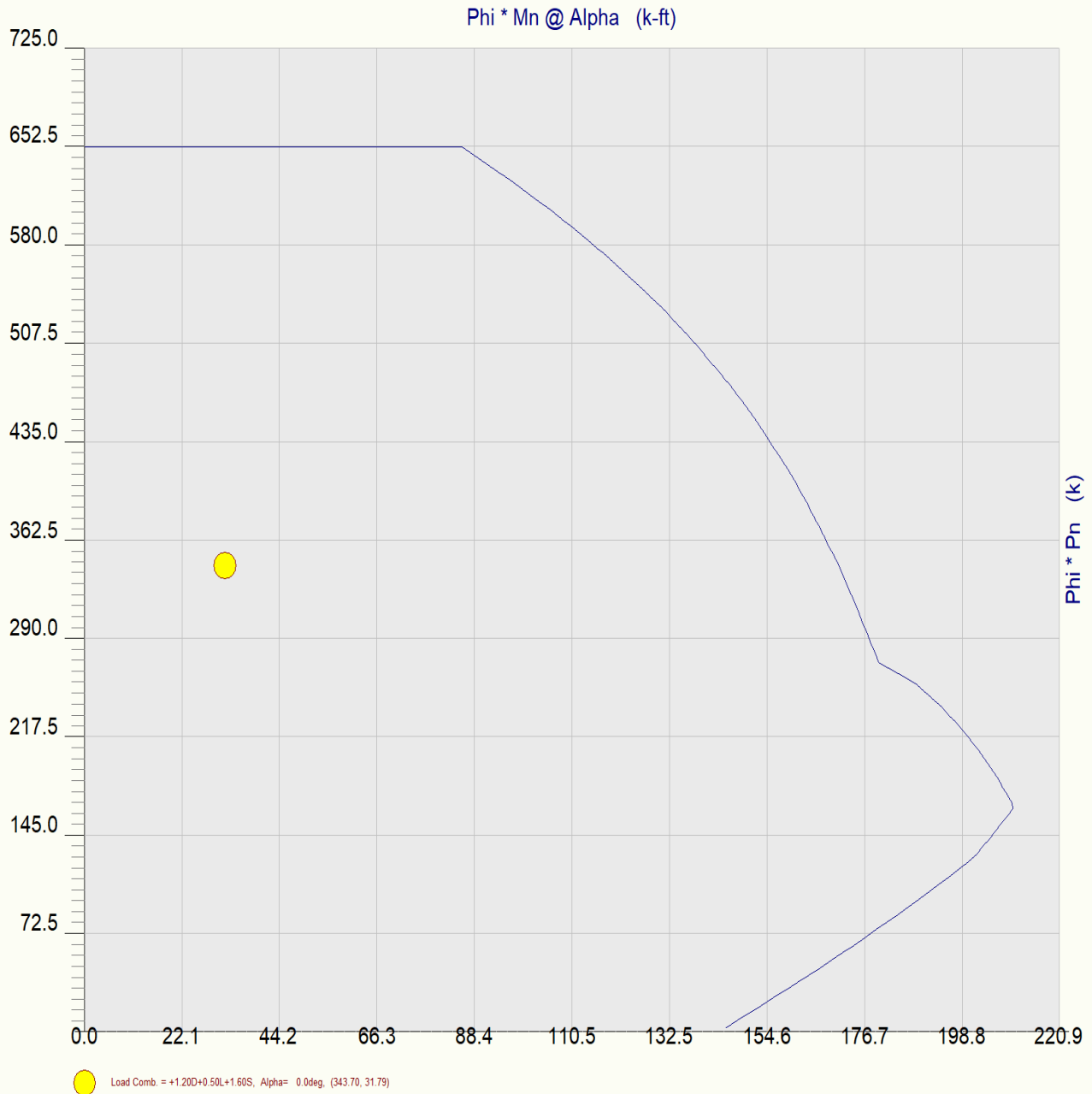
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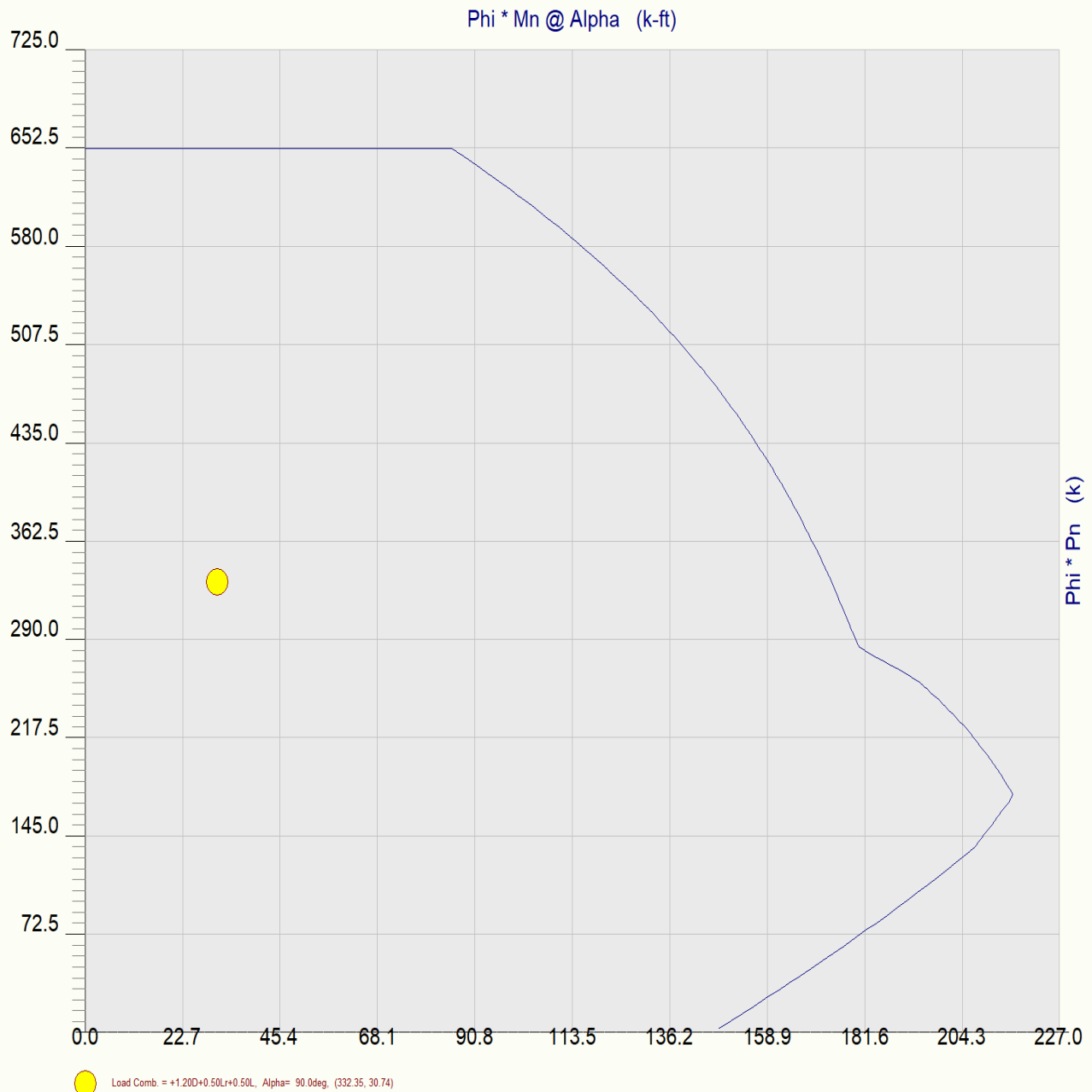
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Concrete Column P-M Interaction Diagram



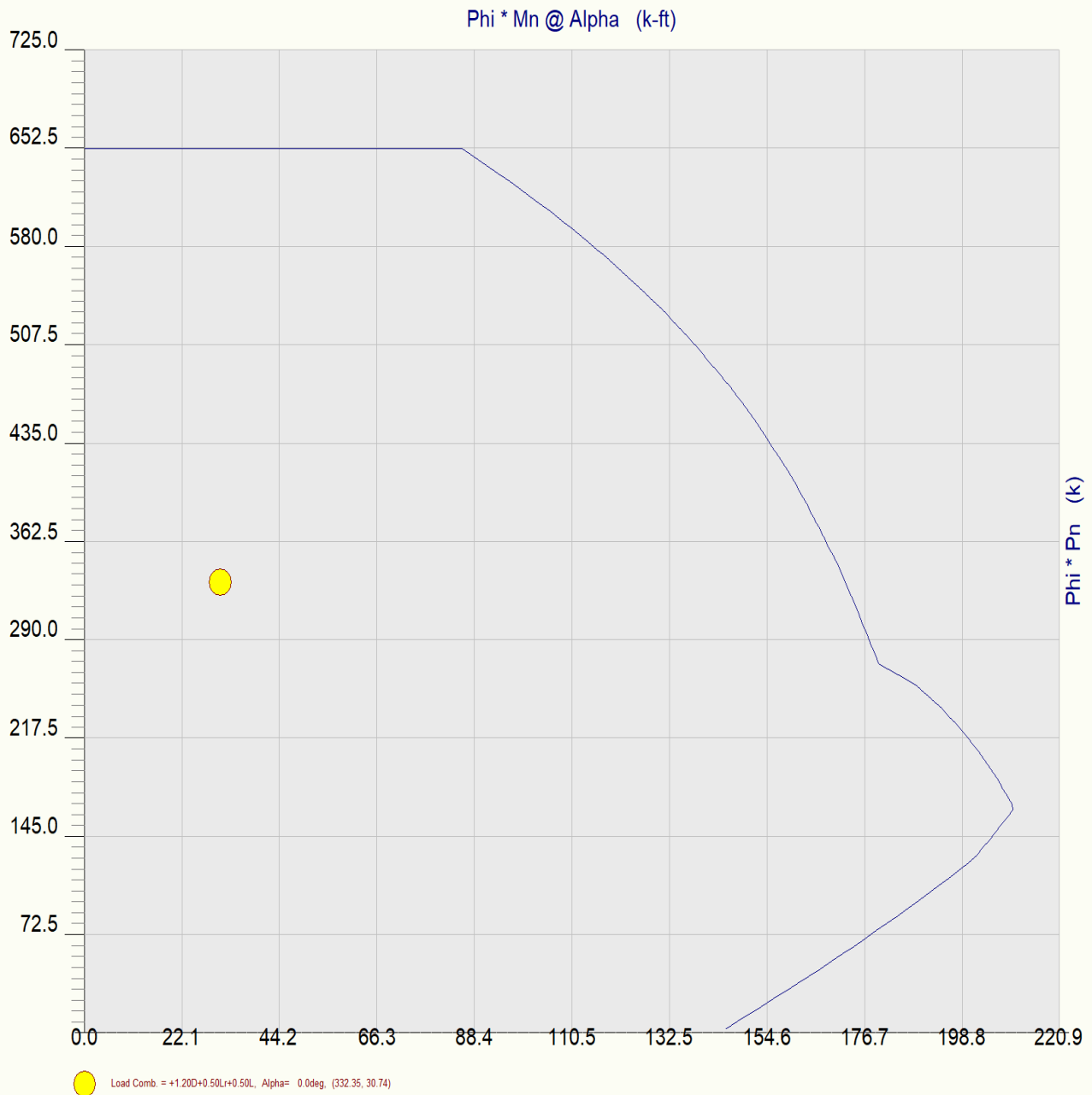
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DESCRIPTION: **Third Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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DESCRIPTION: Second Floor Column

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

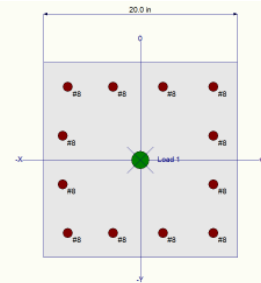
f'_c : Concrete 28 day strength = 4.0 ksi
 E = 3,605.0 ksi
Density = 150.0 pcf
 β = 0.850
 f_y - Main Rebar = 60.0 ksi
 E - Main Rebar = 29,000.0 ksi
Allow. Reinforcing Limits *ASTM A615 Bars Used*
Min. Reinf. = 1.0 %
Max. Reinf. = 8.0 %

Overall Column Height = 15.580 ft
End Fixity **Top & Bottom Pinned**
Brace condition for deflection (buckling) along columns :
X-X (width) axis :
Unbraced Length for buckling ABOUT Y-Y Axis = 15.580 ft, K = 1.0
Y-Y (depth) axis :
Unbraced Length for buckling ABOUT X-X Axis = 15.580 ft, K = 1.0

Column Cross Section

Column Dimensions : 20.0in Square Column, Column Edge to Rebar Edge Cover = 2.0in

Column Reinforcing : 4 - #8 bars @ corners,, 2 - #8 bars top & bottom between corner bars, 2 - #8 bars left & right between corner bars



Applied Loads

Entered loads are factored per load combinations specified by user.

Column self weight included : 6,491.67 lbs * Dead Load Factor
AXIAL LOADS ...

Roof + Tower Loads: Axial Load at 15.580 ft above base, D = 211.90, LR = 5.970, L = 269.680, S = 8.960 k

DESIGN SUMMARY

Load Combination **+1.20D+1.60L+0.50S**
Location of max. above base **15.475 ft**
Maximum Stress Ratio : 0.708 : 1
Ratio = $(P_u^2 + M_u^2)^{0.5} / (\phi P_n^2 + \phi M_n^2)^{0.5}$
 P_u = 698.04 k $\phi * P_n$ = 986.22 k
 M_{u-x} = 0.0 k-ft $\phi * M_{n-x}$ = 0.0 k-ft
 M_{u-y} = 0.0 k-ft $\phi * M_{n-y}$ = 0.0 k-ft
 M_u Angle = 0.0 deg
 M_u at Angle = 0.0 k-ft ϕM_n at Angle = 0.0 k-ft

P_n & M_n values located at P_u-M_u vector intersection with capacity curve

Column Capacities ...

P_{nmax} : Nominal Max. Compressive Axial Capacity **1,896.57 k**
 P_{nmin} : Nominal Min. Tension Axial Capacity **k**
 ϕP_n , max : Usable Compressive Axial Capacity **986.22 k**
 ϕP_n , min : Usable Tension Axial Capacity **k**

Maximum SERVICE Load Reactions ...

Top along Y-Y **0.0 k** Bottom along Y-Y **0.0 k**
Top along X-X **0.0 k** Bottom along X-X **0.0 k**

Maximum SERVICE Load Deflections ...

Along Y-Y **0.0 in** at **0.0 ft** above base
for load combination :
Along X-X **0.0 in** at **0.0 ft** above base
for load combination :

General Section Information . ϕ = 0.650 β = 0.850 θ = 0.80

ρ : % Reinforcing **2.370 %** Rebar % Ok
Reinforcing Area **9.480 in²**
Concrete Area **400.0 in²**

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from		Axial Load		Bending Analysis						k-ft		Utilization	
	X-X	Y-Y	base	ft	Pu	ϕ * Pn	δ x	δ x * Mux	δ y	δ y * Muy	Alpha (deg)	δ Mu	ϕ Mn	Ratio		
+1.40D			15.48		305.75	986.22					0.000			0.310		
+1.20D+0.50Lr+1.60L			15.48		696.54	986.22					0.000			0.706		
+1.20D+1.60L+0.50S			15.48		698.04	986.22					0.000			0.708		

Concrete Column

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Centerline Communications

Lic. #: KW-06013597

DESCRIPTION: Second Floor Column

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base	ft	Axial Load k		Bending Analysis k-ft						Utilization	
	X-X	Y-Y			Pu	$\phi * P_n$	δx	$\delta x * M_{ux}$	δy	$\delta y * M_{uy}$	Alpha (deg)	δM_u	ϕM_n	Ratio
+1.20D+1.60Lr+0.50L			15.48		406.46	986.22					0.000			0.412
+1.20D+1.60Lr			15.48		271.62	986.22					0.000			0.275
+1.20D+0.50L+1.60S			15.48		411.25	986.22					0.000			0.417
+1.20D+1.60S			15.48		276.41	986.22					0.000			0.280
+1.20D+0.50Lr+0.50L			15.48		399.90	986.22					0.000			0.405
+1.20D+0.50L+0.50S			15.48		401.39	986.22					0.000			0.407
+1.20D+0.50L+0.70S			15.48		403.18	986.22					0.000			0.409
+0.90D			15.48		196.55	986.22					0.000			0.199

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top		@ Base	@ Top
D Only						218.392					
+D+L						488.072					
+D+Lr						224.362					
+D+S						227.352					
+D+0.750Lr+0.750L						425.129					
+D+0.750L+0.750S						427.372					
+0.60D						131.035					
Lr Only						5.970					
L Only						269.680					
S Only						8.960					

Maximum Moment Reactions

Note: Only non-zero reactions are listed.

Load Combination	Moment About X-X Axis			Moment About Y-Y Axis		
	@ Base	@ Top		@ Base	@ Top	
D Only			k-ft			k-ft
+D+L			k-ft			k-ft
+D+Lr			k-ft			k-ft
+D+S			k-ft			k-ft
+D+0.750Lr+0.750L			k-ft			k-ft
+D+0.750L+0.750S			k-ft			k-ft
+0.60D			k-ft			k-ft
Lr Only			k-ft			k-ft
L Only			k-ft			k-ft
S Only			k-ft			k-ft

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
D Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+L	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+Lr	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+S	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750L+0.750S	0.0000	in	0.000	ft	0.000	in	0.000	ft
+0.60D	0.0000	in	0.000	ft	0.000	in	0.000	ft
Lr Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
L Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
S Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

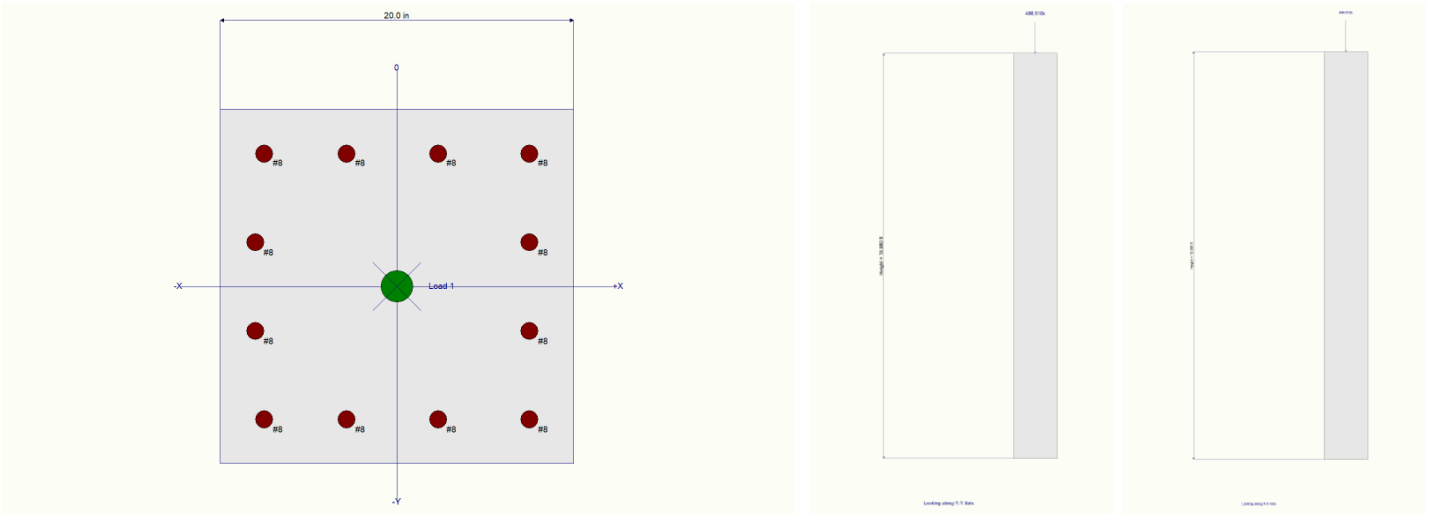
Concrete Column

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DESCRIPTION: Second Floor Column

Sketches



Interaction Diagrams

Concrete Column

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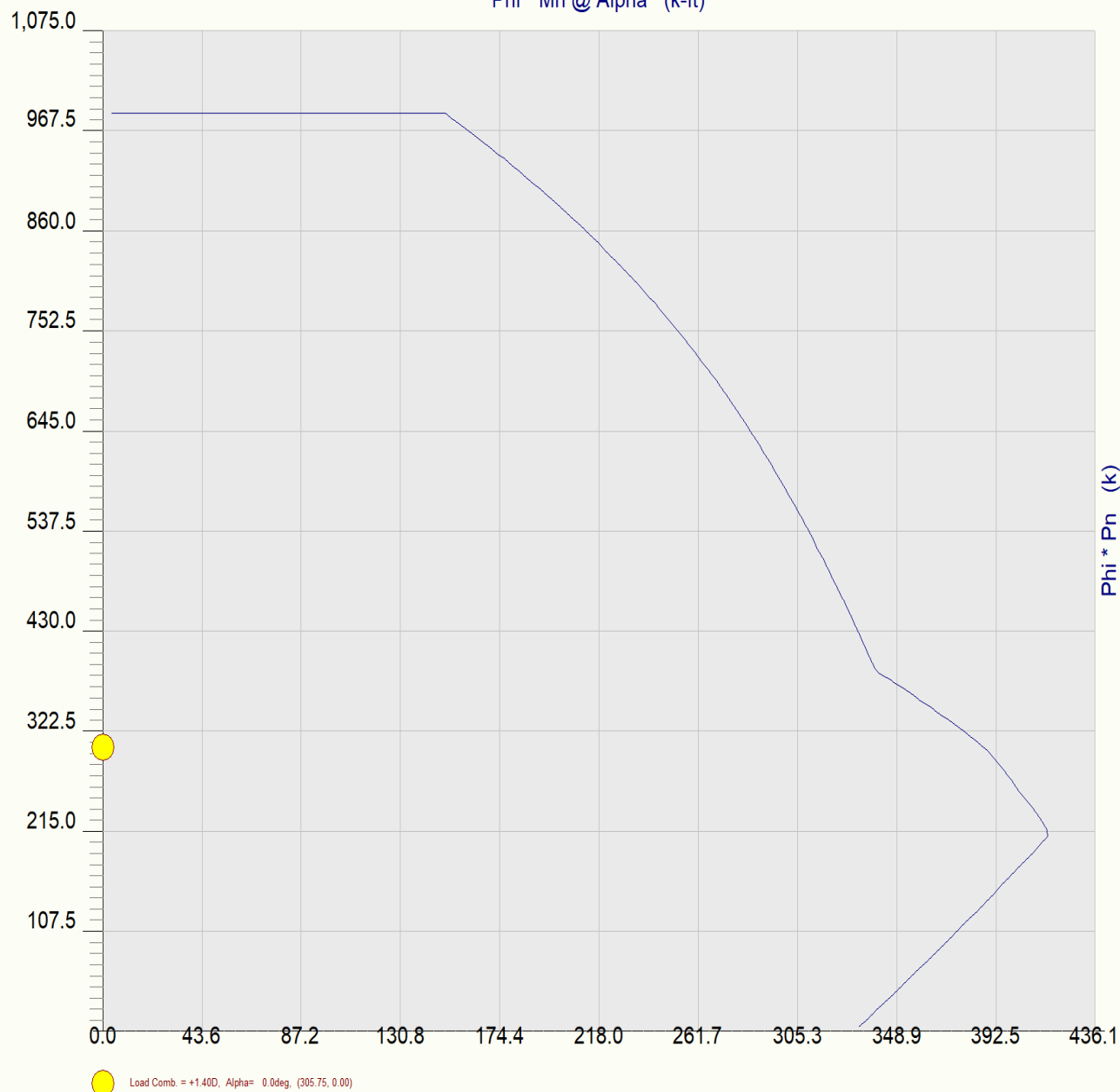
Centerline Communications

DESCRIPTION: **Second Floor Column**

Concrete Column P-M Interaction Diagram

$\Phi * M_n @ \alpha$ (k-ft)

$\Phi * P_n$ (k)



Concrete Column

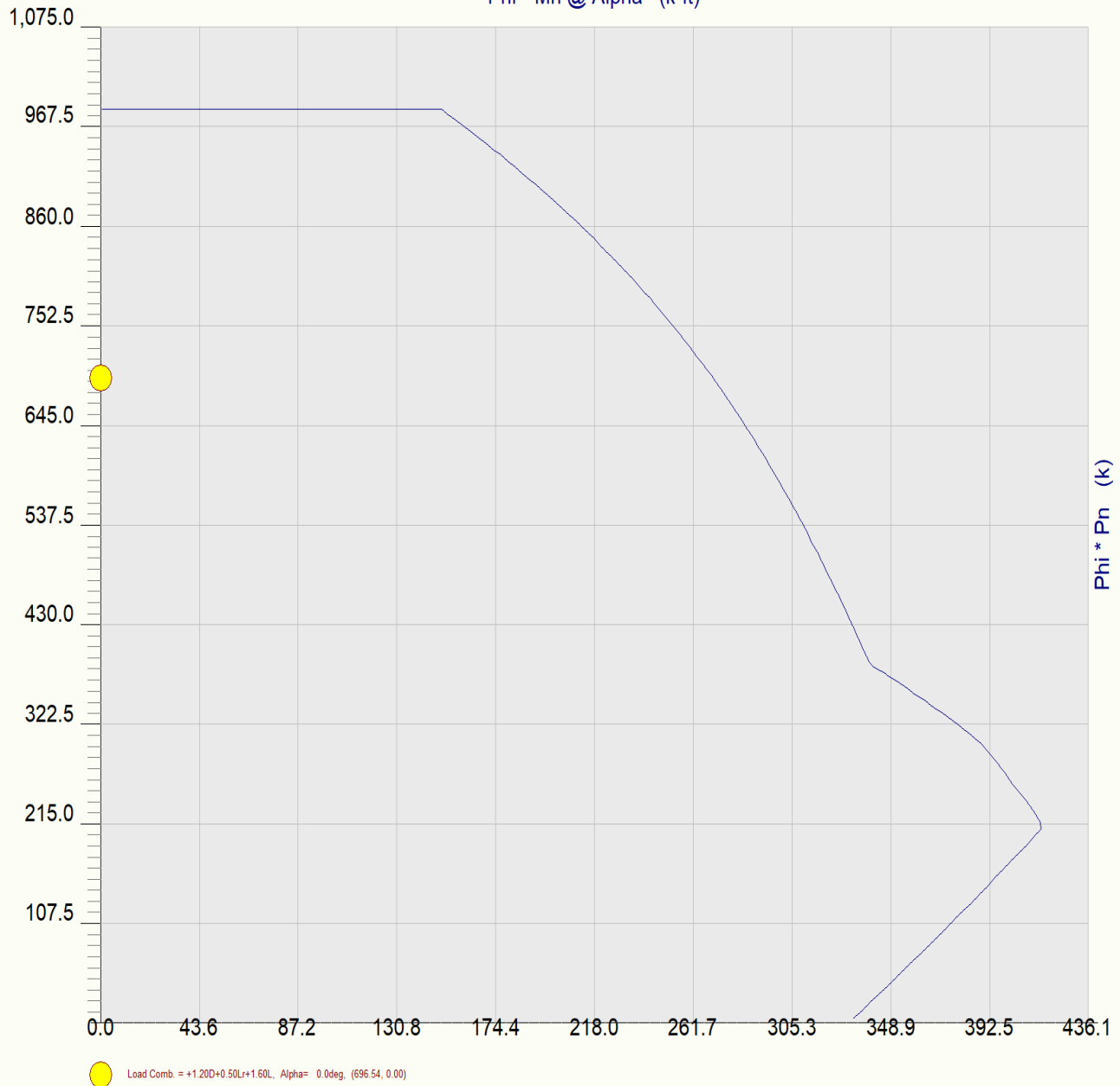
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DESCRIPTION: **Second Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)



Concrete Column

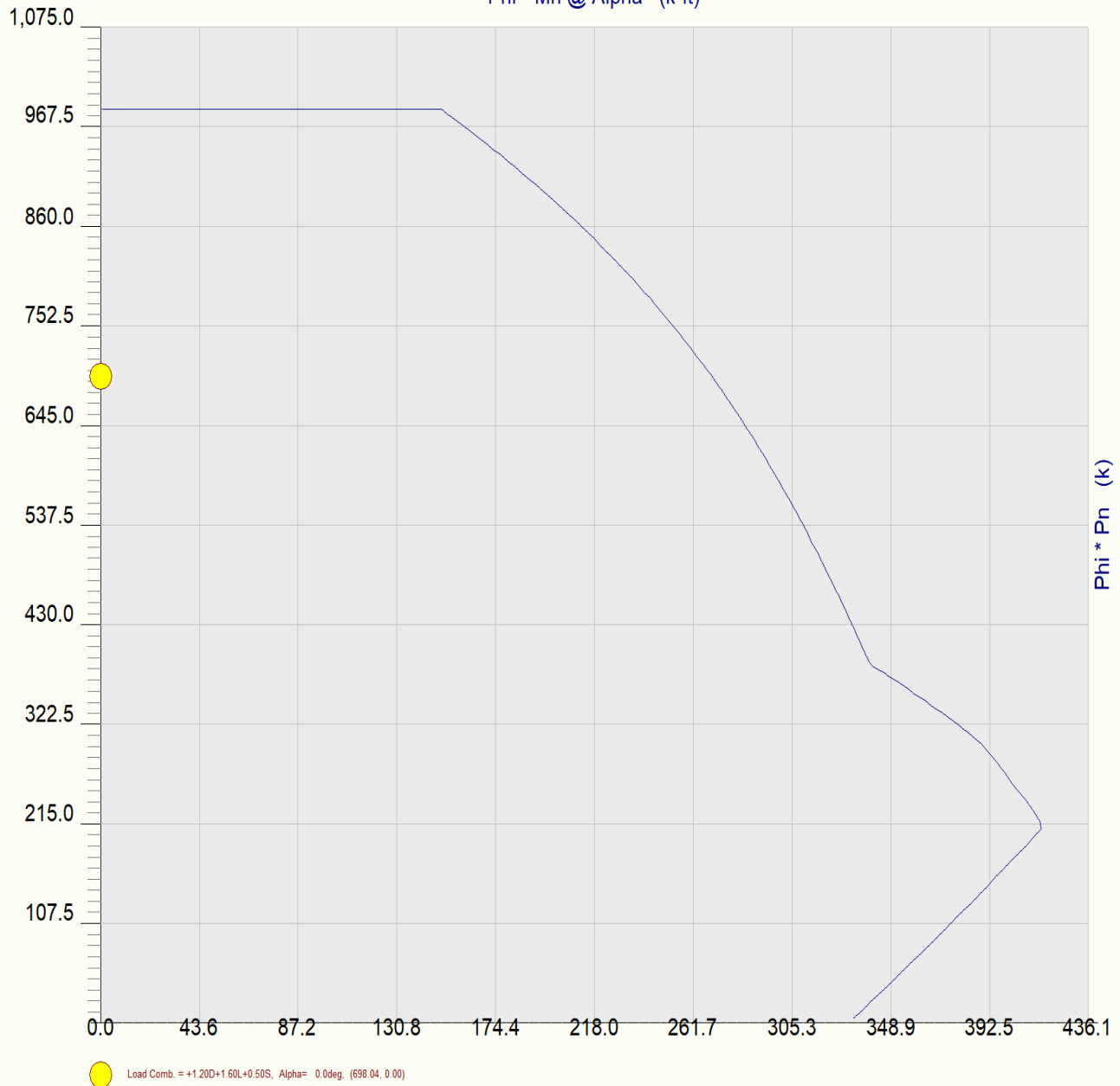
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DESCRIPTION: **Second Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)



Concrete Column

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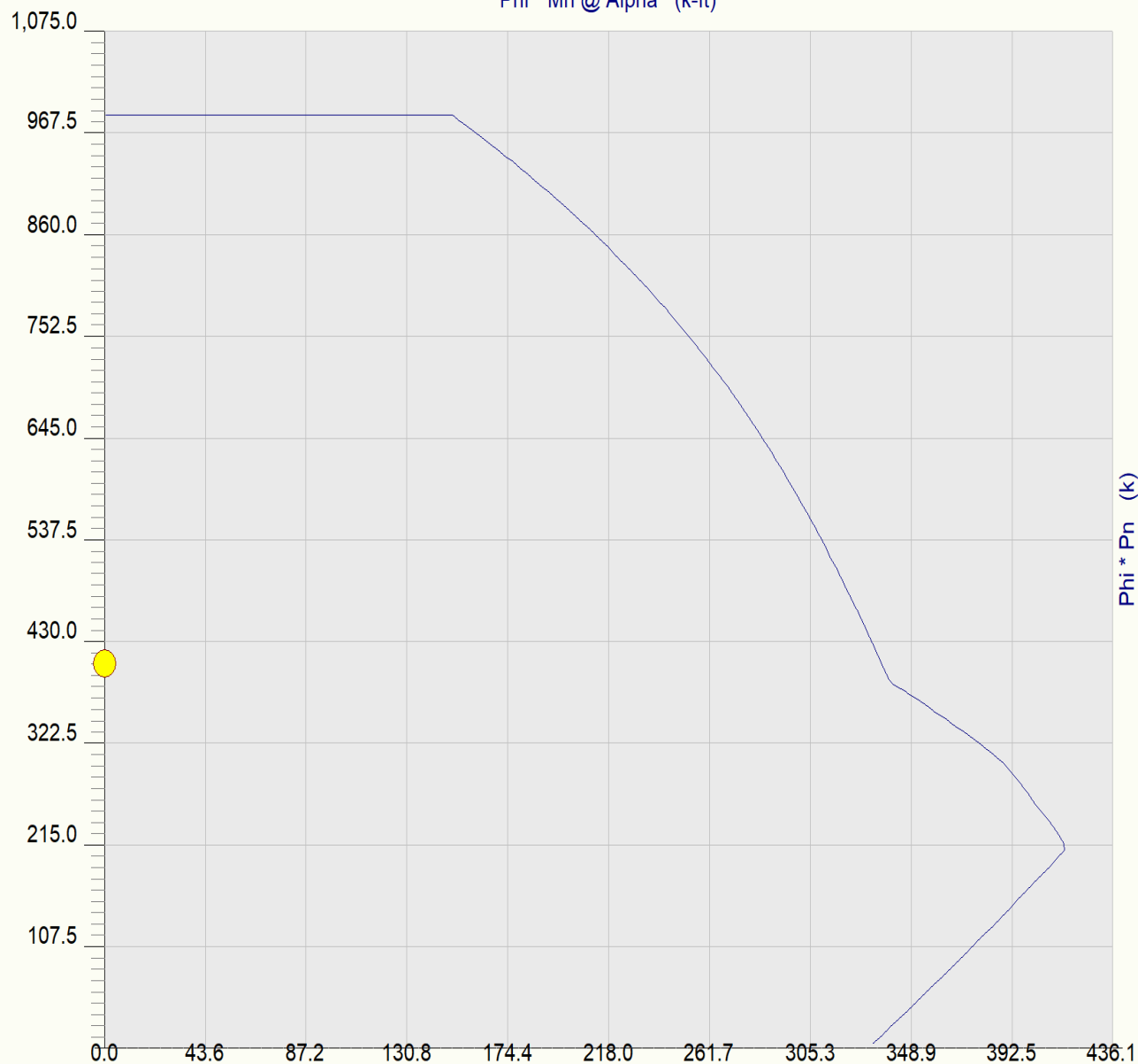
Centerline Communications

DESCRIPTION: **Second Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)

Phi * Pn (k)



Load Comb. = +1.20D+1.60L+0.50L, Alpha= 0.0deg. (406.46, 406.00)

Concrete Column

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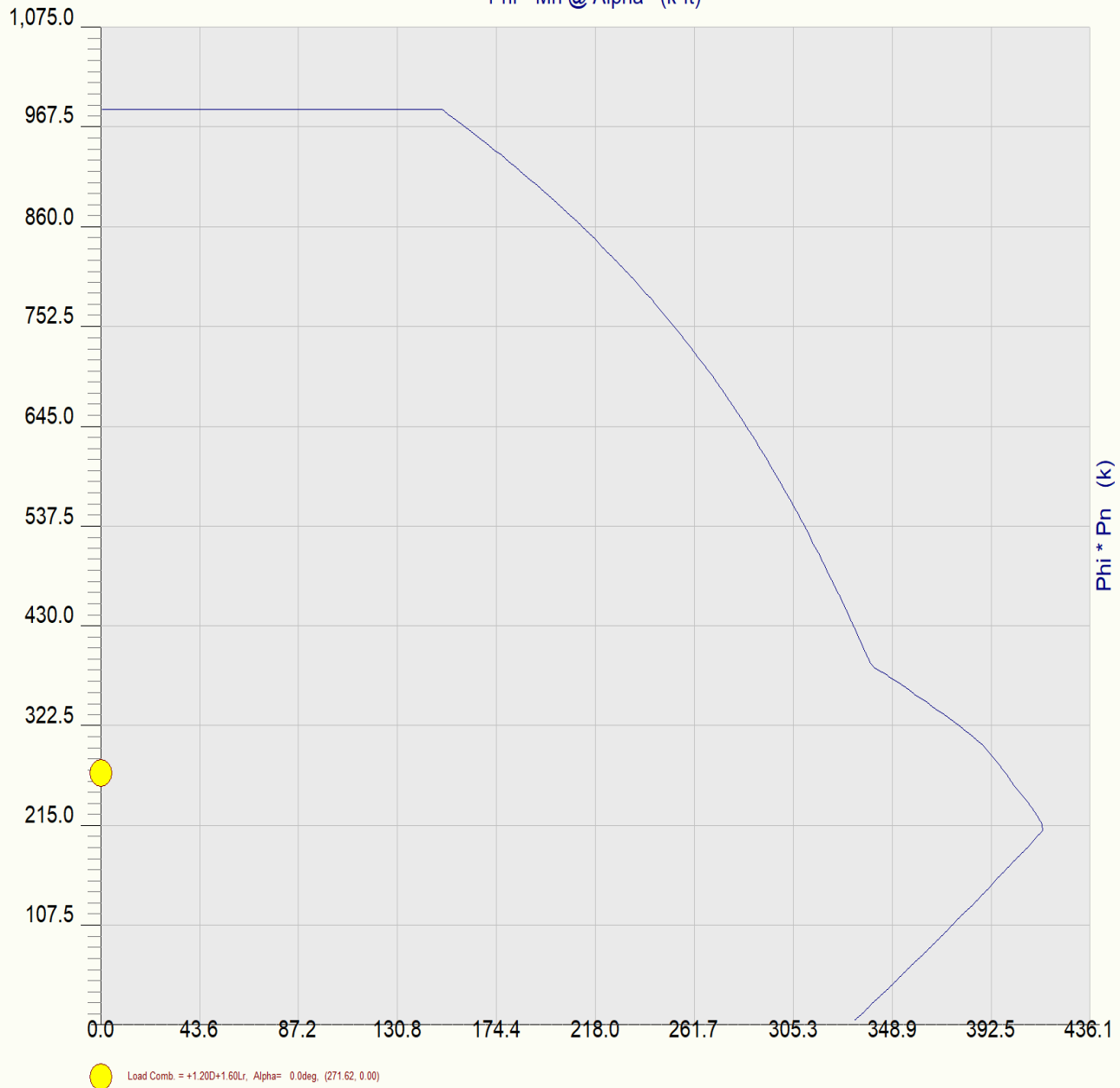
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DESCRIPTION: **Second Floor Column**

Concrete Column P-M Interaction Diagram

$\Phi * M_n @ \alpha$ (k-ft)

$\Phi * P_n$ (k)



Concrete Column

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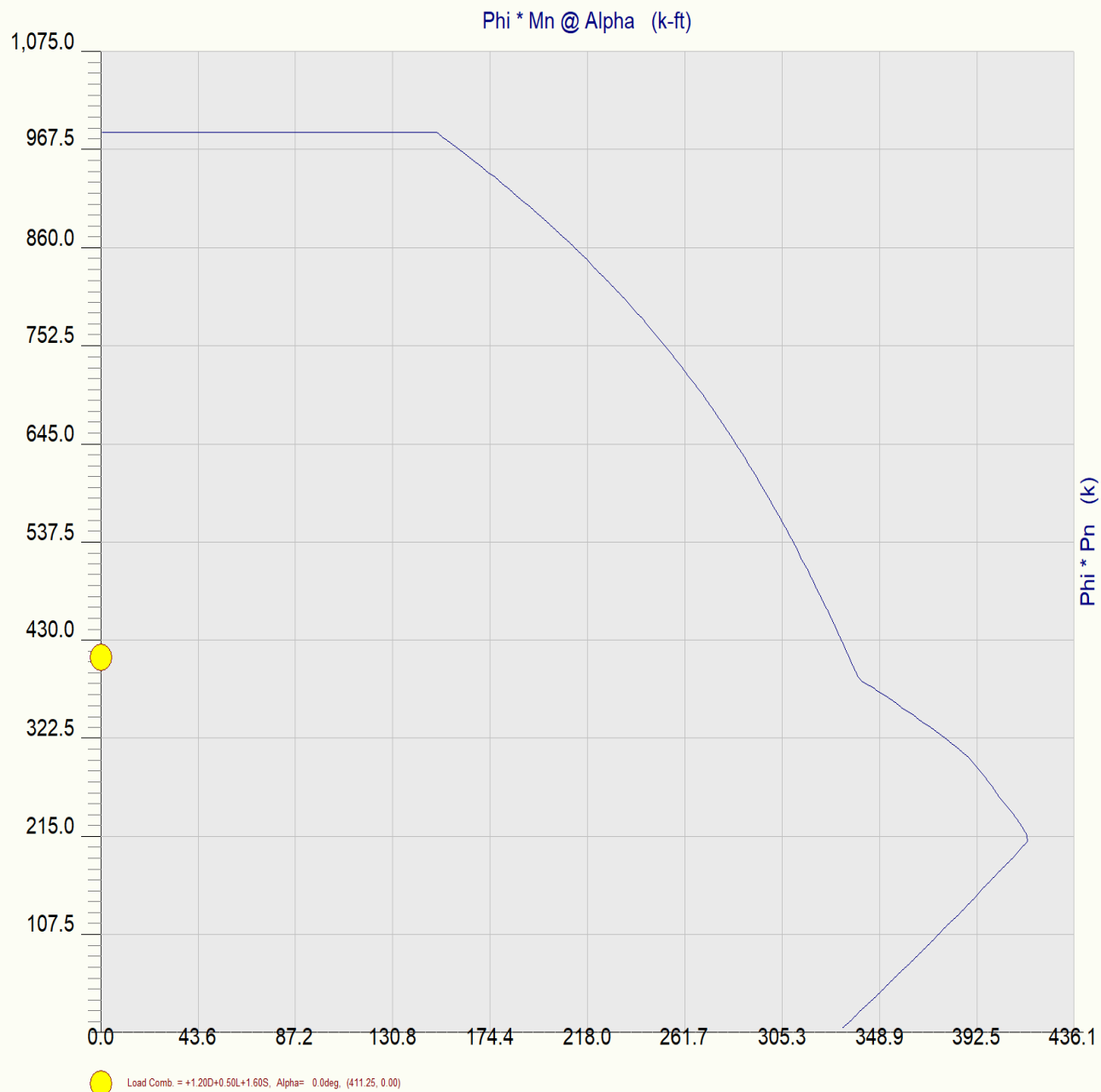
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DESCRIPTION: **Second Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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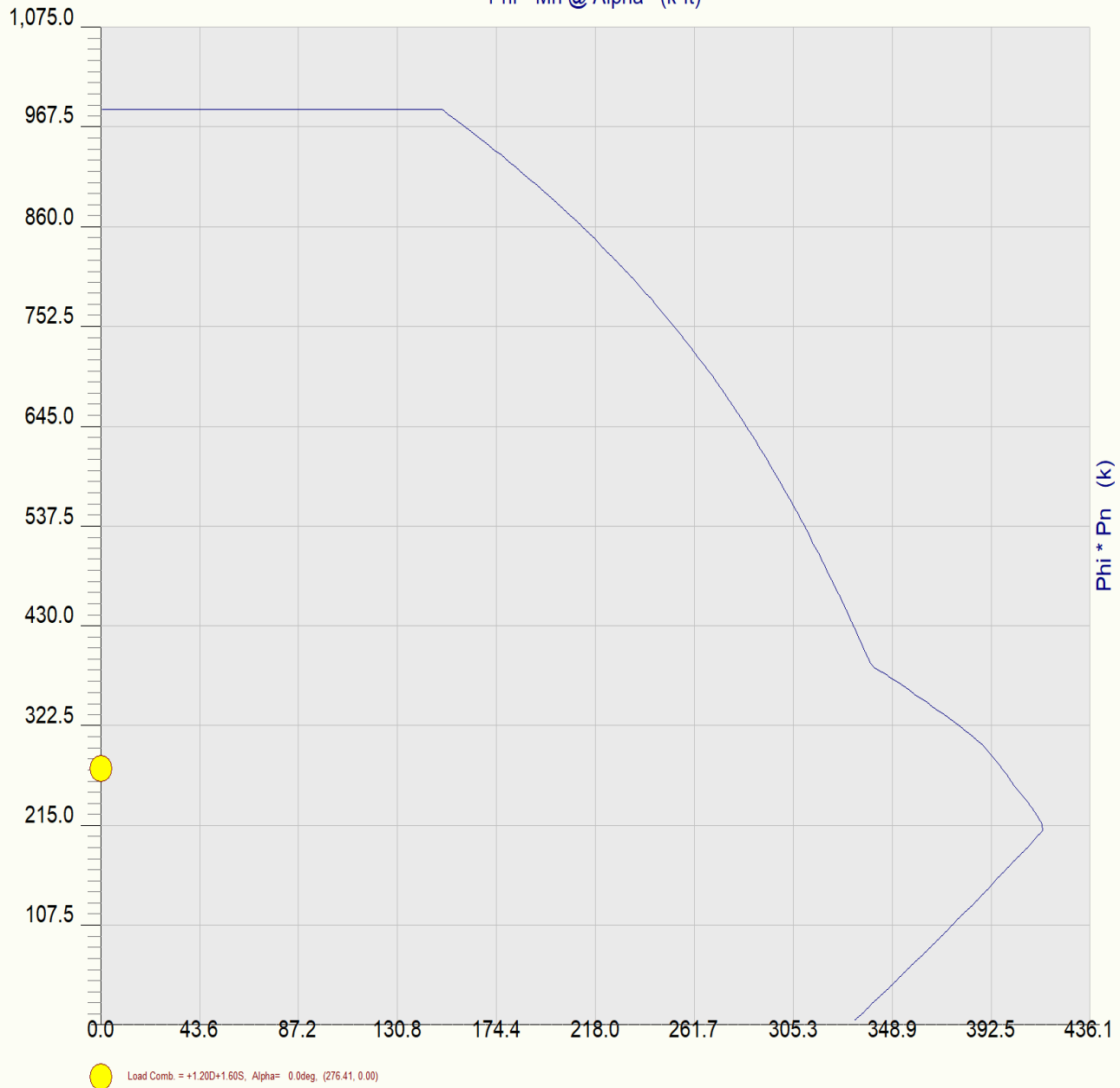
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DESCRIPTION: **Second Floor Column**

Concrete Column P-M Interaction Diagram

$\Phi * M_n @ \alpha$ (k-ft)

$\Phi * P_n$ (k)



Concrete Column

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DESCRIPTION: **Second Floor Column**

Concrete Column P-M Interaction Diagram

$\Phi * M_n @ \alpha$ (k-ft)

$\Phi * P_n$ (k)



Load Comb. = +1.20D+0.50Lr+0.50L, Alpha= 0.0deg, (399.90, 0.00)

Concrete Column

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DESCRIPTION: **Second Floor Column**

Concrete Column P-M Interaction Diagram

$\Phi * M_n @ \alpha$ (k-ft)

$\Phi * P_n$ (k)



Load Comb. = +1.20D+0.50L+0.50S, Alpha= 0.0deg, (401.39, 0.00)

Concrete Column

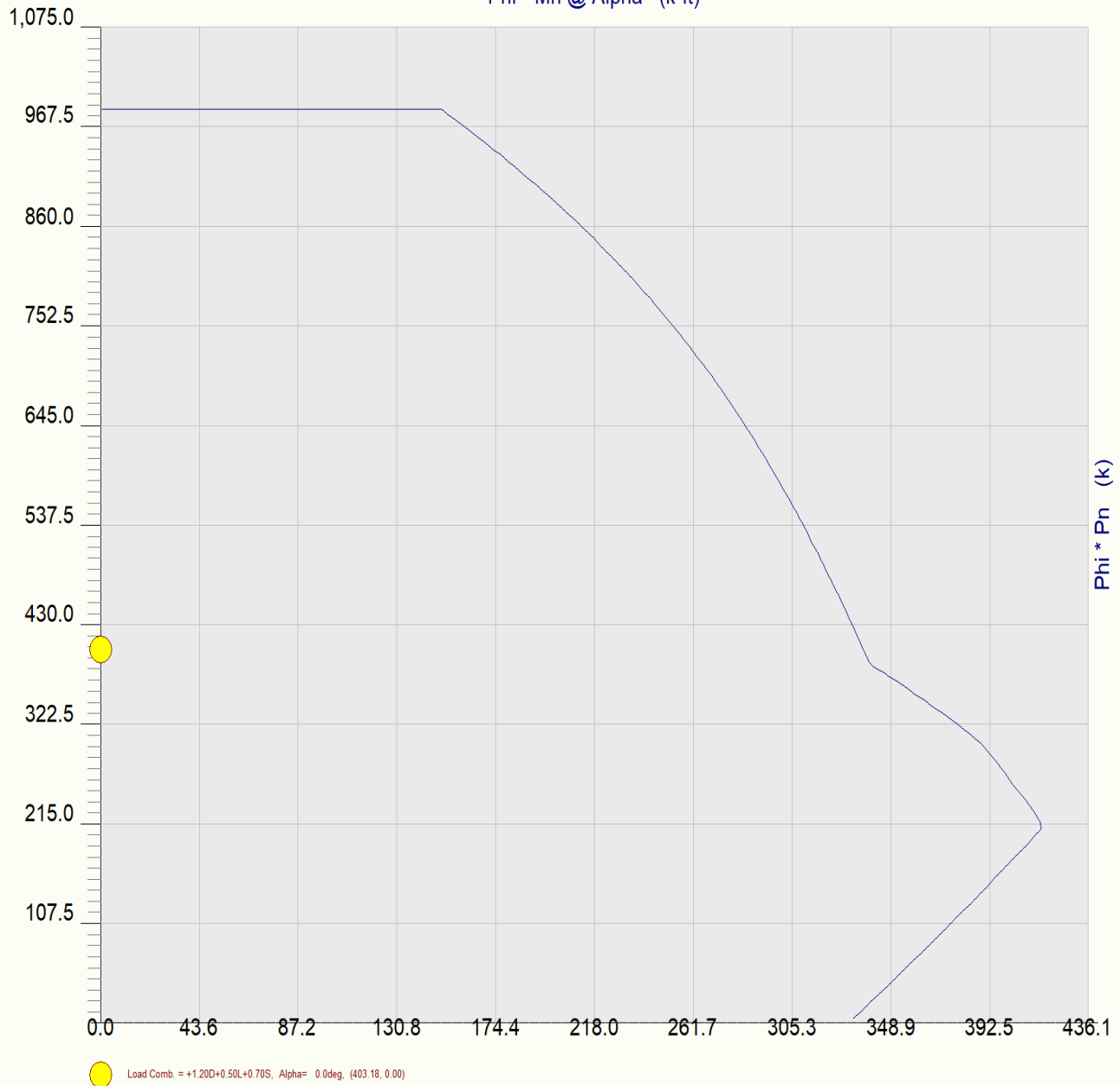
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DESCRIPTION: **Second Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)



Concrete Column

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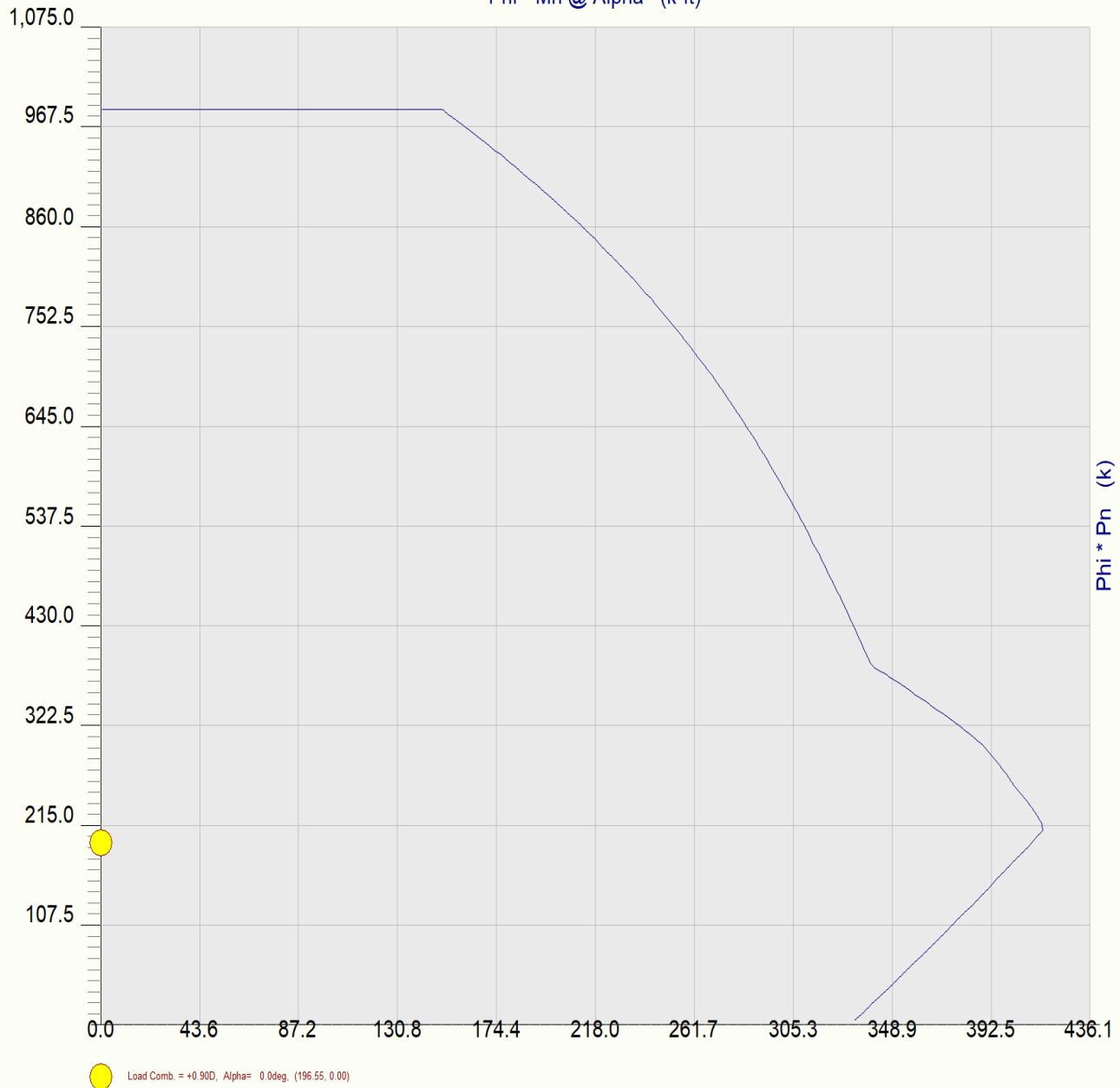
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DESCRIPTION: **Second Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)

Phi * Pn (k)



Concrete Column

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DESCRIPTION: First Floor Column

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

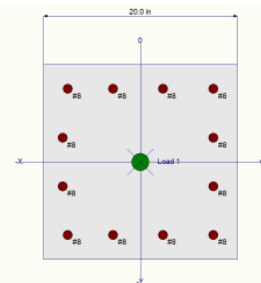
f'_c : Concrete 28 day strength = 4.0 ksi
 E = 3,605.0 ksi
Density = 150.0 pcf
 β = 0.850
 f_y - Main Rebar = 60.0 ksi
 E - Main Rebar = 29,000.0 ksi
Allow. Reinforcing Limits *ASTM A615 Bars Used*
Min. Reinf. = 1.0 %
Max. Reinf. = 8.0 %

Overall Column Height = 14.420 ft
End Fixity **Top & Bottom Pinned**
Brace condition for deflection (buckling) along columns :
X-X (width) axis :
Unbraced Length for buckling ABOUT Y-Y Axis = 14.420 ft, $K = 1.0$
Y-Y (depth) axis :
Unbraced Length for buckling ABOUT X-X Axis = 14.420 ft, $K = 1.0$

Column Cross Section

Column Dimensions : 20.0in Square Column, Column Edge to Rebar Edge Cover = 2.0in

Column Reinforcing : 4 - #8 bars @ corners,, 2 - #8 bars top & bottom between corner bars, 2 - #8 bars left & right between corner bars



Applied Loads

Entered loads are factored per load combinations specified by user.

Column self weight included : 6,008.33 lbs * Dead Load Factor

AXIAL LOADS ...

Roof + Tower Loads: Axial Load at 14.420 ft above base, D = 255.730, LR = 5.970, L = 299.550, S = 8.960 k

DESIGN SUMMARY

Load Combination **+1.20D+1.60L+0.50S**
Location of max. above base **14.323 ft**
Maximum Stress Ratio : 0.809 : 1
 $\text{Ratio} = (P_u^2 + M_u^2)^{.5} / (\Phi P_n^2 + \Phi M_n^2)^{.5}$
 $P_u = 797.85 \text{ k}$ $\Phi * P_n = 986.22 \text{ k}$
 $M_{u-x} = 0.0 \text{ k-ft}$ $\Phi * M_{n-x} = 0.0 \text{ k-ft}$
 $M_{u-y} = 0.0 \text{ k-ft}$ $\Phi * M_{n-y} = 0.0 \text{ k-ft}$
 $M_u \text{ Angle} = 0.0 \text{ deg}$
 $M_u \text{ at Angle} = 0.0 \text{ k-ft}$ $\Phi M_n \text{ at Angle} = 0.0 \text{ k-ft}$

P_n & M_n values located at P_u-M_u vector intersection with capacity curve

Column Capacities ...

P_{nmax} : Nominal Max. Compressive Axial Capacity **1,896.57 k**
 P_{nmin} : Nominal Min. Tension Axial Capacity **k**
 ΦP_n , max : Usable Compressive Axial Capacity **986.22 k**
 ΦP_n , min : Usable Tension Axial Capacity **k**

Maximum SERVICE Load Reactions ...

Top along Y-Y **0.0 k** Bottom along Y-Y **0.0 k**
Top along X-X **0.0 k** Bottom along X-X **0.0 k**

Maximum SERVICE Load Deflections ...

Along Y-Y **0.0 in** at **0.0 ft** above base
for load combination :
Along X-X **0.0 in** at **0.0 ft** above base
for load combination :

General Section Information . $\Phi = 0.650$ $\beta = 0.850$ $\theta = 0.80$

ρ : % Reinforcing **2.370 %** Rebar % Ok
Reinforcing Area **9.480 in²**
Concrete Area **400.0 in²**

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from		Axial Load		Bending Analysis						k-ft		Utilization	
	X-X	Y-Y	base	ft	Pu	ϕ * Pn	δ x	δ x * Mux	δ y	δ y * Muy	Alpha (deg)	δ Mu	ϕ Mn	Ratio		
+1.40D			14.32		366.43	986.22					0.000			0.372		
+1.20D+0.50Lr+1.60L			14.32		796.35	986.22					0.000			0.807		
+1.20D+1.60L+0.50S			14.32		797.85	986.22					0.000			0.809		

Concrete Column

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DESCRIPTION: First Floor Column

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base	ft	Axial Load		Bending Analysis k-ft						Utilization	
	X-X	Y-Y			Pu	ϕ * Pn	δ x	δ x * Mux	δ y	δ y * Muy	Alpha (deg)	δ Mu	ϕ Mn	Ratio
+1.20D+1.60Lr+0.50L			14.32		473.41	986.22					0.000			0.480
+1.20D+1.60Lr			14.32		323.64	986.22					0.000			0.328
+1.20D+0.50L+1.60S			14.32		478.20	986.22					0.000			0.485
+1.20D+1.60S			14.32		328.42	986.22					0.000			0.333
+1.20D+0.50Lr+0.50L			14.32		466.85	986.22					0.000			0.473
+1.20D+0.50L+0.50S			14.32		468.34	986.22					0.000			0.475
+1.20D+0.50L+0.70S			14.32		470.13	986.22					0.000			0.477
+0.90D			14.32		235.56	986.22					0.000			0.239

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top		@ Base	@ Top
D Only						261.738					
+D+L						561.288					
+D+Lr						267.708					
+D+S						270.698					
+D+0.750Lr+0.750L						490.878					
+D+0.750L+0.750S						493.121					
+0.60D						157.043					
Lr Only						5.970					
L Only						299.550					
S Only						8.960					

Maximum Moment Reactions

Note: Only non-zero reactions are listed.

Load Combination	Moment About X-X Axis			Moment About Y-Y Axis		
	@ Base	@ Top		@ Base	@ Top	
D Only			k-ft			k-ft
+D+L			k-ft			k-ft
+D+Lr			k-ft			k-ft
+D+S			k-ft			k-ft
+D+0.750Lr+0.750L			k-ft			k-ft
+D+0.750L+0.750S			k-ft			k-ft
+0.60D			k-ft			k-ft
Lr Only			k-ft			k-ft
L Only			k-ft			k-ft
S Only			k-ft			k-ft

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
D Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+L	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+Lr	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+S	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750L+0.750S	0.0000	in	0.000	ft	0.000	in	0.000	ft
+0.60D	0.0000	in	0.000	ft	0.000	in	0.000	ft
Lr Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
L Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
S Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

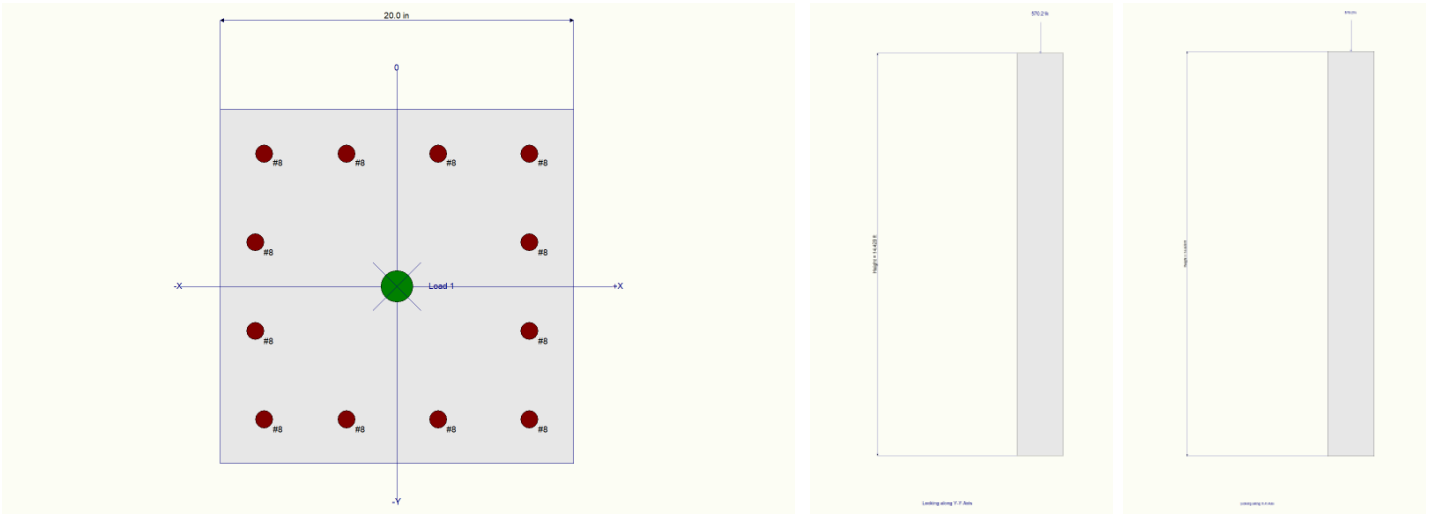
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DESCRIPTION: **First Floor Column**

Sketches



Interaction Diagrams

Concrete Column

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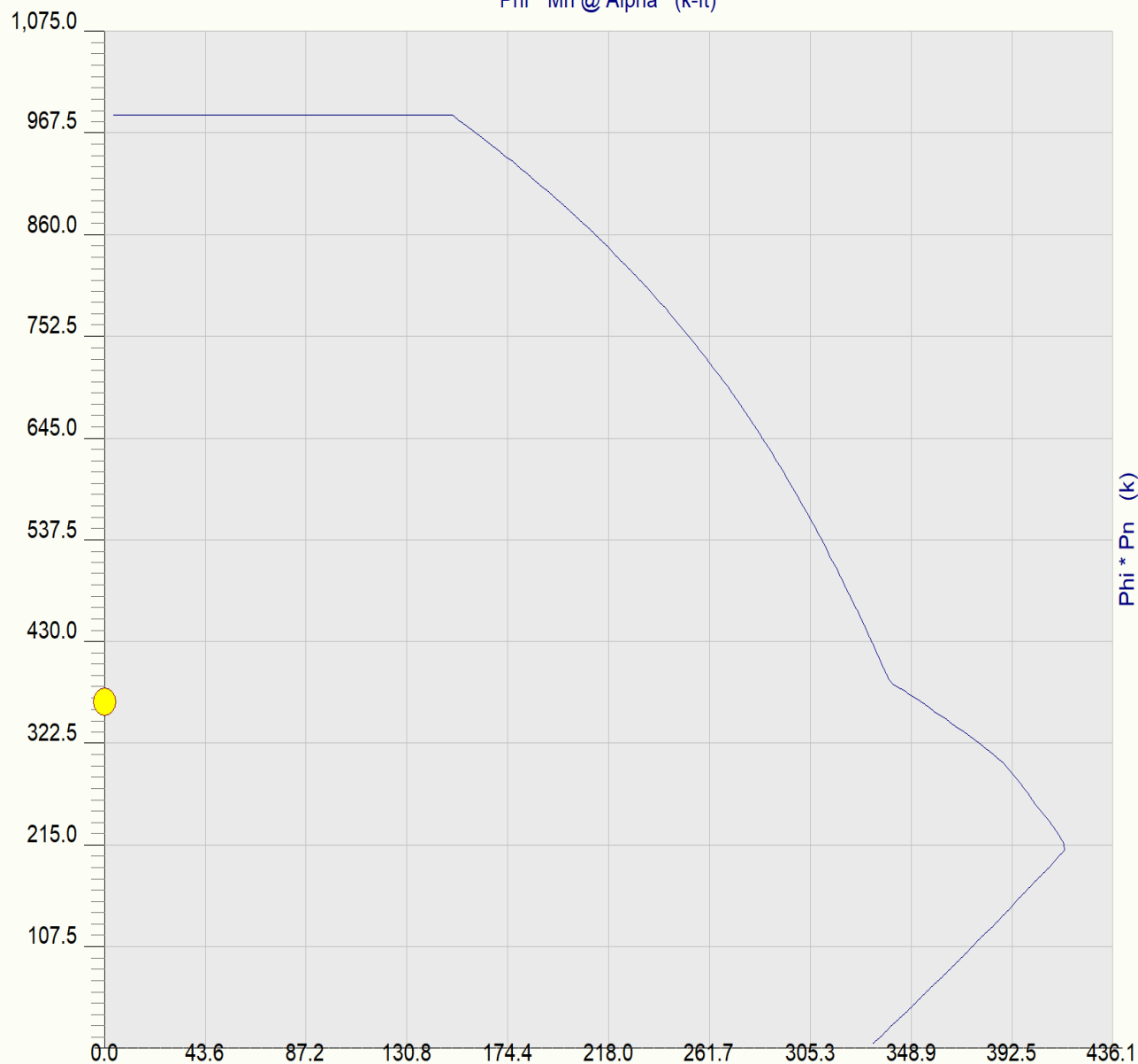
Centerline Communications

DESCRIPTION: **First Floor Column**

Concrete Column P-M Interaction Diagram

$\Phi * M_n @ \alpha$ (k-ft)

$\Phi * P_n$ (k)



Load Comb. = +1.40D, Alpha= 0.0deg, (366.43, 0.00)

Concrete Column

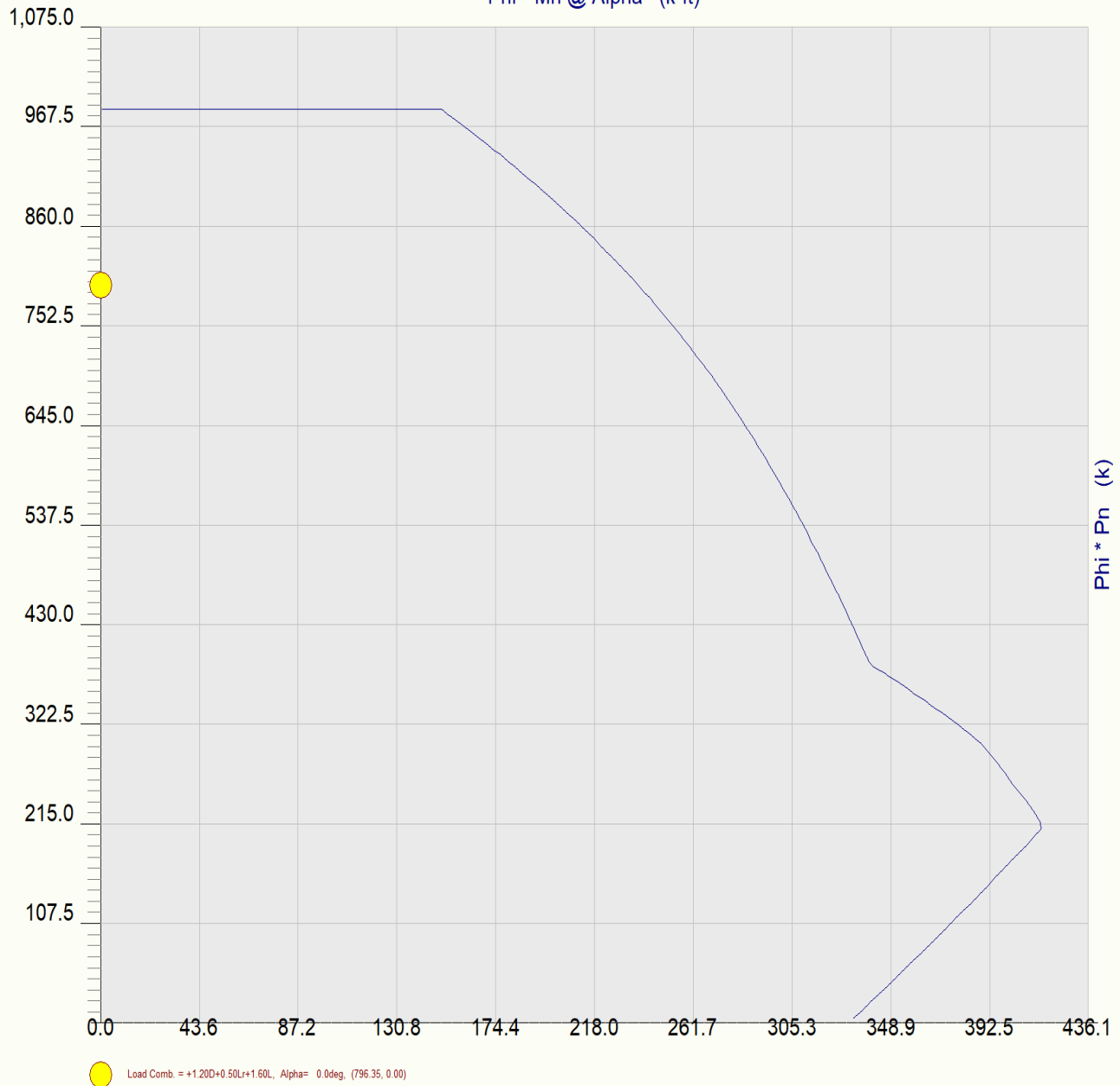
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DESCRIPTION: **First Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)



Concrete Column

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DESCRIPTION: **First Floor Column**

Concrete Column P-M Interaction Diagram

$\Phi * M_n @ \alpha$ (k-ft)

$\Phi * P_n$ (k)



Load Comb. = +1.20D+1.60L+0.50S, $\alpha = 0.0 \text{ deg.}$ (797.85, 0.00)

Concrete Column

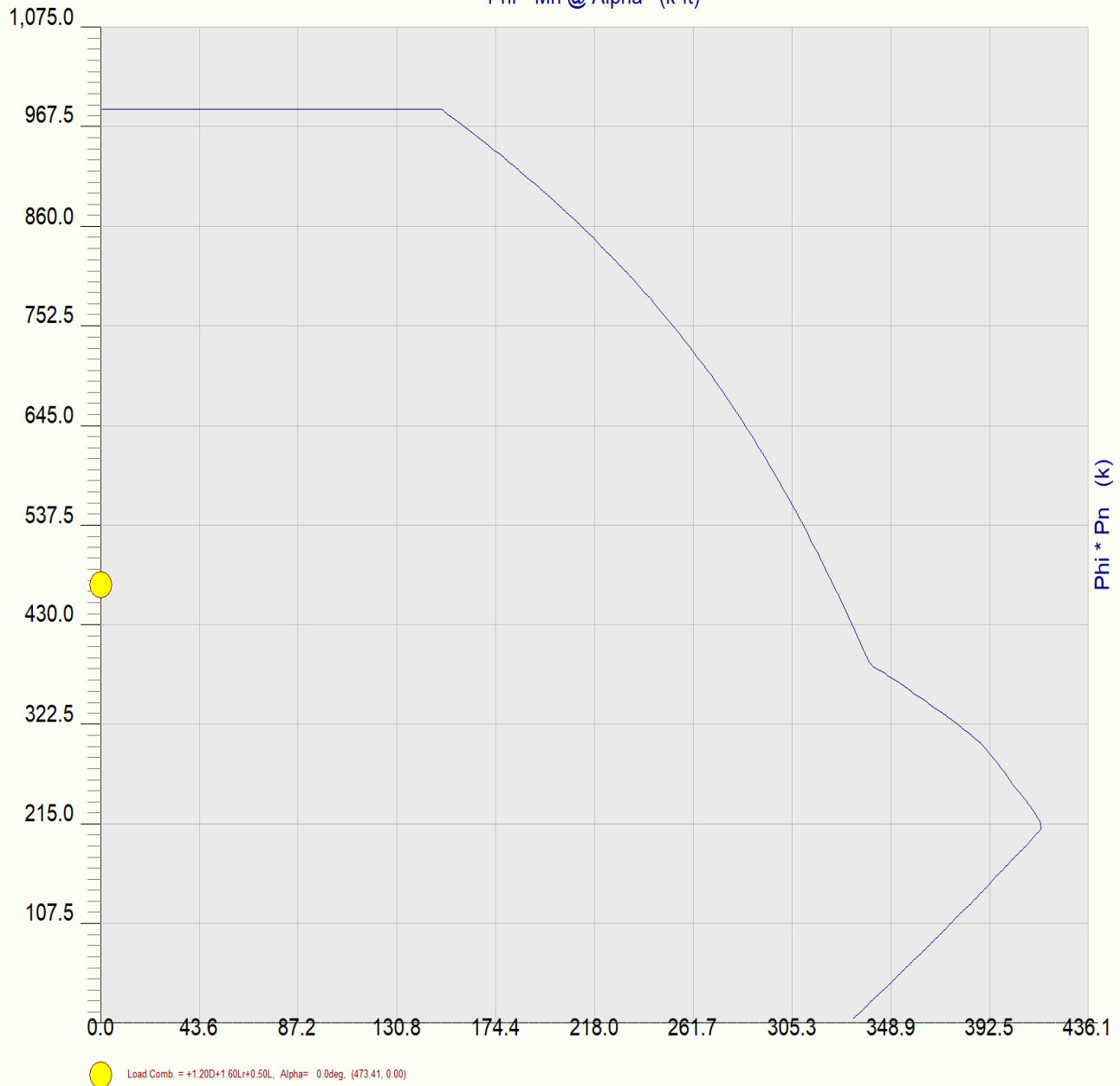
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DESCRIPTION: **First Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)



Concrete Column

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DESCRIPTION: **First Floor Column**

Concrete Column P-M Interaction Diagram

$\Phi * M_n @ \text{Alpha}$ (k-ft)

$\Phi * P_n$ (k)



Load Comb. = +1.20D+1.60Lr, Alpha= 0.0deg, (323.64, 0.00)

Concrete Column

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DESCRIPTION: **First Floor Column**

Concrete Column P-M Interaction Diagram

$\Phi * M_n @ \alpha$ (k-ft)

$\Phi * P_n$ (k)



Load Comb. = +1.20D+0.50L+1.60S, Alpha= 0.0deg. (478.20, 0.00)

Concrete Column

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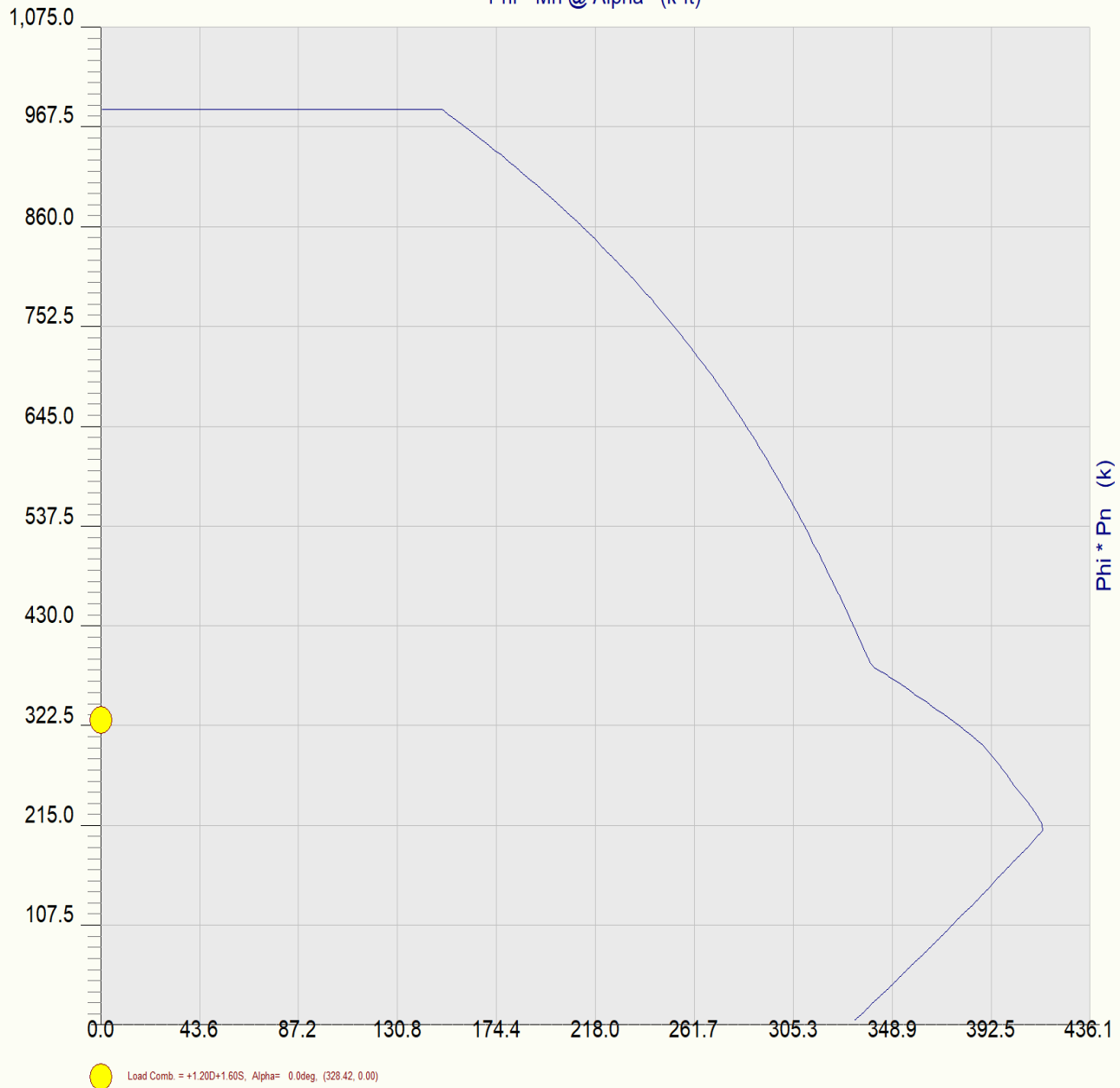
Lic. # : KW-06013597

DESCRIPTION: **First Floor Column**

Concrete Column P-M Interaction Diagram

$\Phi * M_n @ \alpha$ (k-ft)

$\Phi * P_n$ (k)



Concrete Column

File: 638283 Interior Column Analysis.ec6
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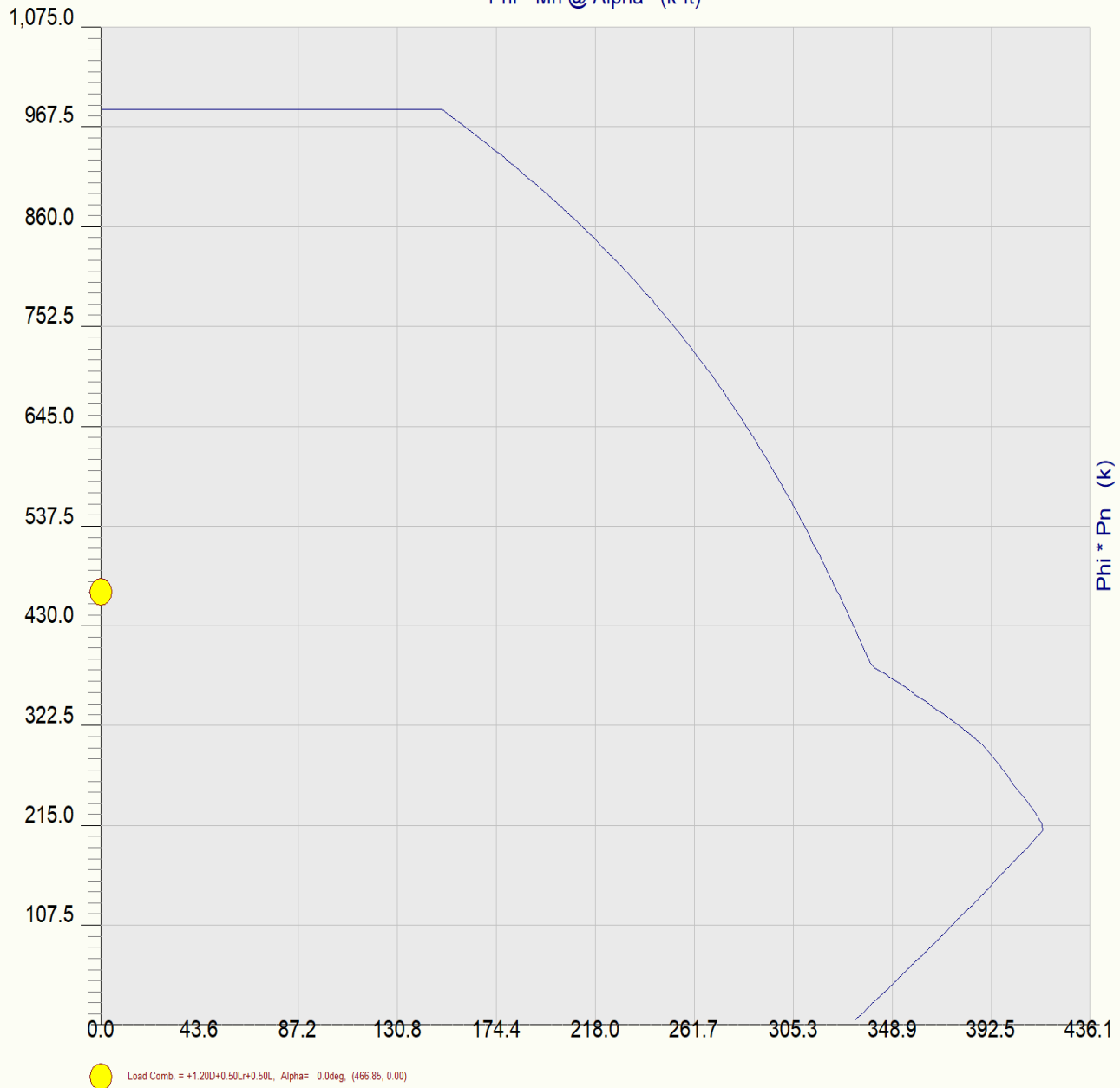
Lic. # : KW-06013597

DESCRIPTION: **First Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)

Phi * Pn (k)



Concrete Column

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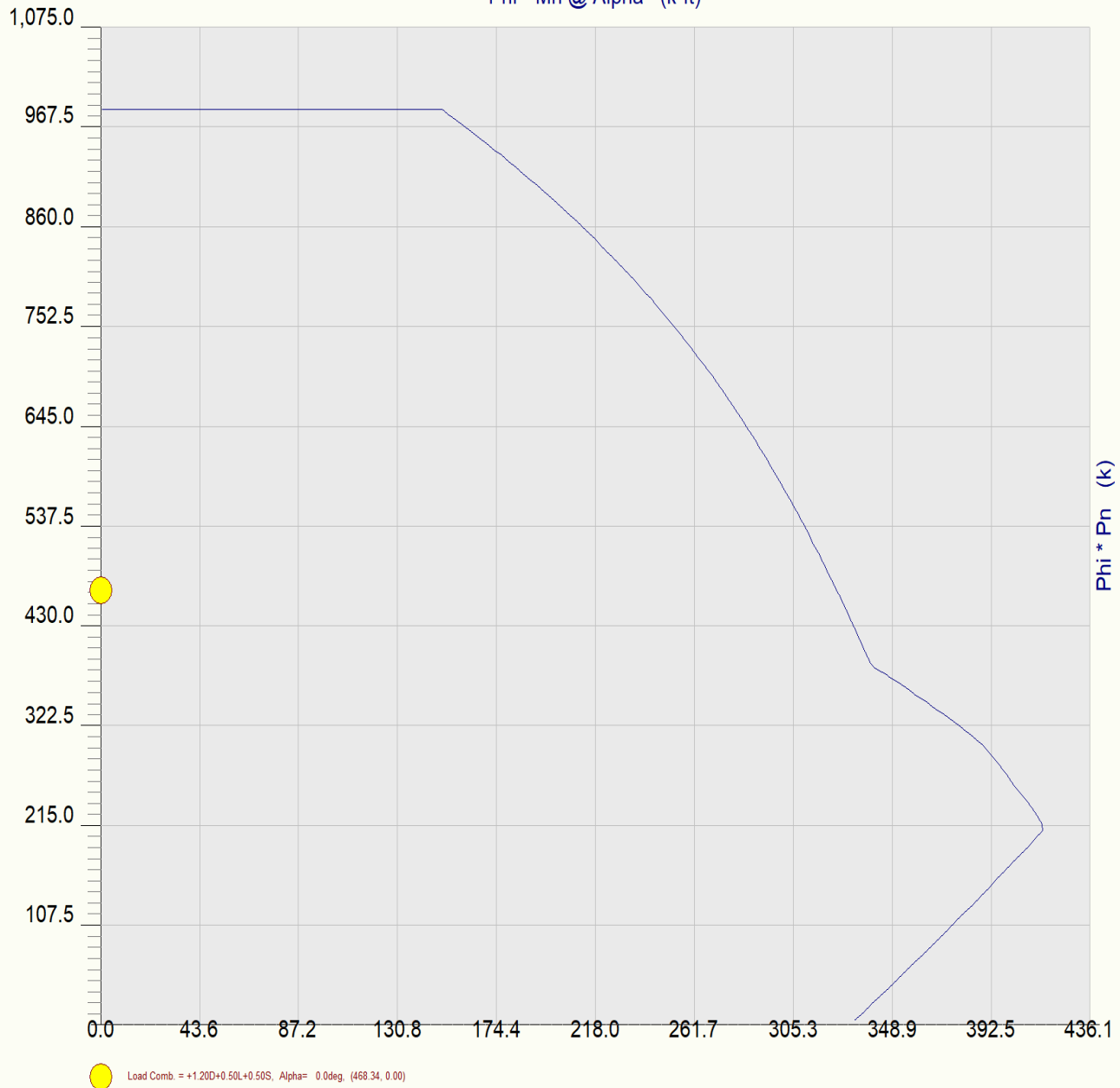
Lic. # : KW-06013597

DESCRIPTION: **First Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)

Phi * Pn (k)



Concrete Column

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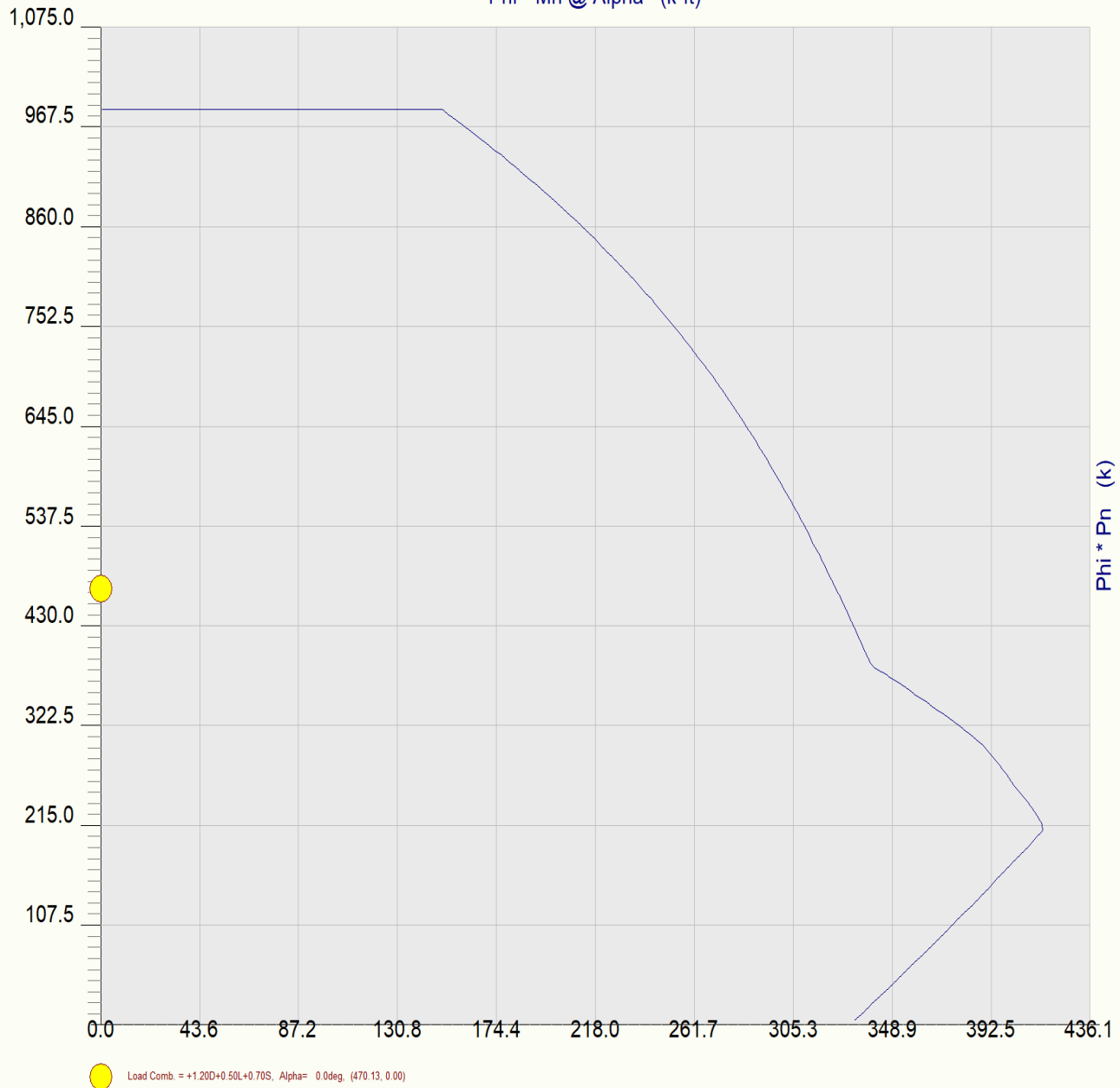
Lic. # : KW-06013597

DESCRIPTION: **First Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)

Phi * Pn (k)



Concrete Column

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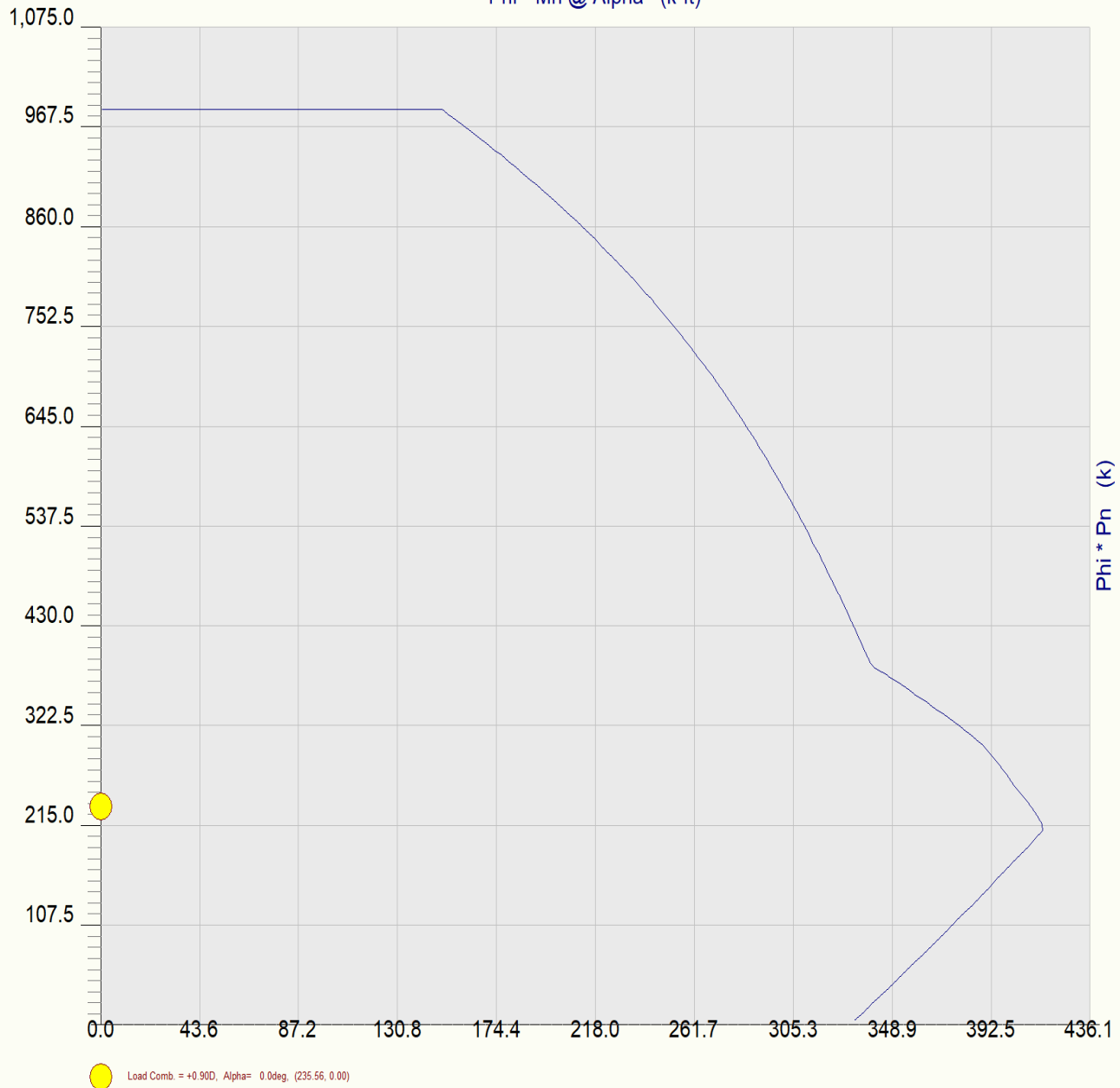
Lic. # : KW-06013597

DESCRIPTION: **First Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)

Phi * Pn (k)



Concrete Column

File: 638283 Interior Column Analysis.ec6
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Centerline Communications

Lic. #: KW-06013597

DESCRIPTION: G Floor Column

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10

Load Combinations Used : IBC 2015

General Information

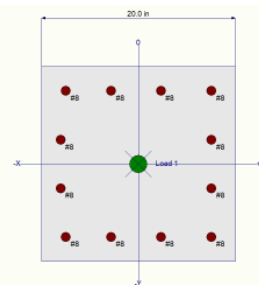
f'_c : Concrete 28 day strength = 4.0 ksi
E = 3,605.0 ksi
Density = 150.0 pcf
 β = 0.850
 f_y - Main Rebar = 60.0 ksi
E - Main Rebar = 29,000.0 ksi
Allow. Reinforcing Limits *ASTM A615 Bars Used*
Min. Reinf. = 1.0 %
Max. Reinf. = 8.0 %

Overall Column Height = 12.340 ft
End Fixity **Top & Bottom Pinned**
Brace condition for deflection (buckling) along columns :
X-X (width) axis :
Unbraced Length for buckling ABOUT Y-Y Axis = 12.340 ft, K = 1.0
Y-Y (depth) axis :
Unbraced Length for buckling ABOUT X-X Axis = 12.340 ft, K = 1.0

Column Cross Section

Column Dimensions : 20.0in Square Column, Column Edge to Rebar Edge Cover = 2.0in

Column Reinforcing : 4 - #8 bars @ corners,, 2 - #8 bars top & bottom between corner bars, 2 - #8 bars left & right between corner bars



Applied Loads

Entered loads are factored per load combinations specified by user.

Column self weight included : 5,141.67 lbs * Dead Load Factor

AXIAL LOADS ...

Roof + Tower Loads: Axial Load at 12.340 ft above base, D = 299.110, LR = 5.970, L = 329.420, S = 8.960 k

DESIGN SUMMARY

Load Combination **+1.20D+1.60L+0.50S**
Location of max. above base **12.257 ft**
Maximum Stress Ratio : 0.909 : 1
Ratio = $(P_u^2 + M_u^2)^{.5} / (\Phi P_n^2 + \Phi M_n^2)^{.5}$
 $P_u = 896.65$ k $\Phi * P_n = 986.22$ k
 $M_{u-x} = 0.0$ k-ft $\Phi * M_{n-x} = 0.0$ k-ft
 $M_{u-y} = 0.0$ k-ft $\Phi * M_{n-y} = 0.0$ k-ft
 M_u Angle = 0.0 deg
 M_u at Angle = 0.0 k-ft ΦM_n at Angle = 0.0 k-ft

P_n & M_n values located at P_u-M_u vector intersection with capacity curve

Column Capacities ...

P_nmax : Nominal Max. Compressive Axial Capacity **1,896.57** k
P_nmin : Nominal Min. Tension Axial Capacity k
 Φ P_n, max : Usable Compressive Axial Capacity **986.22** k
 Φ P_n, min : Usable Tension Axial Capacity k

Maximum SERVICE Load Reactions . .

Top along Y-Y **0.0** k Bottom along Y-Y **0.0** k
Top along X-X **0.0** k Bottom along X-X **0.0** k

Maximum SERVICE Load Deflections . .

Along Y-Y **0.0** in at **0.0** ft above base
for load combination :
Along X-X **0.0** in at **0.0** ft above base
for load combination :

General Section Information . $\Phi = 0.650$ $\beta = 0.850$ $\theta = 0.80$

ρ : % Reinforcing **2.370** % Rebar % Ok
Reinforcing Area **9.480** in²
Concrete Area **400.0** in²

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base	Axial Load k		Bending Analysis k-ft						Utilization	
	X-X	Y-Y		Pu	ϕ * Pn	δ x	δ x * Mux	δ y	δ y * Muy	Alpha (deg)	δ Mu	ϕ Mn	Ratio
+1.40D			12.26	425.95	986.22					0.000			0.432
+1.20D+0.50Lr+1.60L			12.26	895.16	986.22					0.000			0.908
+1.20D+1.60L+0.50S			12.26	896.65	986.22					0.000			0.909

Concrete Column

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Centerline Communications

Lic. # : KW-06013597

DESCRIPTION: G Floor Column

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base	ft	Axial Load		Bending Analysis k-ft						Utilization	
	X-X	Y-Y			Pu	ϕ * Pn	δ x	δ x * Mu	δ y	δ y * Mu	Alpha (deg)	δ Mu	ϕ Mn	Ratio
+1.20D+1.60Lr+0.50L			12.26		539.36	986.22					0.000			0.547
+1.20D+1.60Lr			12.26		374.65	986.22					0.000			0.380
+1.20D+0.50L+1.60S			12.26		544.15	986.22					0.000			0.552
+1.20D+1.60S			12.26		379.44	986.22					0.000			0.385
+1.20D+0.50Lr+0.50L			12.26		532.80	986.22					0.000			0.540
+1.20D+0.50L+0.50S			12.26		534.29	986.22					0.000			0.542
+1.20D+0.50L+0.70S			12.26		536.08	986.22					0.000			0.544
+0.90D			12.26		273.83	986.22					0.000			0.278

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top		@ Base	@ Top
D Only						304.252					
+D+L						633.672					
+D+Lr						310.222					
+D+S						313.212					
+D+0.750Lr+0.750L						555.794					
+D+0.750L+0.750S						558.037					
+0.60D						182.551					
Lr Only						5.970					
L Only						329.420					
S Only						8.960					

Maximum Moment Reactions

Note: Only non-zero reactions are listed.

Load Combination	Moment About X-X Axis			Moment About Y-Y Axis		
	@ Base	@ Top		@ Base	@ Top	
D Only			k-ft			k-ft
+D+L			k-ft			k-ft
+D+Lr			k-ft			k-ft
+D+S			k-ft			k-ft
+D+0.750Lr+0.750L			k-ft			k-ft
+D+0.750L+0.750S			k-ft			k-ft
+0.60D			k-ft			k-ft
Lr Only			k-ft			k-ft
L Only			k-ft			k-ft
S Only			k-ft			k-ft

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
D Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+L	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+Lr	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+S	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750L+0.750S	0.0000	in	0.000	ft	0.000	in	0.000	ft
+0.60D	0.0000	in	0.000	ft	0.000	in	0.000	ft
Lr Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
L Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
S Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

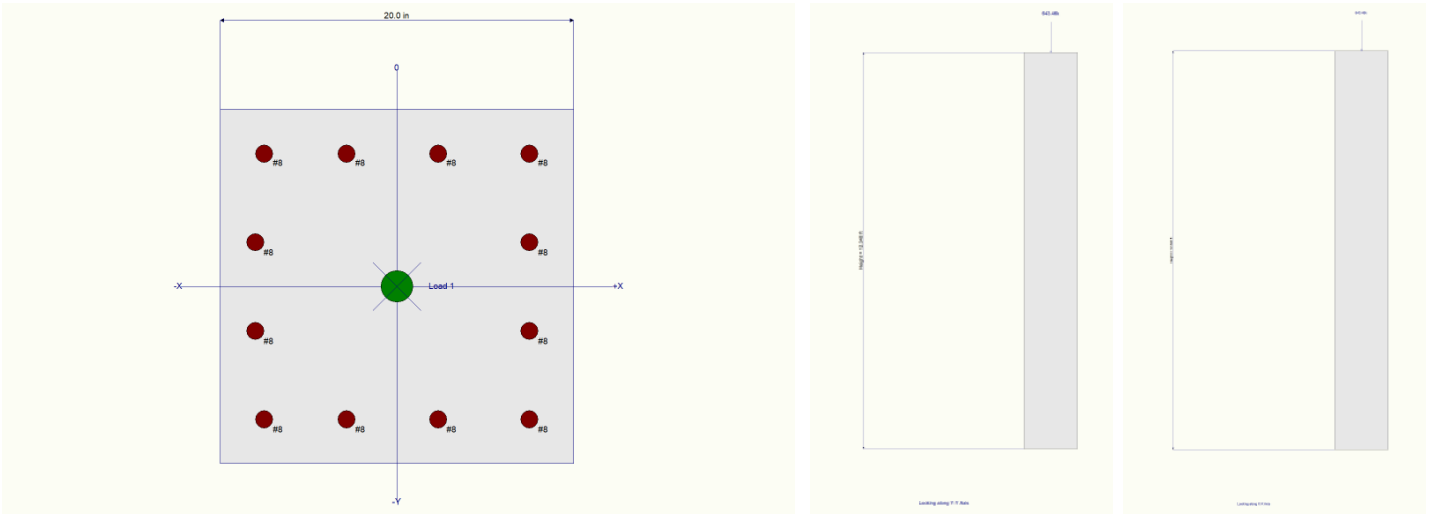
Concrete Column

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Centerline Communications

DESCRIPTION: **G Floor Column**

Sketches



Interaction Diagrams

Concrete Column

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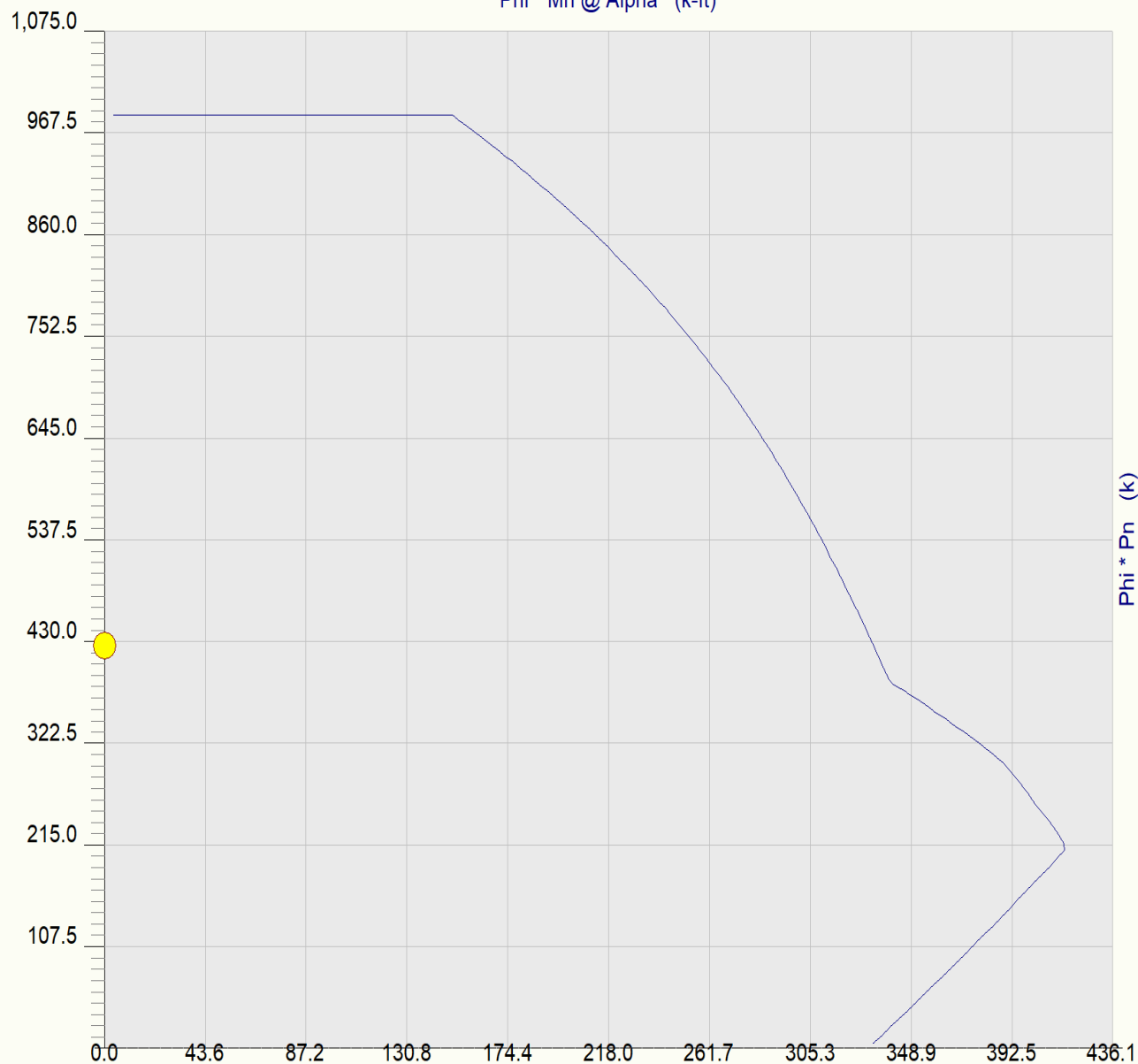
Centerline Communications

DESCRIPTION: **G Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)

Phi * Pn (k)



Load Comb. = +1.40D, Alpha= 0.0deg, (425.95, 0.00)

Concrete Column

File: 638283 Interior Column Analysis.ec6
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Centerline Communications

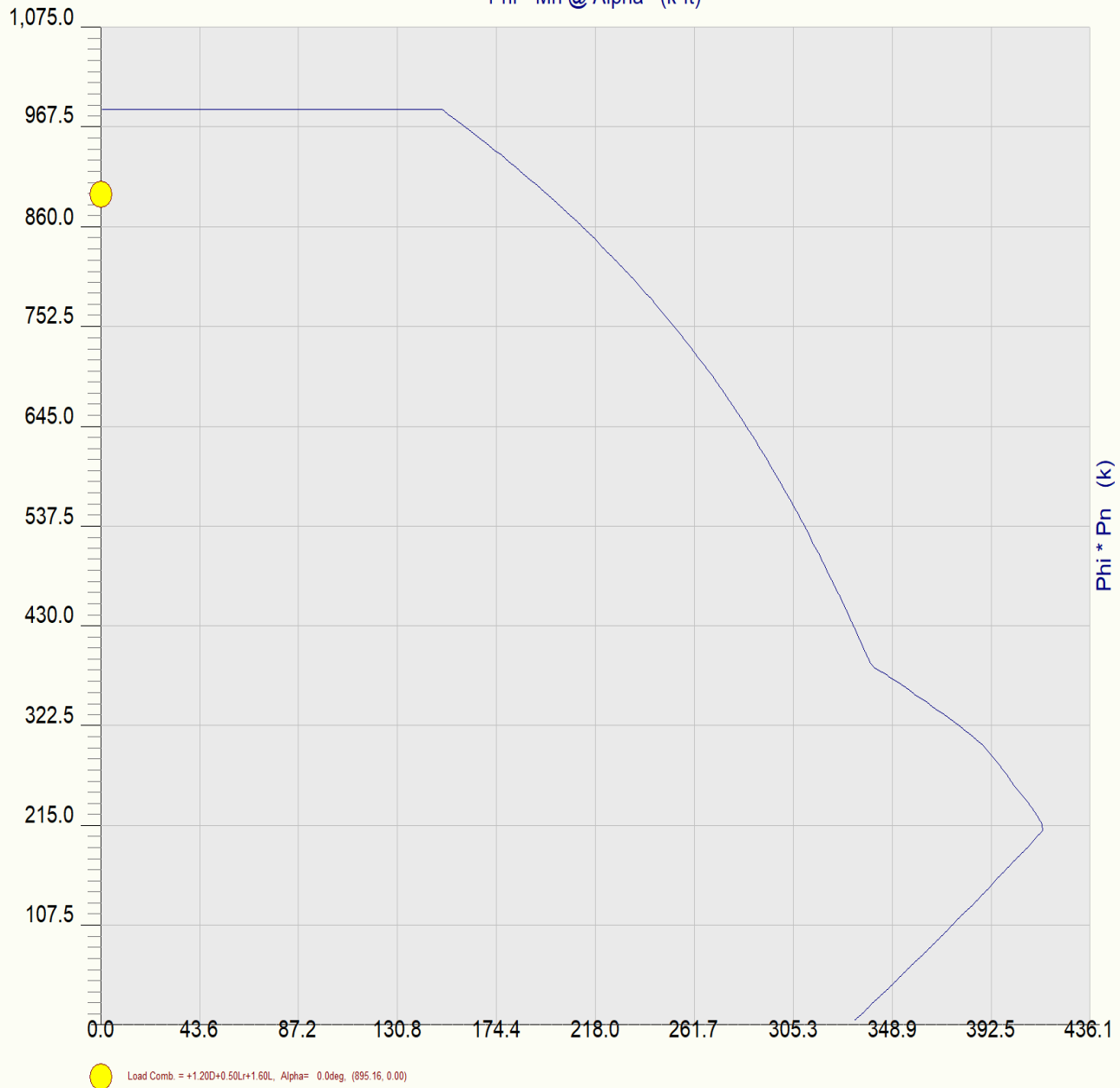
Lic. # : KW-06013597

DESCRIPTION: **G Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)

Phi * Pn (k)



Concrete Column

Lic. # : KW-06013597

File: 638283 Interior Column Analysis.ec6

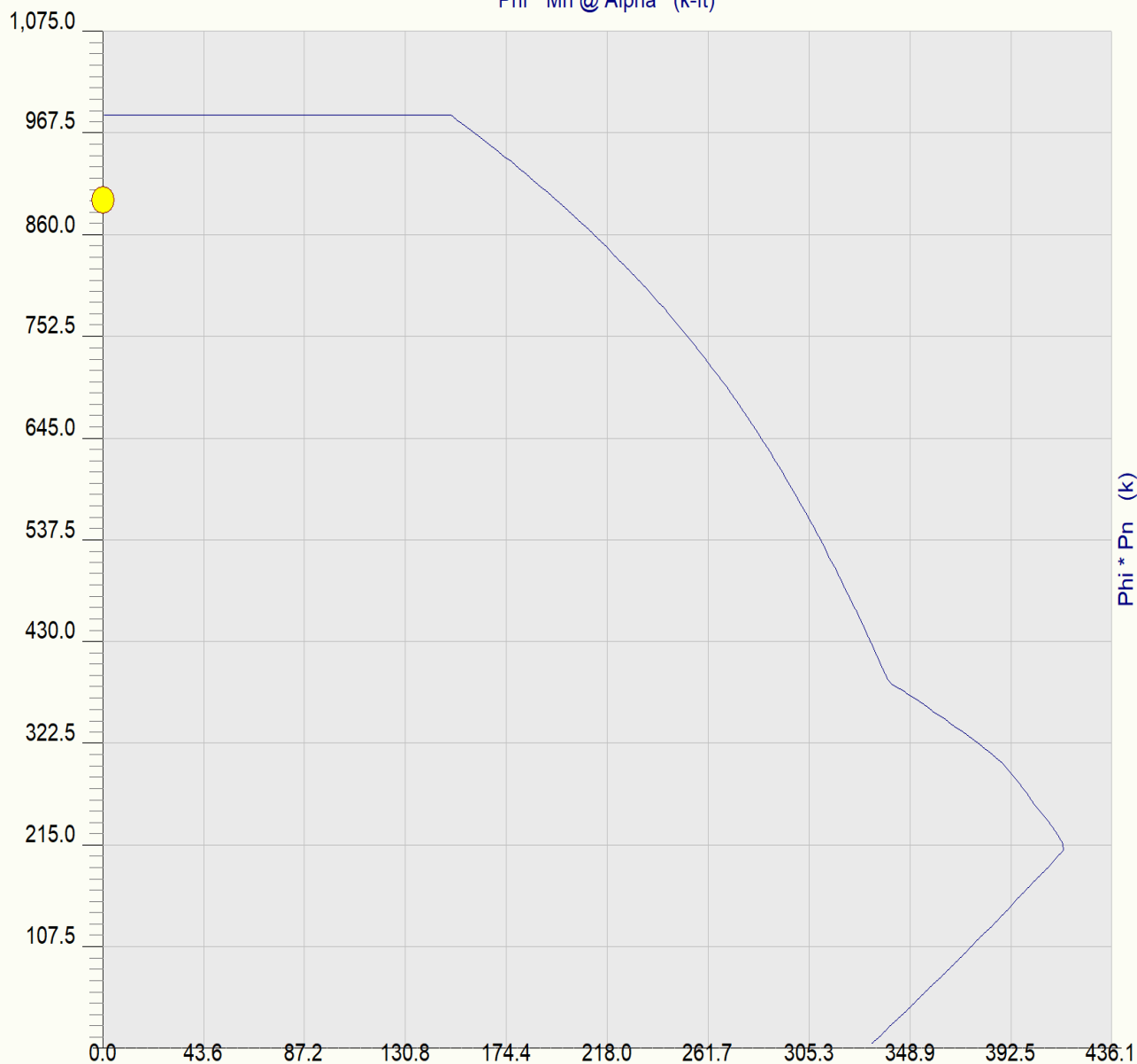
Software copyright ENERCALC, INC. 1983-2020, Build:12.20.8.24

Centerline Communications

DESCRIPTION: **G Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)



Load Comb. = +1.20D+1.60L+0.50S, Alpha= 0.0deg, (896.65, 0.00)

Concrete Column

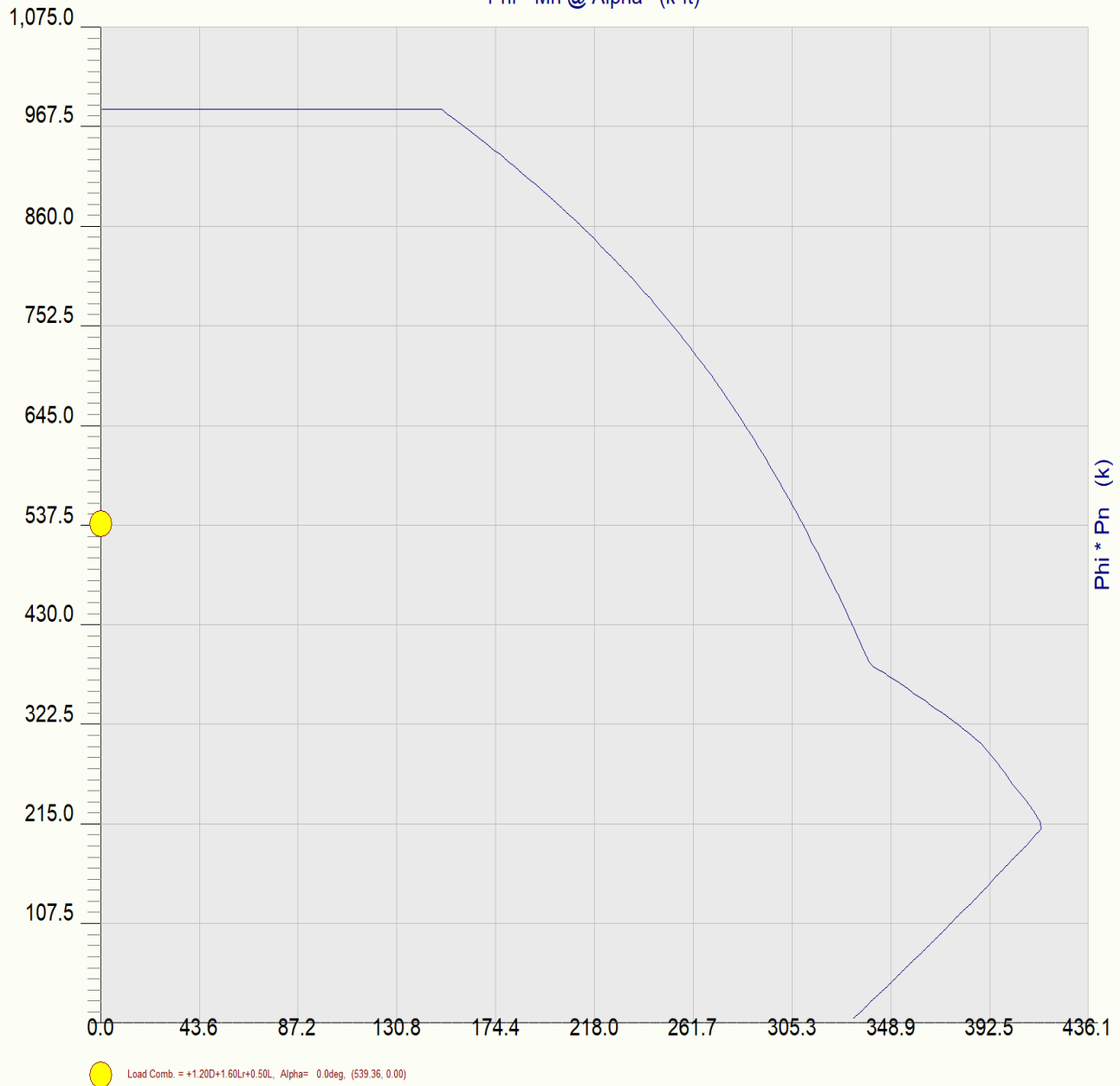
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Centerline Communications

Lic. # : KW-06013597

DESCRIPTION: **G Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)



Concrete Column

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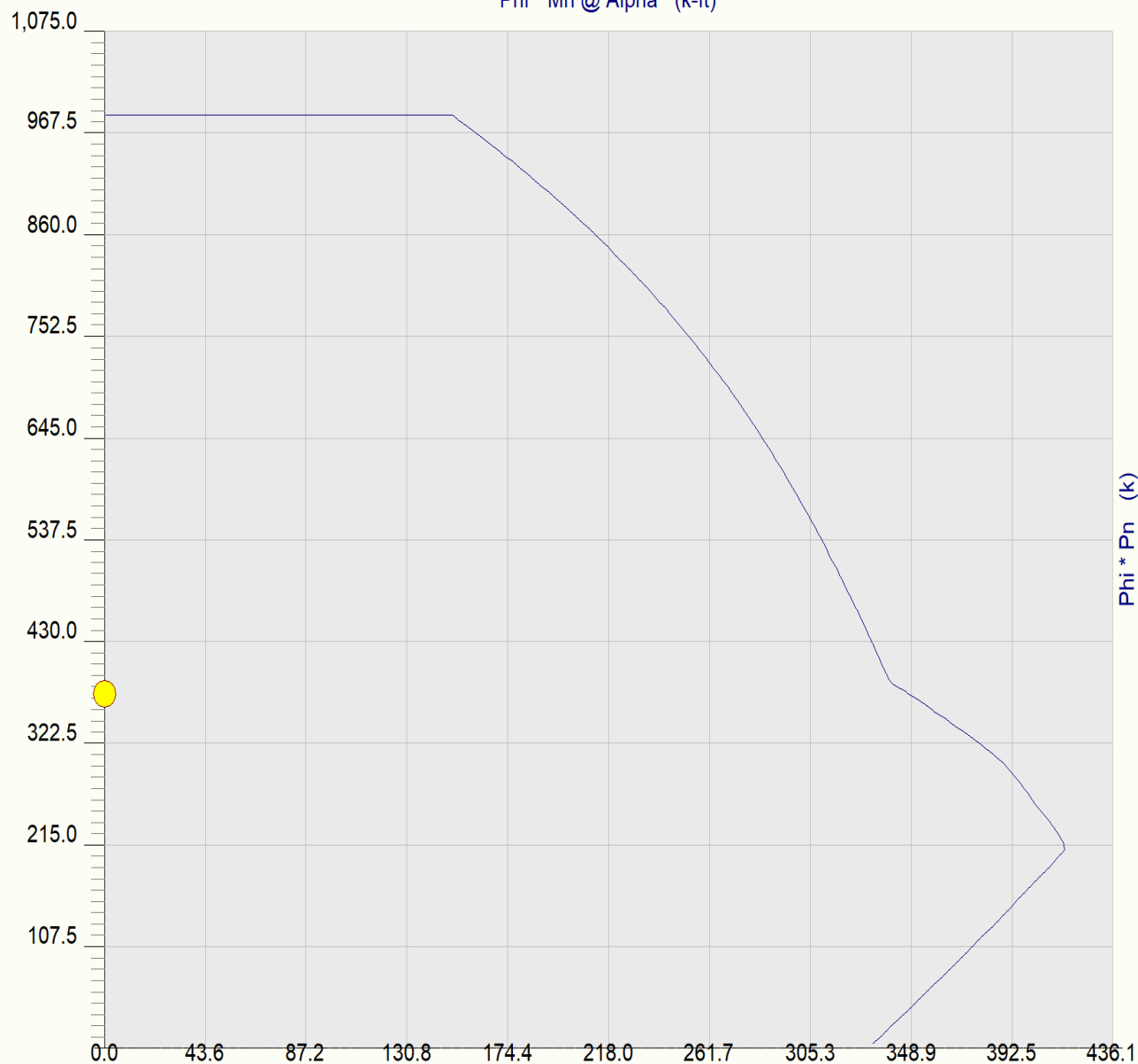
Centerline Communications

DESCRIPTION: **G Floor Column**

Concrete Column P-M Interaction Diagram

$\Phi * M_n @ \alpha$ (k-ft)

$\Phi * P_n$ (k)



Load Comb. = +1.20D+1.60Lr, Alpha= 0.0deg, (374.65, 0.00)

Concrete Column

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File: 638283 Interior Column Analysis.ec6

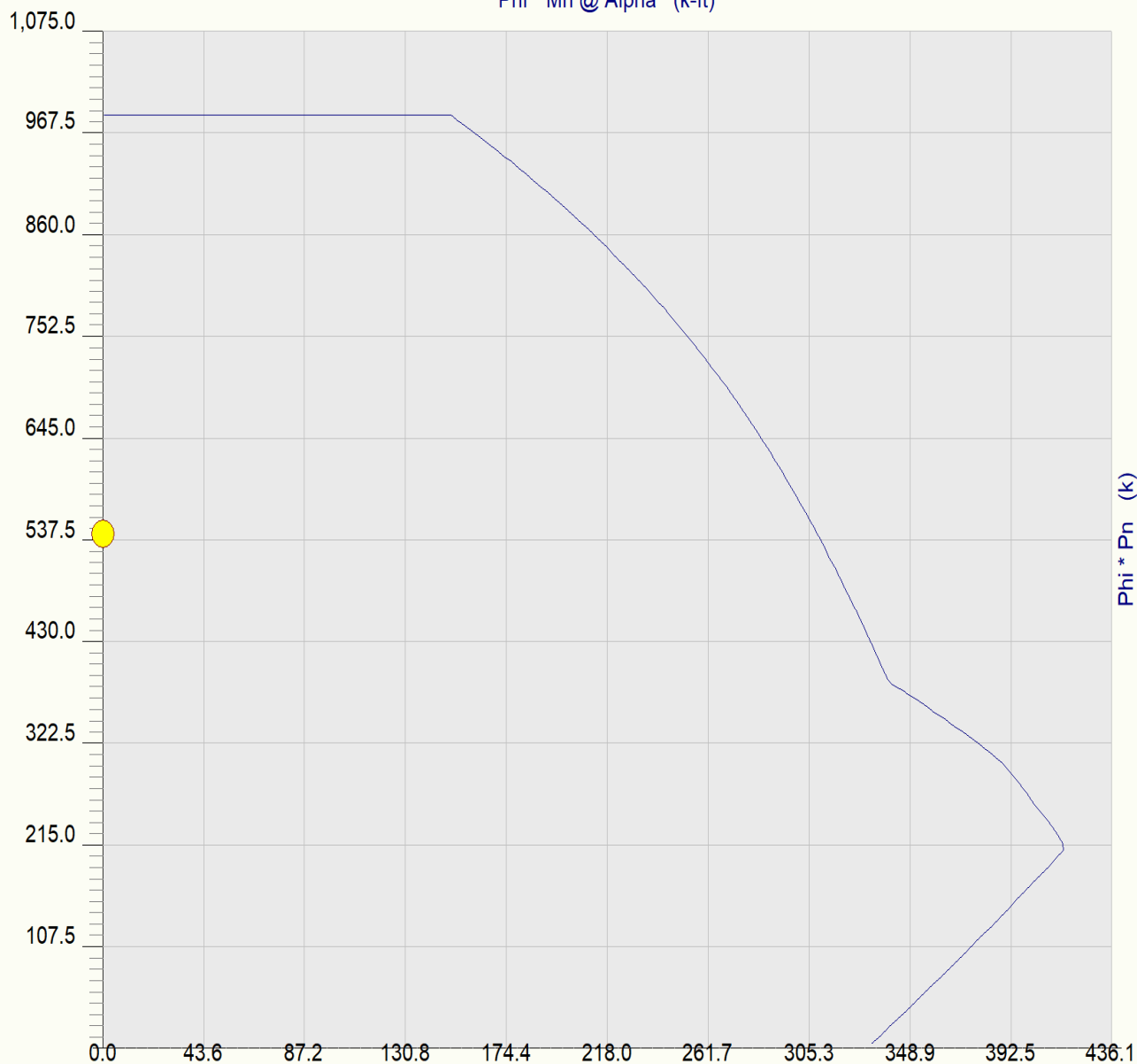
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Centerline Communications

DESCRIPTION: **G Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)



Load Comb. = +1.20D+0.50L+1.60S, Alpha= 0.0deg, (544.15, 0.00)

Concrete Column

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Centerline Communications

Lic. # : KW-06013597

DESCRIPTION: **G Floor Column**

Concrete Column P-M Interaction Diagram

$\Phi * M_n @ \alpha$ (k-ft)

$\Phi * P_n$ (k)



Load Comb. = +1.20D+1.60S, $\alpha = 0.0 \text{ deg.}$ (379.44, 0.00)

Concrete Column

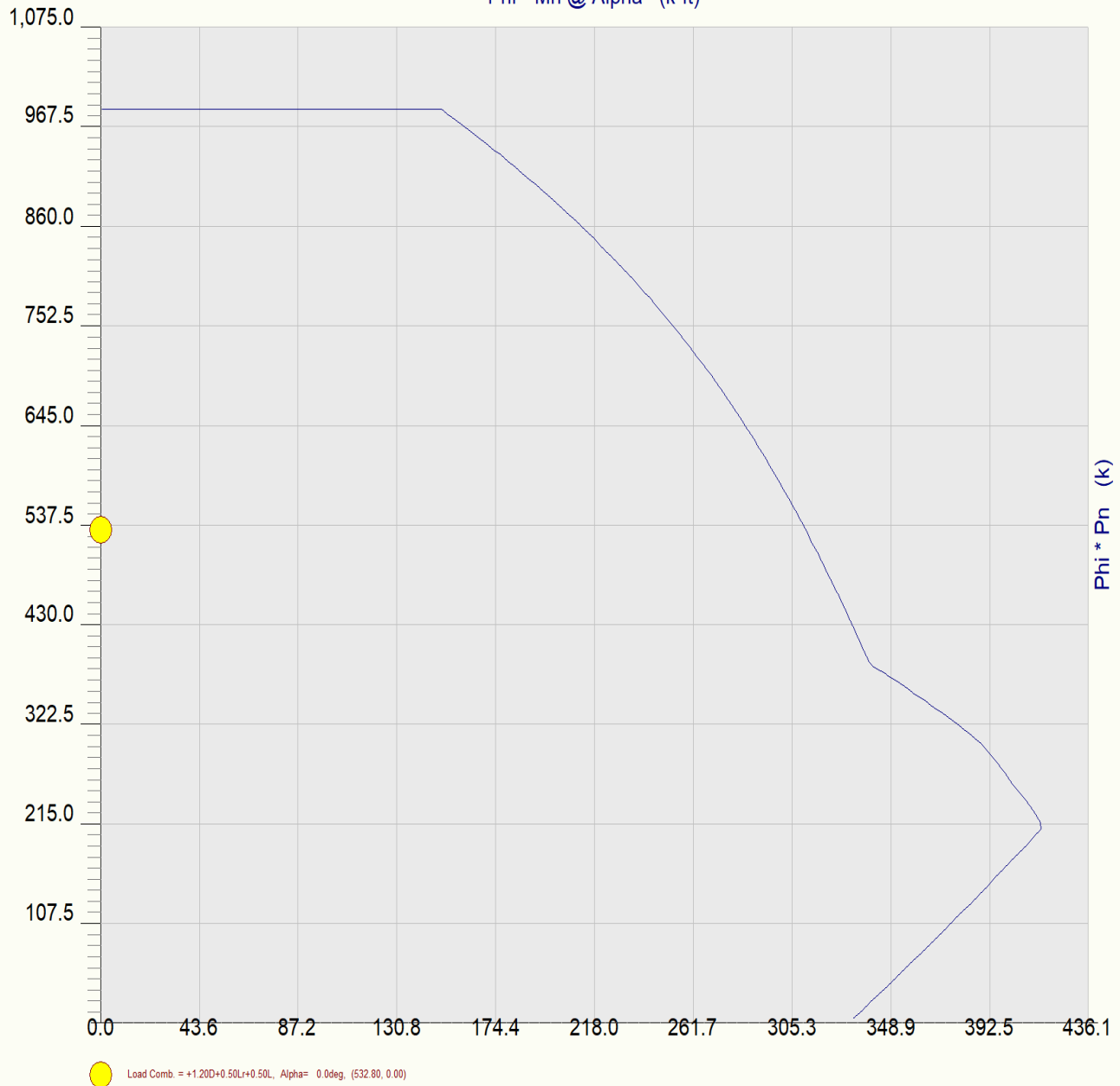
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DESCRIPTION: **G Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)



Concrete Column

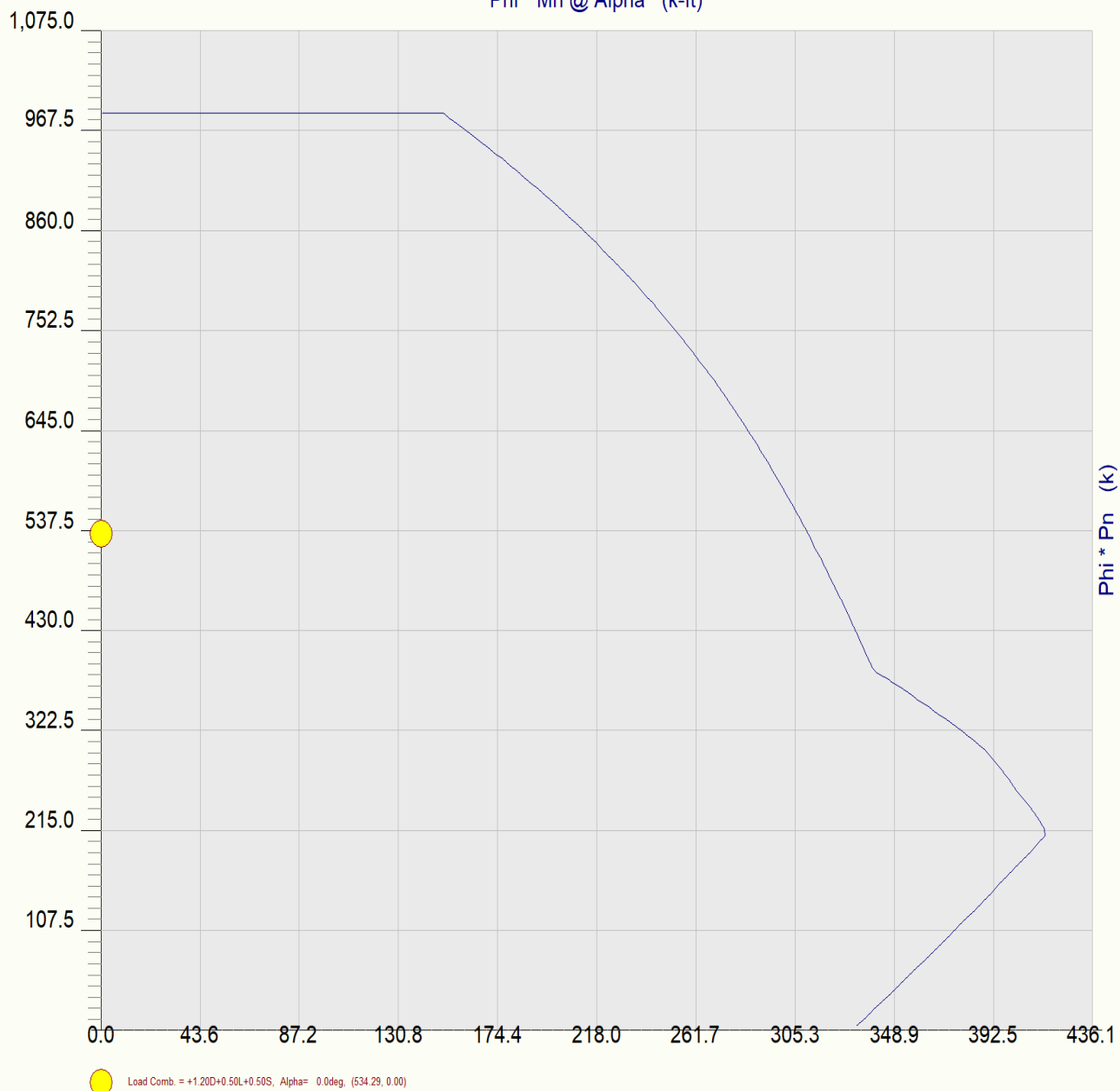
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Centerline Communications

Lic. # : KW-06013597

DESCRIPTION: **G Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)



Concrete Column

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Centerline Communications

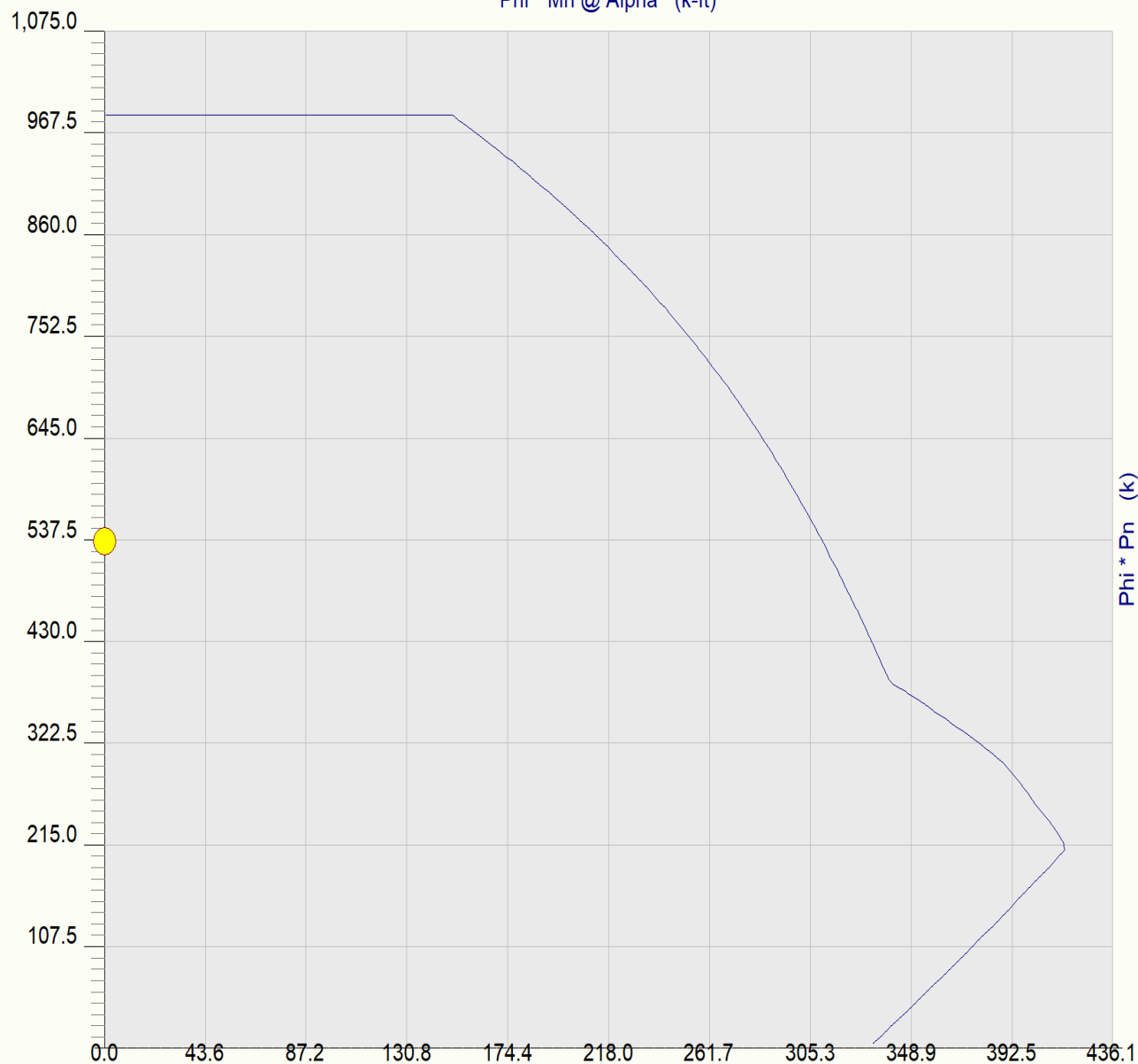
Lic. # : KW-06013597

DESCRIPTION: **G Floor Column**

Concrete Column P-M Interaction Diagram

$\Phi * M_n @ \alpha$ (k-ft)

$\Phi * P_n$ (k)



Load Comb. = +1.20D+0.50L+0.70S, $\alpha = 0.0 \text{ deg.}$ (536.08, 0.00)

Concrete Column

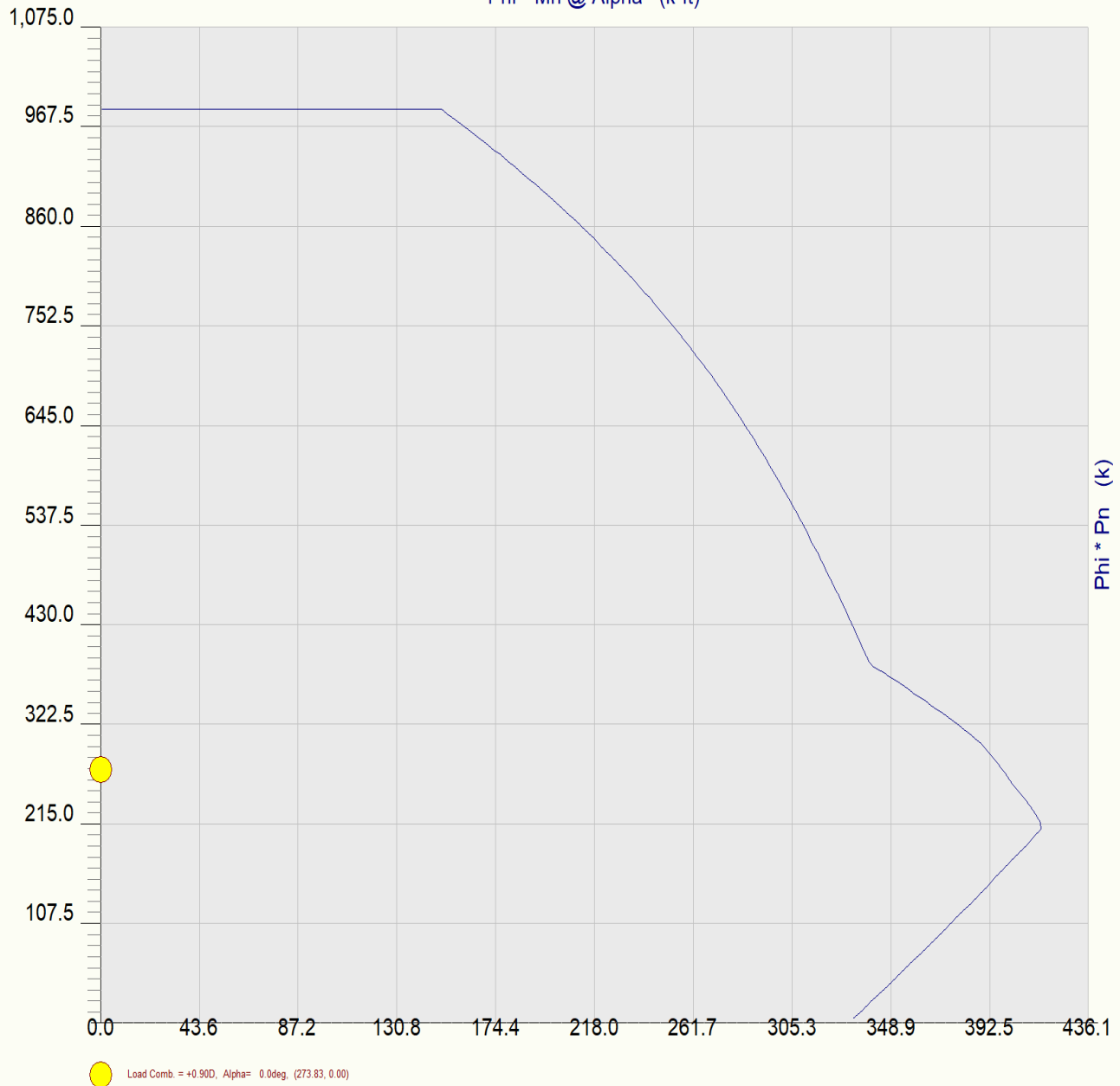
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Lic. # : KW-06013597

DESCRIPTION: **G Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)



Building Column Calculations (Exterior)

Date: 06-17-2022
Project Name: Stamford #1 CO
Site ID: 638283
Designed By: AA Checked By: DC

Check Building Columns:

Exterior Column at Tower:

Load Breakdown:

Tributary Area: $(18.67 \text{ ft} / 2) * ((16 \text{ ft} / 2) + (16 \text{ ft} / 2))$
= 149.36 ft²

Live Loads

→ Snow 30 psf x 149.36 ft²
= **4.48 kips**

→ Service 20 psf x 149.36 ft²
(Roof) **2.99 kips**

→ Service 100 psf x 149.36 ft²
(Typical Floor) **14.94 kips**

Dead Load

→ Roof 100 psf x 149.36 ft²
= **14.94 kips**

***Assume 8" concrete deck (150 pcf)**

→ Floor 125 psf x 149.36 ft²
(Typical Floor) **18.67 kips**

***Assume 10" concrete deck (150 pcf)**

Date: 06-17-2022
 Project Name: Stamford #1 CO
 Site ID: 638283
 Designed By: AA Checked By: DC

Column Loading (Unfactor Loads)

	<u>Snow Load</u> <u>(Kips.)</u>	<u>Live Load</u> <u>(Kips.)</u>	<u>Dead Load</u> <u>(Kips.)</u>	<u>Dead Load</u> <u>Column (Kips.)</u>	<u>Total Load</u> <u>(Kips.)</u>
Tower Load	-	150.19	14.70	-	164.89
Roof	4.48	2.99	14.94	-	22.40
Total=	4.48	153.17	29.64	0.00	187.29
Sixth Floor (17"x17")	0.00	14.94	18.67	4.34	37.95
Total=	4.48	168.11	48.31	4.34	225.24
Fifth Floor (17"x17")	0.00	14.94	18.67	4.34	37.95
Total=	4.48	183.05	66.98	8.68	263.19
Fourth Floor (17"x17")	0.00	14.94	18.67	4.34	37.95
Total=	4.48	197.98	85.65	13.02	301.13
Third Floor (17"x17")	0.00	14.94	18.67	4.94	38.55
Total=	4.48	212.92	104.32	17.97	339.68
Second Floor (20"x20")	0.00	14.94	18.67	6.49	40.10
Total=	4.48	227.85	122.99	24.46	379.78
First Floor (20"x20")	0.00	14.94	18.67	6.01	39.62
Total=	4.48	242.79	141.66	30.47	419.39
G Floor (20"x20")					

***Reference the structural analysis by Foresite LLC, dated December 29, 2021 for tower reactions.**

Concrete Column

File: 638283 Exterior Column Analysis.ec6
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Centerline Communications

Lic. #: KW-06013597

DESCRIPTION: Sixth Floor Column

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

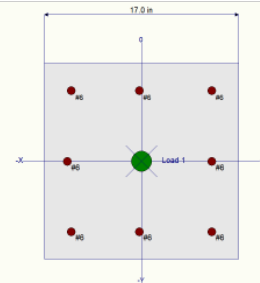
f'_c : Concrete 28 day strength = 4.0 ksi
E = 3,605.0 ksi
Density = 150.0 pcf
 β = 0.850
 f_y - Main Rebar = 60.0 ksi
E - Main Rebar = 29,000.0 ksi
Allow. Reinforcing Limits *ASTM A615 Bars Used*
Min. Reinf. = 1.0 %
Max. Reinf. = 8.0 %

Overall Column Height = 14.420 ft
End Fixity **Top & Bottom Pinned**
Brace condition for deflection (buckling) along columns :
X-X (width) axis :
Unbraced Length for buckling ABOUT Y-Y Axis = 14.420 ft, K = 1.0
Y-Y (depth) axis :
Unbraced Length for buckling ABOUT X-X Axis = 14.420 ft, K = 1.0

Column Cross Section

Column Dimensions : 17.0in Square Column, Column Edge to Rebar Edge Cover = 2.0in

Column Reinforcing : 4 - #6 bars @ corners,, 1 - #6 bars top & bottom between corner bars, 1 - #6 bars left & right between corner bars



Entered loads are factored per load combinations specified by user.

Applied Loads

Column self weight included : 4,341.02 lbs * Dead Load Factor
AXIAL LOADS . . .
Roof + Tower Loads: Axial Load at 14.420 ft above base, D = 29.640, LR = 2.990, L = 150.190, S = 4.480 k
BENDING LOADS . . .
Tower Load: Lat. Point Load at 14.420 ft creating M_x -x, W = 14.375 k

DESIGN SUMMARY

Load Combination **+1.20D+1.60L+0.50S**
Location of max. above base **14.323 ft**
Maximum Stress Ratio 0.460 : 1
Ratio = $(P_u^2 + M_u^2)^{0.5} / (\phi P_n^2 + \phi M_n^2)^{0.5}$
 P_u = **283.321 k** $\phi * P_n$ = **614.55 k**
 M_{u-x} = **0.0 k-ft** $\phi * M_{n-x}$ = **0.0 k-ft**
 M_{u-y} = **26.207 k-ft** $\phi * M_{n-y}$ = **55.969 k-ft**
 M_u Angle = **90.0 deg**
 M_u at Angle = **26.207 k-ft** ϕM_n at Angle = **56.998 k-ft**

P_n & M_n values located at P_u - M_u vector intersection with capacity curve

Column Capacities . . .

P_{nmax} : Nominal Max. Compressive Axial Capacity **1,181.83 k**
 P_{nmin} : Nominal Min. Tension Axial Capacity **k**
 ϕP_n , max : Usable Compressive Axial Capacity **614.55 k**
 ϕP_n , min : Usable Tension Axial Capacity **k**

Maximum SERVICE Load Reactions . .

Top along Y-Y **0.0 k** Bottom along Y-Y **0.0 k**
Top along X-X **14.375 k** Bottom along X-X **0.0 k**

Maximum SERVICE Load Deflections . . .

Along Y-Y **0.0 in** at **0.0 ft** above base
for load combination :
Along X-X **0.0 in** at **0.0 ft** above base
for load combination :

General Section Information . ϕ = 0.650 β = 0.850 θ = 0.80

ρ : % Reinforcing **1.218 %** Rebar % Ok
Reinforcing Area **3.520 in²**
Concrete Area **289.0 in²**

Concrete Column

File: 638283 Exterior Column Analysis.ec6
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Centerline Communications

Lic. # : KW-06013597

DESCRIPTION: Sixth Floor Column

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base ft	Axial Load k		Bending Analysis k-ft								Utilization	
	X-X	Y-Y		Pu	$\phi * P_n$	δx	$\delta x * M_{ux}$	δy	$\delta y * M_{uy}$	Alpha (deg)	δM_u	ϕM_n	Ratio		
+1.40D		M2,min	14.32	47.57	614.55			1.000	4.40	90.000	4.40	57.00	0.077		
+1.40D	M2,min		14.32	47.57	614.55	1.000	4.40			0.000	4.40	57.06	0.077		
+1.20D+0.50Lr+1.60L		M2,min	14.32	282.58	614.55			1.000	26.14	90.000	26.14	57.00	0.459		
+1.20D+0.50Lr+1.60L	M2,min		14.32	282.58	614.55	1.000	26.14			0.000	26.14	57.06	0.459		
+1.20D+1.60L+0.50S		M2,min	14.32	283.32	614.55			1.000	26.21	90.000	26.21	57.00	0.460		
+1.20D+1.60L+0.50S	M2,min		14.32	283.32	614.55	1.000	26.21			0.000	26.21	57.06	0.460		
+1.20D+1.60Lr+0.50L		M2,min	14.32	120.66	614.55			1.000	11.16	90.000	11.16	57.00	0.196		
+1.20D+1.60Lr+0.50L	M2,min		14.32	120.66	614.55	1.000	11.16			0.000	11.16	57.06	0.196		
+1.20D+1.60Lr+0.50W		M2,min	14.32	45.56	614.55			1.000	4.21	90.000	4.21	57.00	0.074		
+1.20D+1.60Lr+0.50W	M2,min		14.32	45.56	614.55	1.000	4.21			0.000	4.21	57.06	0.074		
+1.20D+0.50L+1.60S		M2,min	14.32	123.04	614.55			1.000	11.38	90.000	11.38	57.00	0.200		
+1.20D+0.50L+1.60S	M2,min		14.32	123.04	614.55	1.000	11.38			0.000	11.38	57.06	0.200		
+1.20D+1.60S+0.50W		M2,min	14.32	47.95	614.55			1.000	4.43	90.000	4.43	57.00	0.078		
+1.20D+1.60S+0.50W	M2,min		14.32	47.95	614.55	1.000	4.43			0.000	4.43	57.06	0.078		
+1.20D+0.50Lr+0.50L+W		M2,min	14.32	117.37	614.55			1.000	10.86	90.000	10.86	57.00	0.191		
+1.20D+0.50Lr+0.50L+W	M2,min		14.32	117.37	614.55	1.000	10.86			0.000	10.86	57.06	0.191		
+1.20D+0.50L+0.50S+W		M2,min	14.32	118.11	614.55			1.000	10.93	90.000	10.93	57.00	0.192		
+1.20D+0.50L+0.50S+W	M2,min		14.32	118.11	614.55	1.000	10.93			0.000	10.93	57.06	0.192		
+1.20D+0.50L+0.70S		M2,min	14.32	119.01	614.55			1.000	11.01	90.000	11.01	57.00	0.193		
+1.20D+0.50L+0.70S	M2,min		14.32	119.01	614.55	1.000	11.01			0.000	11.01	57.06	0.193		
+0.90D+W		M2,min	14.32	30.58	614.55			1.000	2.83	90.000	2.83	57.00	0.050		
+0.90D+W	M2,min		14.32	30.58	614.55	1.000	2.83			0.000	2.83	57.06	0.050		
+0.90D		M2,min	14.32	30.58	614.55			1.000	2.83	90.000	2.83	57.00	0.050		
+0.90D	M2,min		14.32	30.58	614.55	1.000	2.83			0.000	2.83	57.06	0.050		

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top		@ Base	@ Top
D Only						33.981					
+D+L						184.171					
+D+Lr						36.971					
+D+S						38.461					
+D+0.750Lr+0.750L						148.866					
+D+0.750L+0.750S						149.984					
+D+0.60W					8.625	33.981					
+D+0.750Lr+0.750L+0.450W					6.469	148.866					
+D+0.750L+0.750S+0.450W					6.469	149.984					
+0.60D+0.60W					8.625	20.389					
+0.60D						20.389					
Lr Only						2.990					
L Only						150.190					
S Only						4.480					
W Only					14.375						

Maximum Moment Reactions

Note: Only non-zero reactions are listed.

Load Combination	Moment About X-X Axis			Moment About Y-Y Axis	
	@ Base	@ Top		@ Base	@ Top
D Only			k-ft		k-ft
+D+L			k-ft		k-ft
+D+Lr			k-ft		k-ft
+D+S			k-ft		k-ft
+D+0.750Lr+0.750L			k-ft		k-ft
+D+0.750L+0.750S			k-ft		k-ft
+D+0.60W			k-ft		k-ft
+D+0.750Lr+0.750L+0.450W			k-ft		k-ft
+D+0.750L+0.750S+0.450W			k-ft		k-ft

Concrete Column

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DESCRIPTION: Sixth Floor Column

Maximum Moment Reactions

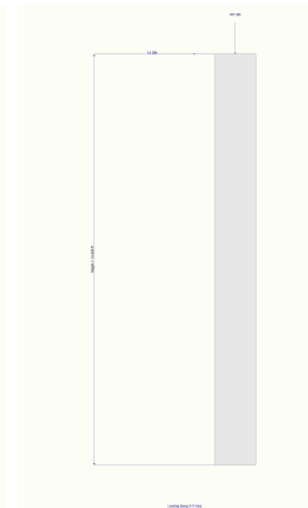
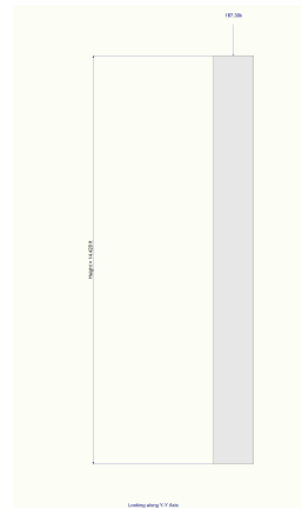
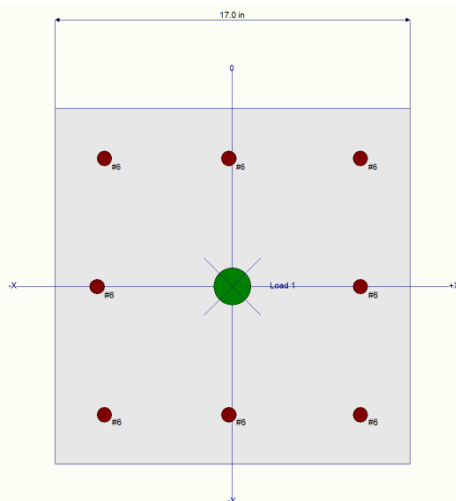
Note: Only non-zero reactions are listed.

Load Combination	Moment About X-X Axis		Moment About Y-Y Axis	
	@ Base	@ Top	@ Base	@ Top
+0.60D+0.60W		k-ft		k-ft
+0.60D		k-ft		k-ft
Lr Only		k-ft		k-ft
L Only		k-ft		k-ft
S Only		k-ft		k-ft
W Only		k-ft		k-ft

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection	Distance	Max. Y-Y Deflection	Distance
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+L	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+Lr	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+S	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr+0.750L	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L+0.750S	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.60W	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr+0.750L+0.450W	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750L+0.750S+0.450W	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D+0.60W	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D	0.0000 in	0.000 ft	0.000 in	0.000 ft
Lr Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
L Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
S Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
W Only	0.0000 in	0.000 ft	0.000 in	0.000 ft

Sketches



Interaction Diagrams

Concrete Column

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DESCRIPTION: **Sixth Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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DESCRIPTION: **Sixth Floor Column**

Concrete Column P-M Interaction Diagram



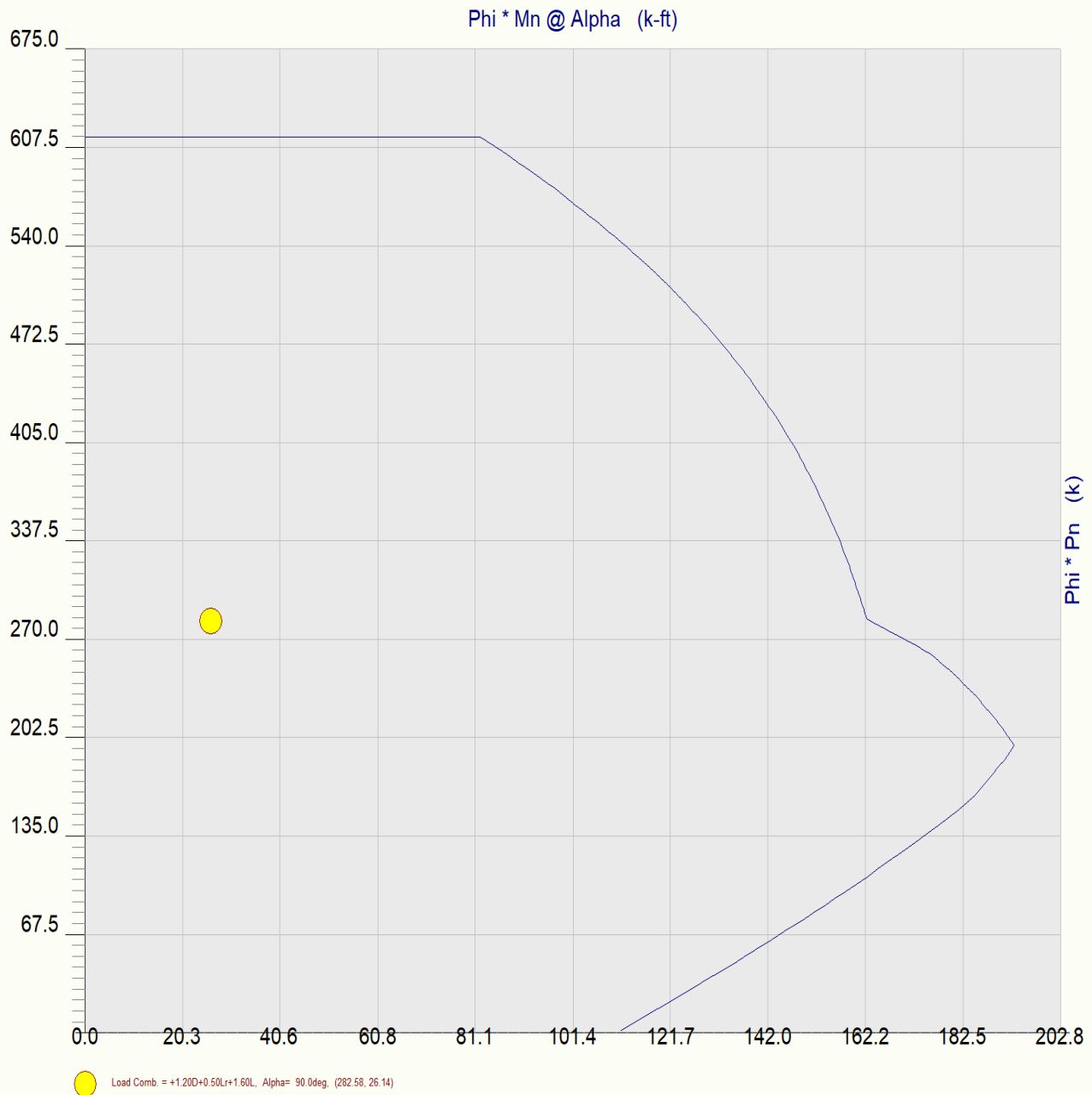
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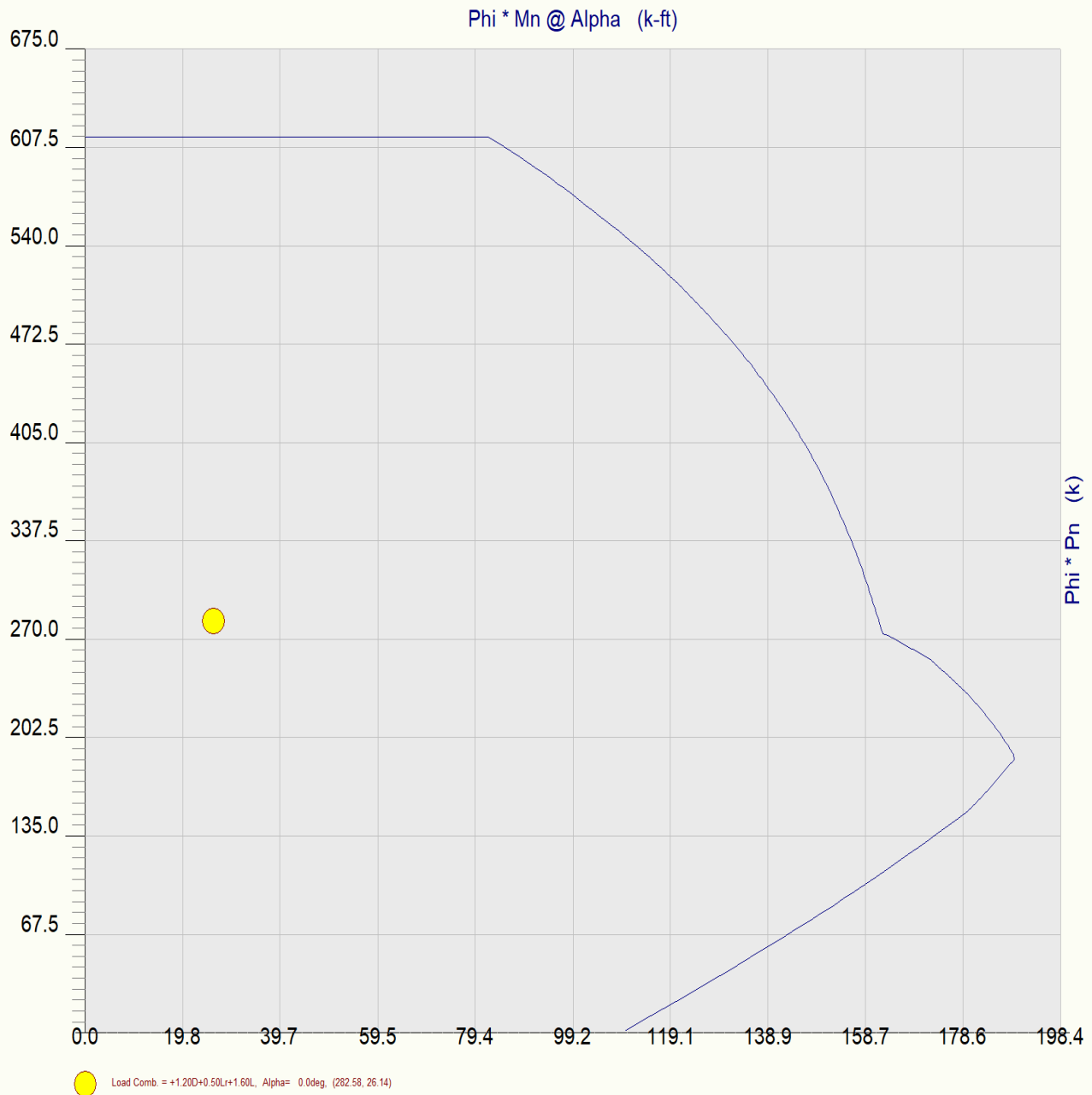
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Concrete Column P-M Interaction Diagram



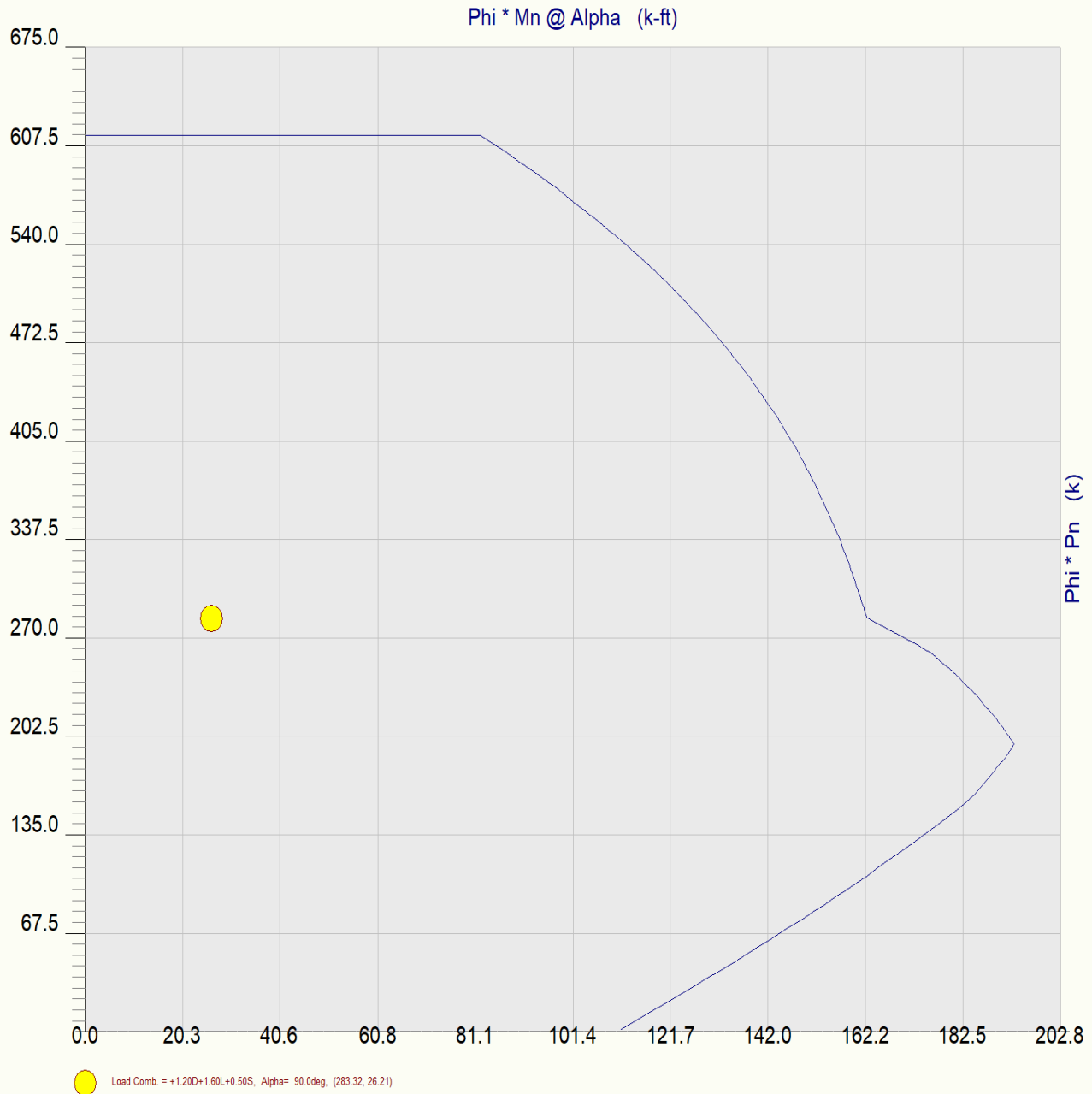
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Concrete Column P-M Interaction Diagram



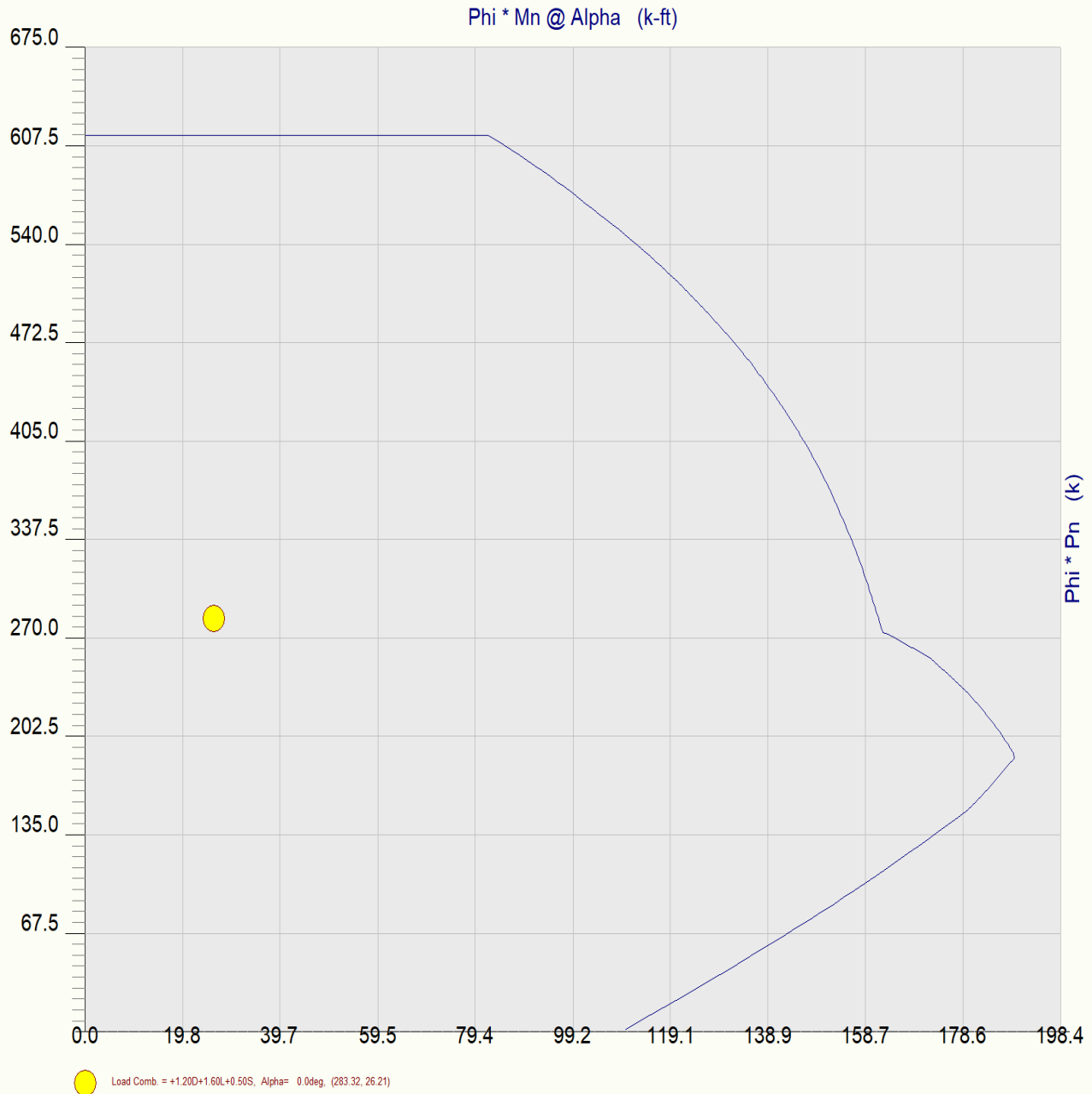
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Concrete Column P-M Interaction Diagram



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Concrete Column P-M Interaction Diagram



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Concrete Column P-M Interaction Diagram



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Concrete Column P-M Interaction Diagram



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Concrete Column P-M Interaction Diagram



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Concrete Column P-M Interaction Diagram



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Concrete Column P-M Interaction Diagram



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Concrete Column P-M Interaction Diagram



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DESCRIPTION: Sixth Floor Column

Concrete Column P-M Interaction Diagram



Concrete Column

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DESCRIPTION: Fifth Floor Column

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

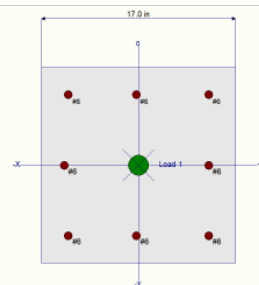
f'_c : Concrete 28 day strength = 4.0 ksi
 E = 3,605.0 ksi
Density = 150.0 pcf
 β = 0.850
 f_y - Main Rebar = 60.0 ksi
 E - Main Rebar = 29,000.0 ksi
Allow. Reinforcing Limits *ASTM A615 Bars Used*
Min. Reinf. = 1.0 %
Max. Reinf. = 8.0 %

Overall Column Height = 14.420 ft
End Fixity **Top & Bottom Pinned**
Brace condition for deflection (buckling) along columns :
X-X (width) axis :
Unbraced Length for buckling ABOUT Y-Y Axis = 14.420 ft, $K = 1.0$
Y-Y (depth) axis :
Unbraced Length for buckling ABOUT X-X Axis = 14.420 ft, $K = 1.0$

Column Cross Section

Column Dimensions : 17.0in Square Column, Column Edge to Rebar Edge Cover = 2.0in

Column Reinforcing : 4 - #6 bars @ corners,, 1 - #6 bars top & bottom between corner bars, 1 - #6 bars left & right between corner bars



Applied Loads

Entered loads are factored per load combinations specified by user.

Column self weight included : 4,341.02 lbs * Dead Load Factor

AXIAL LOADS . . .

Roof + Tower Loads: Axial Load at 14.420 ft above base, D = 52.650, LR = 2.990, L = 165.120, S = 4.480 k

DESIGN SUMMARY

Load Combination **+1.20D+1.60L+0.50S**
Location of max. above base **14.323 ft**
Maximum Stress Ratio 0.544 : 1
Ratio = $(P_u^2 + M_u^2)^{.5} / (\Phi P_n^2 + \Phi M_n^2)^{.5}$
 P_u = 334.821 k $\Phi * P_n$ = 614.55 k
 M_u-x = 0.0 k-ft $\Phi * M_n-x$ = 0.0 k-ft
 M_u-y = 30.971 k-ft $\Phi * M_n-y$ = 55.969 k-ft
 M_u Angle = 90.0 deg
 M_u at Angle = 30.971 k-ft ΦM_n at Angle = 56.998 k-ft

P_n & M_n values located at P_u-M_u vector intersection with capacity curve

Column Capacities . . .

P_{nmax} : Nominal Max. Compressive Axial Capacity **1,181.83 k**
 P_{nmin} : Nominal Min. Tension Axial Capacity **k**
 ΦP_n , max : Usable Compressive Axial Capacity **614.55 k**
 ΦP_n , min : Usable Tension Axial Capacity **k**

Maximum SERVICE Load Reactions . .

Top along Y-Y **0.0 k** Bottom along Y-Y **0.0 k**
Top along X-X **0.0 k** Bottom along X-X **0.0 k**

Maximum SERVICE Load Deflections . . .

Along Y-Y **0.0 in** at **0.0 ft** above base
for load combination :
Along X-X **0.0 in** at **0.0 ft** above base
for load combination :

General Section Information . $\phi = 0.650$ $\beta = 0.850$ $\theta = 0.80$

ρ : % Reinforcing **1.218 %** Rebar % Ok
Reinforcing Area **3.520 in²**
Concrete Area **289.0 in²**

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base ft	Axial Load k		Bending Analysis k-ft						Utilization	
	X-X	Y-Y		P_u	$\Phi * P_n$	δx	$\delta x * M_{ux}$	δy	$\delta y * M_{uy}$	Alpha (deg)	δM_u	ΦM_n	Ratio
+1.40D		M2,min	14.32	79.79	614.55			1.000	7.38	90.000	7.38	57.00	0.130
+1.40D	M2,min		14.32	79.79	614.55	1.000	7.38			0.000	7.38	57.06	0.130
+1.20D+0.50Lr+1.60L		M2,min	14.32	334.08	614.55			1.000	30.90	90.000	30.90	57.00	0.543

Concrete Column

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DESCRIPTION: Fifth Floor Column

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base ft	Axial Load k		Bending Analysis k-ft								Utilization	
	X-X	Y-Y		Pu	ϕ * Pn	δ x	δ x * Mu _x	δ y	δ y * Mu _y	Alpha (deg)	δ Mu	ϕ Mn	Ratio		
+1.20D+0.50Lr+1.60L	M2,min		14.32	334.08	614.55	1.000	30.90			0.000	30.90	57.06	0.542		
+1.20D+1.60L+0.50S		M2,min	14.32	334.82	614.55			1.000	30.97	90.000	30.97	57.00	0.544		
+1.20D+1.60L+0.50S	M2,min		14.32	334.82	614.55	1.000	30.97			0.000	30.97	57.06	0.544		
+1.20D+1.60Lr+0.50L		M2,min	14.32	155.73	614.55			1.000	14.41	90.000	14.41	57.00	0.253		
+1.20D+1.60Lr+0.50L	M2,min		14.32	155.73	614.55	1.000	14.41			0.000	14.41	57.06	0.253		
+1.20D+1.60Lr		M2,min	14.32	73.17	614.55			1.000	6.77	90.000	6.77	57.00	0.119		
+1.20D+1.60Lr	M2,min		14.32	73.17	614.55	1.000	6.77			0.000	6.77	57.06	0.119		
+1.20D+0.50L+1.60S		M2,min	14.32	158.12	614.55			1.000	14.63	90.000	14.63	57.00	0.257		
+1.20D+0.50L+1.60S	M2,min		14.32	158.12	614.55	1.000	14.63			0.000	14.63	57.06	0.257		
+1.20D+1.60S		M2,min	14.32	75.56	614.55			1.000	6.99	90.000	6.99	57.00	0.123		
+1.20D+1.60S	M2,min		14.32	75.56	614.55	1.000	6.99			0.000	6.99	57.06	0.123		
+1.20D+0.50Lr+0.50L		M2,min	14.32	152.44	614.55			1.000	14.10	90.000	14.10	57.00	0.248		
+1.20D+0.50Lr+0.50L	M2,min		14.32	152.44	614.55	1.000	14.10			0.000	14.10	57.06	0.248		
+1.20D+0.50L+0.50S		M2,min	14.32	153.19	614.55			1.000	14.17	90.000	14.17	57.00	0.249		
+1.20D+0.50L+0.50S	M2,min		14.32	153.19	614.55	1.000	14.17			0.000	14.17	57.06	0.249		
+1.20D+0.50L+0.70S		M2,min	14.32	154.09	614.55			1.000	14.25	90.000	14.25	57.00	0.250		
+1.20D+0.50L+0.70S	M2,min		14.32	154.09	614.55	1.000	14.25			0.000	14.25	57.06	0.250		
+0.90D		M2,min	14.32	51.29	614.55			1.000	4.74	90.000	4.74	57.00	0.083		
+0.90D	M2,min		14.32	51.29	614.55	1.000	4.74			0.000	4.74	57.06	0.083		

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction @ Base	My - End Moments k-ft		Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top	@ Base	@ Top
D Only						56.991				
+D+L						222.111				
+D+Lr						59.981				
+D+S						61.471				
+D+0.750Lr+0.750L						183.074				
+D+0.750L+0.750S						184.191				
+0.60D						34.195				
Lr Only						2.990				
L Only						165.120				
S Only						4.480				

Maximum Moment Reactions

Note: Only non-zero reactions are listed.

Load Combination	Moment About X-X Axis			Moment About Y-Y Axis		
	@ Base	@ Top		@ Base	@ Top	
D Only			k-ft			k-ft
+D+L			k-ft			k-ft
+D+Lr			k-ft			k-ft
+D+S			k-ft			k-ft
+D+0.750Lr+0.750L			k-ft			k-ft
+D+0.750L+0.750S			k-ft			k-ft
+0.60D			k-ft			k-ft
Lr Only			k-ft			k-ft
L Only			k-ft			k-ft
S Only			k-ft			k-ft

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
D Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+L	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+Lr	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+S	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750L+0.750S	0.0000	in	0.000	ft	0.000	in	0.000	ft
+0.60D	0.0000	in	0.000	ft	0.000	in	0.000	ft

Concrete Column

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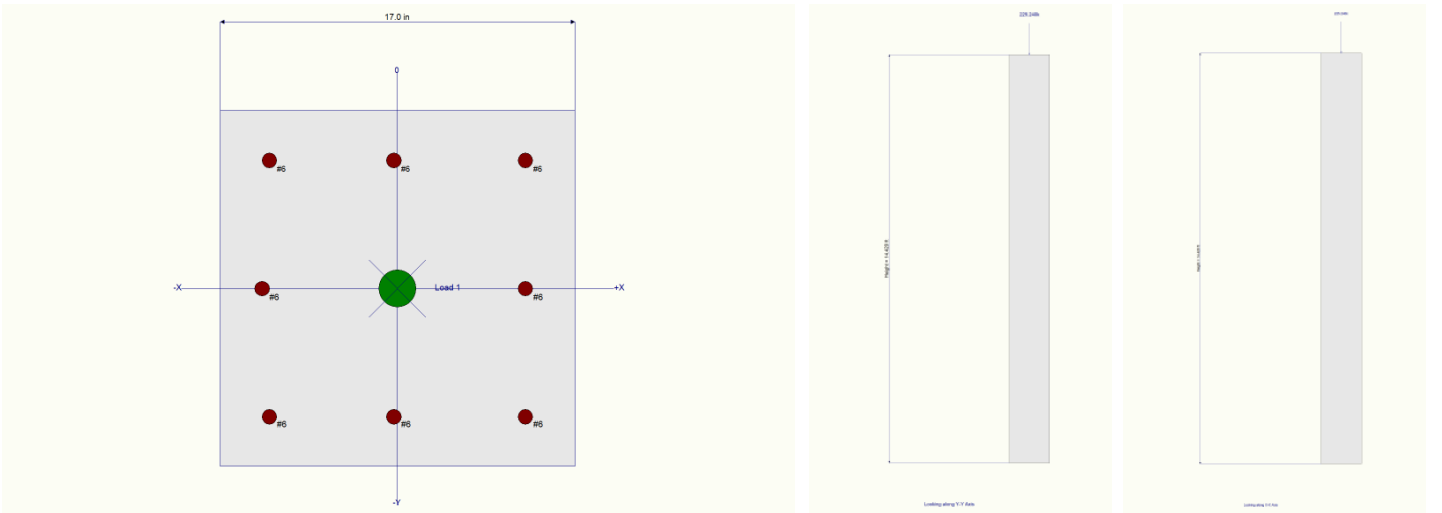
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DESCRIPTION: Fifth Floor Column

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
Lr Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
L Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
S Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

Sketches



Interaction Diagrams

Concrete Column

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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram



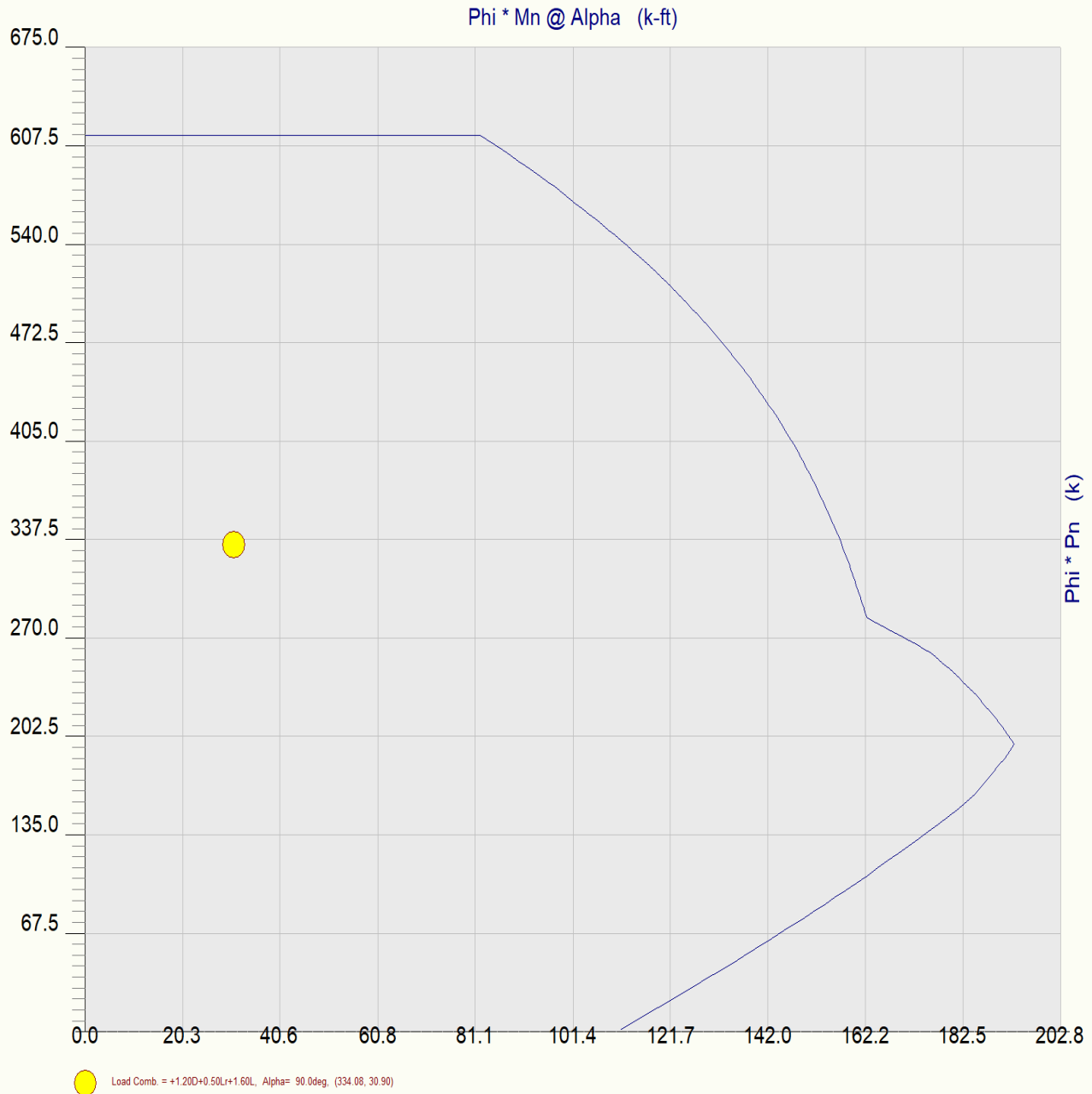
Concrete Column

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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram



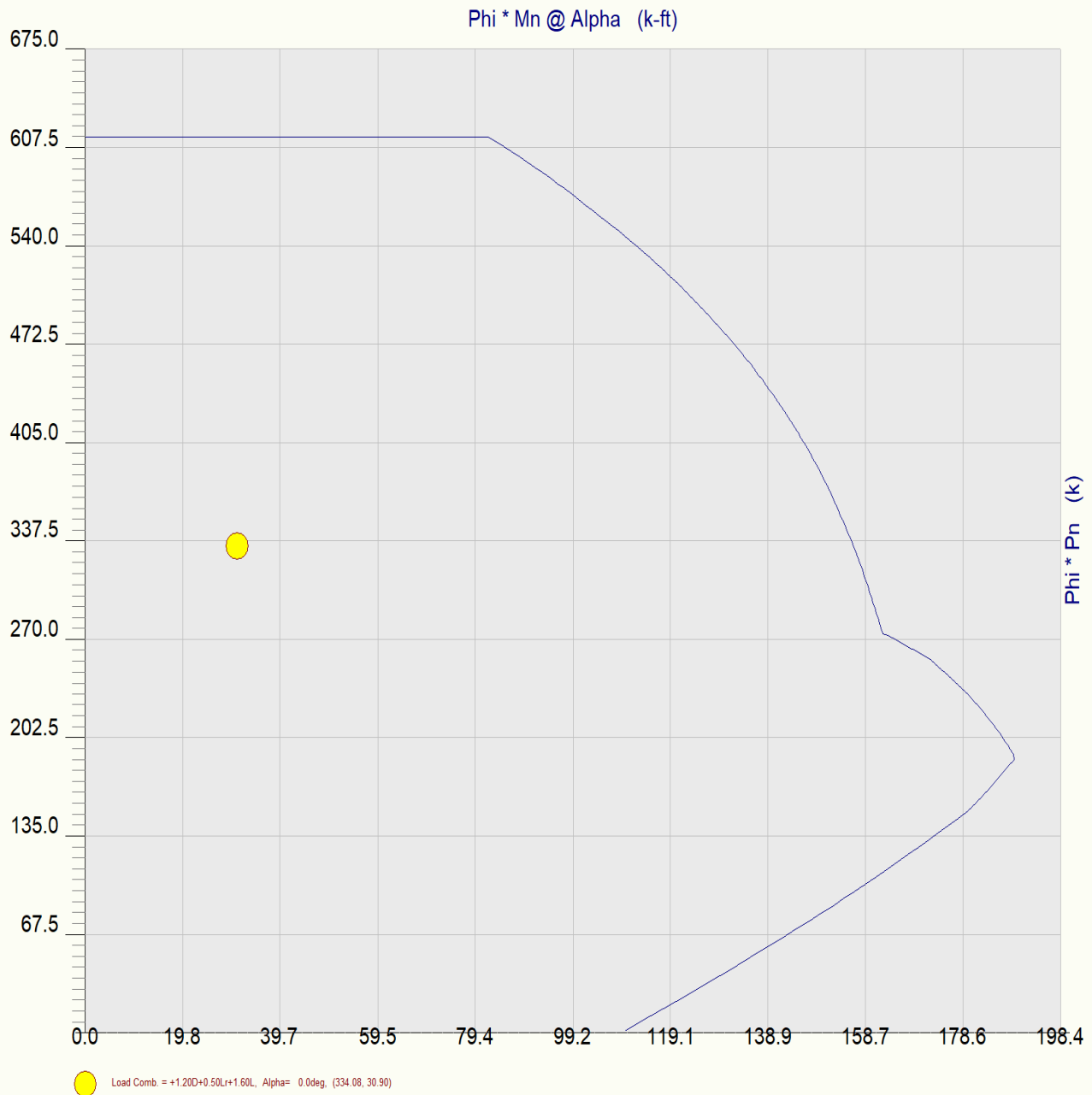
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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram



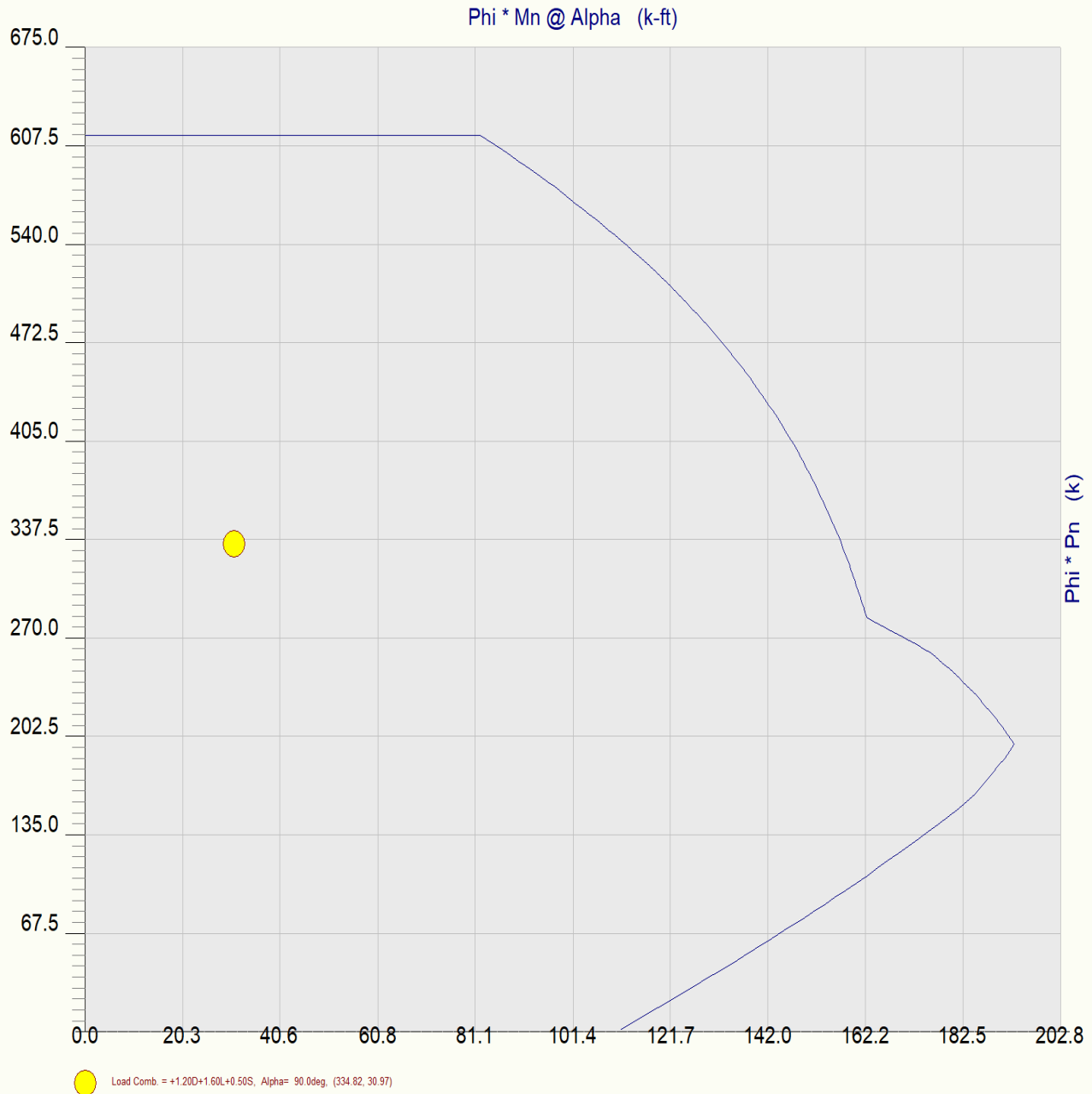
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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram



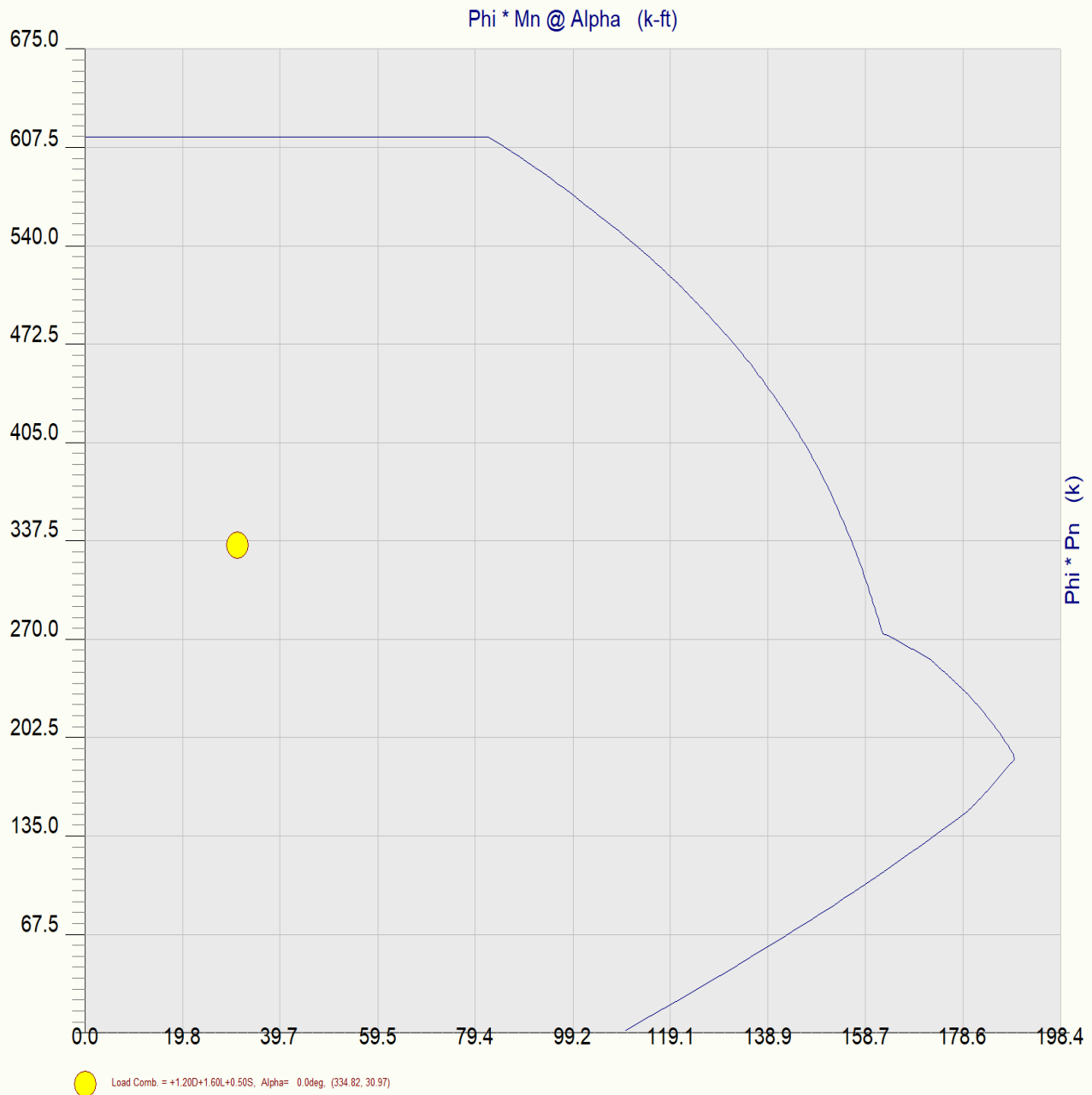
Concrete Column

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Concrete Column P-M Interaction Diagram



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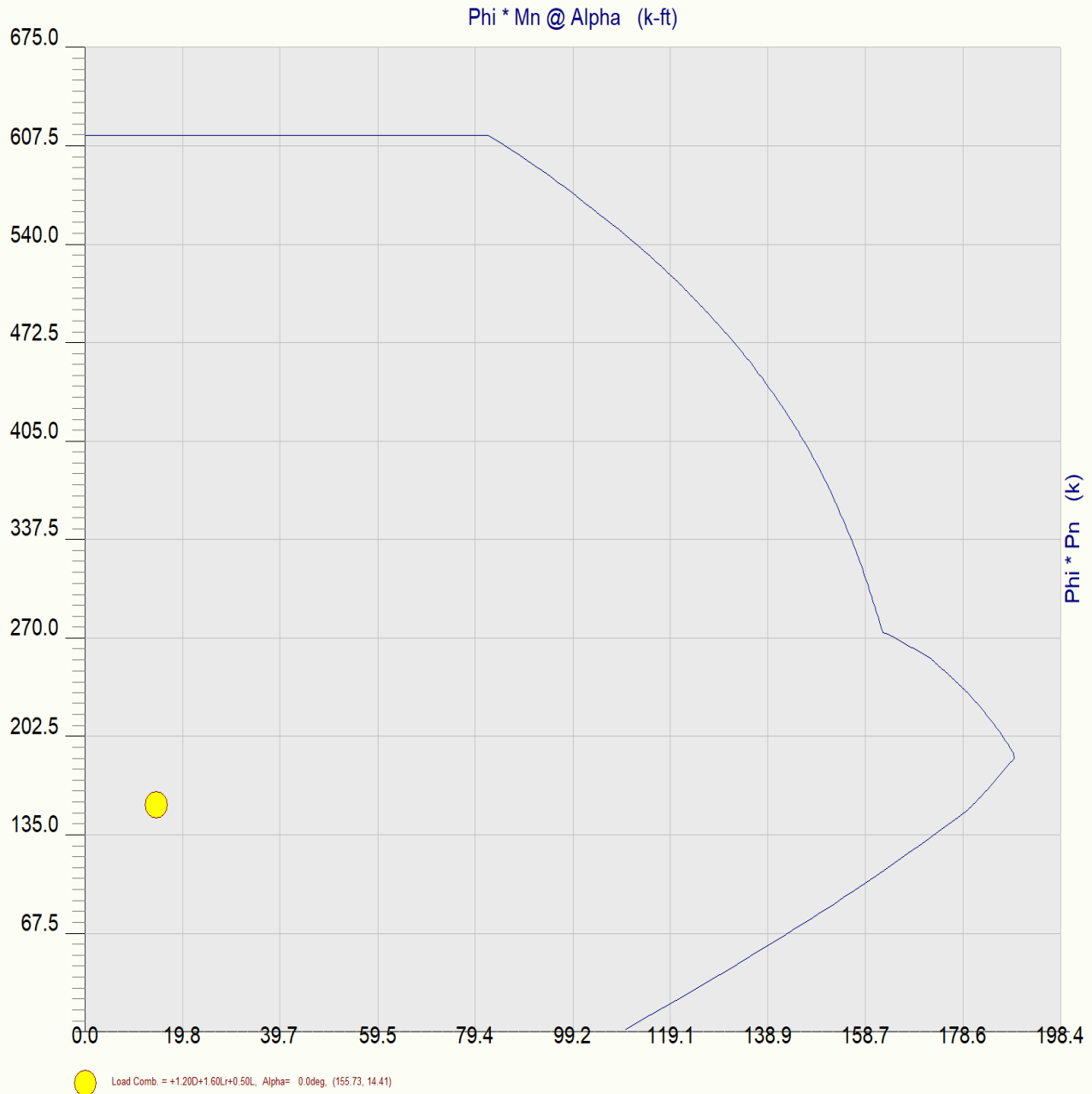
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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram



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Concrete Column P-M Interaction Diagram



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Concrete Column P-M Interaction Diagram



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Concrete Column P-M Interaction Diagram



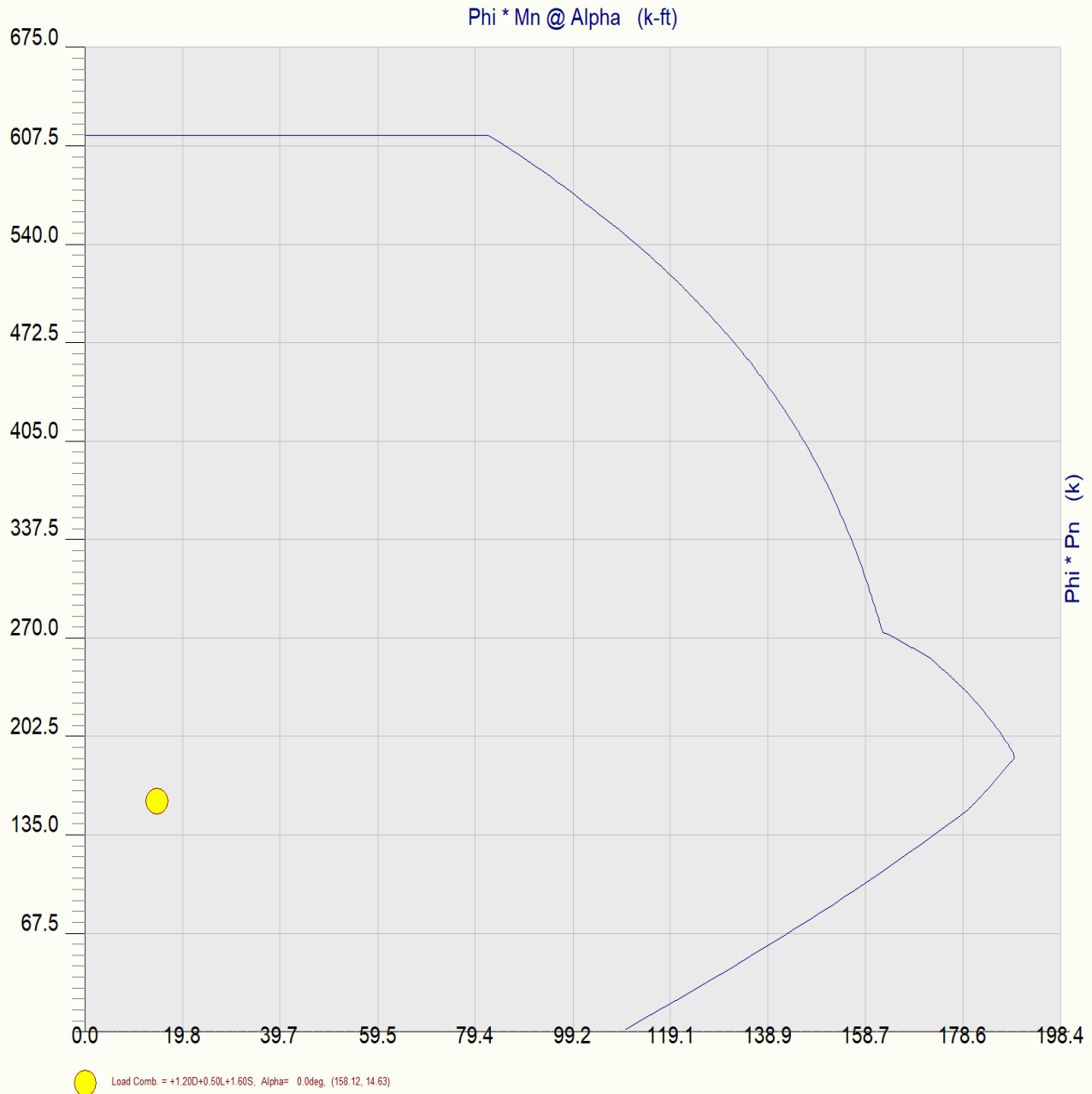
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Concrete Column P-M Interaction Diagram



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Concrete Column P-M Interaction Diagram



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Concrete Column P-M Interaction Diagram



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Concrete Column P-M Interaction Diagram



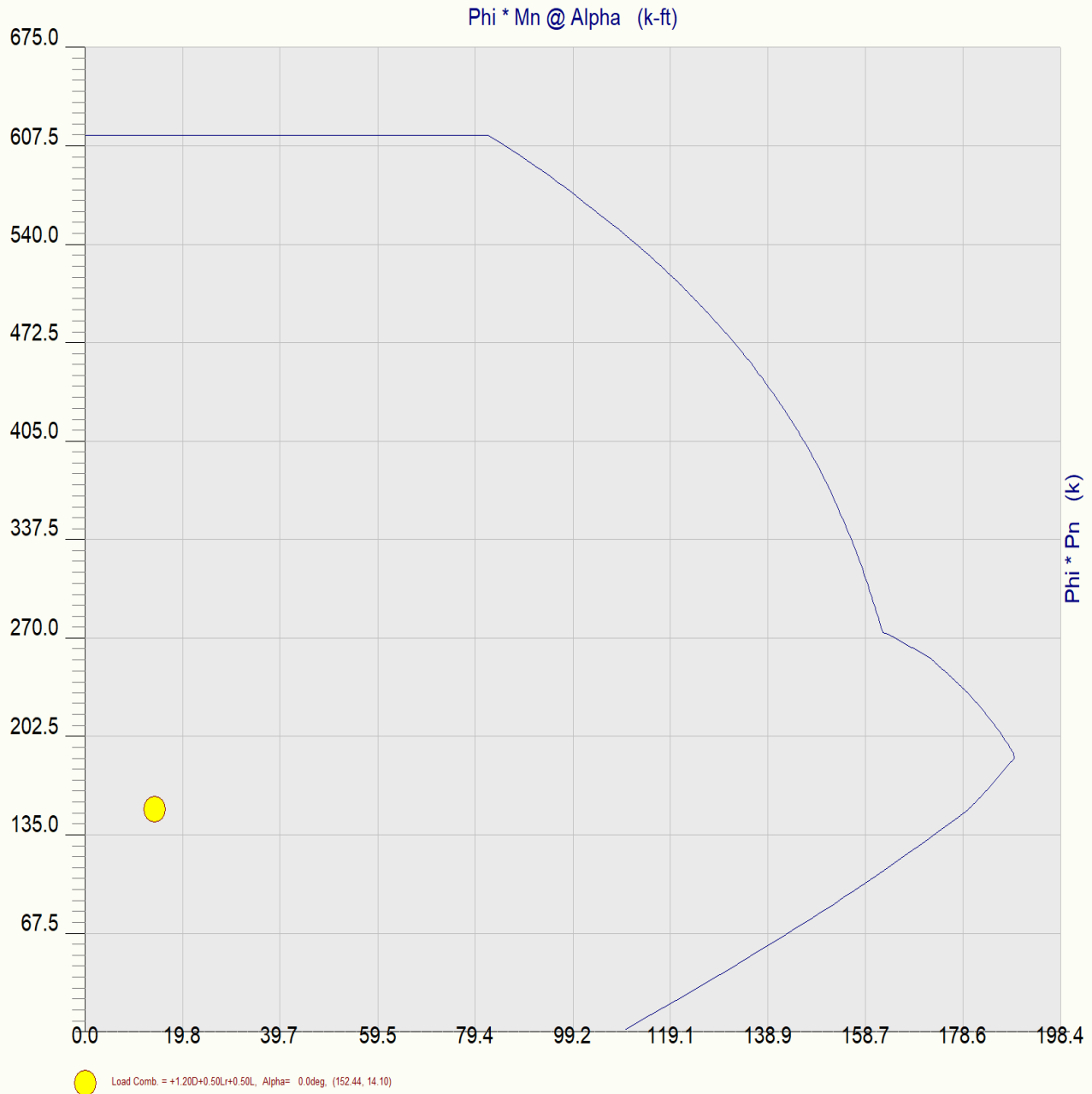
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DESCRIPTION: **Fifth Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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DESCRIPTION: Fourth Floor Column

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

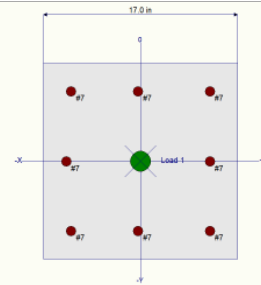
fc : Concrete 28 day strength = 4.0 ksi
E = 3,605.0 ksi
Density = 150.0 pcf
 β = 0.850
fy - Main Rebar = 60.0 ksi
E - Main Rebar = 29,000.0 ksi
Allow. Reinforcing Limits *ASTM A615 Bars Used*
Min. Reinf. = 1.0 %
Max. Reinf. = 8.0 %

Overall Column Height = 14.420 ft
End Fixity **Top & Bottom Pinned**
Brace condition for deflection (buckling) along columns :
X-X (width) axis :
Unbraced Length for buckling ABOUT Y-Y Axis = 14.420 ft, K = 1.0
Y-Y (depth) axis :
Unbraced Length for buckling ABOUT X-X Axis = 14.420 ft, K = 1.0

Column Cross Section

Column Dimensions : 17.0in Square Column, Column Edge to Rebar Edge Cover = 2.0in

Column Reinforcing : 4 - #7 bars @ corners,, 1 - #7 bars top & bottom between corner bars, 1 - #7 bars left & right between corner bars



Entered loads are factored per load combinations specified by user.

Applied Loads

Column selfweight included : 4,341.02 lbs * Dead Load Factor
AXIAL LOADS ...
Roof + Tower Loads: Axial Load at 14.420 ft above base, D = 75.680, LR = 2.990, L = 180.060, S = 4.480 k

DESIGN SUMMARY

Load Combination **+1.20D+1.60L+0.50S**
Location of max. above base **14.323 ft**
Maximum Stress Ratio 0.590 : 1
Ratio = $(P_u^2 + M_u^2)^{0.5} / (\Phi P_n^2 + \Phi M_n^2)^{0.5}$
Pu = **386.361 k** $\Phi * P_n$ = **652.23 k**
Mu-x = **0.0 k-ft** $\Phi * M_n-x$ = **0.0 k-ft**
Mu-y = **35.738 k-ft** $\Phi * M_n-y$ = **59.753 k-ft**
Mu Angle = **90.0 deg**
Mu at Angle = **35.738 k-ft** ΦM_n at Angle = **60.858 k-ft**

Pn & Mn values located at Pu-Mu vector intersection with capacity curve

Column Capacities ...

Pnmax : Nominal Max. Compressive Axial Capacity **1,254.28 k**
Pnmin : Nominal Min. Tension Axial Capacity **k**
 ΦP_n , max : Usable Compressive Axial Capacity **652.23 k**
 ΦP_n , min : Usable Tension Axial Capacity **k**

Maximum SERVICE Load Reactions ..

Top along Y-Y **0.0 k** Bottom along Y-Y **0.0 k**
Top along X-X **0.0 k** Bottom along X-X **0.0 k**

Maximum SERVICE Load Deflections ...

Along Y-Y **0.0 in** at **0.0 ft** above base
for load combination :
Along X-X **0.0 in** at **0.0 ft** above base
for load combination :

General Section Information $\phi = 0.650$ $\beta = 0.850$ $\theta = 0.80$

ρ : % Reinforcing **1.661 %** Rebar % Ok
Reinforcing Area **4.80 in²**
Concrete Area **289.0 in²**

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist from base ft	Axial Load k				Bending Analysis k-ft				Utilization	
	X-X	Y-Y		Pu	ϕ * Pn	δ x	δ x * Mux	δ y	δ y * Muy	Alpha (deg)	δ Mu	ϕ Mn	Ratio
+1.40D	M2,min	M2,min	14.32	112.03	652.23			1.000	10.36	90.000	10.36	60.86	0.171
+1.40D			14.32	112.03	652.23	1.000	10.36			0.000	10.36	60.91	0.171
+1.20D+0.50Lr+1.60L		M2,min	14.32	385.62	652.23			1.000	35.67	90.000	35.67	60.86	0.588

Concrete Column

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DESCRIPTION: Fourth Floor Column

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist from base ft	Axial Load k		Bending Analysis k-ft								Utilization	
	X-X	Y-Y		Pu	$\phi * P_n$	δx	$\delta x * M_{ux}$	δy	$\delta y * M_{uy}$	Alpha (deg)	δM_u	ϕM_n	Ratio		
+1.20D+0.50Lr+1.60L	M2,min		14.32	385.62	652.23	1.000	35.67			0.000	35.67	60.91	0.588		
+1.20D+1.60L+0.50S		M2,min	14.32	386.36	652.23			1.000	35.74	90.000	35.74	60.86	0.590		
+1.20D+1.60L+0.50S	M2,min		14.32	386.36	652.23	1.000	35.74			0.000	35.74	60.91	0.589		
+1.20D+1.60Lr+0.50L		M2,min	14.32	190.84	652.23			1.000	17.65	90.000	17.65	60.86	0.291		
+1.20D+1.60Lr+0.50L	M2,min		14.32	190.84	652.23	1.000	17.65			0.000	17.65	60.91	0.291		
+1.20D+1.60Lr		M2,min	14.32	100.81	652.23			1.000	9.32	90.000	9.32	60.86	0.154		
+1.20D+1.60Lr	M2,min		14.32	100.81	652.23	1.000	9.32			0.000	9.32	60.91	0.154		
+1.20D+0.50L+1.60S		M2,min	14.32	193.22	652.23			1.000	17.87	90.000	17.87	60.86	0.295		
+1.20D+0.50L+1.60S	M2,min		14.32	193.22	652.23	1.000	17.87			0.000	17.87	60.91	0.295		
+1.20D+1.60S		M2,min	14.32	103.19	652.23			1.000	9.55	90.000	9.55	60.86	0.157		
+1.20D+1.60S	M2,min		14.32	103.19	652.23	1.000	9.55			0.000	9.55	60.91	0.157		
+1.20D+0.50Lr+0.50L		M2,min	14.32	187.55	652.23			1.000	17.35	90.000	17.35	60.86	0.286		
+1.20D+0.50Lr+0.50L	M2,min		14.32	187.55	652.23	1.000	17.35			0.000	17.35	60.91	0.286		
+1.20D+0.50L+0.50S		M2,min	14.32	188.30	652.23			1.000	17.42	90.000	17.42	60.86	0.287		
+1.20D+0.50L+0.50S	M2,min		14.32	188.30	652.23	1.000	17.42			0.000	17.42	60.91	0.287		
+1.20D+0.50L+0.70S		M2,min	14.32	189.19	652.23			1.000	17.50	90.000	17.50	60.86	0.289		
+1.20D+0.50L+0.70S	M2,min		14.32	189.19	652.23	1.000	17.50			0.000	17.50	60.91	0.289		
+0.90D		M2,min	14.32	72.02	652.23			1.000	6.66	90.000	6.66	60.86	0.110		
+0.90D	M2,min		14.32	72.02	652.23	1.000	6.66			0.000	6.66	60.91	0.110		

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top		@ Base	@ Top
D Only						80.021					
+D+L						260.081					
+D+Lr						83.011					
+D+S						84.501					
+D+0.750Lr+0.750L						217.309					
+D+0.750L+0.750S						218.426					
+0.60D						48.013					
Lr Only						2.990					
L Only						180.060					
S Only						4.480					

Maximum Moment Reactions

Note: Only non-zero reactions are listed.

Load Combination	Moment About X-X Axis			Moment About Y-Y Axis		
	@ Base	@ Top		@ Base	@ Top	
D Only			k-ft			k-ft
+D+L			k-ft			k-ft
+D+Lr			k-ft			k-ft
+D+S			k-ft			k-ft
+D+0.750Lr+0.750L			k-ft			k-ft
+D+0.750L+0.750S			k-ft			k-ft
+0.60D			k-ft			k-ft
Lr Only			k-ft			k-ft
L Only			k-ft			k-ft
S Only			k-ft			k-ft

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
				ft				ft
D Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+L	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+Lr	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+S	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750L+0.750S	0.0000	in	0.000	ft	0.000	in	0.000	ft
+0.60D	0.0000	in	0.000	ft	0.000	in	0.000	ft

Concrete Column

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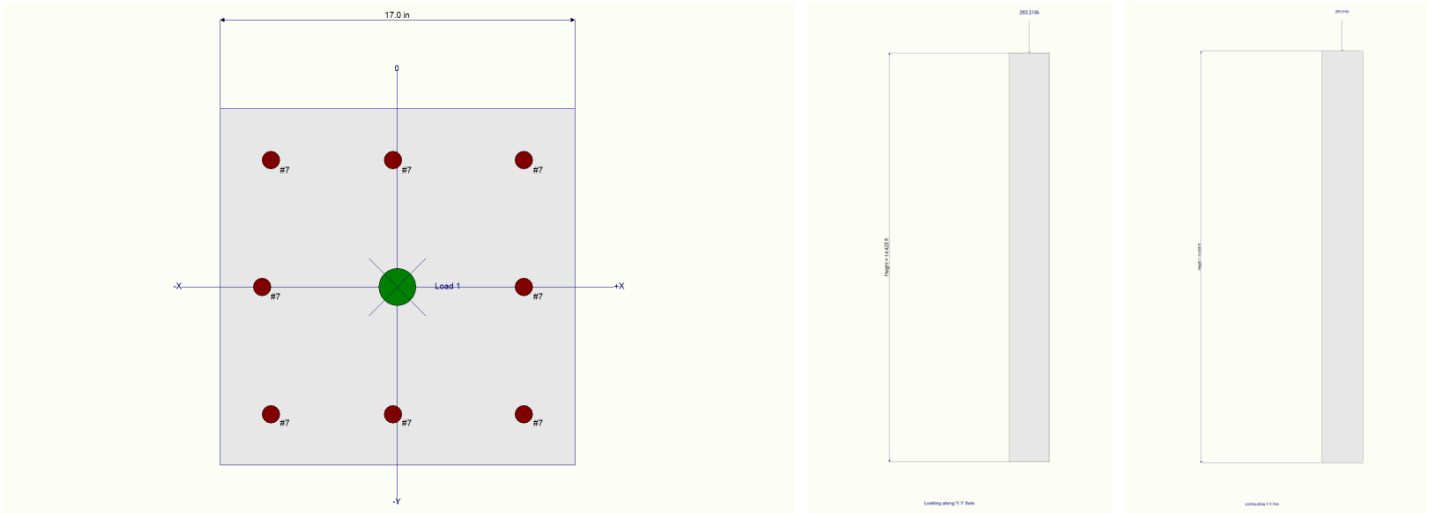
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DESCRIPTION: **Fourth Floor Column**

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
Lr Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
L Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
S Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

Sketches



Interaction Diagrams

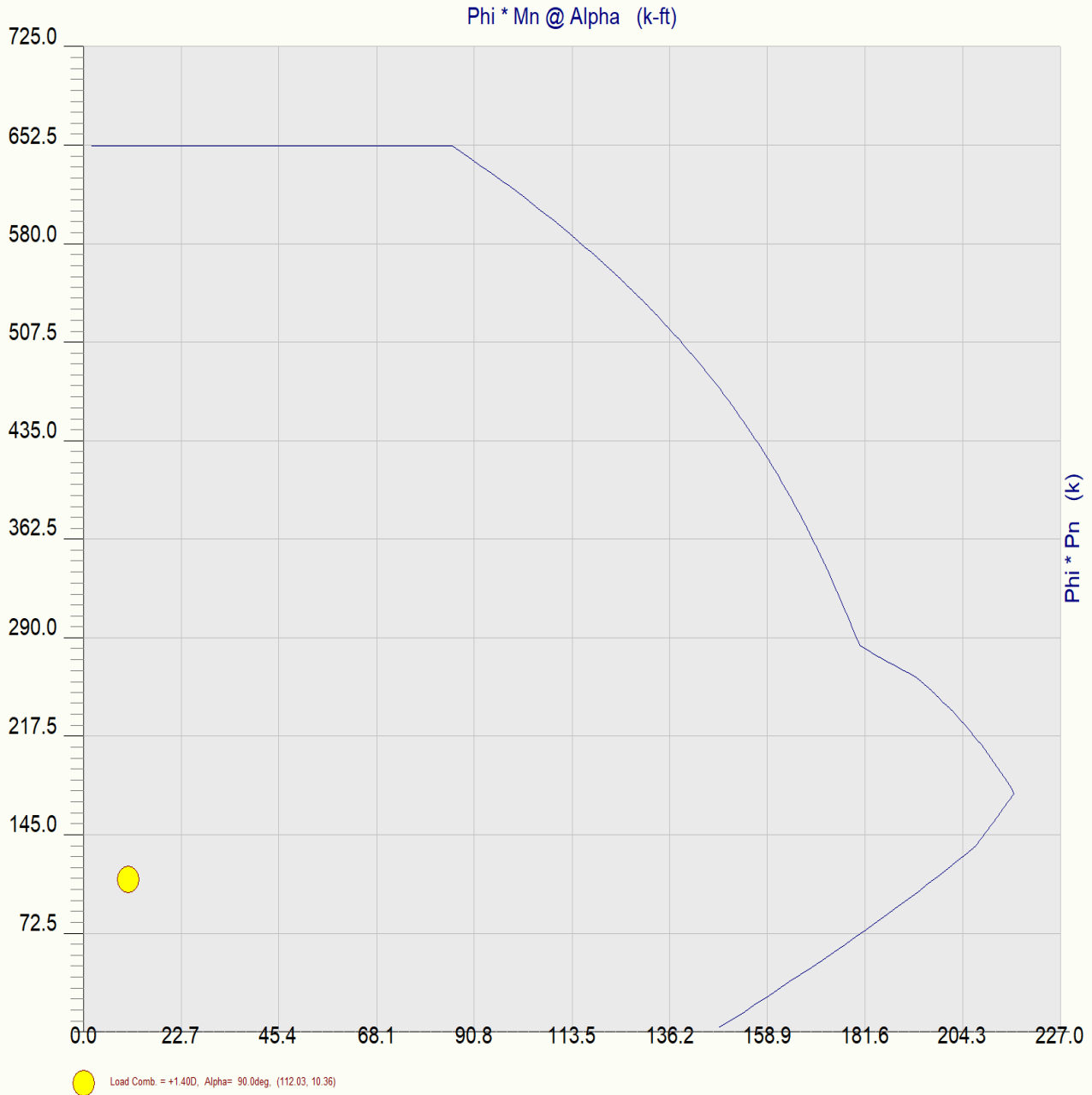
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DESCRIPTION: **Fourth Floor Column**

Concrete Column P-M Interaction Diagram



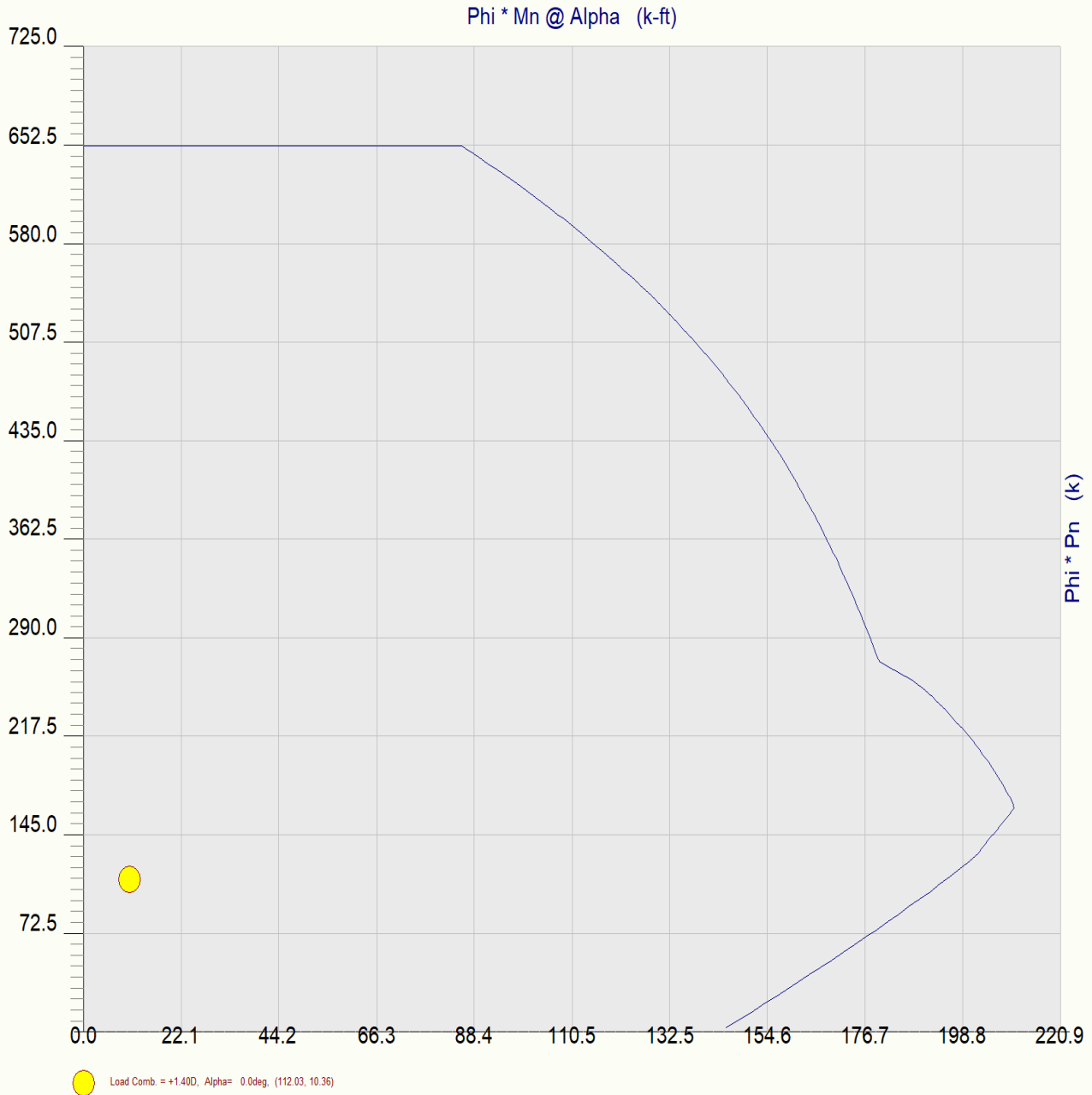
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Concrete Column P-M Interaction Diagram



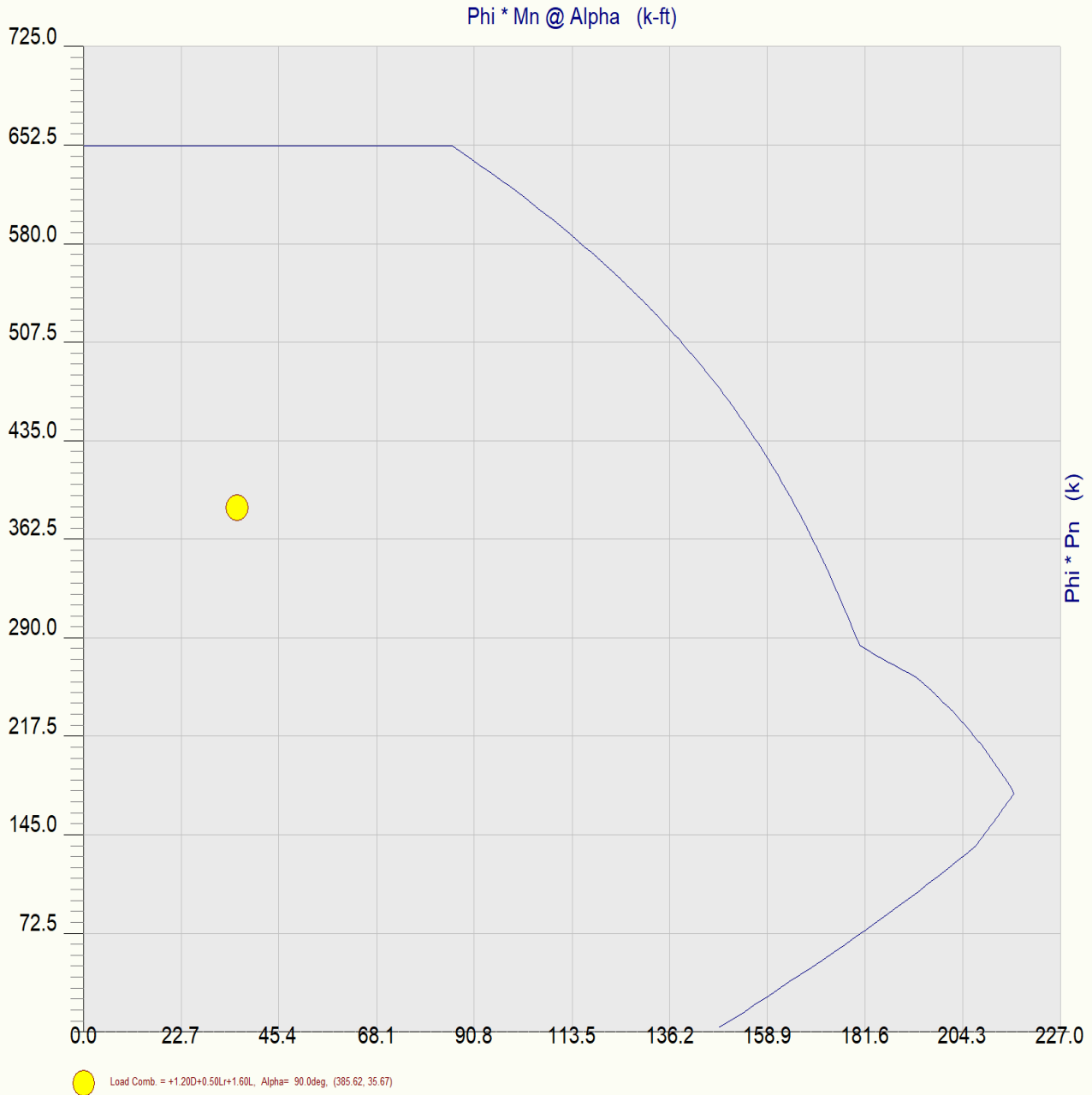
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Concrete Column P-M Interaction Diagram



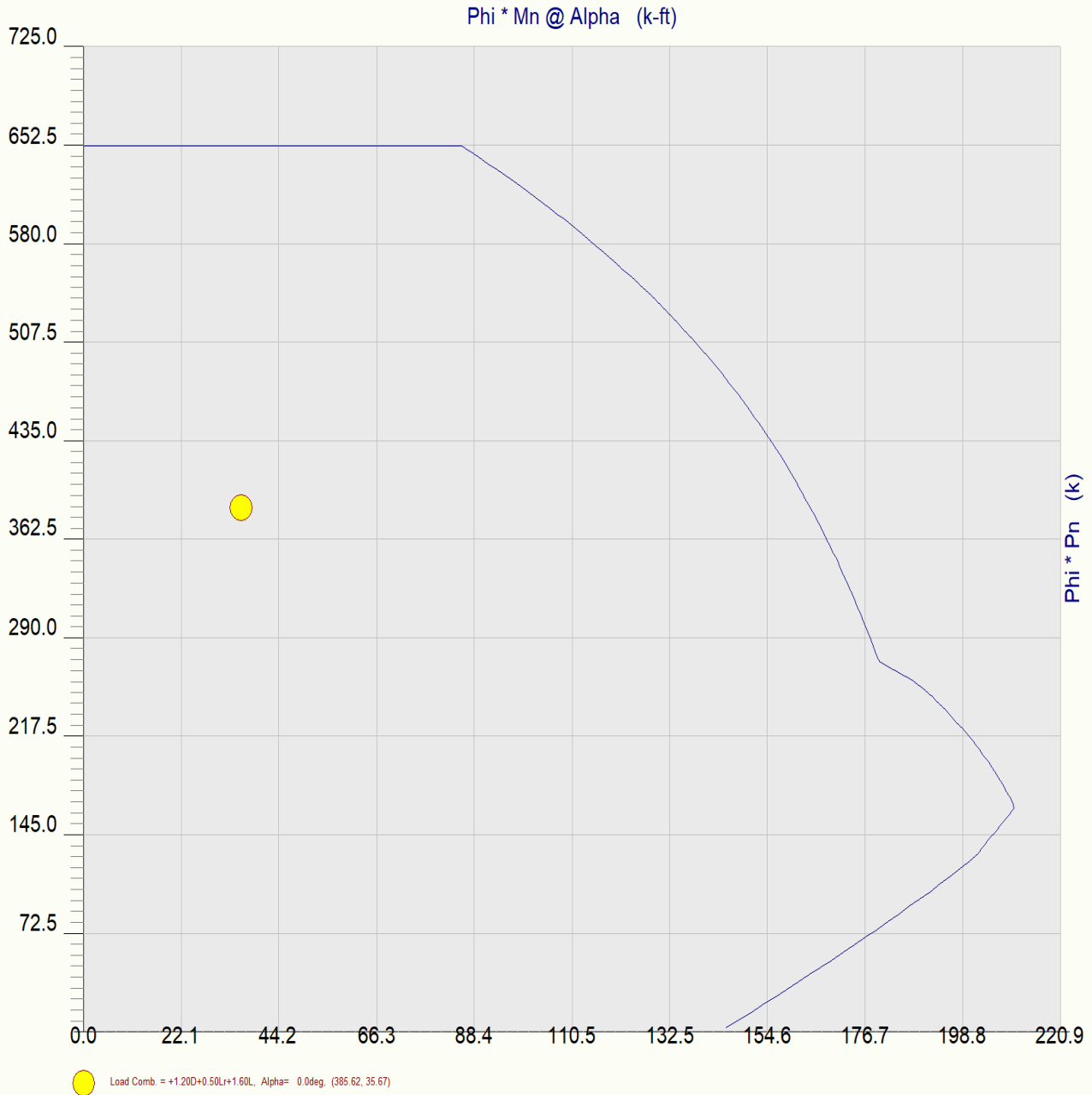
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Concrete Column P-M Interaction Diagram



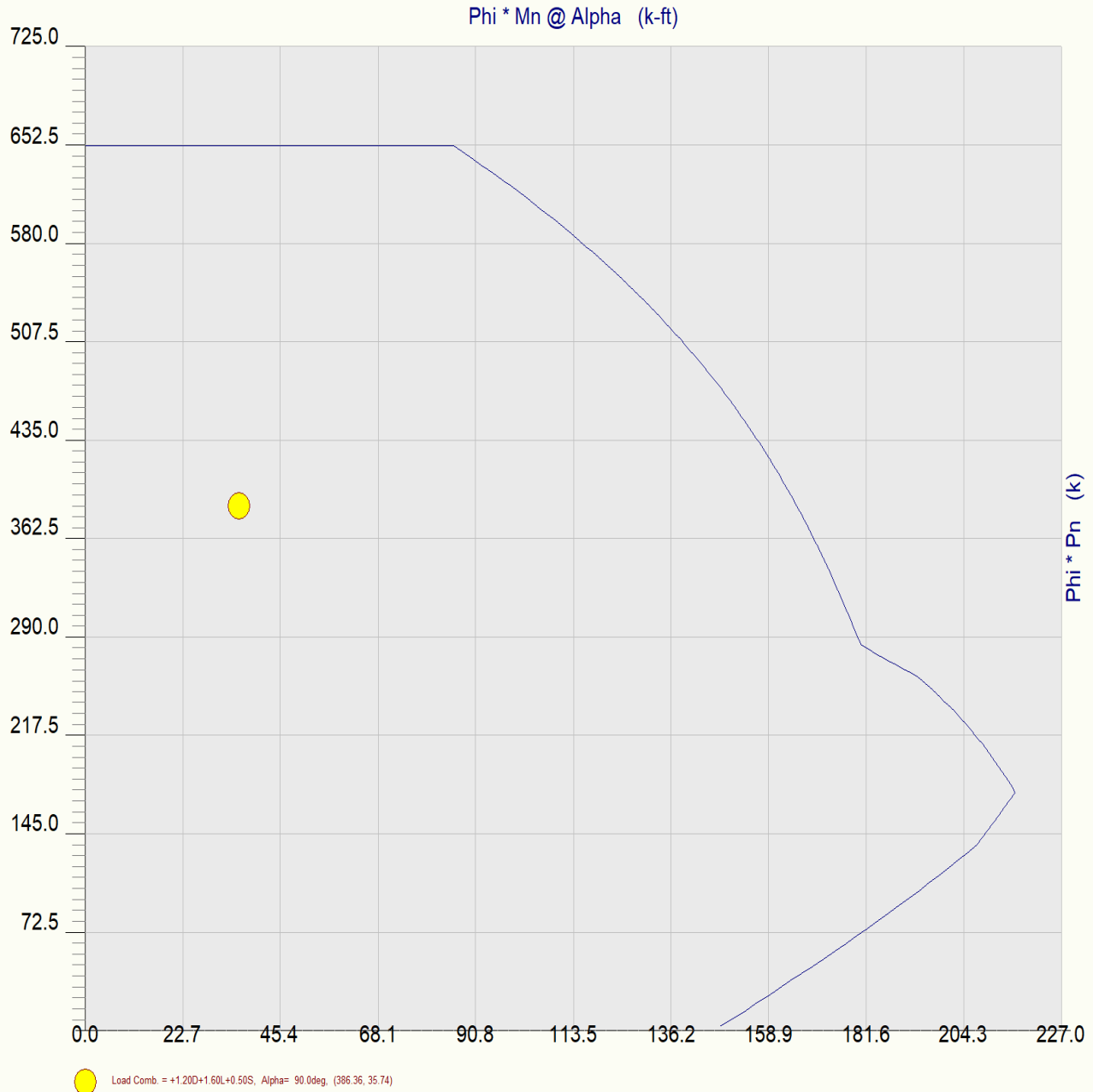
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Concrete Column P-M Interaction Diagram



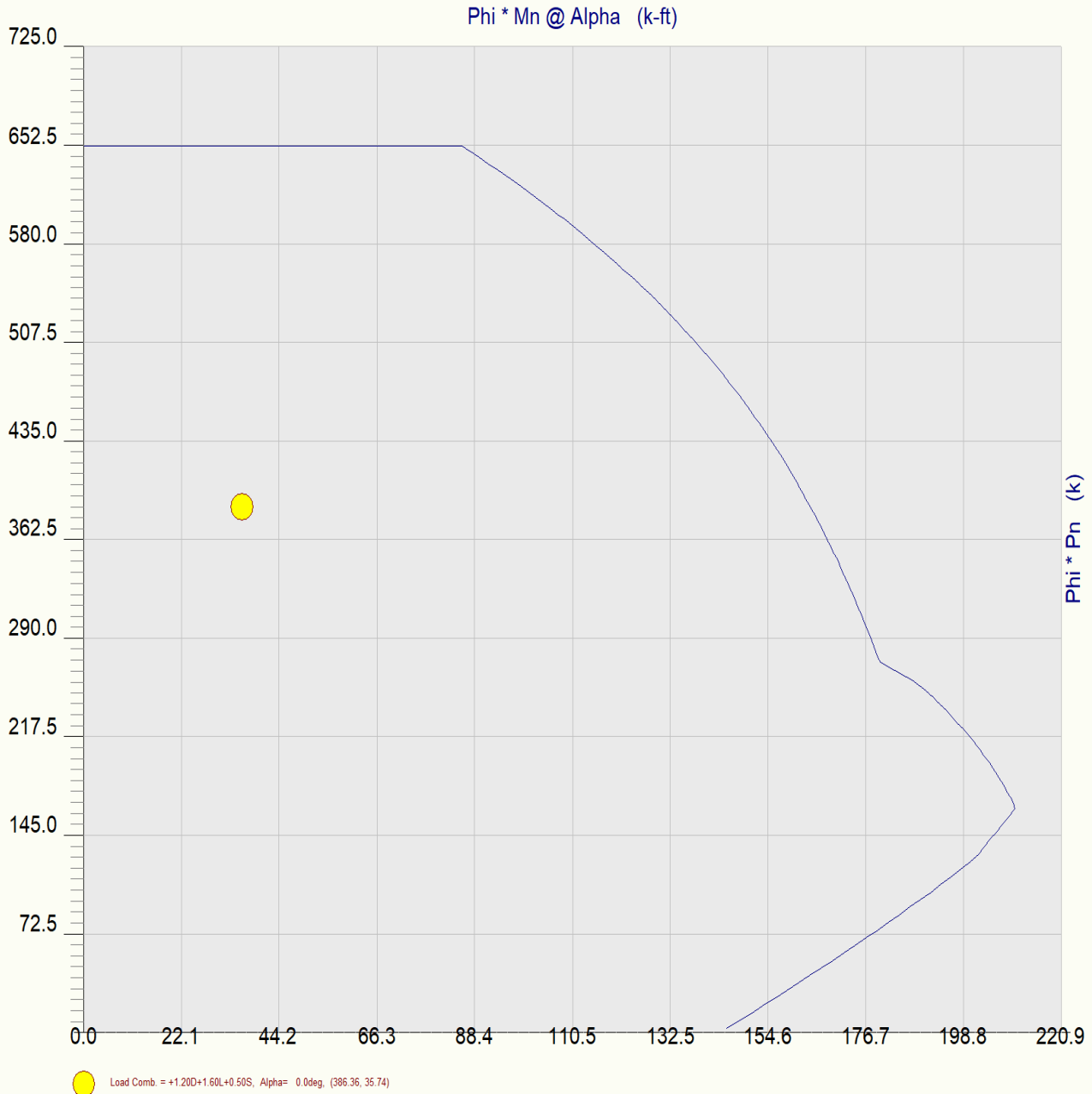
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Concrete Column P-M Interaction Diagram



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Concrete Column P-M Interaction Diagram



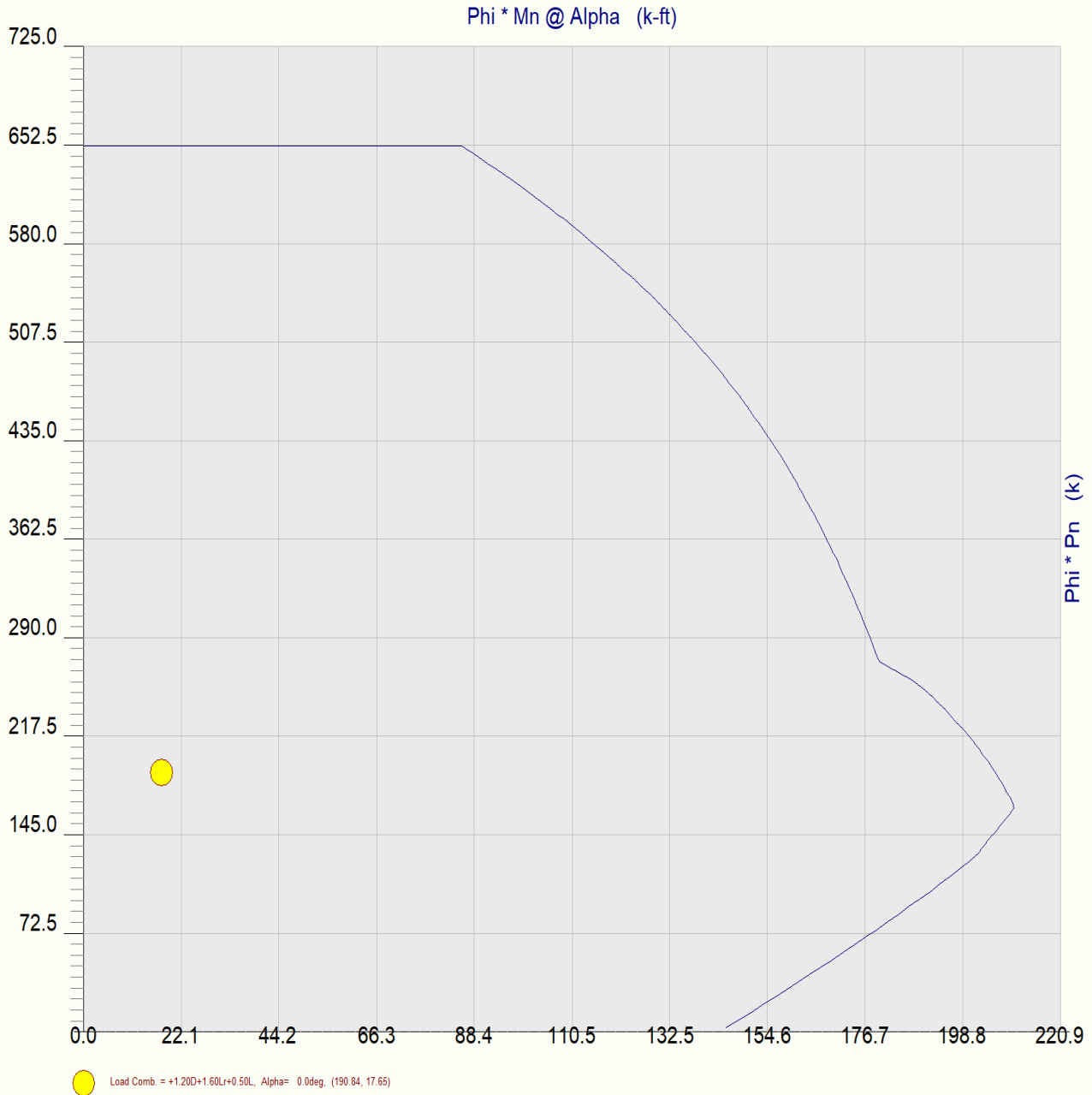
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Concrete Column P-M Interaction Diagram



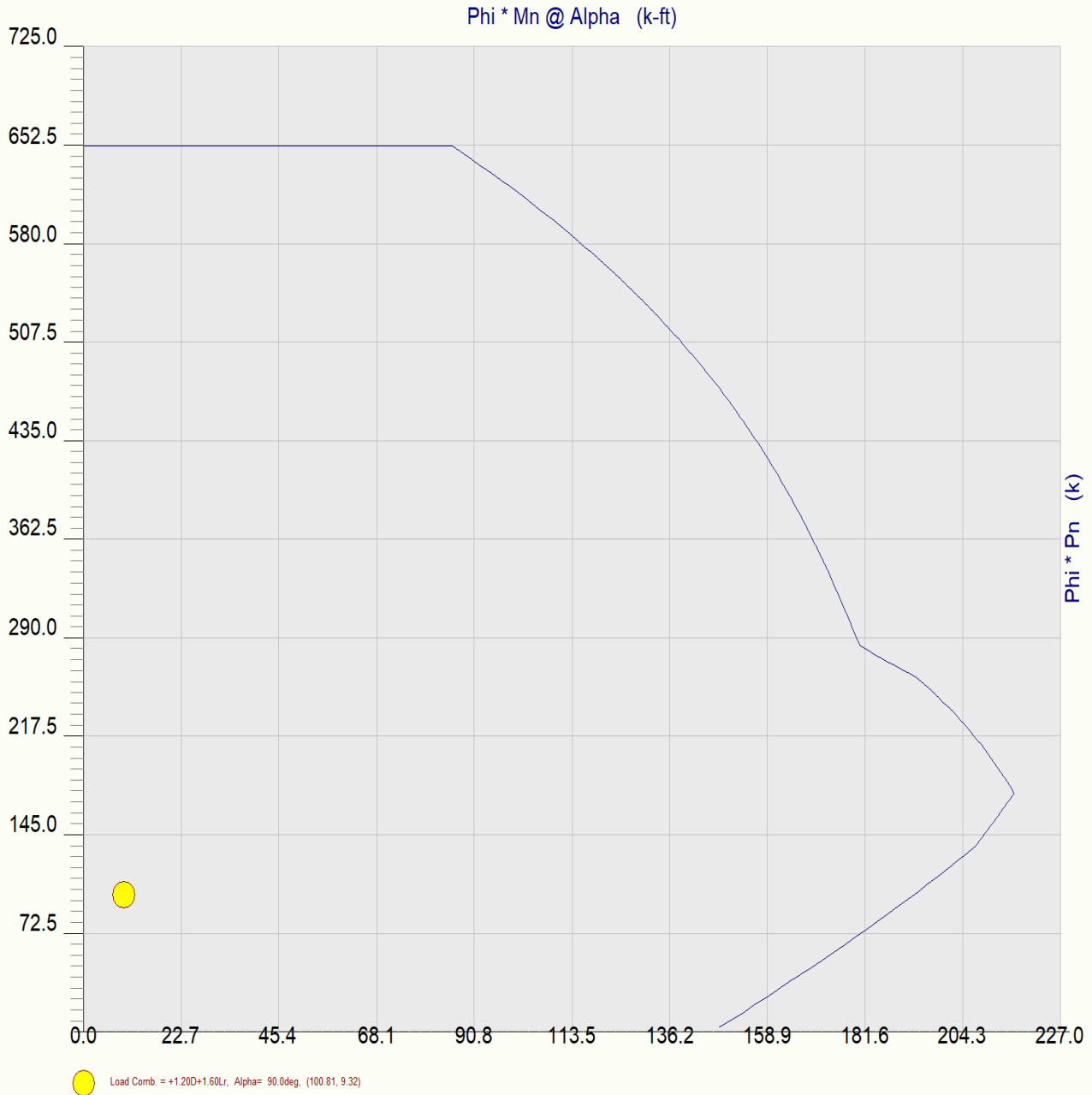
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Concrete Column P-M Interaction Diagram



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DESCRIPTION: **Fourth Floor Column**

Concrete Column P-M Interaction Diagram



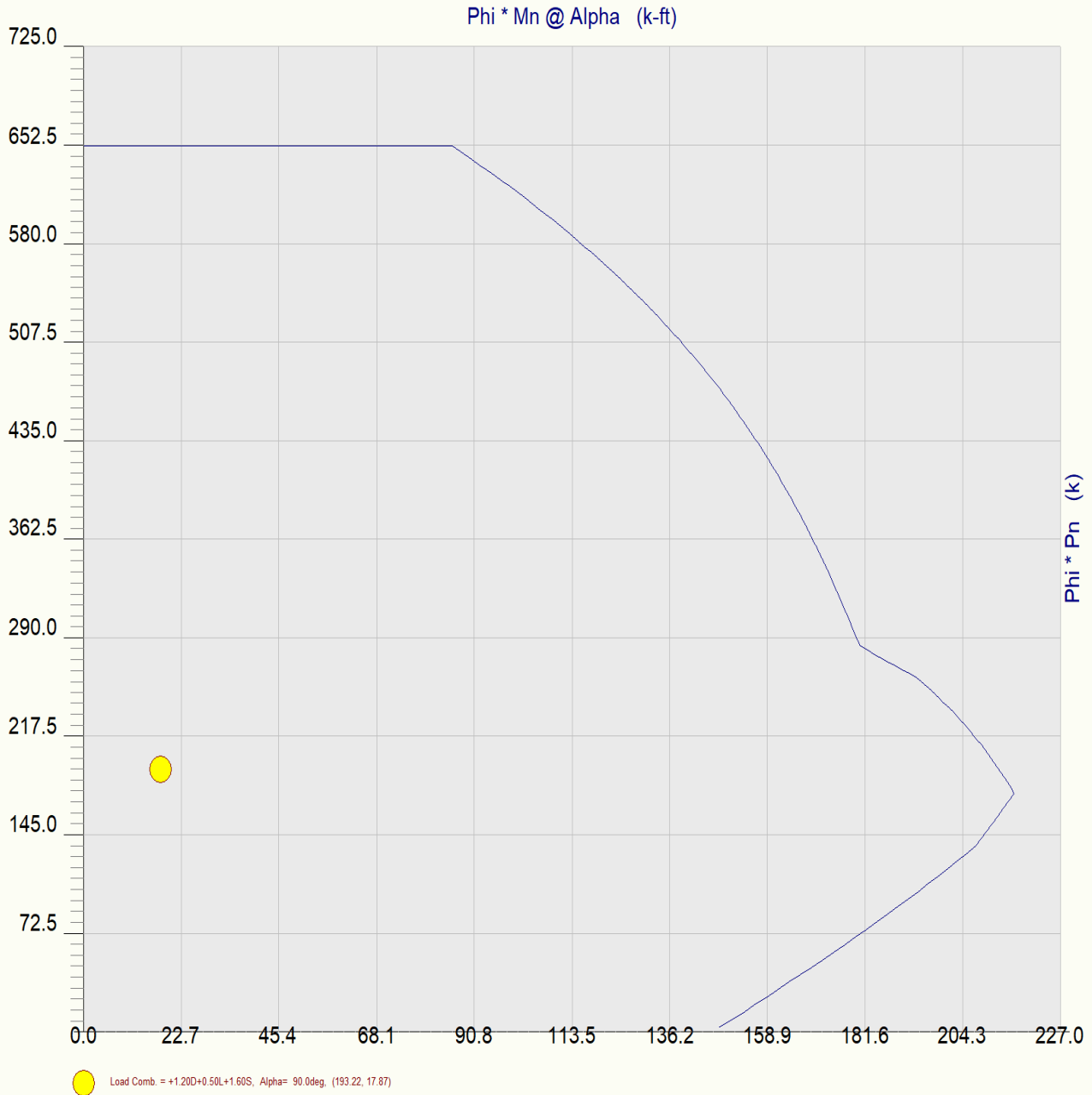
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DESCRIPTION: **Fourth Floor Column**

Concrete Column P-M Interaction Diagram



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DESCRIPTION: **Fourth Floor Column**

Concrete Column P-M Interaction Diagram



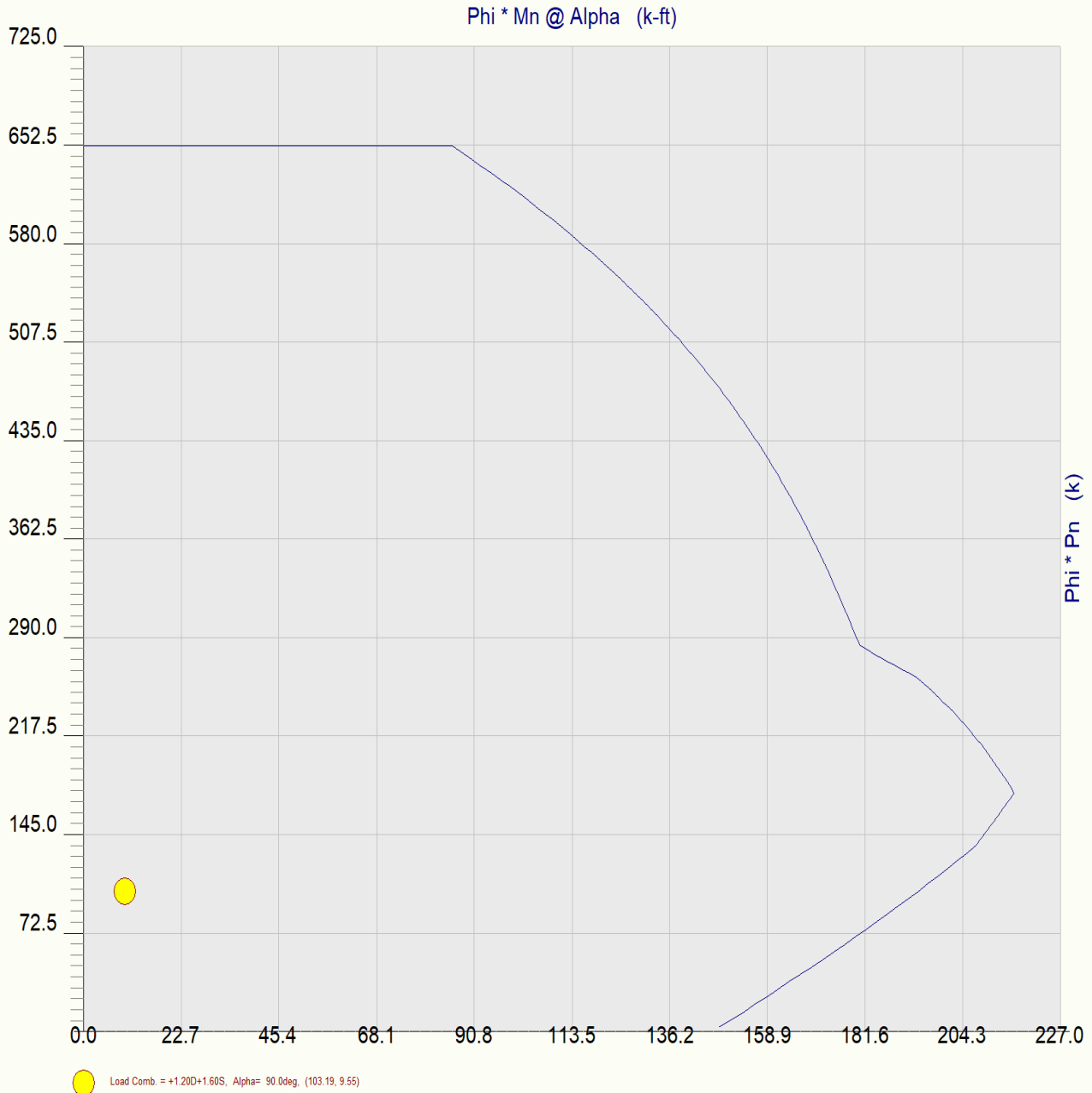
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Concrete Column P-M Interaction Diagram



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Concrete Column P-M Interaction Diagram



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DESCRIPTION: **Fourth Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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DESCRIPTION: **Fourth Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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DESCRIPTION: Third Floor Column

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10

Load Combinations Used : IBC 2015

General Information

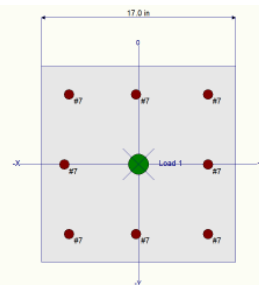
f'_c : Concrete 28 day strength = 4.0 ksi
E = 3,605.0 ksi
Density = 150.0 pcf
 β = 0.850
 f_y - Main Rebar = 60.0 ksi
E - Main Rebar = 29,000.0 ksi
Allow. Reinforcing Limits *ASTM A615 Bars Used*
Min. Reinf. = 1.0 %
Max. Reinf. = 8.0 %

Overall Column Height = 16.420 ft
End Fixity **Top & Bottom Pinned**
Brace condition for deflection (buckling) along columns :
X-X (width) axis :
Unbraced Length for buckling ABOUT Y-Y Axis = 16.420 ft, K = 1.0
Y-Y (depth) axis :
Unbraced Length for buckling ABOUT X-X Axis = 16.420 ft, K = 1.0

Column Cross Section

Column Dimensions : 17.0in Square Column, Column Edge to Rebar Edge Cover = 2.0in

Column Reinforcing : 4 - #7 bars @ corners,, 1 - #7 bars top & bottom between corner bars, 1 - #7 bars left & right between corner bars



Applied Loads

Entered loads are factored per load combinations specified by user.

Column self weight included : 4,943.10 lbs * Dead Load Factor

AXIAL LOADS ...

Roof + Tower Loads: Axial Load at 16.420 ft above base, D = 98.670, LR = 2.990, L = 194.990, S = 4.480 k

DESIGN SUMMARY

Load Combination **+1.20D+1.60L+0.50S**
Location of max. above base **16.310 ft**
Maximum Stress Ratio : 0.669 : 1
Ratio = $(P_u^2 + M_u^2)^{.5} / (\Phi P_n^2 + \Phi M_n^2)^{.5}$
 P_u = 438.560 k $\Phi * P_n$ = 652.23 k
 M_{u-x} = 0.0 k-ft $\Phi * M_{n-x}$ = 0.0 k-ft
 M_{u-y} = 40.567 k-ft $\Phi * M_{n-y}$ = 59.753 k-ft
 M_u Angle = 90.0 deg
 M_u at Angle = 40.567 k-ft ΦM_n at Angle = 60.858 k-ft

P_n & M_n values located at P_u-M_u vector intersection with capacity curve

Column Capacities ...

P_{nmax} : Nominal Max. Compressive Axial Capacity **1,254.28 k**
 P_{nmin} : Nominal Min. Tension Axial Capacity **k**
 ΦP_n , max : Usable Compressive Axial Capacity **652.23 k**
 ΦP_n , min : Usable Tension Axial Capacity **k**

Maximum SERVICE Load Reactions . .

Top along Y-Y **0.0 k** Bottom along Y-Y **0.0 k**
Top along X-X **0.0 k** Bottom along X-X **0.0 k**

Maximum SERVICE Load Deflections . .

Along Y-Y **0.0 in** at **0.0 ft** above base
for load combination :
Along X-X **0.0 in** at **0.0 ft** above base
for load combination :

General Section Information . Φ = 0.650 β = 0.850 θ = 0.80

ρ : % Reinforcing **1.661 %** Rebar % Ok
Reinforcing Area **4.80 in²**
Concrete Area **289.0 in²**

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from		Axial Load		Bending Analysis k-ft						Utilization	
	X-X	Y-Y	base	ft	Pu	ϕ * Pn	δ x	δ x * Mux	δ y	δ y * Muy	Alpha (deg)	δ Mu	ϕ Mn	Ratio
+1.40D		M2,min	16.31		145.06	652.23			1.000	13.42	90.000	13.42	60.86	0.221
+1.40D	M2,min		16.31		145.06	652.23	1.000	13.42			0.000	13.42	60.91	0.221
+1.20D+0.50Lr+1.60L		M2,min	16.31		437.81	652.23			1.000	40.50	90.000	40.50	60.86	0.668

Concrete Column

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DESCRIPTION: Third Floor Column

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base ft	Axial Load k		Bending Analysis k-ft								Utilization	
	X-X	Y-Y		Pu	ϕ * Pn	δ x	δ x * Mu _x	δ y	δ y * Mu _y	Alpha (deg)	δ Mu	ϕ Mn	Ratio		
+1.20D+0.50Lr+1.60L	M2,min		16.31	437.81	652.23	1.000	40.50			0.000	40.50	60.91	0.668		
+1.20D+1.60L+0.50S		M2,min	16.31	438.56	652.23			1.000	40.57	90.000	40.57	60.86	0.669		
+1.20D+1.60L+0.50S	M2,min		16.31	438.56	652.23	1.000	40.57			0.000	40.57	60.91	0.669		
+1.20D+1.60Lr+0.50L		M2,min	16.31	226.61	652.23			1.000	20.96	90.000	20.96	60.86	0.346		
+1.20D+1.60Lr+0.50L	M2,min		16.31	226.61	652.23	1.000	20.96			0.000	20.96	60.91	0.346		
+1.20D+1.60Lr		M2,min	16.31	129.12	652.23			1.000	11.94	90.000	11.94	60.86	0.197		
+1.20D+1.60Lr	M2,min		16.31	129.12	652.23	1.000	11.94			0.000	11.94	60.91	0.197		
+1.20D+0.50L+1.60S		M2,min	16.31	229.00	652.23			1.000	21.18	90.000	21.18	60.86	0.349		
+1.20D+0.50L+1.60S	M2,min		16.31	229.00	652.23	1.000	21.18			0.000	21.18	60.91	0.349		
+1.20D+1.60S		M2,min	16.31	131.50	652.23			1.000	12.16	90.000	12.16	60.86	0.201		
+1.20D+1.60S	M2,min		16.31	131.50	652.23	1.000	12.16			0.000	12.16	60.91	0.201		
+1.20D+0.50Lr+0.50L		M2,min	16.31	223.33	652.23			1.000	20.66	90.000	20.66	60.86	0.341		
+1.20D+0.50Lr+0.50L	M2,min		16.31	223.33	652.23	1.000	20.66			0.000	20.66	60.91	0.341		
+1.20D+0.50L+0.50S		M2,min	16.31	224.07	652.23			1.000	20.73	90.000	20.73	60.86	0.342		
+1.20D+0.50L+0.50S	M2,min		16.31	224.07	652.23	1.000	20.73			0.000	20.73	60.91	0.342		
+1.20D+0.50L+0.70S		M2,min	16.31	224.97	652.23			1.000	20.81	90.000	20.81	60.86	0.343		
+1.20D+0.50L+0.70S	M2,min		16.31	224.97	652.23	1.000	20.81			0.000	20.81	60.91	0.343		
+0.90D		M2,min	16.31	93.25	652.23			1.000	8.63	90.000	8.63	60.86	0.142		
+0.90D	M2,min		16.31	93.25	652.23	1.000	8.63			0.000	8.63	60.91	0.142		

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction @ Base	My - End Moments k-ft		Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top	@ Base	@ Top
D Only						103.613				
+D+L						298.603				
+D+Lr						106.603				
+D+S						108.093				
+D+0.750Lr+0.750L						252.098				
+D+0.750L+0.750S						253.216				
+0.60D						62.168				
Lr Only						2.990				
L Only						194.990				
S Only						4.480				

Maximum Moment Reactions

Note: Only non-zero reactions are listed.

Load Combination	Moment About X-X Axis			Moment About Y-Y Axis		
	@ Base	@ Top		@ Base	@ Top	
D Only			k-ft			k-ft
+D+L			k-ft			k-ft
+D+Lr			k-ft			k-ft
+D+S			k-ft			k-ft
+D+0.750Lr+0.750L			k-ft			k-ft
+D+0.750L+0.750S			k-ft			k-ft
+0.60D			k-ft			k-ft
Lr Only			k-ft			k-ft
L Only			k-ft			k-ft
S Only			k-ft			k-ft

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
D Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+L	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+Lr	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+S	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L	0.0000	in	0.000	ft	0.000	in	0.000	ft
+D+0.750L+0.750S	0.0000	in	0.000	ft	0.000	in	0.000	ft
+0.60D	0.0000	in	0.000	ft	0.000	in	0.000	ft

Concrete Column

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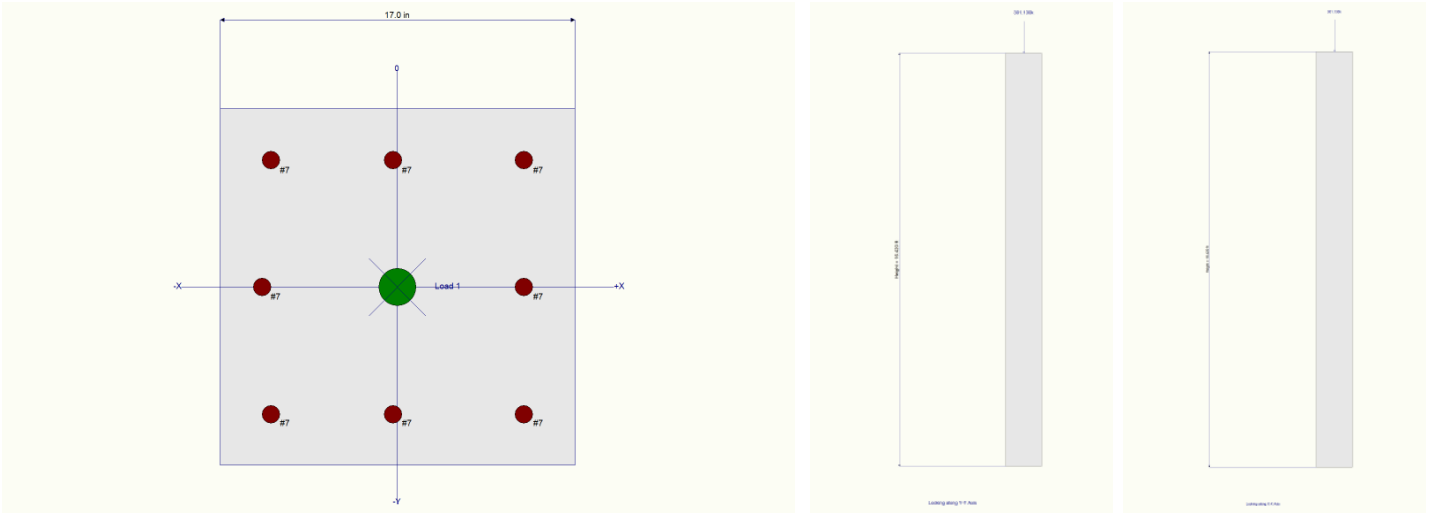
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Centerline Communications

DESCRIPTION: Third Floor Column

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
Lr Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
L Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
S Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

Sketches



Interaction Diagrams

Concrete Column

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DESCRIPTION: **Third Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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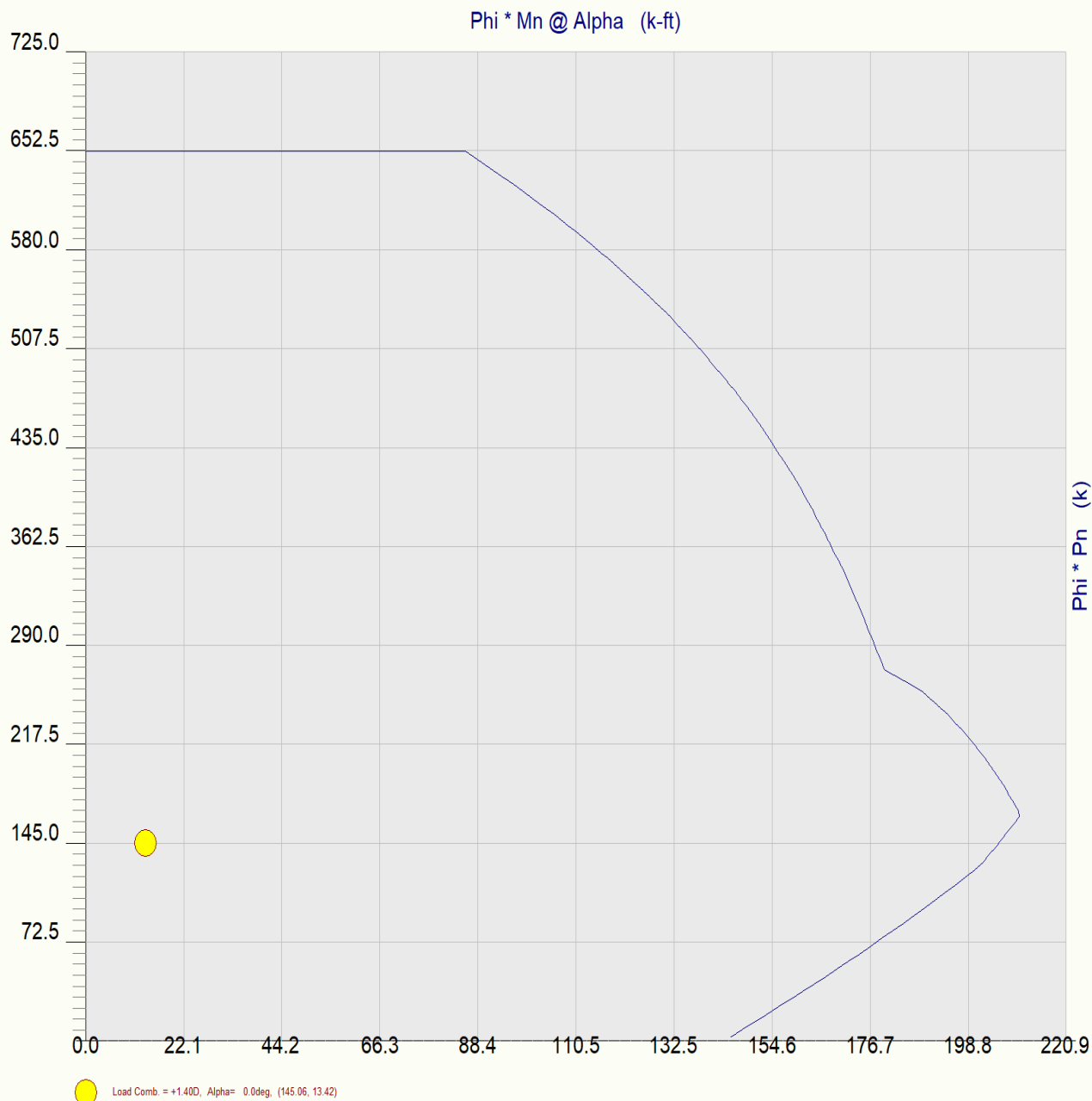
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DESCRIPTION: **Third Floor Column**

Concrete Column P-M Interaction Diagram



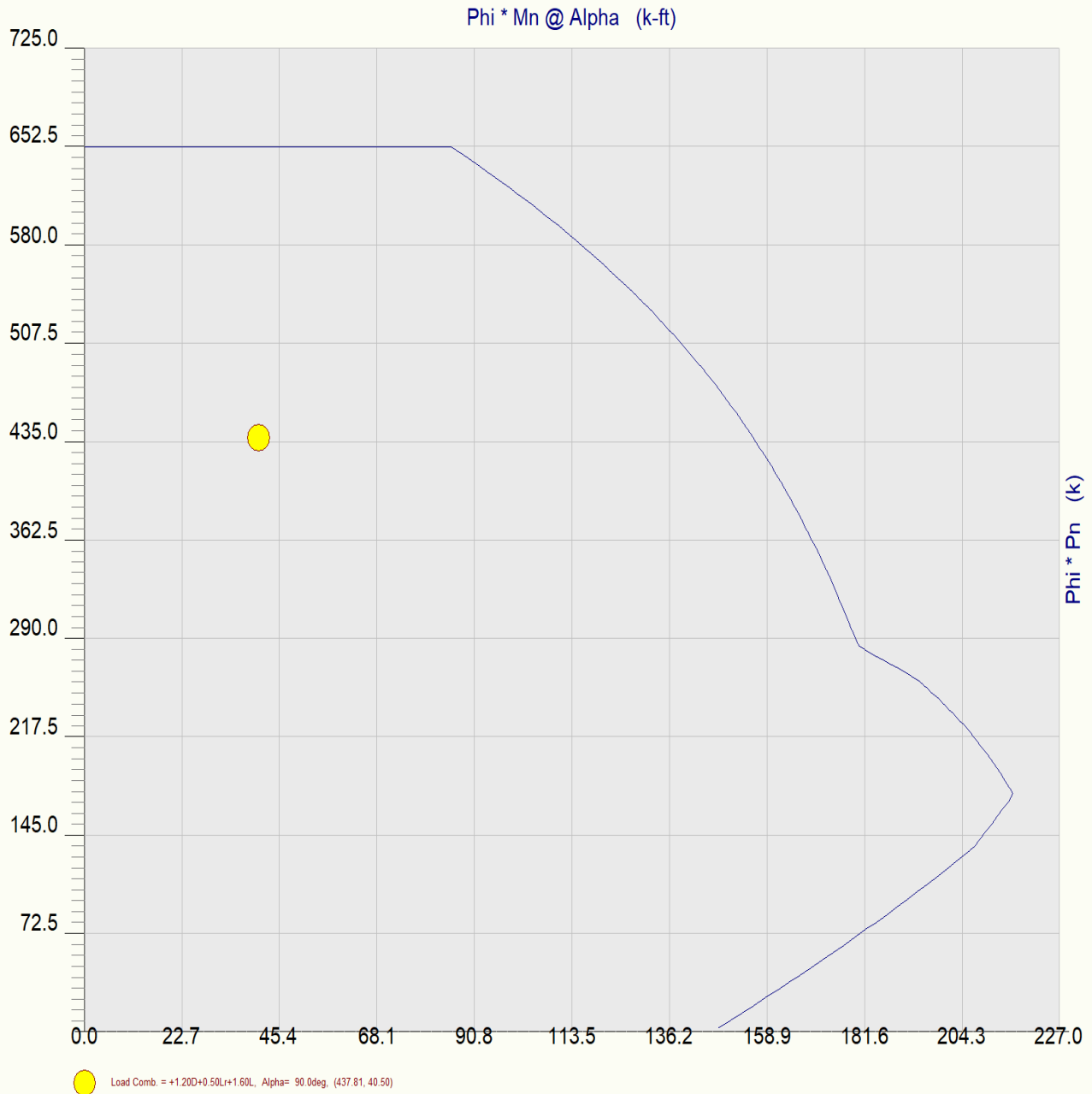
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DESCRIPTION: **Third Floor Column**

Concrete Column P-M Interaction Diagram



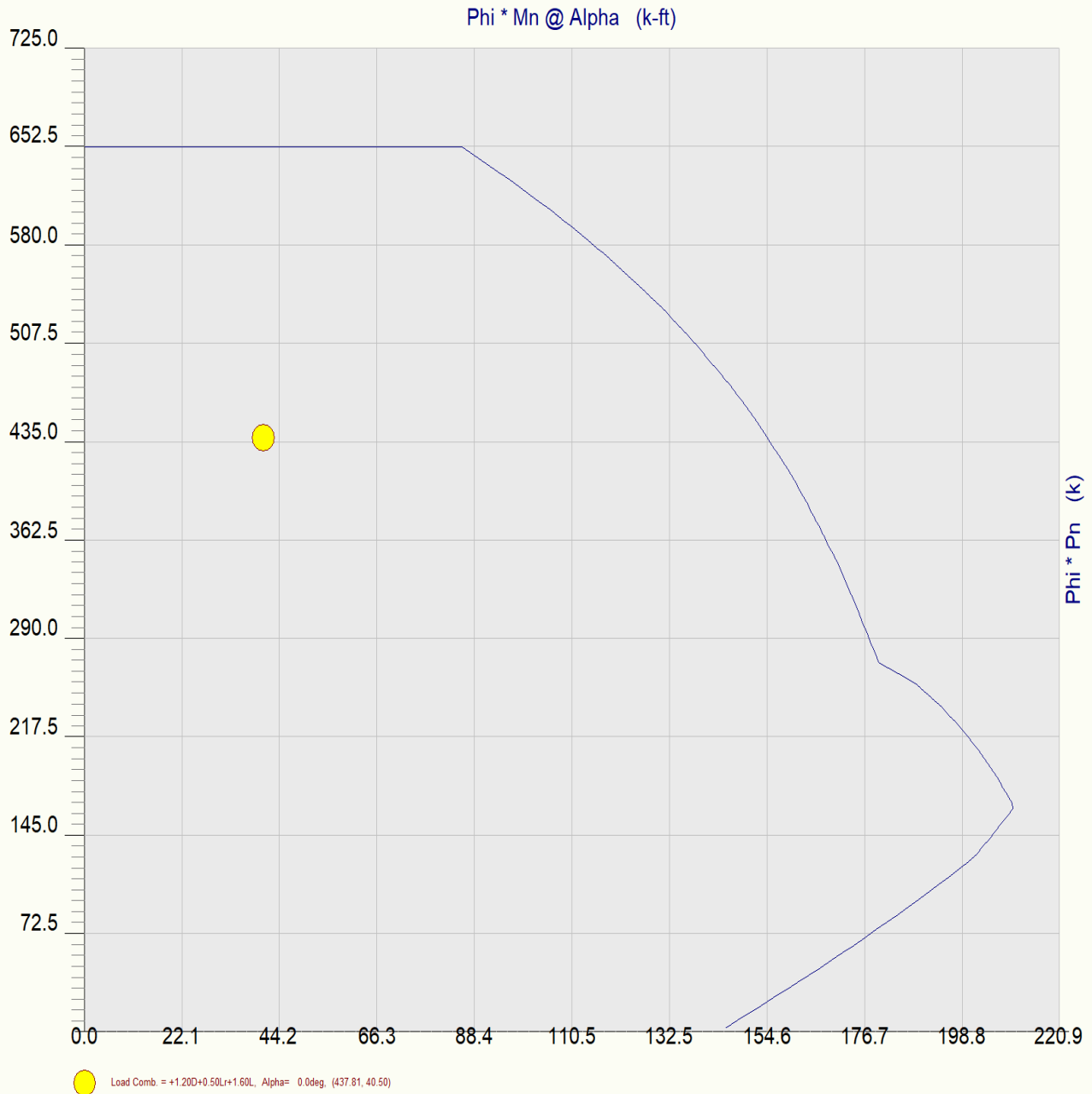
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DESCRIPTION: **Third Floor Column**

Concrete Column P-M Interaction Diagram



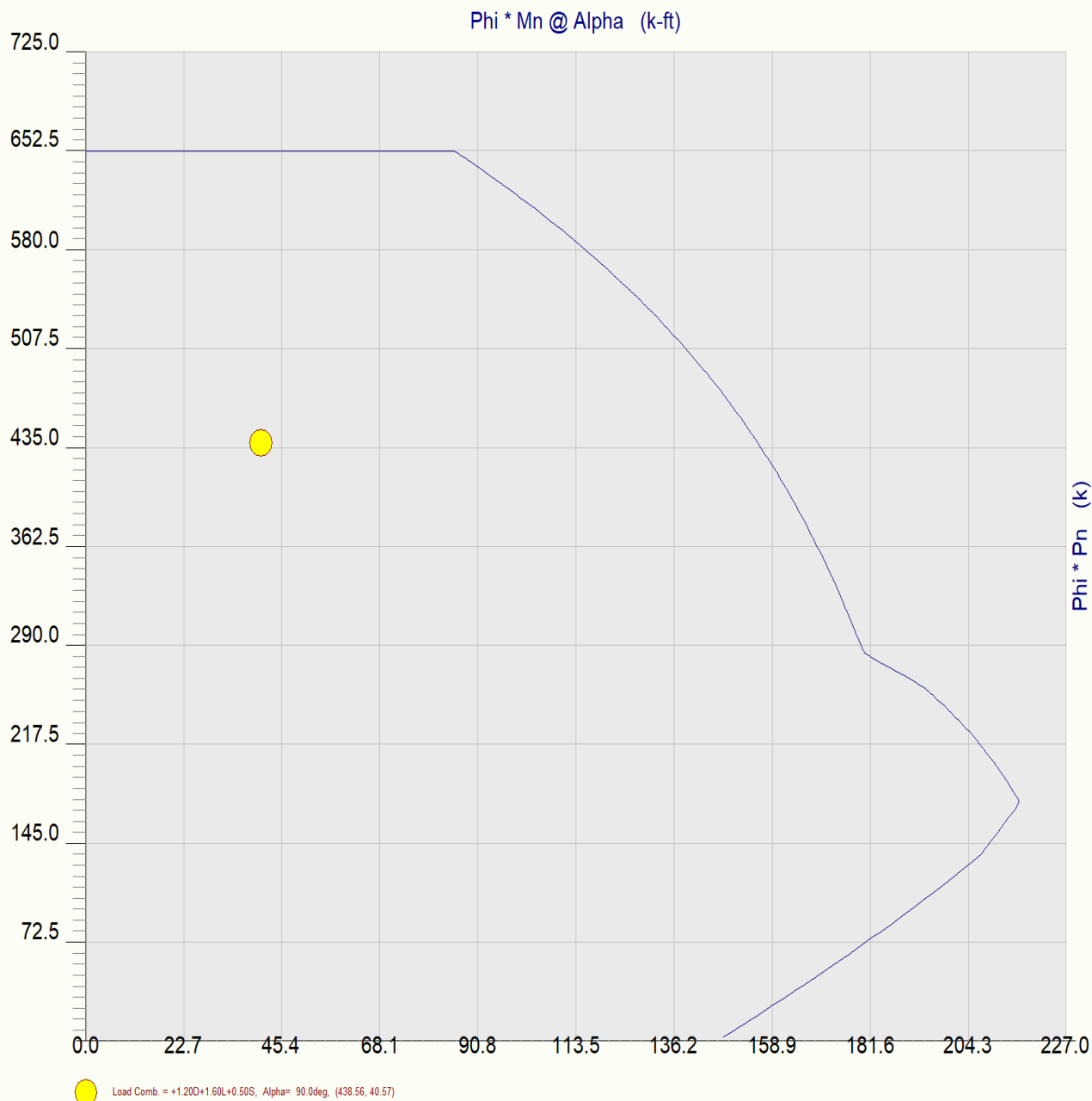
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DESCRIPTION: **Third Floor Column**

Concrete Column P-M Interaction Diagram



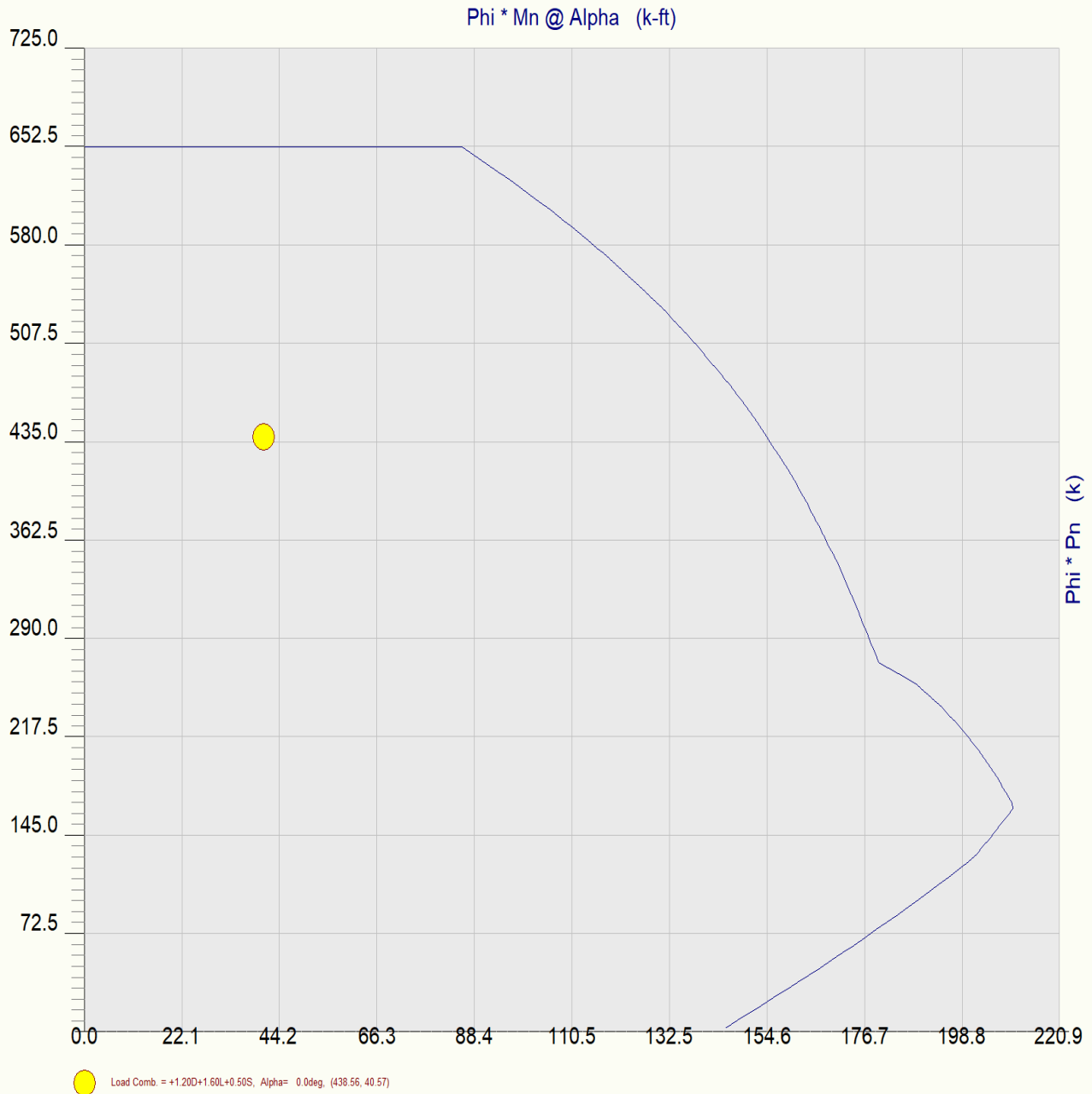
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DESCRIPTION: **Third Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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DESCRIPTION: **Third Floor Column**

Concrete Column P-M Interaction Diagram



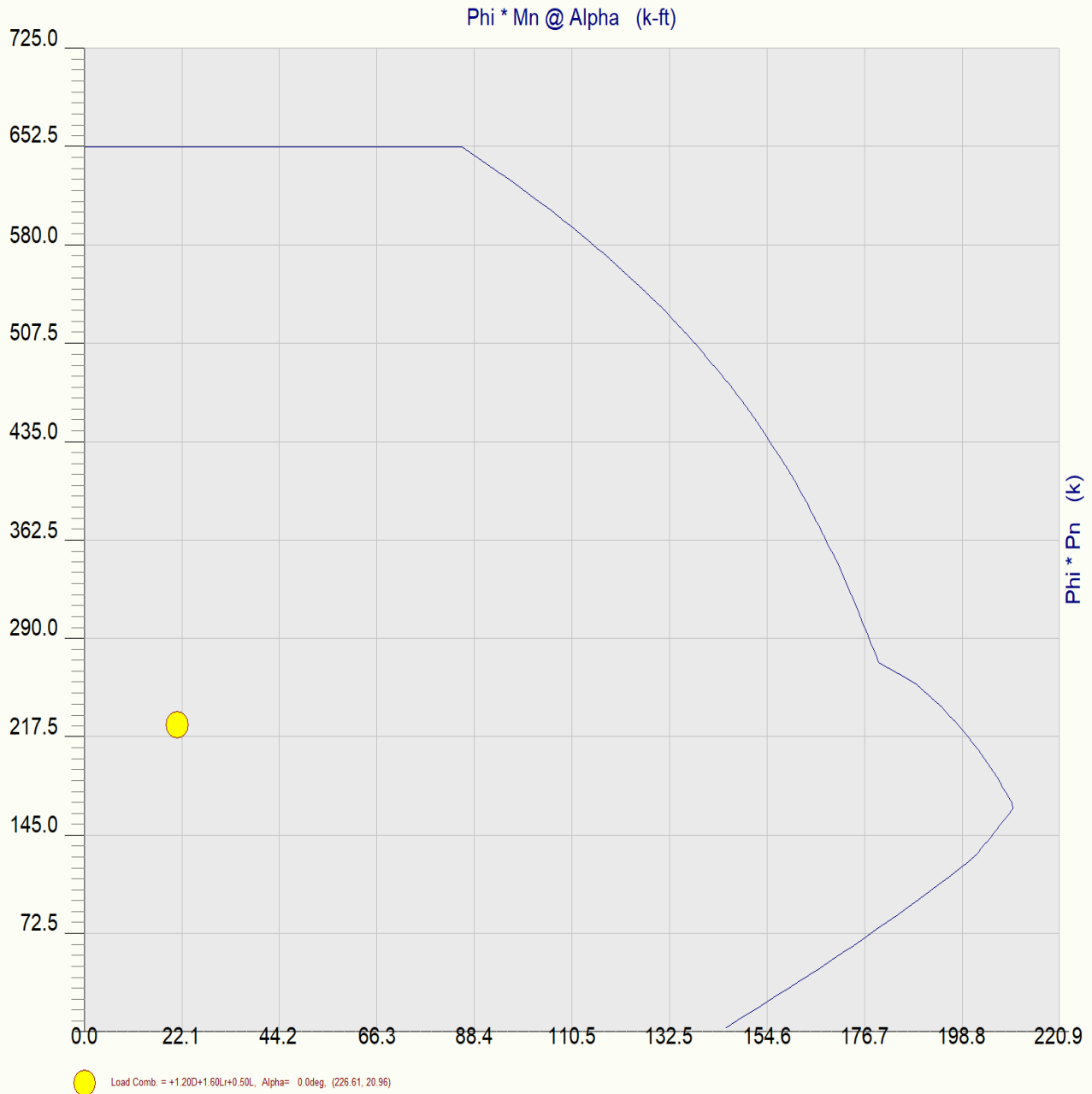
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Concrete Column P-M Interaction Diagram



Concrete Column

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DESCRIPTION: **Third Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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DESCRIPTION: **Third Floor Column**

Concrete Column P-M Interaction Diagram



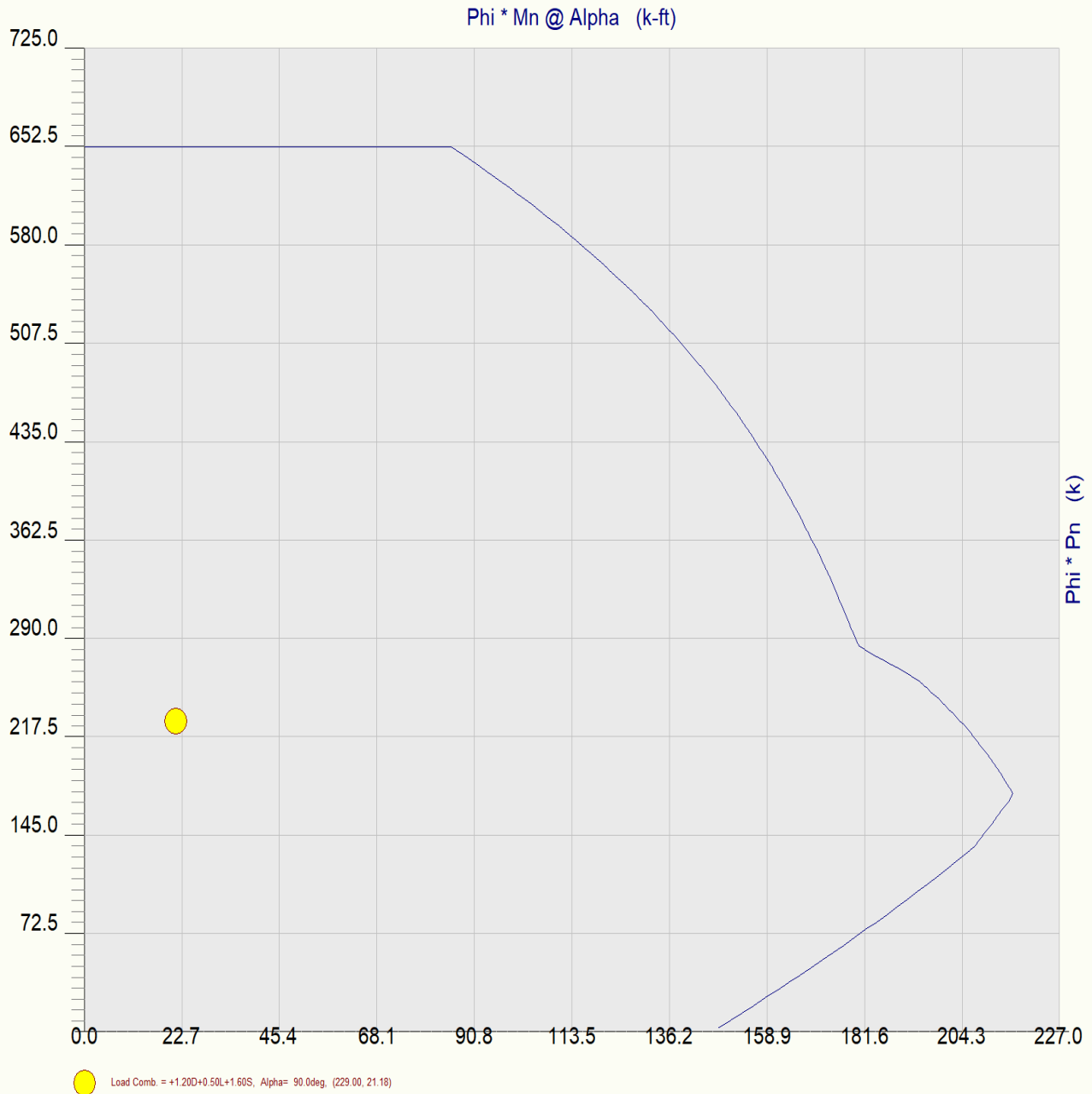
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DESCRIPTION: **Third Floor Column**

Concrete Column P-M Interaction Diagram



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DESCRIPTION: **Third Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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DESCRIPTION: **Third Floor Column**

Concrete Column P-M Interaction Diagram



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DESCRIPTION: **Third Floor Column**

Concrete Column P-M Interaction Diagram



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DESCRIPTION: **Third Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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DESCRIPTION: **Third Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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DESCRIPTION: Second Floor Column

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

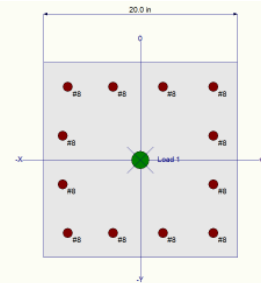
f'_c : Concrete 28 day strength = 4.0 ksi
 E = 3,605.0 ksi
Density = 150.0 pcf
 β = 0.850
 f_y - Main Rebar = 60.0 ksi
 E - Main Rebar = 29,000.0 ksi
Allow. Reinforcing Limits *ASTM A615 Bars Used*
Min. Reinf. = 1.0 %
Max. Reinf. = 8.0 %

Overall Column Height = 15.580 ft
End Fixity **Top & Bottom Pinned**
Brace condition for deflection (buckling) along columns :
X-X (width) axis :
Unbraced Length for buckling ABOUT Y-Y Axis = 15.580 ft, K = 1.0
Y-Y (depth) axis :
Unbraced Length for buckling ABOUT X-X Axis = 15.580 ft, K = 1.0

Column Cross Section

Column Dimensions : 20.0in Square Column, Column Edge to Rebar Edge Cover = 2.0in

Column Reinforcing : 4 - #8 bars @ corners,, 2 - #8 bars top & bottom between corner bars, 2 - #8 bars left & right between corner bars



Applied Loads

Entered loads are factored per load combinations specified by user.

Column self weight included : 6,491.67 lbs * Dead Load Factor
AXIAL LOADS ...

Roof + Tower Loads: Axial Load at 15.580 ft above base, D = 122.290, LR = 2.990, L = 209.930, S = 4.480 k

DESIGN SUMMARY

Load Combination **+1.20D+1.60L+0.50S**
Location of max. above base **15.475 ft**
Maximum Stress Ratio : 0.500 : 1
Ratio = $(P_u^2 + M_u^2)^{.5} / (\Phi P_n^2 + \Phi M_n^2)^{.5}$
 P_u = 492.666 k $\Phi * P_n$ = 986.22 k
 M_{u-x} = 0.0 k-ft $\Phi * M_{n-x}$ = 0.0 k-ft
 M_{u-y} = 0.0 k-ft $\Phi * M_{n-y}$ = 0.0 k-ft
 M_u Angle = 0.0 deg
 M_u at Angle = 0.0 k-ft ΦM_n at Angle = 0.0 k-ft

P_n & M_n values located at P_u-M_u vector intersection with capacity curve

Column Capacities ...

P_{nmax} : Nominal Max. Compressive Axial Capacity **1,896.57 k**
 P_{nmin} : Nominal Min. Tension Axial Capacity **k**
 ΦP_n , max : Usable Compressive Axial Capacity **986.22 k**
 ΦP_n , min : Usable Tension Axial Capacity **k**

Maximum SERVICE Load Reactions ...

Top along Y-Y **0.0 k** Bottom along Y-Y **0.0 k**
Top along X-X **0.0 k** Bottom along X-X **0.0 k**

Maximum SERVICE Load Deflections ...

Along Y-Y **0.0 in** at **0.0 ft** above base
for load combination :
Along X-X **0.0 in** at **0.0 ft** above base
for load combination :

General Section Information . ϕ = 0.650 β = 0.850 θ = 0.80

ρ : % Reinforcing **2.370 %** Rebar % Ok
Reinforcing Area **9.480 in²**
Concrete Area **400.0 in²**

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from		Axial Load	Bending Analysis					k-ft	Utilization		
	X-X	Y-Y	base	ft	Pu	ϕ * Pn	δ x	δ x * Mux	δ y	δ y * Muy	Alpha (deg)	δ Mu	ϕ Mn	Ratio
+1.40D			15.48		180.29	986.22					0.000			0.183
+1.20D+0.50Lr+1.60L			15.48		491.92	986.22					0.000			0.499
+1.20D+1.60L+0.50S			15.48		492.67	986.22					0.000			0.500

Concrete Column

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DESCRIPTION: Second Floor Column

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base ft	Axial Load k		Bending Analysis k-ft								Utilization	
	X-X	Y-Y		Pu	$\phi * Pn$	δx	$\delta x * Mu_x$	δy	$\delta y * Mu_y$	Alpha (deg)	δMu	ϕMn	Ratio		
+1.20D+1.60Lr+0.50L			15.48	264.29	986.22					0.000			0.268		
+1.20D+1.60Lr			15.48	159.32	986.22					0.000			0.162		
+1.20D+0.50L+1.60S			15.48	266.67	986.22					0.000			0.270		
+1.20D+1.60S			15.48	161.71	986.22					0.000			0.164		
+1.20D+0.50Lr+0.50L			15.48	261.00	986.22					0.000			0.265		
+1.20D+0.50L+0.50S			15.48	261.74	986.22					0.000			0.265		
+1.20D+0.50L+0.70S			15.48	262.64	986.22					0.000			0.266		
+0.90D			15.48	115.90	986.22					0.000			0.118		

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top		@ Base	@ Top
D Only						128.782					
+D+L						338.712					
+D+Lr						131.772					
+D+S						133.262					
+D+0.750Lr+0.750L						288.472					
+D+0.750L+0.750S						289.589					
+0.60D						77.269					
Lr Only						2.990					
L Only						209.930					
S Only						4.480					

Maximum Moment Reactions

Note: Only non-zero reactions are listed.

Load Combination	Moment About X-X Axis			Moment About Y-Y Axis		
	@ Base	@ Top		@ Base	@ Top	
D Only			k-ft			k-ft
+D+L			k-ft			k-ft
+D+Lr			k-ft			k-ft
+D+S			k-ft			k-ft
+D+0.750Lr+0.750L			k-ft			k-ft
+D+0.750L+0.750S			k-ft			k-ft
+0.60D			k-ft			k-ft
Lr Only			k-ft			k-ft
L Only			k-ft			k-ft
S Only			k-ft			k-ft

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance	Max. Y-Y Deflection		Distance
D Only	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+L	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+Lr	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+S	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+0.750Lr+0.750L	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+0.750L+0.750S	0.0000	in	0.000 ft	0.000	in	0.000 ft
+0.60D	0.0000	in	0.000 ft	0.000	in	0.000 ft
Lr Only	0.0000	in	0.000 ft	0.000	in	0.000 ft
L Only	0.0000	in	0.000 ft	0.000	in	0.000 ft
S Only	0.0000	in	0.000 ft	0.000	in	0.000 ft

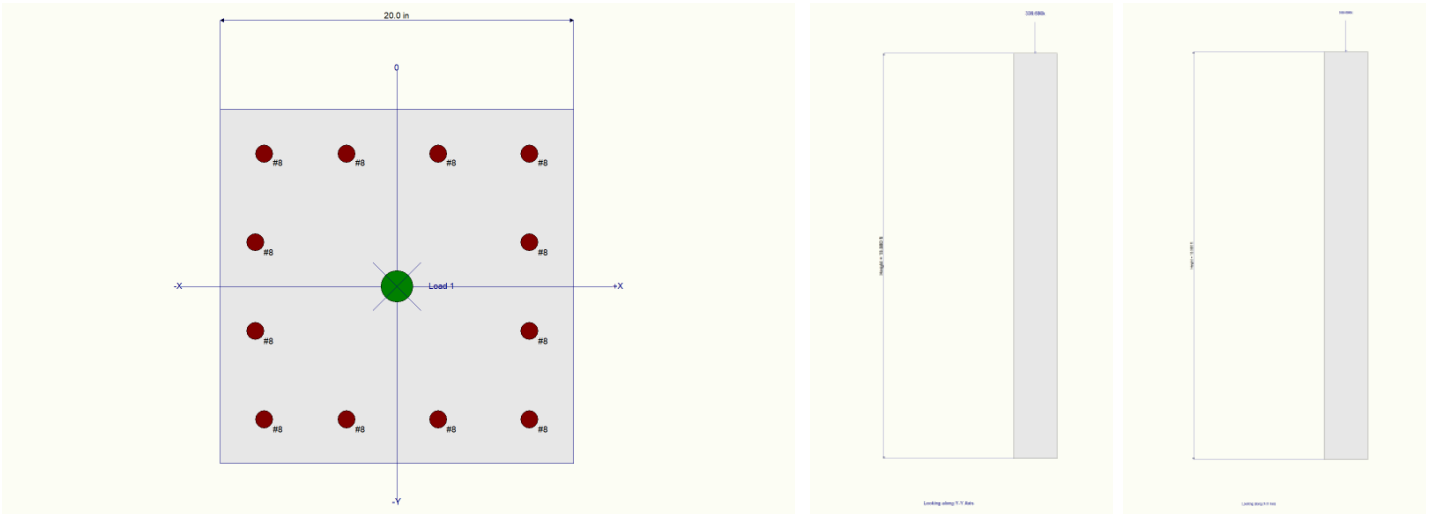
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DESCRIPTION: **Second Floor Column**

Sketches



Interaction Diagrams

Concrete Column

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DESCRIPTION: **Second Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)



Load Comb. = +1.40D, Alpha= 0.0deg, (180.29, 0.00)

Concrete Column

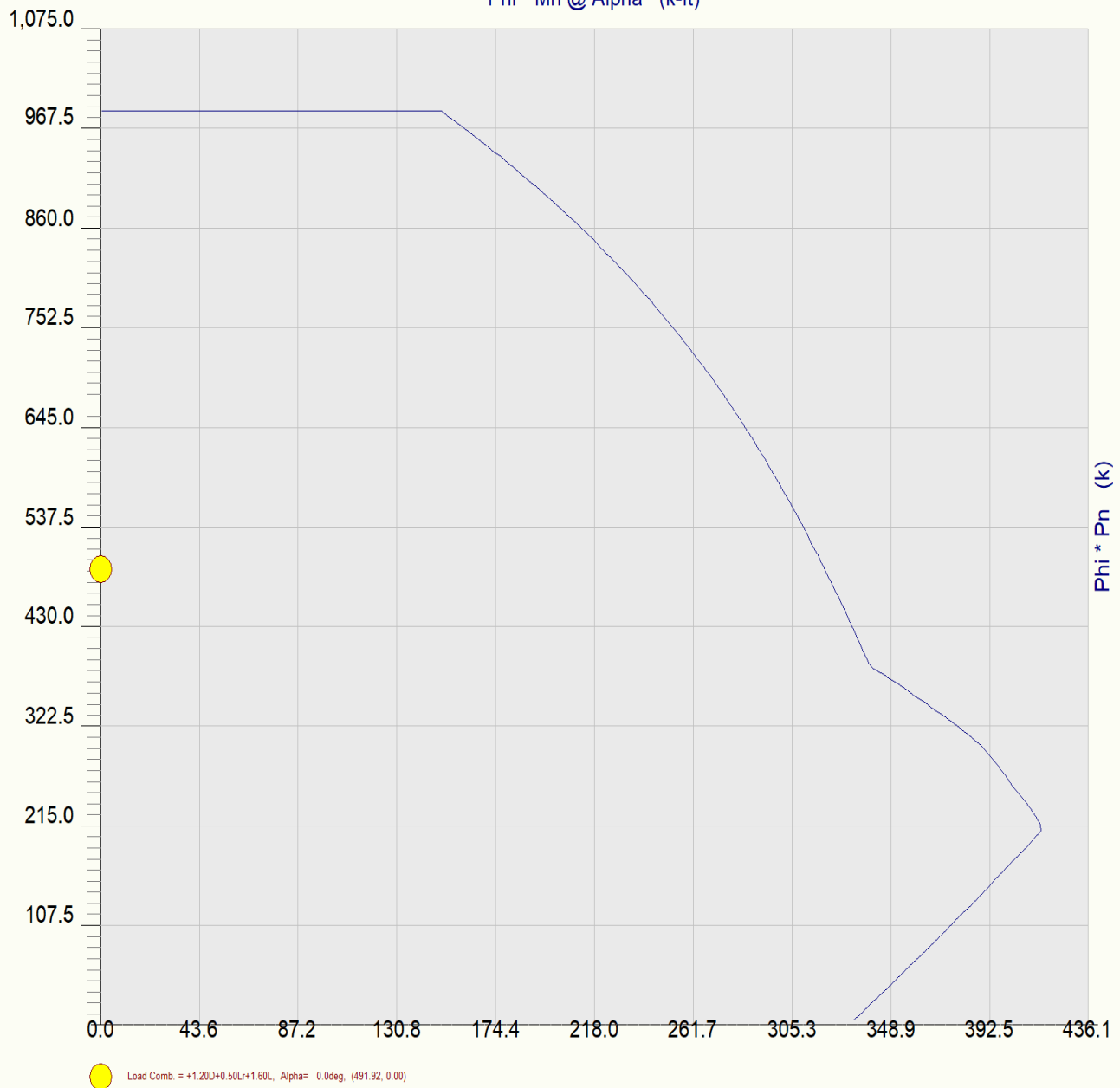
File: 638283 Exterior Column Analysis.ec6
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Centerline Communications

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DESCRIPTION: **Second Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)



Concrete Column

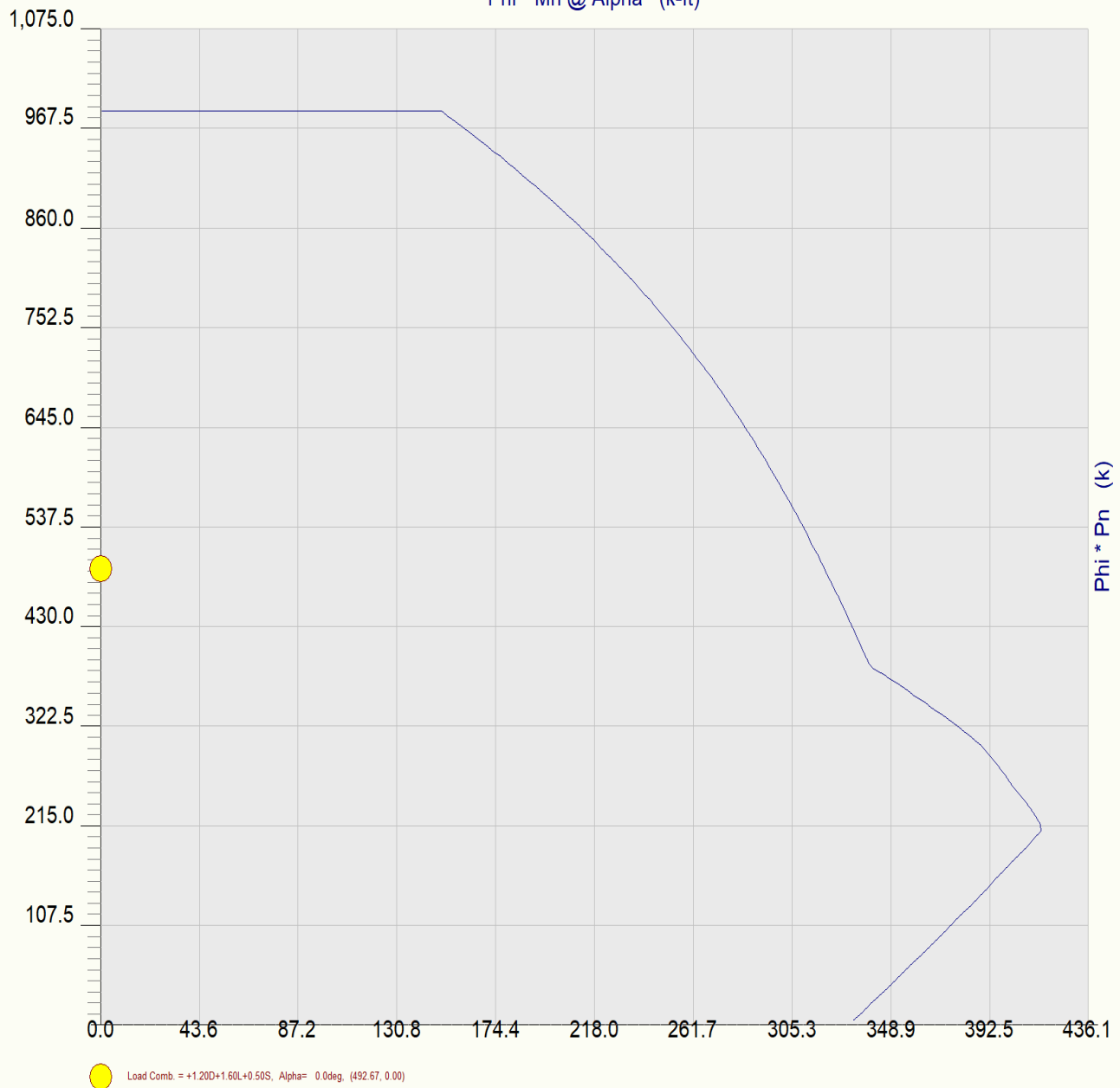
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Lic. # : KW-06013597

DESCRIPTION: **Second Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)



Concrete Column

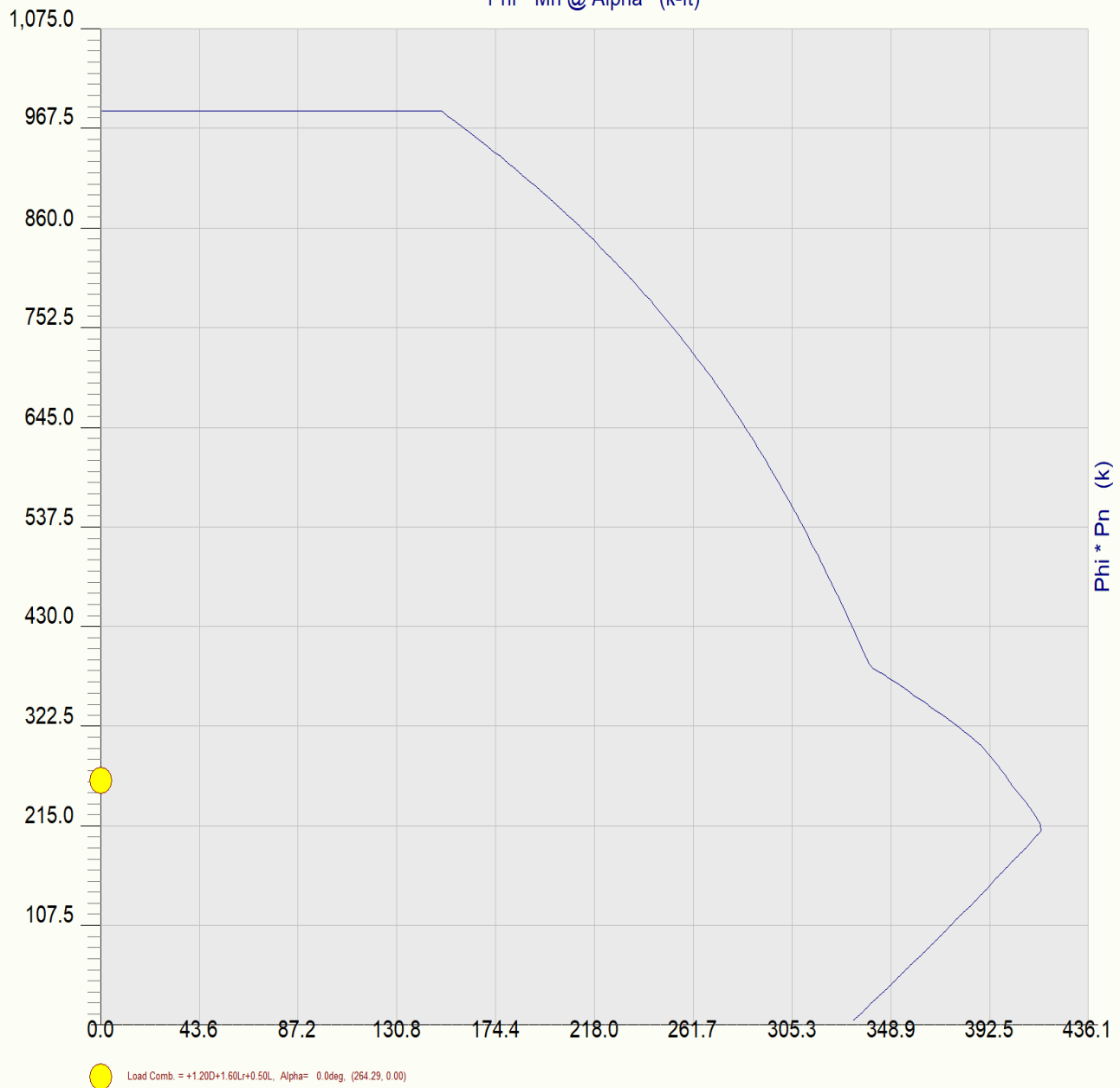
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Lic. # : KW-06013597

DESCRIPTION: **Second Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)



Concrete Column

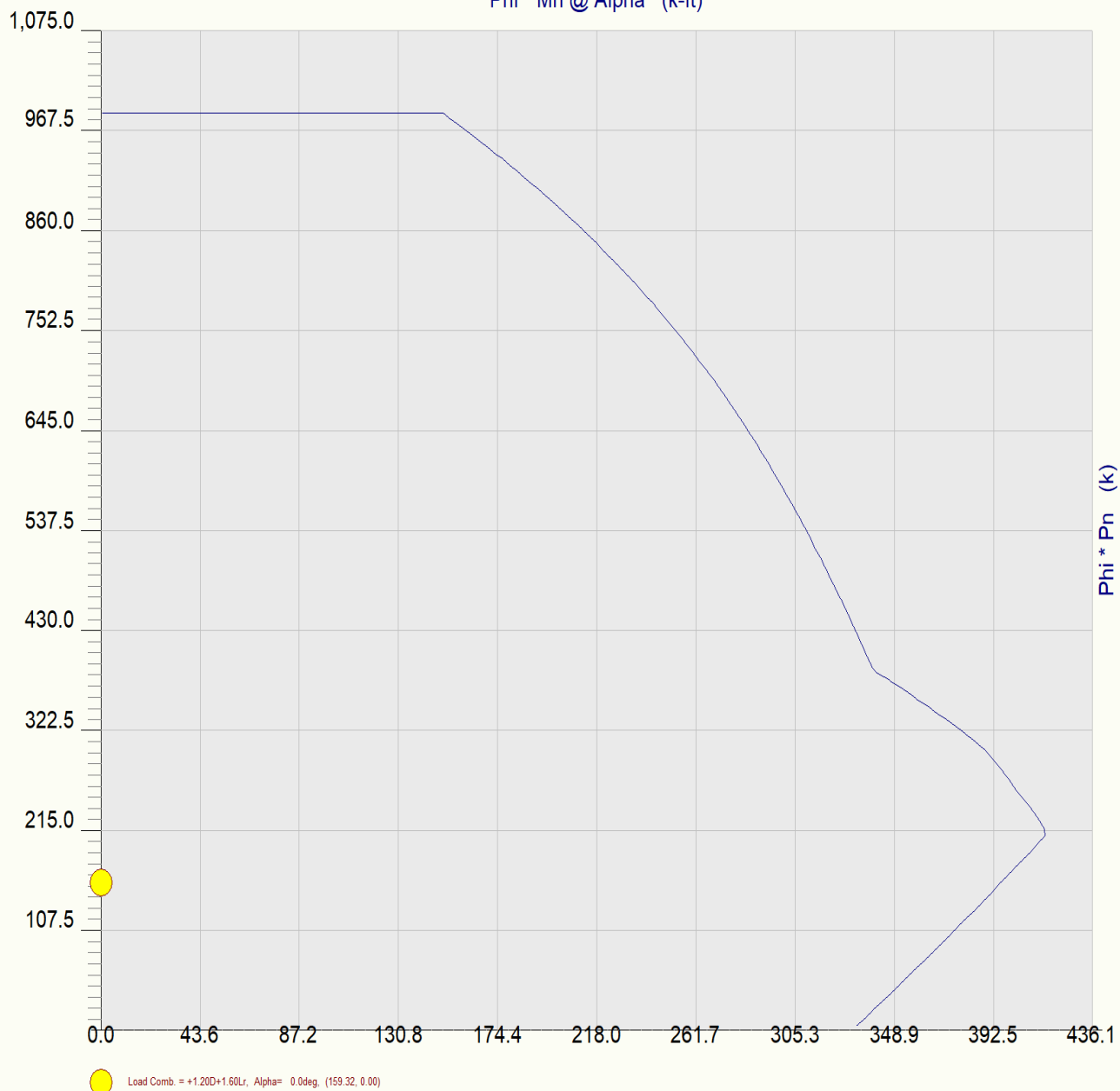
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File: 638283 Exterior Column Analysis.ec6
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Centerline Communications

DESCRIPTION: **Second Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)



Concrete Column

File: 638283 Exterior Column Analysis.ec6
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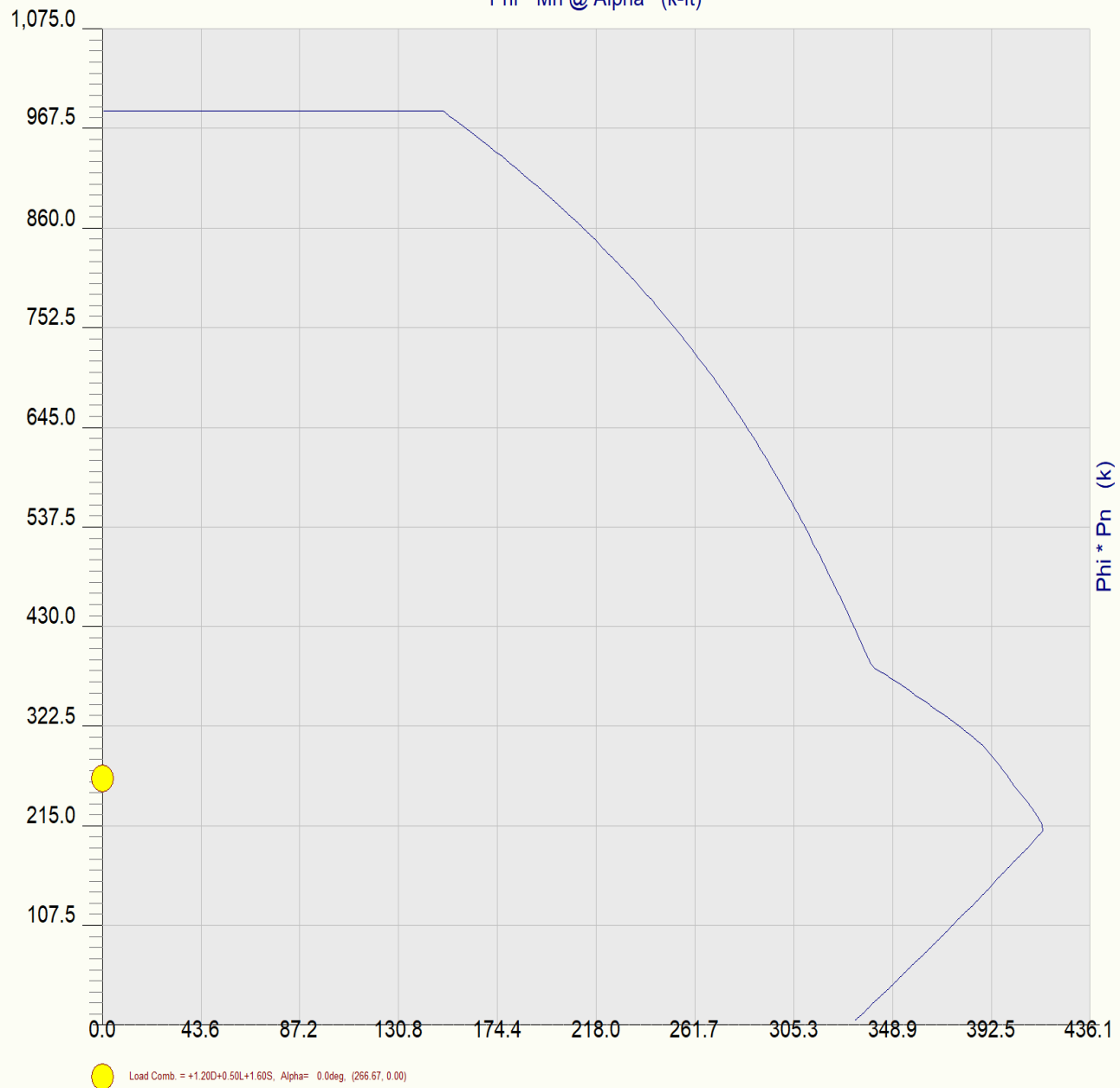
Lic. # : KW-06013597

DESCRIPTION: **Second Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)

Phi * Pn (k)



Concrete Column

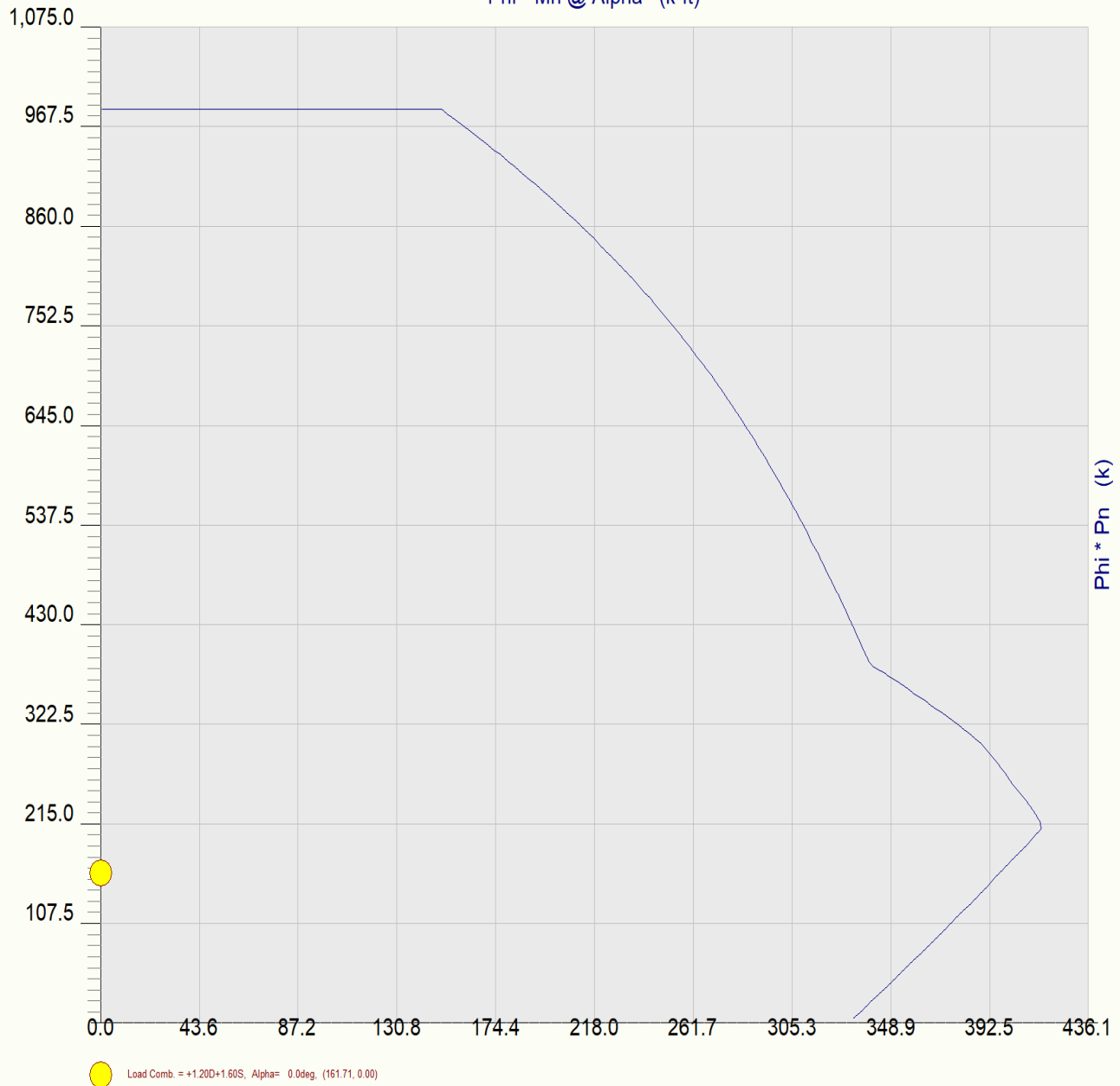
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Lic. # : KW-06013597

DESCRIPTION: **Second Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)



Concrete Column

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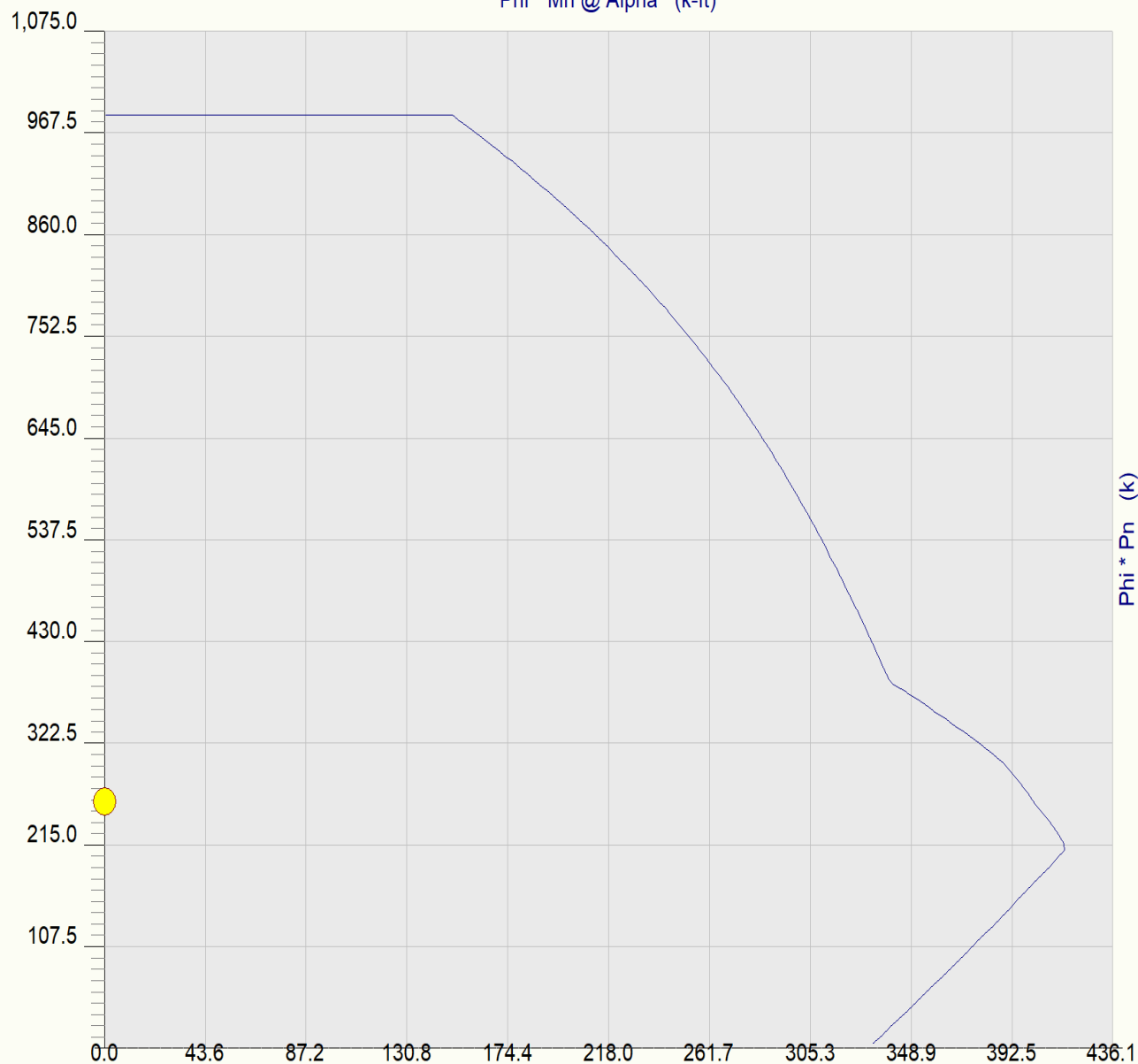
Lic. # : KW-06013597

DESCRIPTION: **Second Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)

Phi * Pn (k)



Load Comb. = +1.20D+0.50L+0.50L, Alpha= 0.0deg, (261.00, 0.00)

Concrete Column

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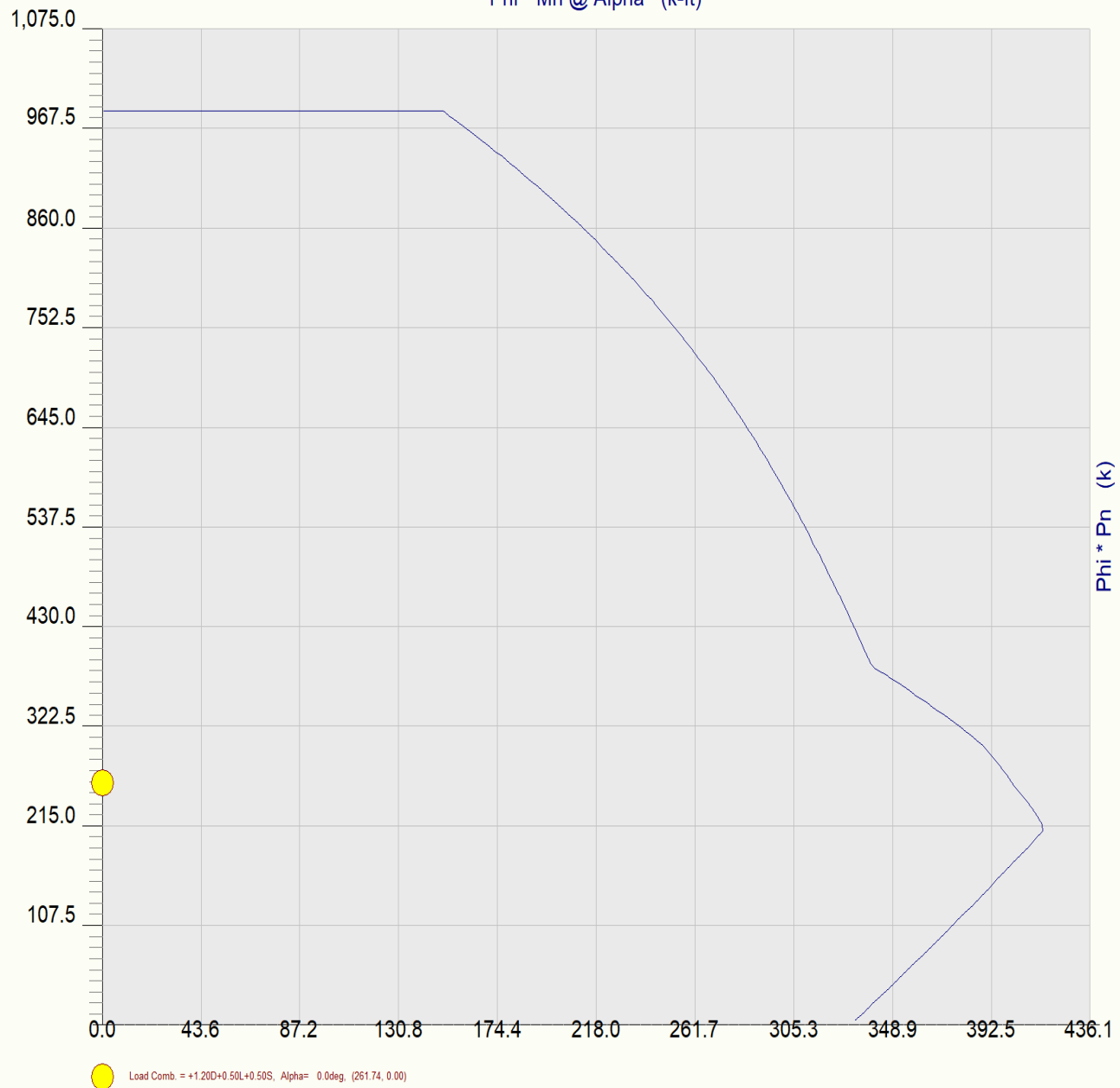
Lic. # : KW-06013597

DESCRIPTION: **Second Floor Column**

Concrete Column P-M Interaction Diagram

$\Phi * M_n @ \alpha$ (k-ft)

$\Phi * P_n$ (k)



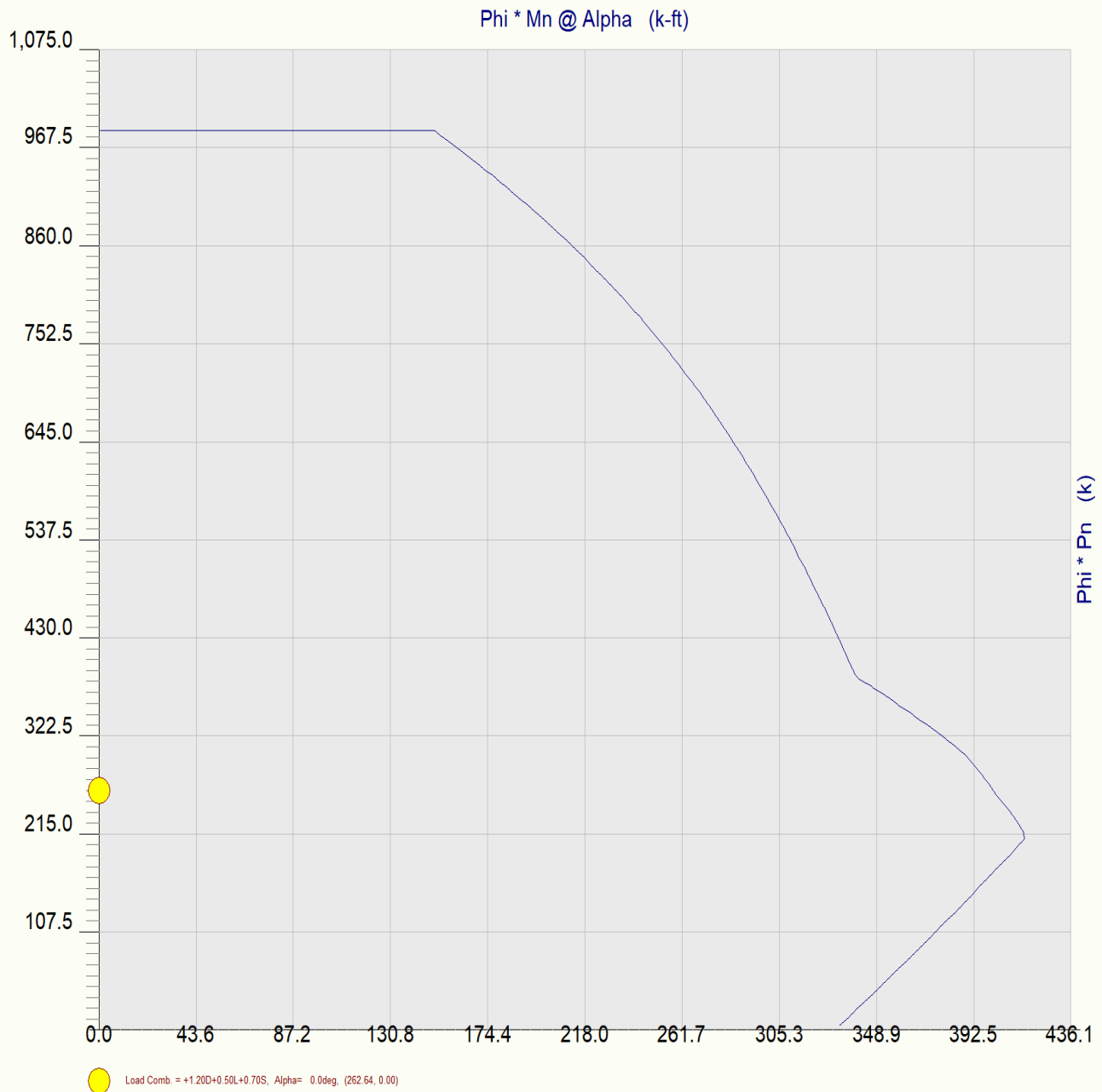
Concrete Column

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DESCRIPTION: **Second Floor Column**

Concrete Column P-M Interaction Diagram



Concrete Column

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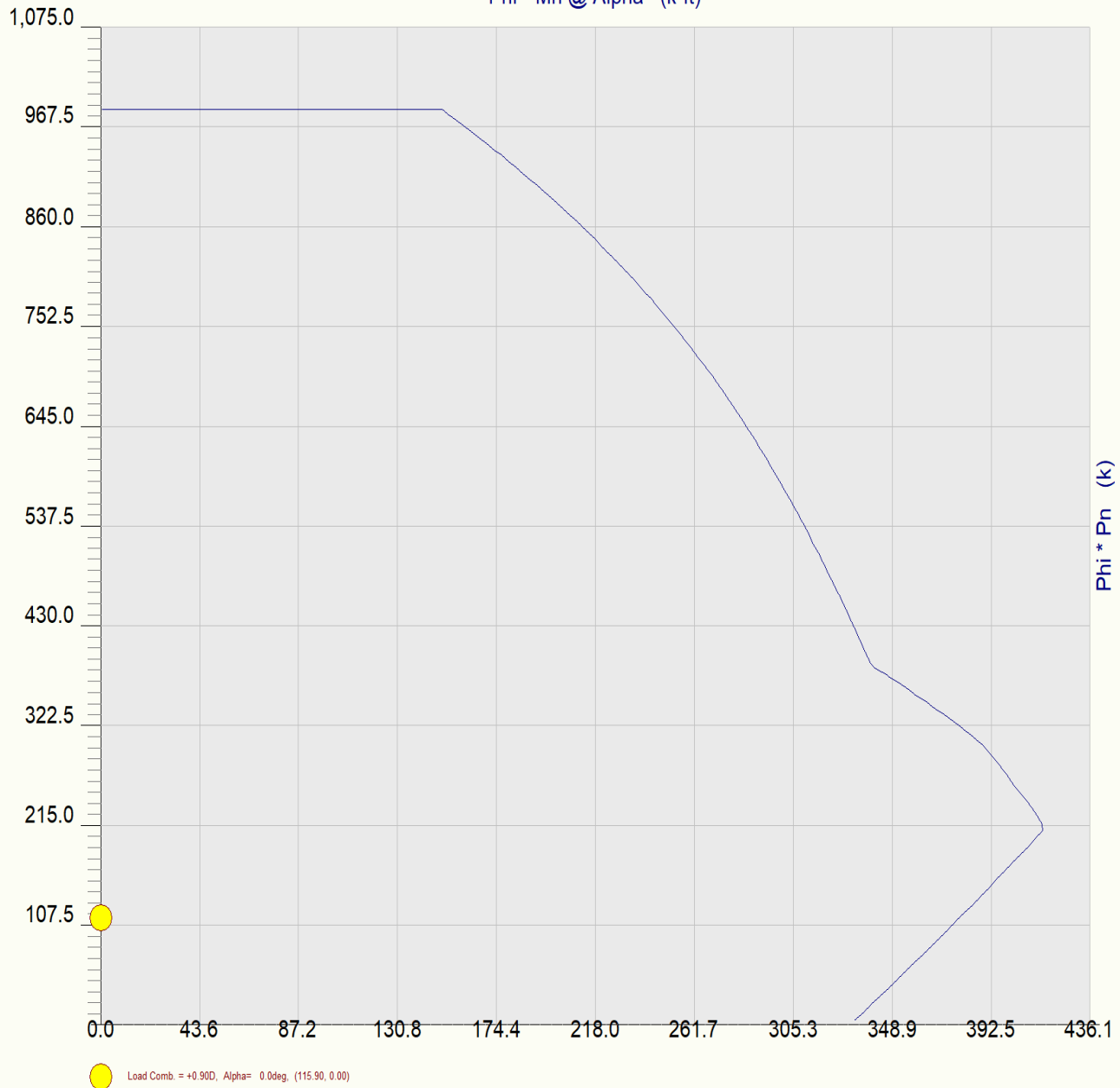
Lic. # : KW-06013597

DESCRIPTION: **Second Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)

Phi * Pn (k)



Concrete Column

File: 638283 Exterior Column Analysis.ec6
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Lic. #: KW-06013597

DESCRIPTION: First Floor Column

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10
Load Combinations Used : IBC 2015

General Information

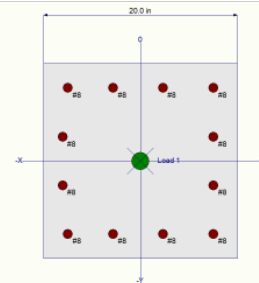
f'_c : Concrete 28 day strength = 4.0 ksi
 E = 3,605.0 ksi
Density = 150.0 pcf
 β = 0.850
 f_y - Main Rebar = 60.0 ksi
 E - Main Rebar = 29,000.0 ksi
Allow. Reinforcing Limits *ASTM A615 Bars Used*
Min. Reinf. = 1.0 %
Max. Reinf. = 8.0 %

Overall Column Height = 14.420 ft
End Fixity **Top & Bottom Pinned**
Brace condition for deflection (buckling) along columns :
X-X (width) axis :
Unbraced Length for buckling ABOUT Y-Y Axis = 14.420 ft, $K = 1.0$
Y-Y (depth) axis :
Unbraced Length for buckling ABOUT X-X Axis = 14.420 ft, $K = 1.0$

Column Cross Section

Column Dimensions : 20.0in Square Column, Column Edge to Rebar Edge Cover = 2.0in

Column Reinforcing : 4 - #8 bars @ corners,, 2 - #8 bars top & bottom between corner bars, 2 - #8 bars left & right between corner bars



Entered loads are factored per load combinations specified by user.

Applied Loads

Column self weight included : 6,008.33 lbs * Dead Load Factor
AXIAL LOADS . . .
Roof + Tower Loads: Axial Load at 14.420 ft above base, D = 147.450, LR = 2.990, L = 224.860, S = 4.480 k

DESIGN SUMMARY

Load Combination **+1.20D+1.60L+0.50S**
Location of max. above base **14.323 ft**
Maximum Stress Ratio 0.554 : 1
Ratio = $(P_u^2 + M_u^2)^{.5} / (\Phi P_n^2 + \Phi M_n^2)^{.5}$
 $P_u = 546.17$ k $\Phi * P_n = 986.22$ k
 $M_u - x = 0.0$ k-ft $\Phi * M_n - x = 0.0$ k-ft
 $M_u - y = 0.0$ k-ft $\Phi * M_n - y = 0.0$ k-ft
 M_u Angle = 0.0 deg
 M_u at Angle = 0.0 k-ft ΦM_n at Angle = 0.0 k-ft

P_n & M_n values located at P_u-M_u vector intersection with capacity curve

Column Capacities . . .

P_nmax : Nominal Max. Compressive Axial Capacity **1,896.57** k
P_nmin : Nominal Min. Tension Axial Capacity k
 ΦP_n , max : Usable Compressive Axial Capacity **986.22** k
 ΦP_n , min : Usable Tension Axial Capacity k

Maximum SERVICE Load Reactions . .

Top along Y-Y **0.0** k Bottom along Y-Y **0.0** k
Top along X-X **0.0** k Bottom along X-X **0.0** k

Maximum SERVICE Load Deflections . . .

Along Y-Y **0.0** in at **0.0** ft above base
for load combination :
Along X-X **0.0** in at **0.0** ft above base
for load combination :

General Section Information . $\phi = 0.650$ $\beta = 0.850$ $\theta = 0.80$

ρ : % Reinforcing **2.370** % Rebar % Ok
Reinforcing Area **9.480** in²
Concrete Area **400.0** in²

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base ft	Axial Load k Pu	Bending Analysis k-ft						Utilization	
	X-X	Y-Y			$\phi * P_n$	δx	$\delta x * M_{ux}$	δy	$\delta y * M_{uy}$	Alpha (deg)	δM_u	ϕM_n Ratio
+1.40D			14.32	214.84	986.22					0.000		0.218
+1.20D+0.50Lr+1.60L			14.32	545.42	986.22					0.000		0.553
+1.20D+1.60L+0.50S			14.32	546.17	986.22					0.000		0.554

Concrete Column

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Centerline Communications

Lic. #: KW-06013597

DESCRIPTION: First Floor Column

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base ft	Axial Load k		Bending Analysis k-ft								Utilization	
	X-X	Y-Y		Pu	$\phi * P_n$	δx	$\delta x * M_{ux}$	δy	$\delta y * M_{uy}$	Alpha (deg)	δM_u	ϕM_n	Ratio		
+1.20D+1.60Lr+0.50L			14.32	301.36	986.22					0.000			0.306		
+1.20D+1.60Lr			14.32	188.93	986.22					0.000			0.192		
+1.20D+0.50L+1.60S			14.32	303.75	986.22					0.000			0.308		
+1.20D+1.60S			14.32	191.32	986.22					0.000			0.194		
+1.20D+0.50Lr+0.50L			14.32	298.08	986.22					0.000			0.302		
+1.20D+0.50L+0.50S			14.32	298.82	986.22					0.000			0.303		
+1.20D+0.50L+0.70S			14.32	299.72	986.22					0.000			0.304		
+0.90D			14.32	138.11	986.22					0.000			0.140		

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top		@ Base	@ Top
D Only						153.458					
+D+L						378.318					
+D+Lr						156.448					
+D+S						157.938					
+D+0.750Lr+0.750L						324.346					
+D+0.750L+0.750S						325.463					
+0.60D						92.075					
Lr Only						2.990					
L Only						224.860					
S Only						4.480					

Maximum Moment Reactions

Note: Only non-zero reactions are listed.

Load Combination	Moment About X-X Axis			Moment About Y-Y Axis		
	@ Base	@ Top		@ Base	@ Top	
D Only			k-ft			k-ft
+D+L			k-ft			k-ft
+D+Lr			k-ft			k-ft
+D+S			k-ft			k-ft
+D+0.750Lr+0.750L			k-ft			k-ft
+D+0.750L+0.750S			k-ft			k-ft
+0.60D			k-ft			k-ft
Lr Only			k-ft			k-ft
L Only			k-ft			k-ft
S Only			k-ft			k-ft

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance	Max. Y-Y Deflection		Distance
D Only	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+L	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+Lr	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+S	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+0.750Lr+0.750L	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+0.750L+0.750S	0.0000	in	0.000 ft	0.000	in	0.000 ft
+0.60D	0.0000	in	0.000 ft	0.000	in	0.000 ft
Lr Only	0.0000	in	0.000 ft	0.000	in	0.000 ft
L Only	0.0000	in	0.000 ft	0.000	in	0.000 ft
S Only	0.0000	in	0.000 ft	0.000	in	0.000 ft

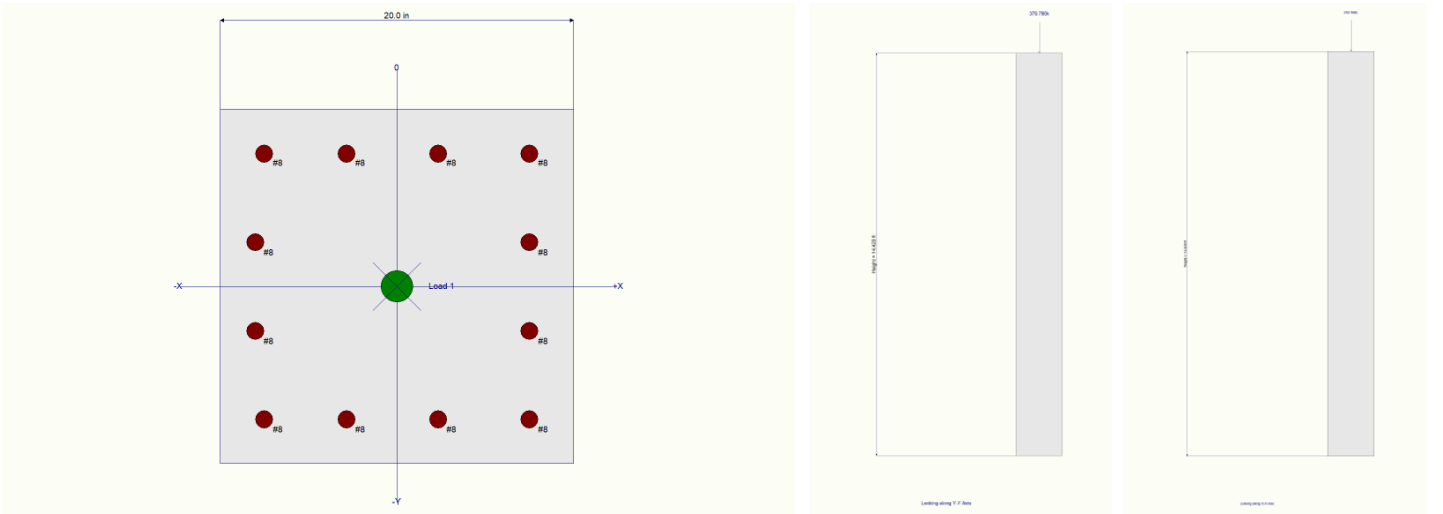
Concrete Column

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DESCRIPTION: **First Floor Column**

Sketches



Interaction Diagrams

Concrete Column

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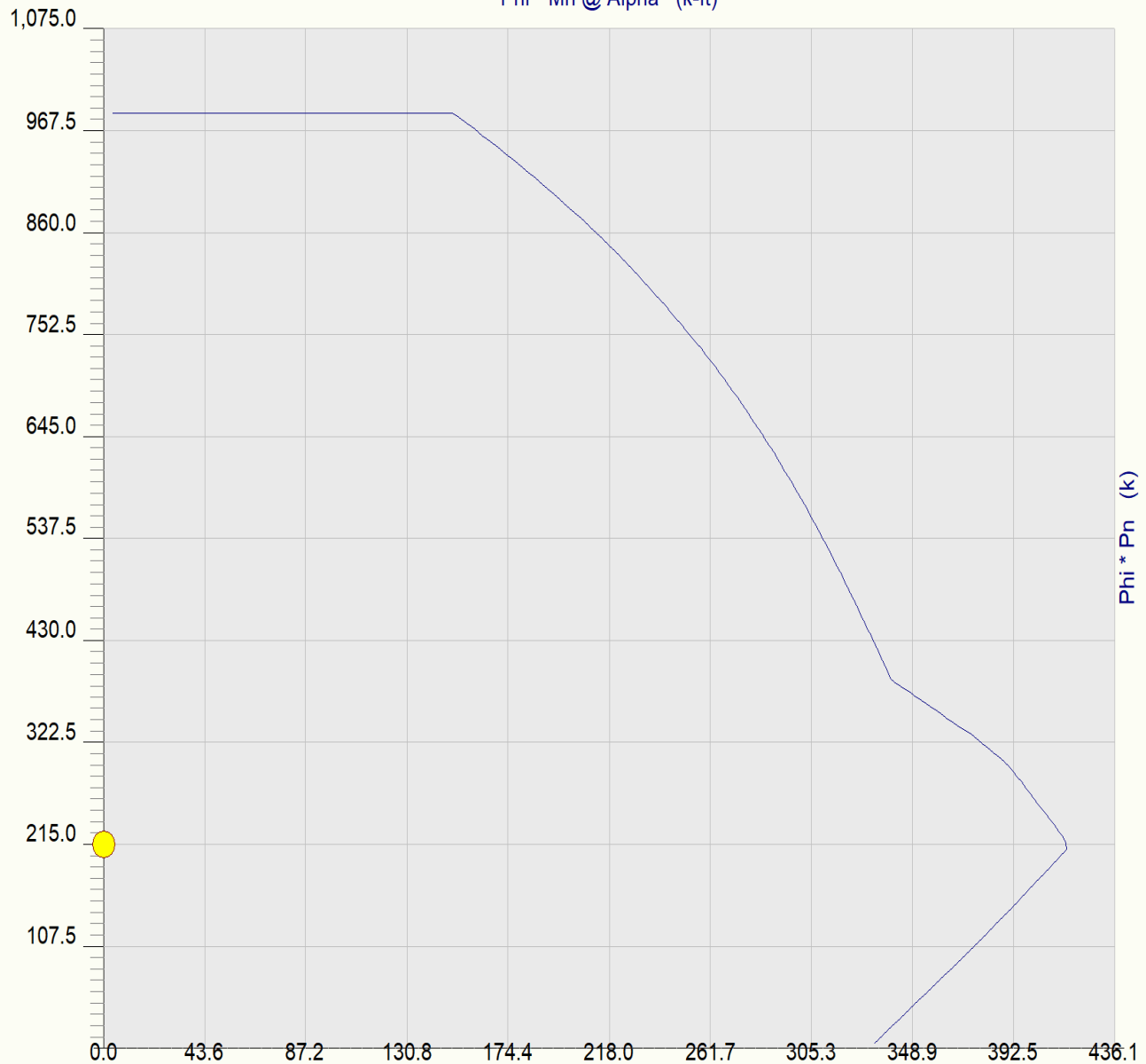
Lic. # : KW-06013597

DESCRIPTION: **First Floor Column**

Concrete Column P-M Interaction Diagram

$\Phi * M_n @ \alpha$ (k-ft)

$\Phi * P_n$ (k)



Load Comb. = +1.40D, Alpha= 0.0deg, (214.84, 0.00)

Concrete Column

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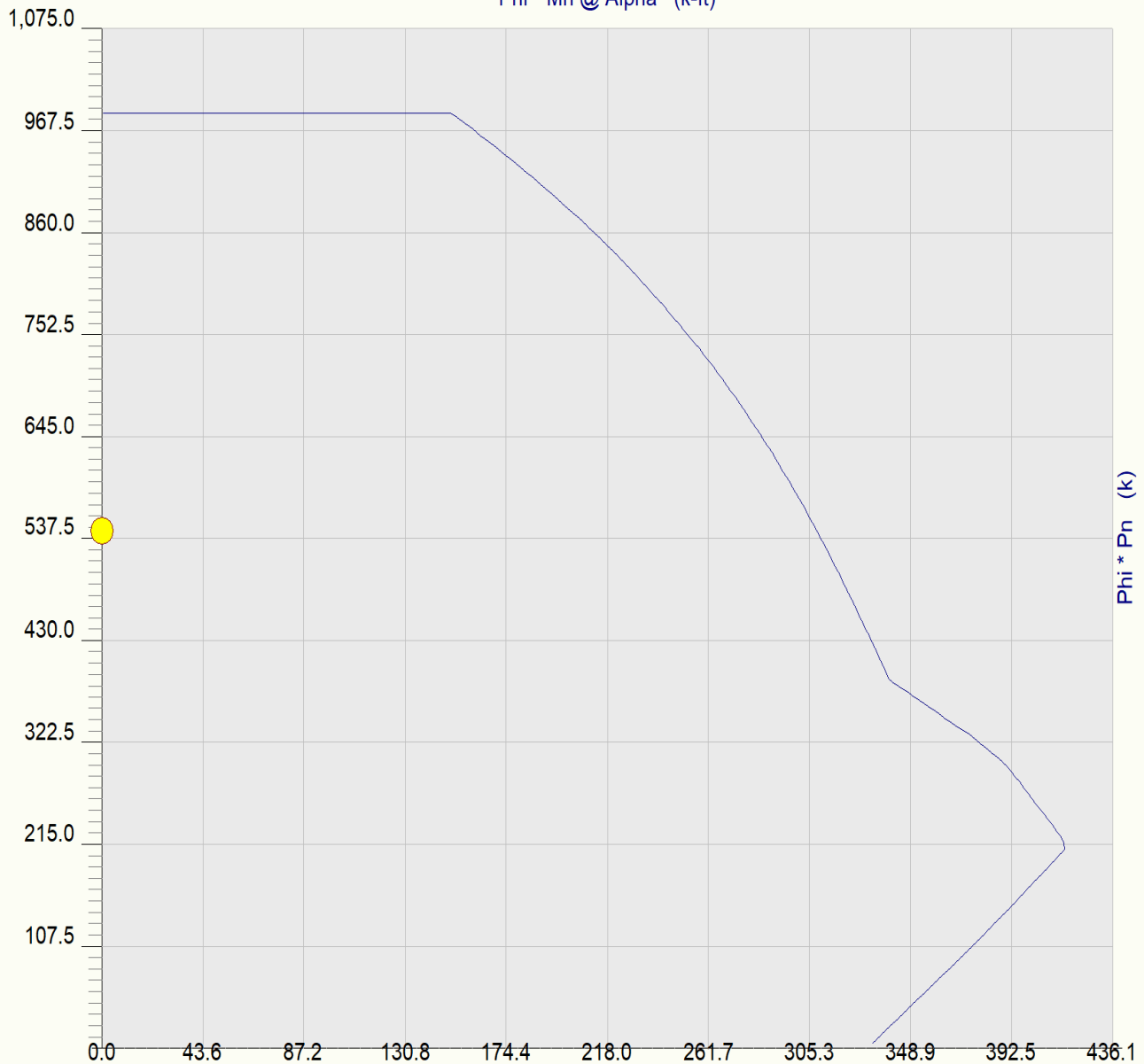
Lic. # : KW-06013597

DESCRIPTION: **First Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)

Phi * Pn (k)



Load Comb. = +1.20D+0.50L+1.60L, Alpha= 0.0deg, (545.42, 0.00)

Concrete Column

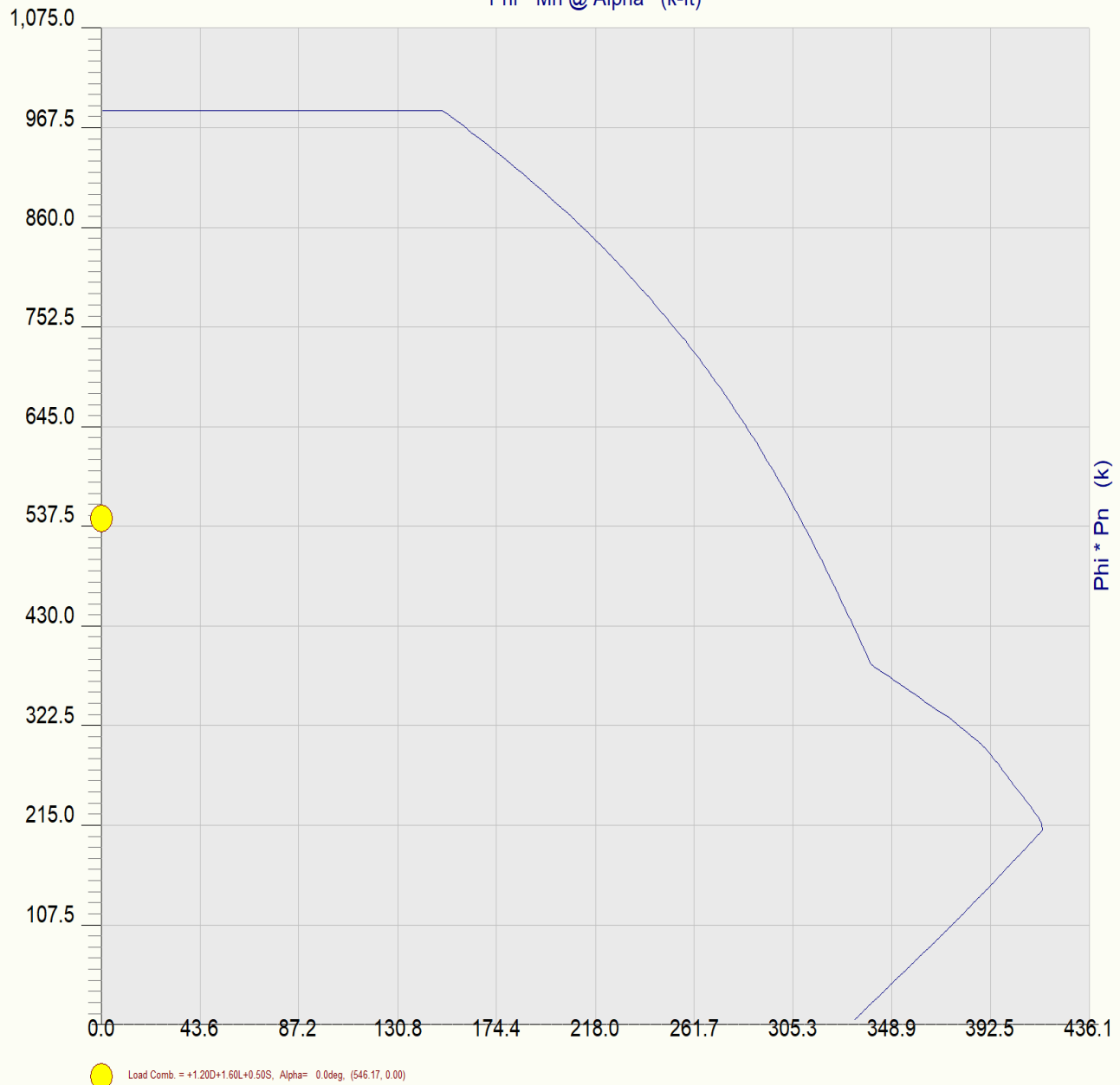
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DESCRIPTION: **First Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)



Concrete Column

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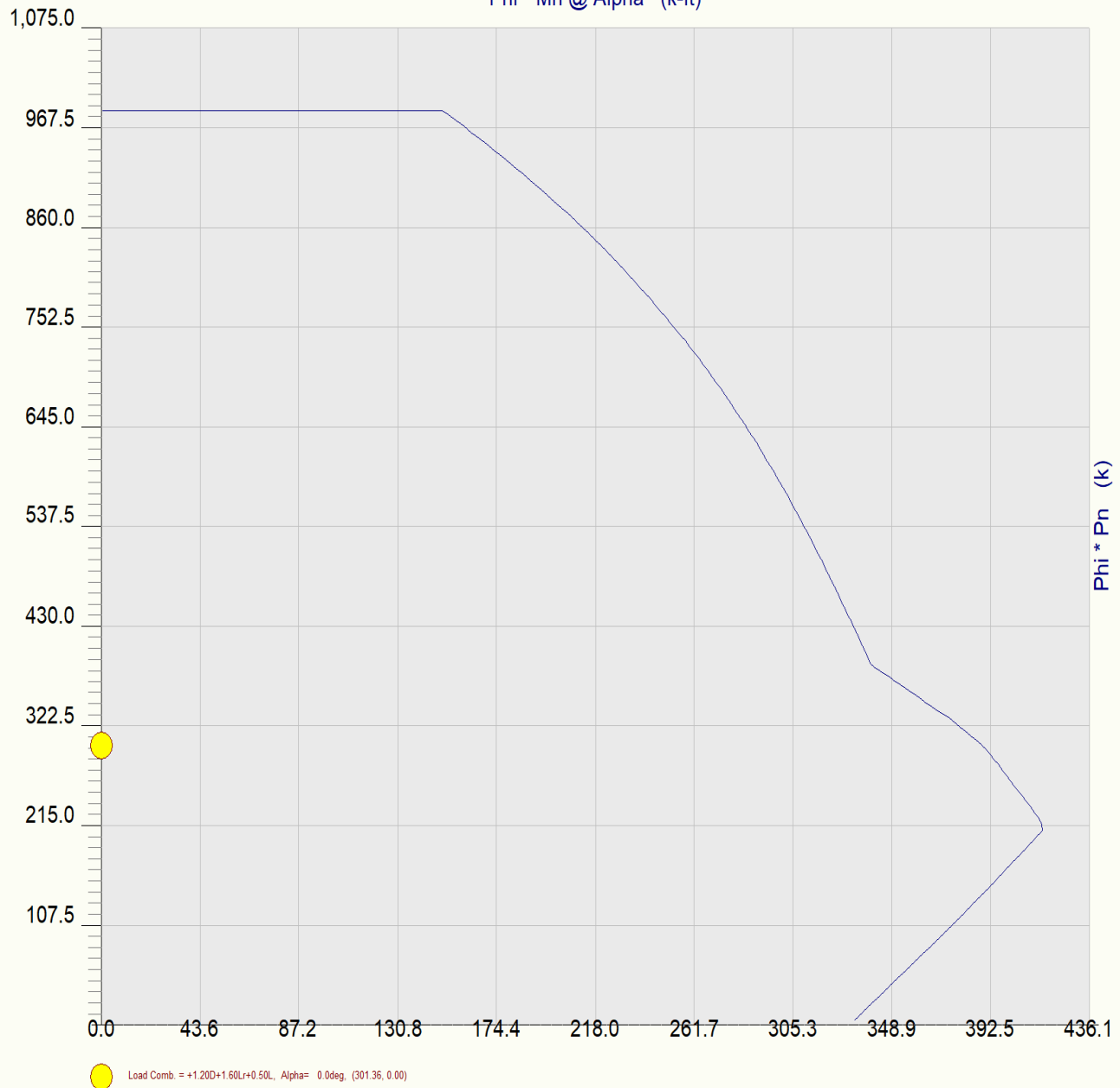
Lic. # : KW-06013597

DESCRIPTION: **First Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)

Phi * Pn (k)



Concrete Column

File: 638283 Exterior Column Analysis.ec6
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Centerline Communications

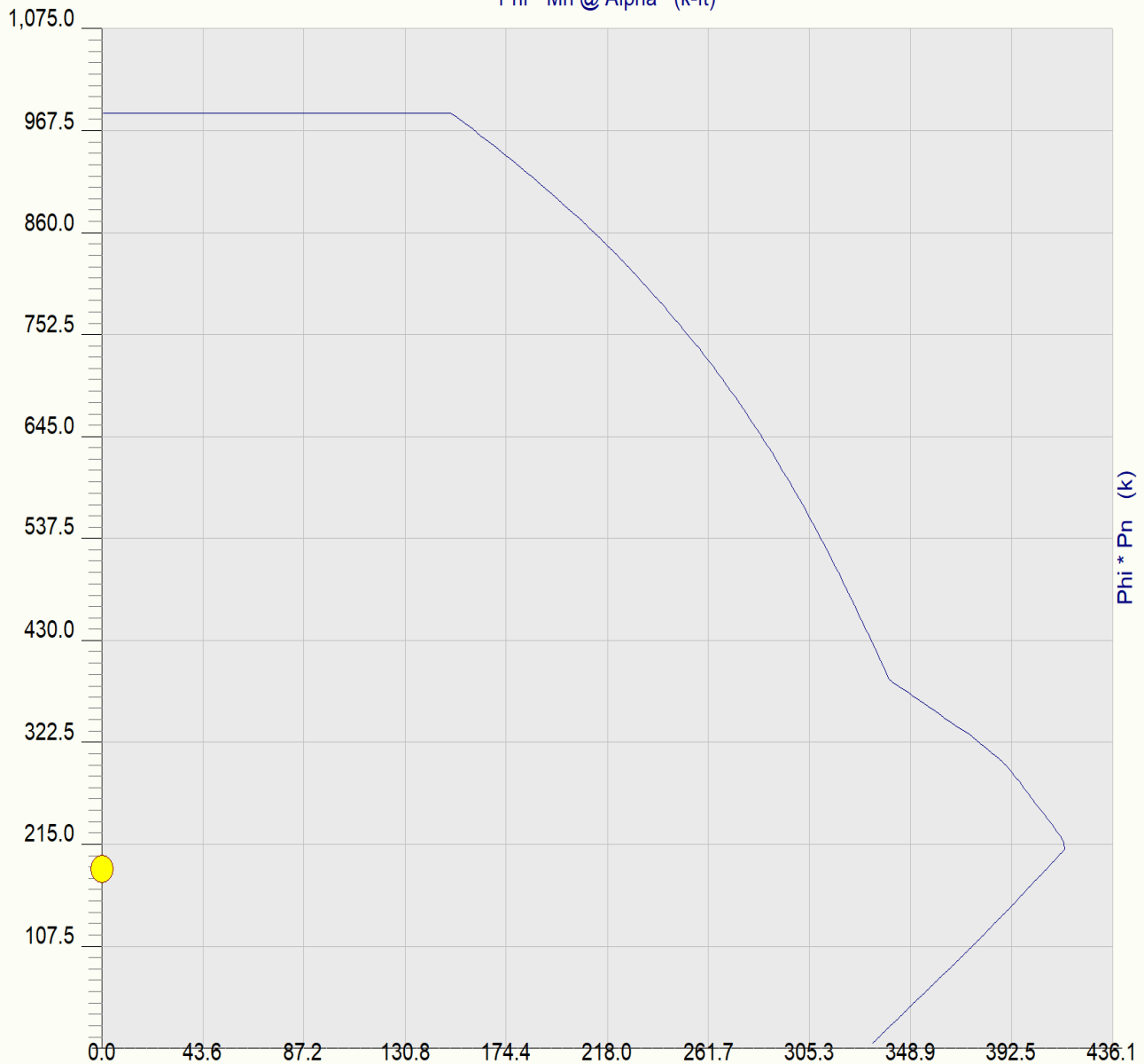
Lic. # : KW-06013597

DESCRIPTION: **First Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)

Phi * Pn (k)



Load Comb. = +1.20D+1.60Lr, Alpha= 0.0deg, (188.93, 0.00)

Concrete Column

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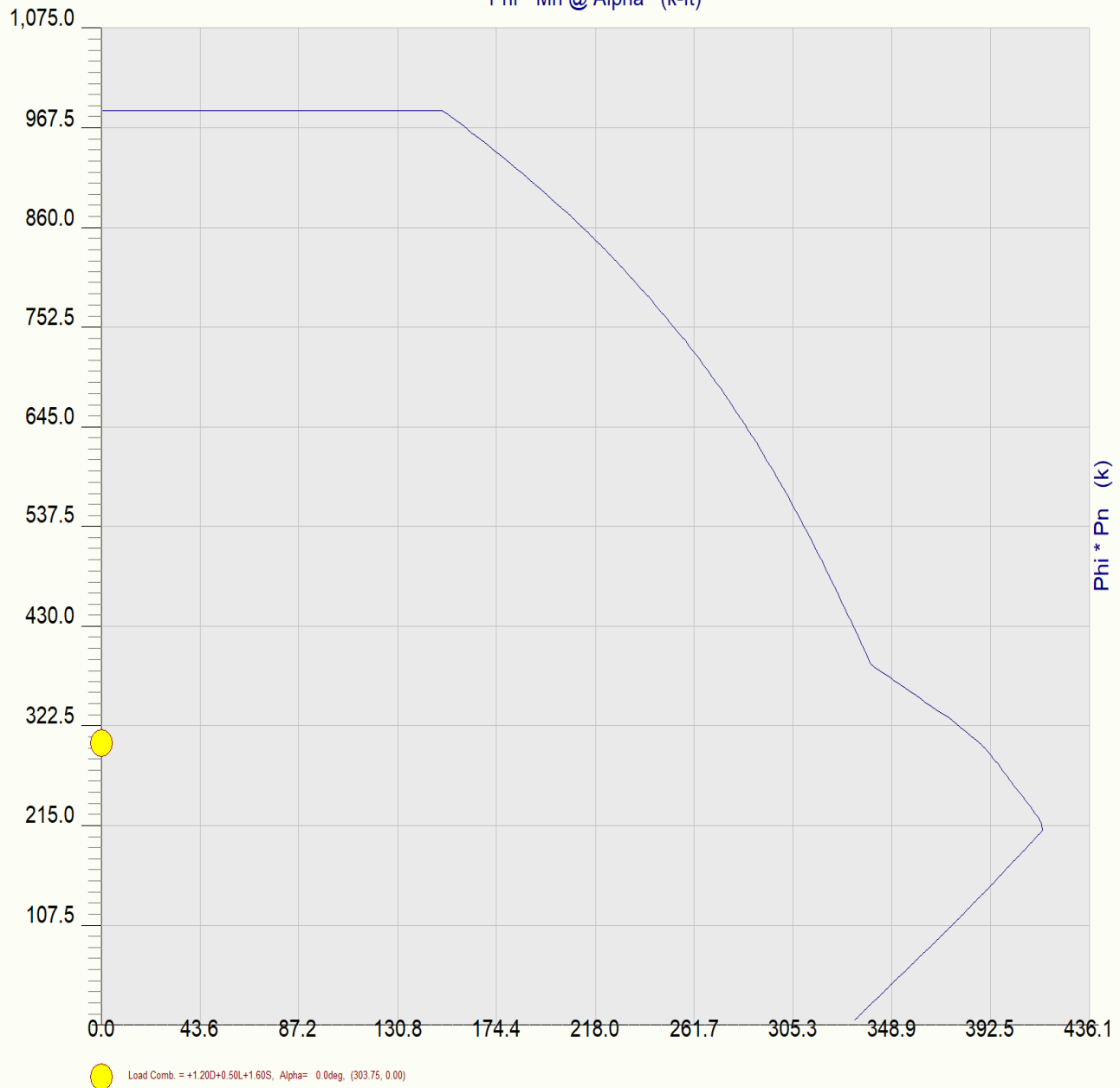
Lic. # : KW-06013597

DESCRIPTION: **First Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)

Phi * Pn (k)



Concrete Column

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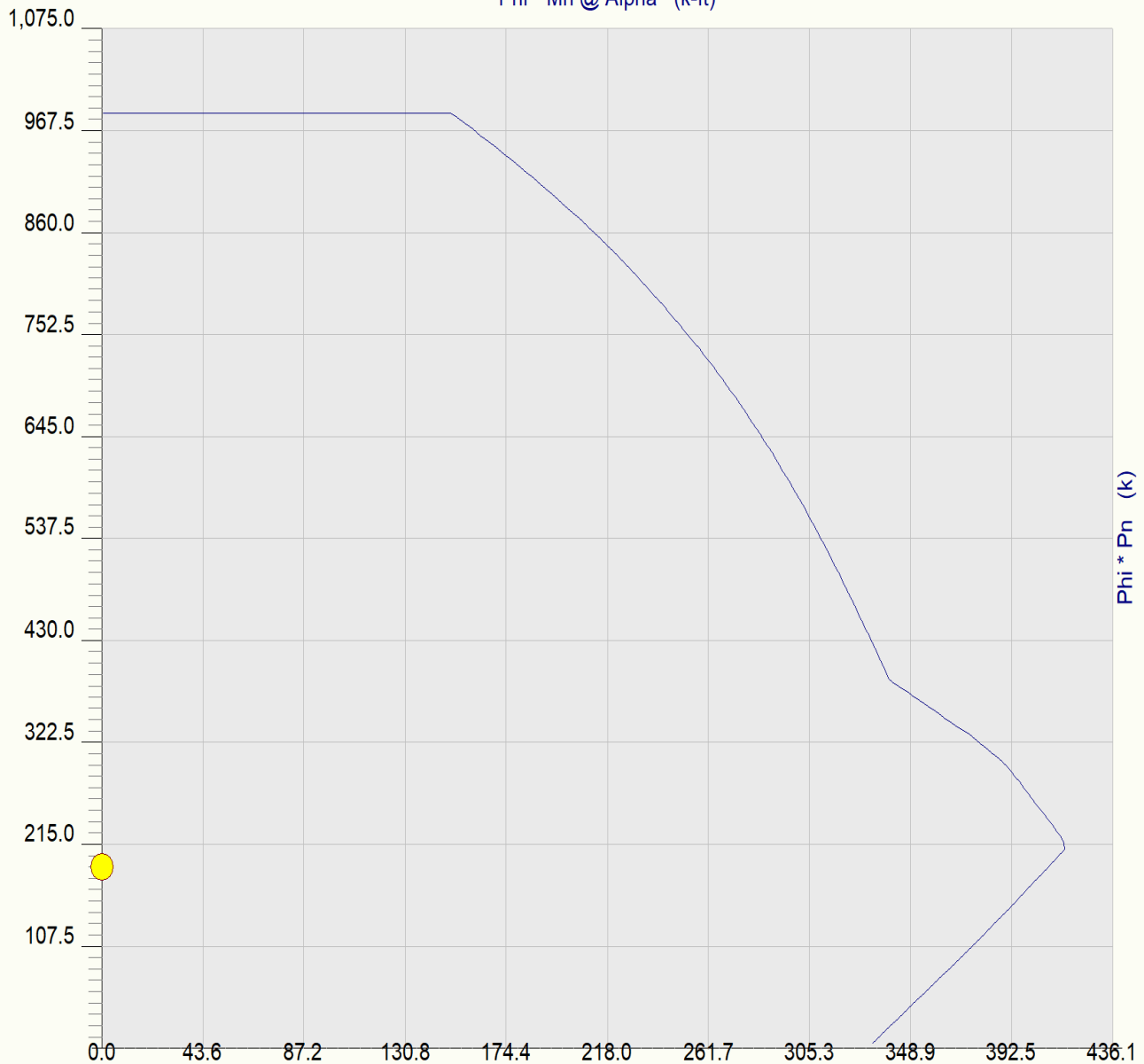
Lic. # : KW-06013597

DESCRIPTION: **First Floor Column**

Concrete Column P-M Interaction Diagram

$\Phi * M_n @ \alpha$ (k-ft)

$\Phi * P_n$ (k)



Load Comb. = +1.20D+1.60S, Alpha= 0.0deg, (191.32, 0.00)

Concrete Column

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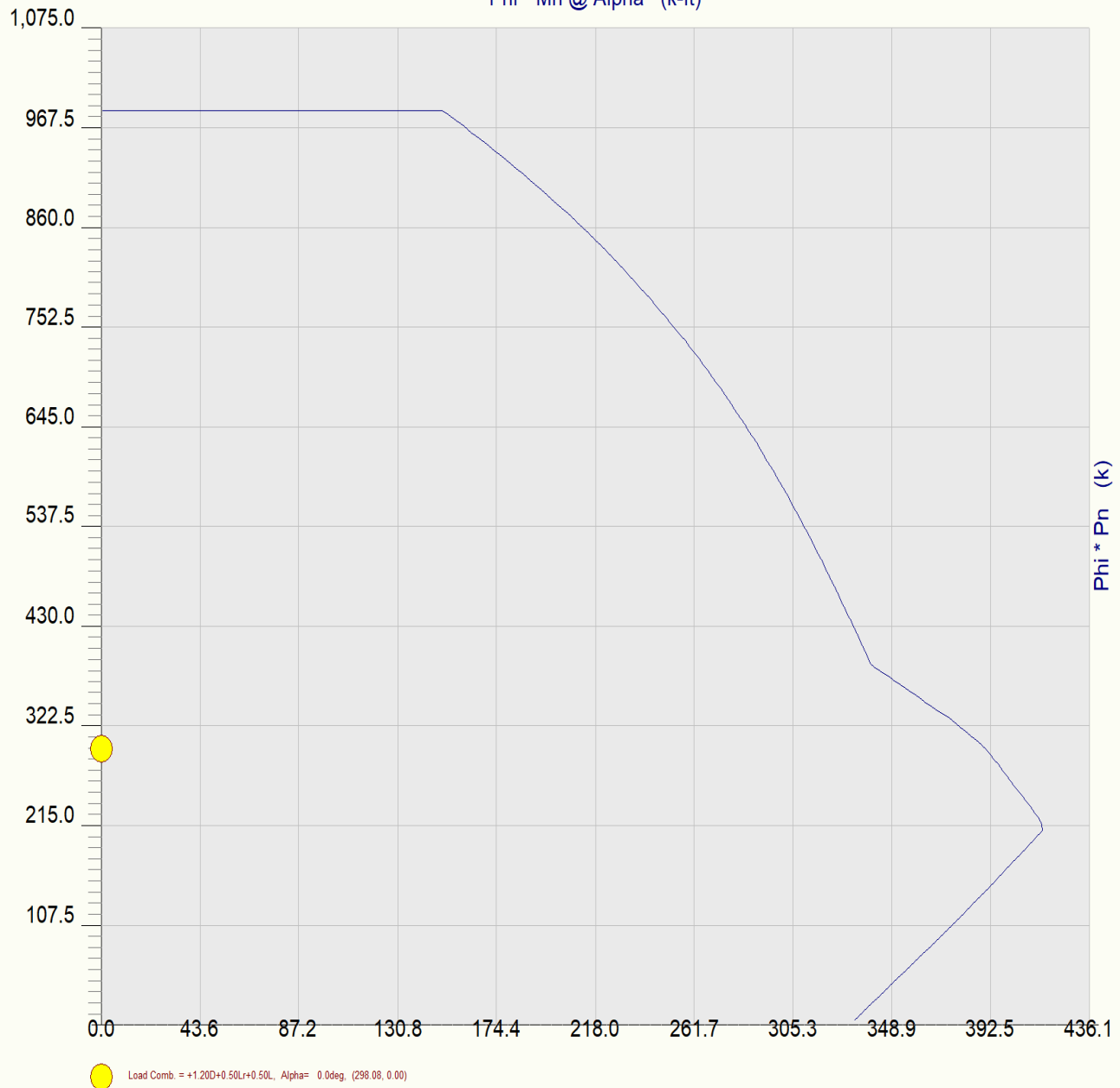
Lic. # : KW-06013597

DESCRIPTION: **First Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)

Phi * Pn (k)



Concrete Column

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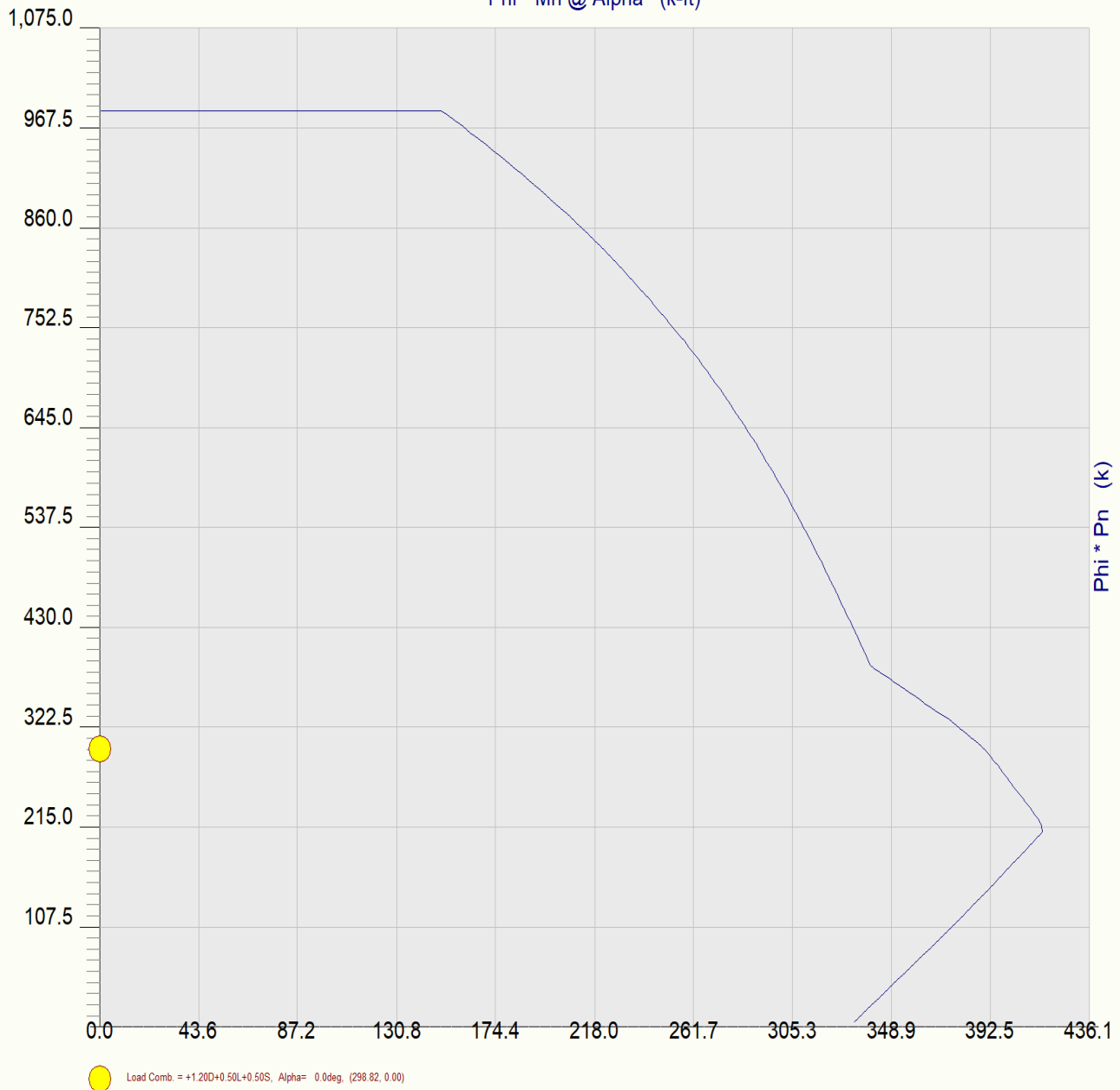
Lic. # : KW-06013597

DESCRIPTION: **First Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)

Phi * Pn (k)



Concrete Column

File: 638283 Exterior Column Analysis.ec6
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Centerline Communications

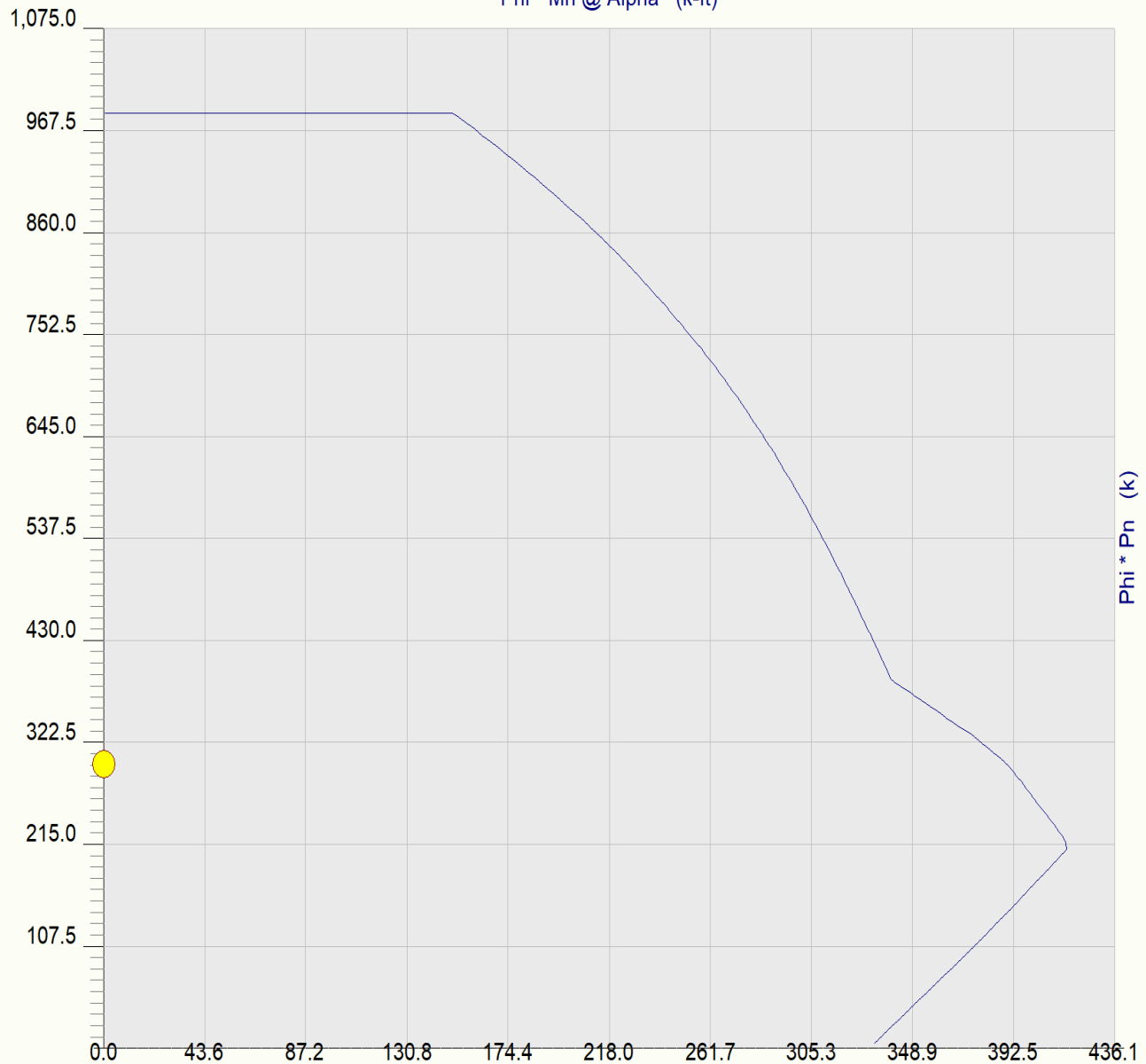
Lic. # : KW-06013597

DESCRIPTION: **First Floor Column**

Concrete Column P-M Interaction Diagram

$\Phi * M_n @ \text{Alpha}$ (k-ft)

$\Phi * P_n$ (k)



Load Comb. = +1.20D+0.50L+0.70S, Alpha= 0.0deg, (299.72, 0.00)

Concrete Column

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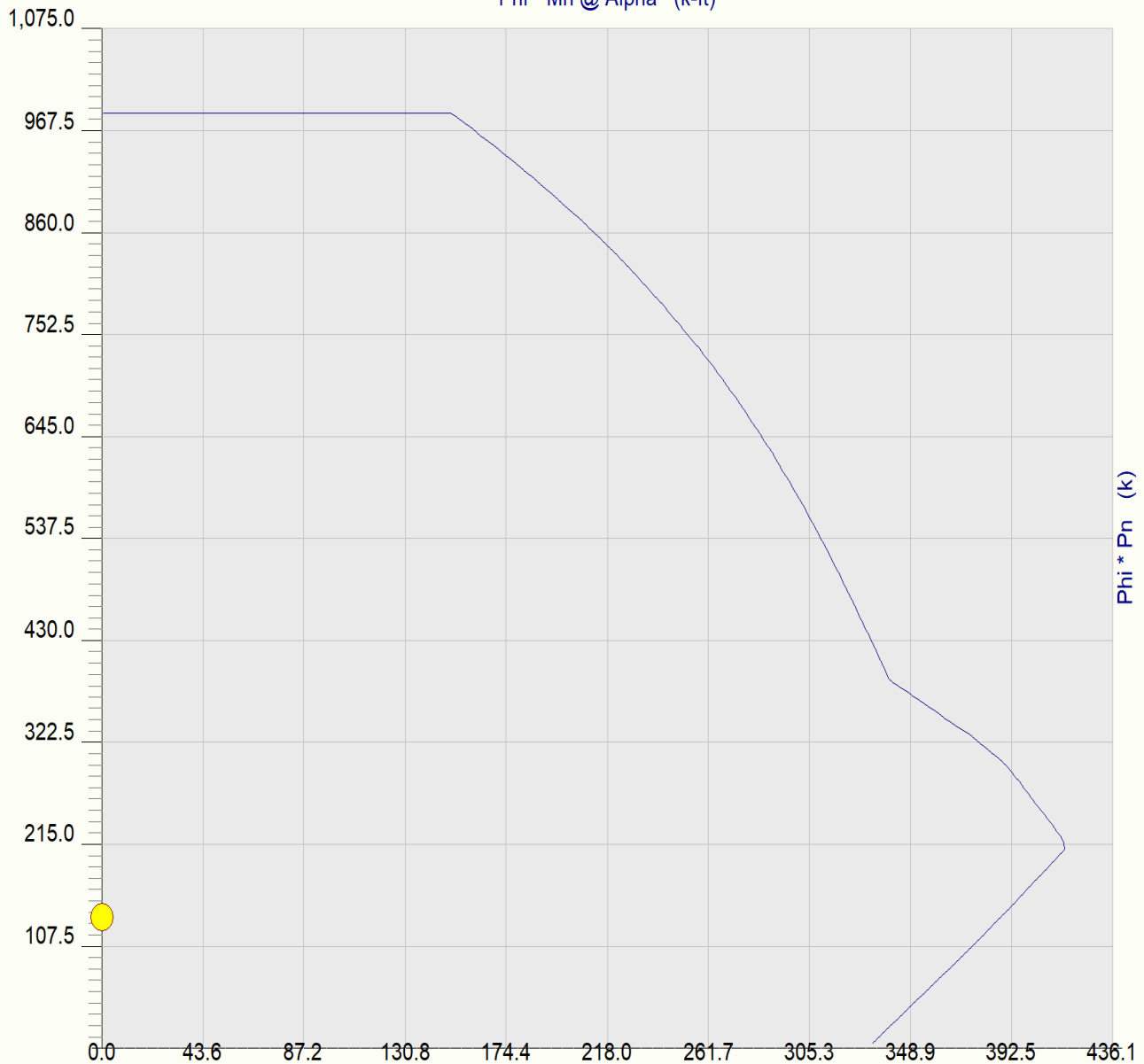
Lic. # : KW-06013597

DESCRIPTION: **First Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)

Phi * Pn (k)



Load Comb. = +0.90D, Alpha= 0.0deg, (138.11, 0.00)

Concrete Column

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Lic. #: KW-06013597

DESCRIPTION: G Floor Column

Code References

Calculations per ACI 318-14, IBC 2015, CBC 2016, ASCE 7-10

Load Combinations Used : IBC 2015

General Information

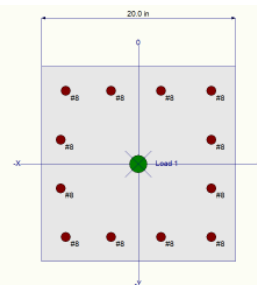
f'_c : Concrete 28 day strength = 4.0 ksi
 E = 3,605.0 ksi
 Density = 150.0 pcf
 β = 0.850
 f_y - Main Rebar = 60.0 ksi
 E - Main Rebar = 29,000.0 ksi
 Allow. Reinforcing Limits *ASTM A615 Bars Used*
 Min. Reinf. = 1.0 %
 Max. Reinf. = 8.0 %

Overall Column Height = 12.340 ft
 End Fixity **Top & Bottom Pinned**
 Brace condition for deflection (buckling) along columns :
 X-X (width) axis :
 Unbraced Length for buckling ABOUT Y-Y Axis = 12.340 ft, K = 1.0
 Y-Y (depth) axis :
 Unbraced Length for buckling ABOUT X-X Axis = 12.340 ft, K = 1.0

Column Cross Section

Column Dimensions : 20.0in Square Column, Column Edge to Rebar Edge Cover = 2.0in

 Column Reinforcing : 4 - #8 bars @ corners,, 2 - #8 bars top & bottom between corner bars, 2 - #8 bars left & right between corner bars



Applied Loads

Entered loads are factored per load combinations specified by user.

Column self weight included : 5,141.67 lbs * Dead Load Factor

AXIAL LOADS ...

Roof + Tower Loads: Axial Load at 12.340 ft above base, D = 172.130, LR = 2.990, L = 239.80, S = 4.480 k

DESIGN SUMMARY

Load Combination **+1.20D+1.60L+0.50S**
 Location of max. above base **12.257 ft**
Maximum Stress Ratio : 0.607 : 1
 $\text{Ratio} = (P_u^2 + M_u^2)^{.5} / (\phi P_n^2 + \phi M_n^2)^{.5}$
 $P_u = 598.65 \text{ k}$ $\phi * P_n = 986.22 \text{ k}$
 $M_{u-x} = 0.0 \text{ k-ft}$ $\phi * M_{n-x} = 0.0 \text{ k-ft}$
 $M_{u-y} = 0.0 \text{ k-ft}$ $\phi * M_{n-y} = 0.0 \text{ k-ft}$
 $M_u \text{ Angle} = 0.0 \text{ deg}$
 $M_u \text{ at Angle} = 0.0 \text{ k-ft}$ $\phi M_n \text{ at Angle} = 0.0 \text{ k-ft}$

P_n & M_n values located at P_u-M_u vector intersection with capacity curve

Column Capacities ...

P_{nmax} : Nominal Max. Compressive Axial Capacity **1,896.57 k**
 P_{nmin} : Nominal Min. Tension Axial Capacity **k**
 ϕP_n , max : Usable Compressive Axial Capacity **986.22 k**
 ϕP_n , min : Usable Tension Axial Capacity **k**

Maximum SERVICE Load Reactions . .

Top along Y-Y **0.0 k** Bottom along Y-Y **0.0 k**
 Top along X-X **0.0 k** Bottom along X-X **0.0 k**

Maximum SERVICE Load Deflections . .

Along Y-Y **0.0 in** at **0.0 ft** above base
 for load combination :
 Along X-X **0.0 in** at **0.0 ft** above base
 for load combination :

General Section Information . $\phi = 0.650$ $\beta = 0.850$ $\theta = 0.80$

ρ : % Reinforcing **2.370 %** Rebar % Ok
 Reinforcing Area **9.480 in²**
 Concrete Area **400.0 in²**

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base ft	Axial Load k Pu	$\phi * P_n$	Bending Analysis k-ft				Utilization		
	X-X	Y-Y				δx	$\delta x * M_{ux}$	δy	$\delta y * M_{uy}$	Alpha (deg)	δM_u	ϕM_n Ratio
+1.40D			12.26	248.18	986.22					0.000		0.252
+1.20D+0.50Lr+1.60L			12.26	597.90	986.22					0.000		0.606
+1.20D+1.60L+0.50S			12.26	598.65	986.22					0.000		0.607

Concrete Column

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DESCRIPTION: G Floor Column

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base ft	Axial Load k		Bending Analysis k-ft								Utilization	
	X-X	Y-Y		Pu	$\phi * P_n$	δx	$\delta x * M_{ux}$	δy	$\delta y * M_{uy}$	Alpha (deg)	δM_u	ϕM_n	Ratio		
+1.20D+1.60Lr+0.50L			12.26	337.41	986.22					0.000			0.342		
+1.20D+1.60Lr			12.26	217.51	986.22					0.000			0.221		
+1.20D+0.50L+1.60S			12.26	339.79	986.22					0.000			0.345		
+1.20D+1.60S			12.26	219.89	986.22					0.000			0.223		
+1.20D+0.50Lr+0.50L			12.26	334.12	986.22					0.000			0.339		
+1.20D+0.50L+0.50S			12.26	334.87	986.22					0.000			0.340		
+1.20D+0.50L+0.70S			12.26	335.76	986.22					0.000			0.340		
+0.90D			12.26	159.54	986.22					0.000			0.162		

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	My - End Moments		k-ft	Mx - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top		@ Base	@ Top
D Only						177.272					
+D+L						417.072					
+D+Lr						180.262					
+D+S						181.752					
+D+0.750Lr+0.750L						359.364					
+D+0.750L+0.750S						360.482					
+0.60D						106.363					
Lr Only						2.990					
L Only						239.800					
S Only						4.480					

Maximum Moment Reactions

Note: Only non-zero reactions are listed.

Load Combination	Moment About X-X Axis			Moment About Y-Y Axis	
	@ Base	@ Top		@ Base	@ Top
D Only			k-ft		k-ft
+D+L			k-ft		k-ft
+D+Lr			k-ft		k-ft
+D+S			k-ft		k-ft
+D+0.750Lr+0.750L			k-ft		k-ft
+D+0.750L+0.750S			k-ft		k-ft
+0.60D			k-ft		k-ft
Lr Only			k-ft		k-ft
L Only			k-ft		k-ft
S Only			k-ft		k-ft

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance	Max. Y-Y Deflection		Distance
D Only	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+L	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+Lr	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+S	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+0.750Lr+0.750L	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+0.750L+0.750S	0.0000	in	0.000 ft	0.000	in	0.000 ft
+0.60D	0.0000	in	0.000 ft	0.000	in	0.000 ft
Lr Only	0.0000	in	0.000 ft	0.000	in	0.000 ft
L Only	0.0000	in	0.000 ft	0.000	in	0.000 ft
S Only	0.0000	in	0.000 ft	0.000	in	0.000 ft

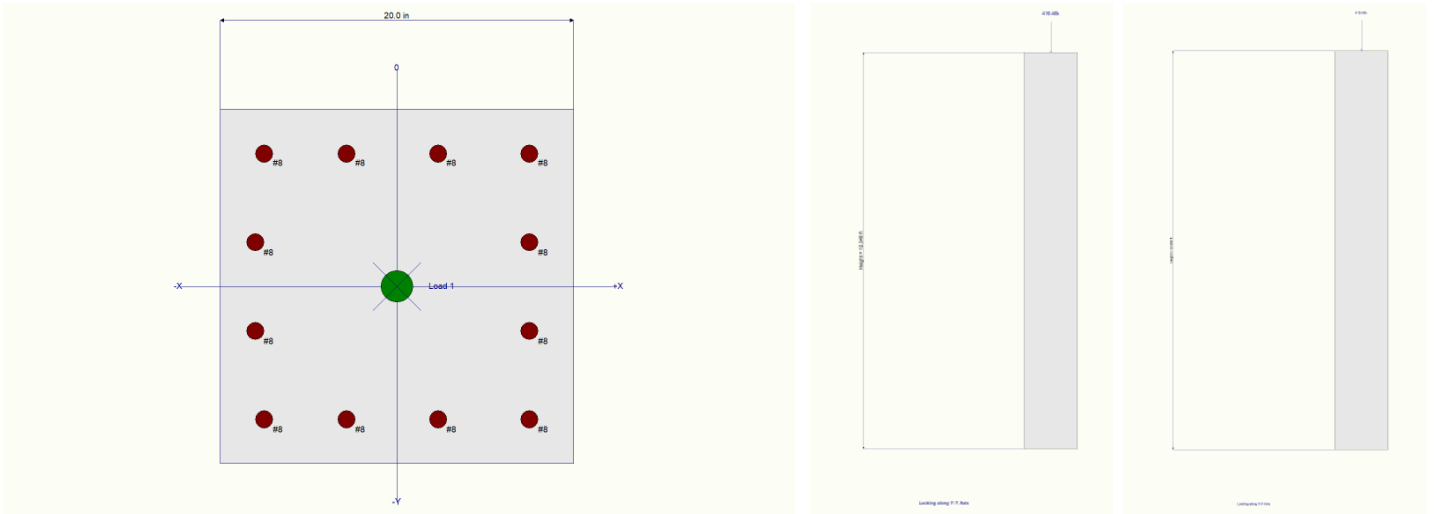
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DESCRIPTION: **G Floor Column**

Sketches



Interaction Diagrams

Concrete Column

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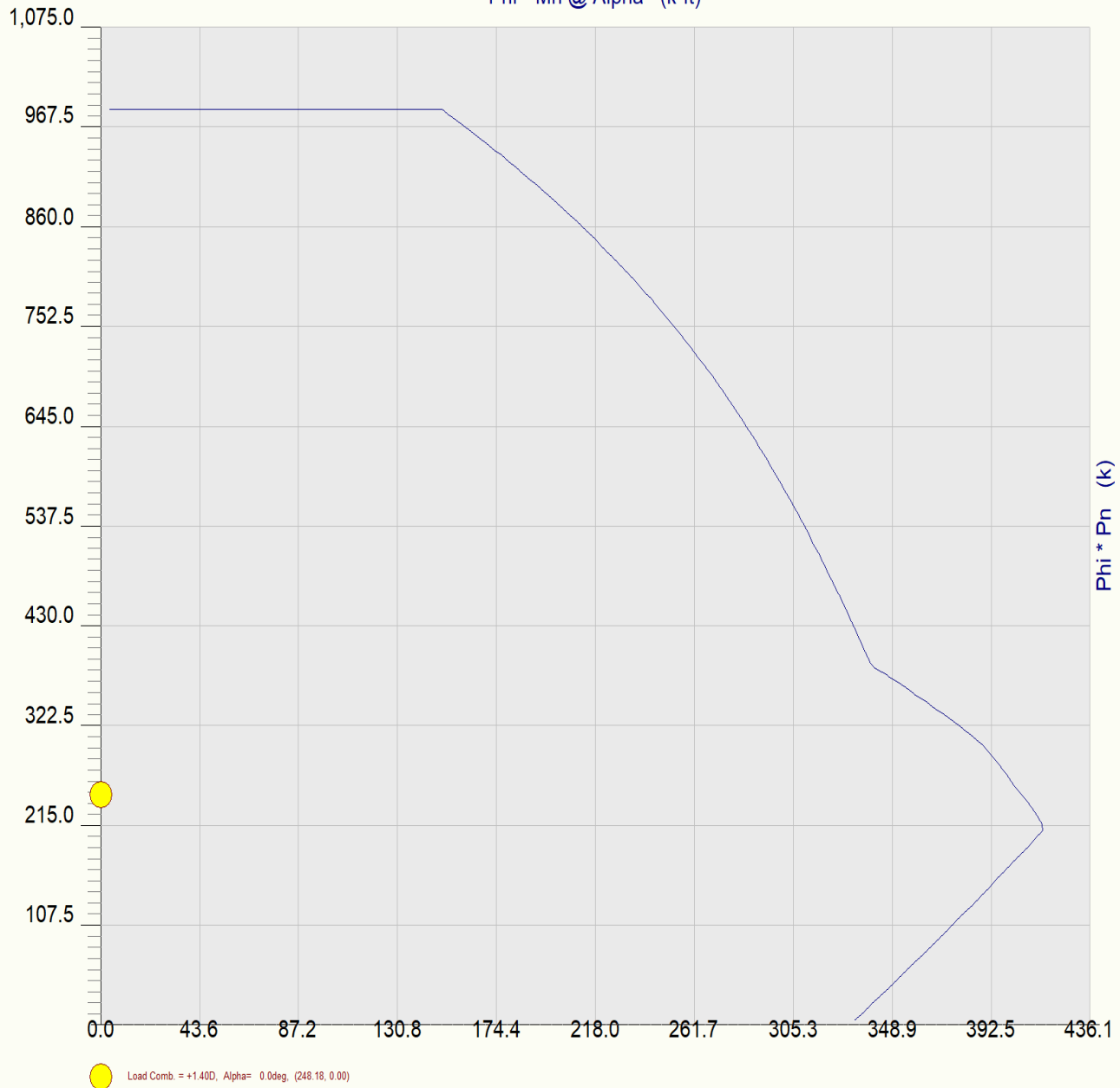
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DESCRIPTION: **G Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)

Phi * Pn (k)



Concrete Column

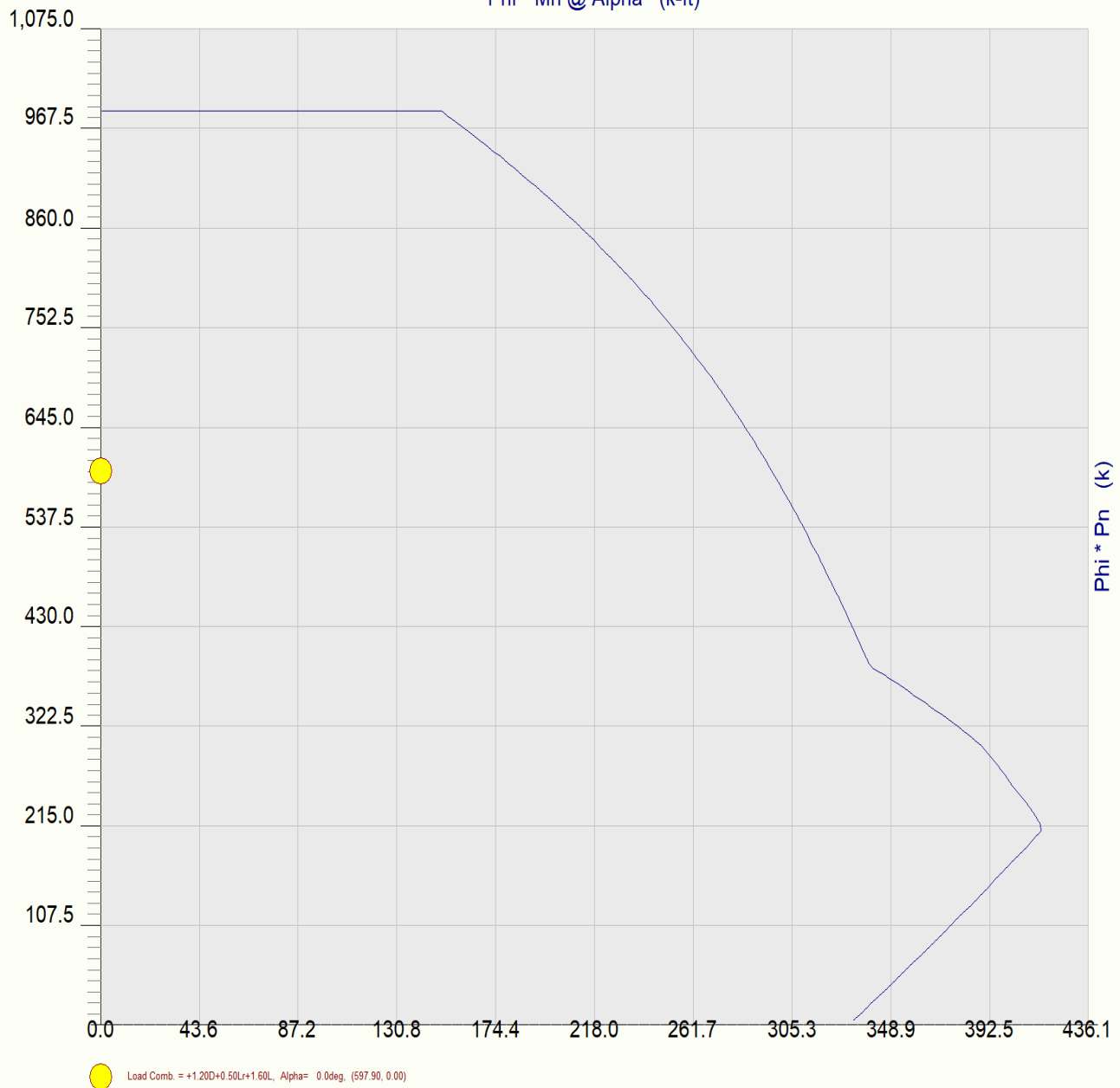
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DESCRIPTION: **G Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)



Concrete Column

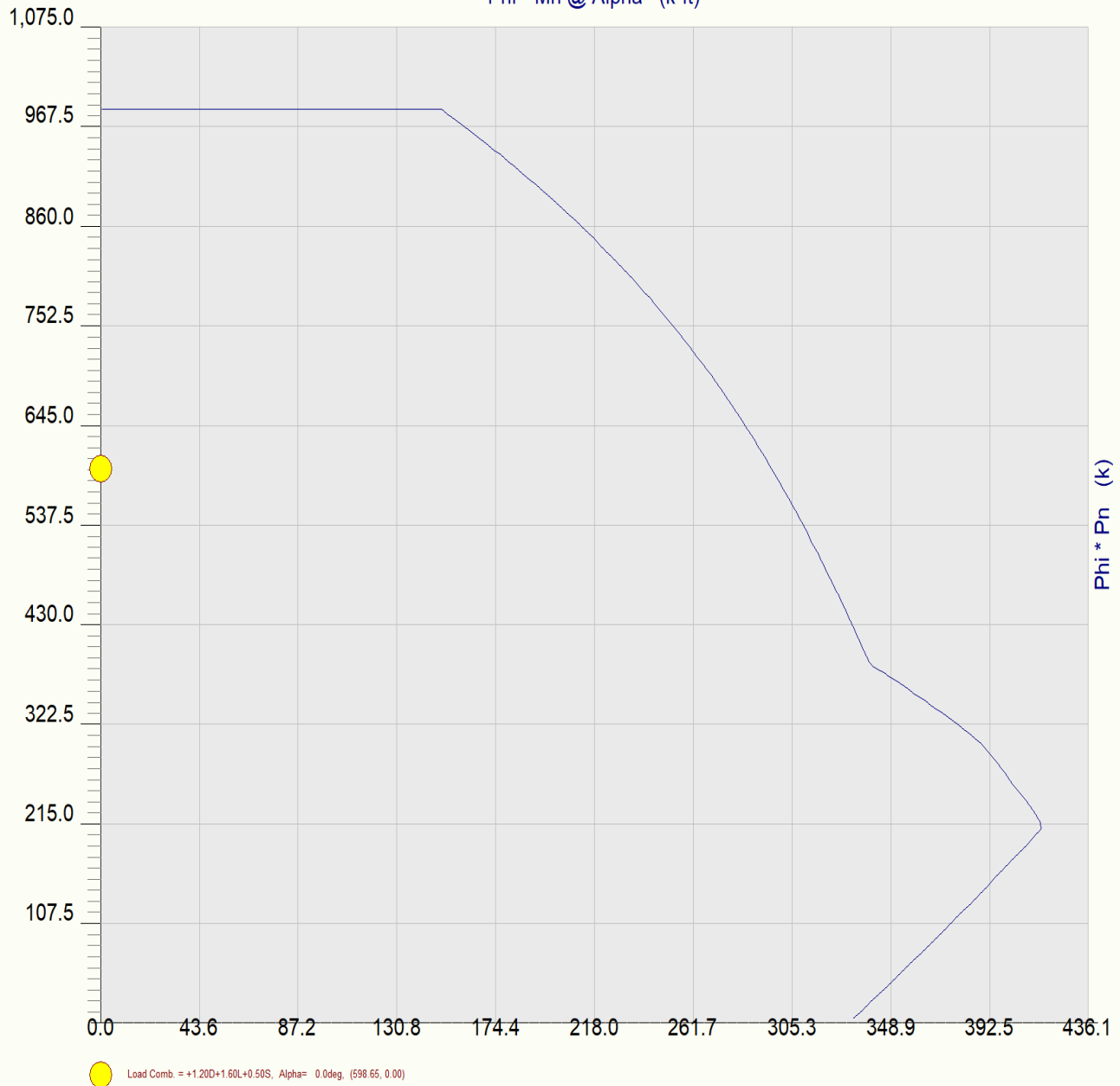
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Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)



Concrete Column

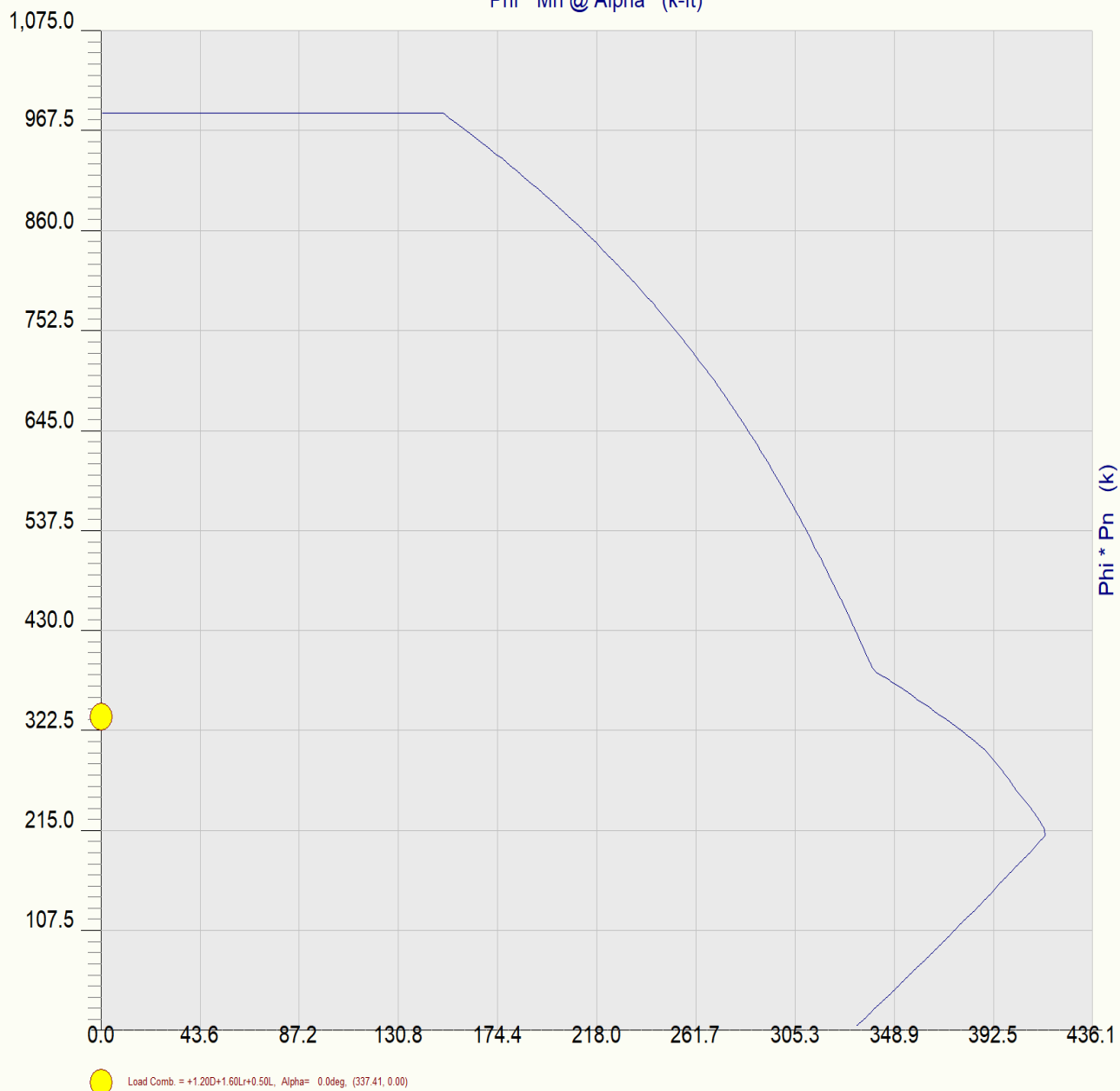
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Phi * Mn @ Alpha (k-ft)



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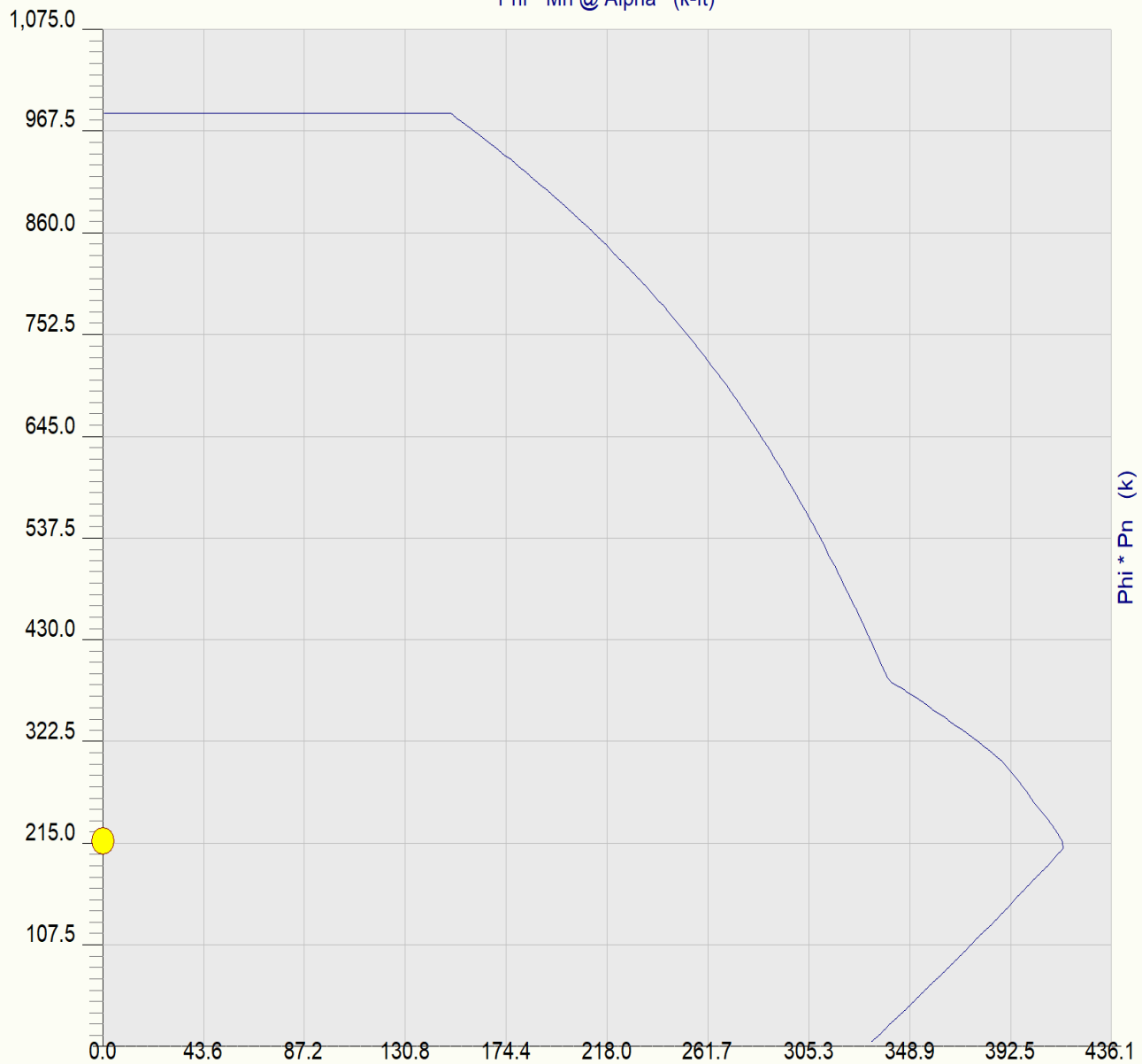
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DESCRIPTION: **G Floor Column**

Concrete Column P-M Interaction Diagram

$\Phi * M_n @ \text{Alpha}$ (k-ft)

$\Phi * P_n$ (k)



Load Comb. = +1.20D+1.60Lr, Alpha= 0.0deg, (217.51, 0.00)

Concrete Column

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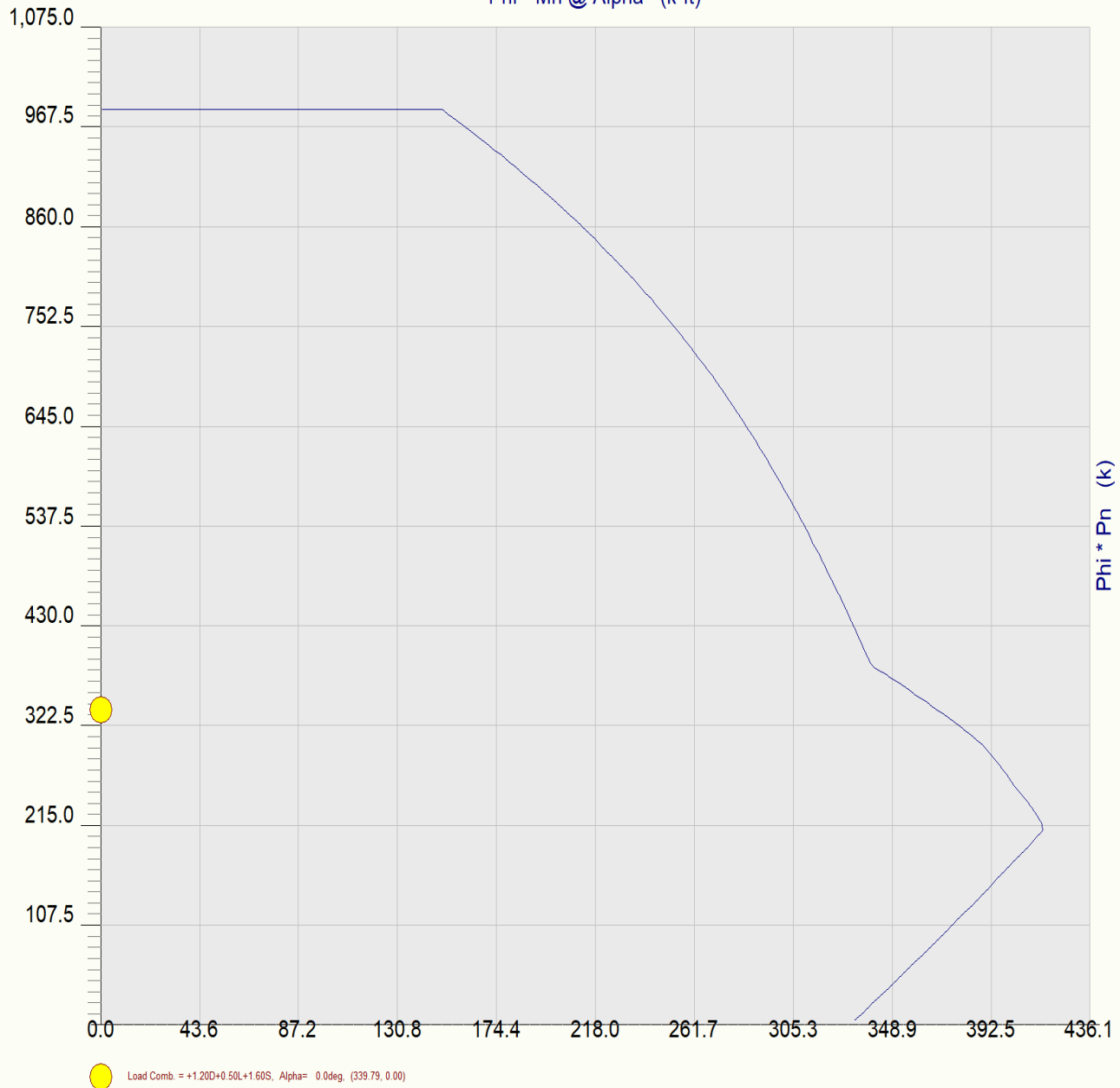
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Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)

Phi * Pn (k)



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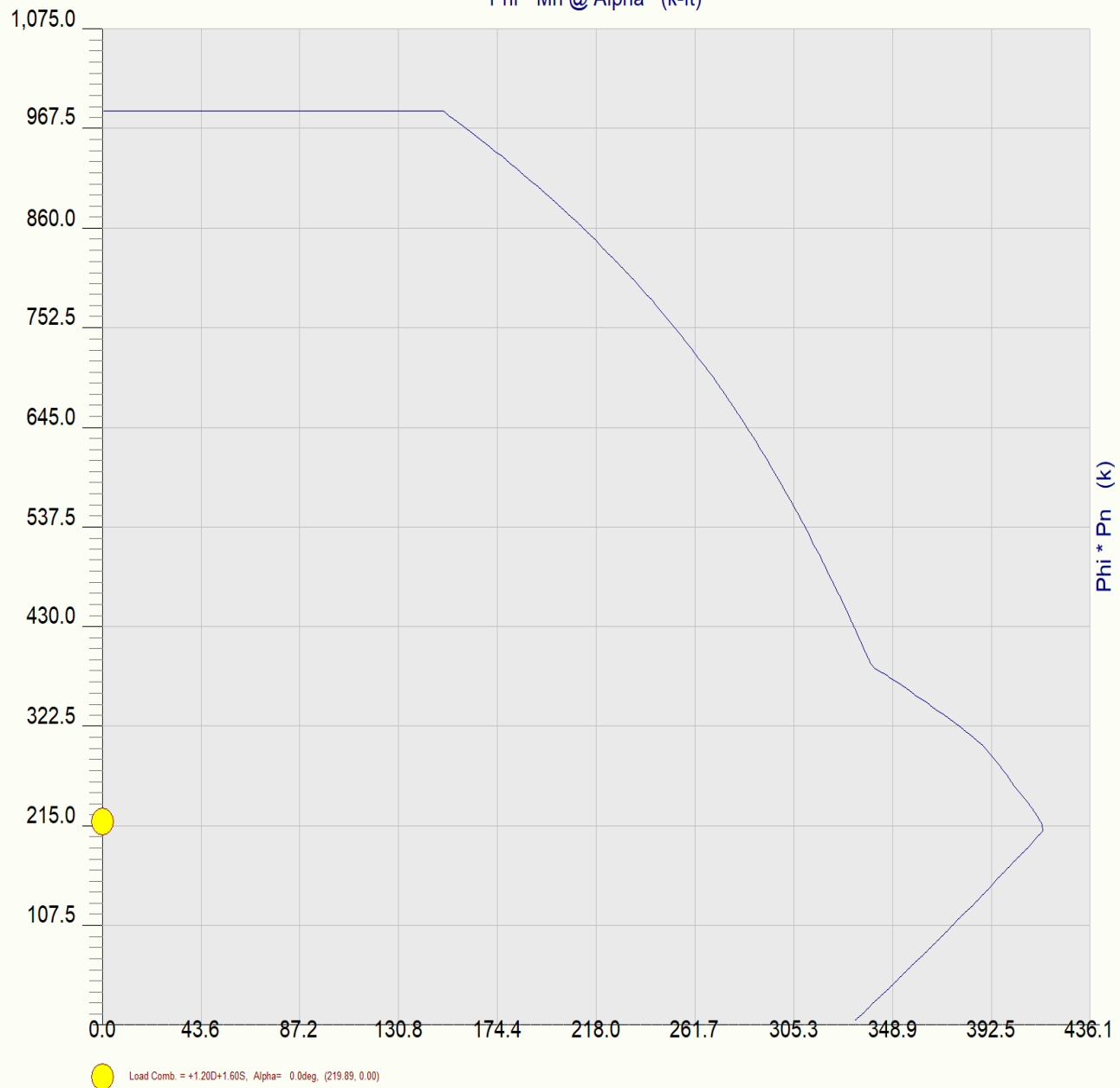
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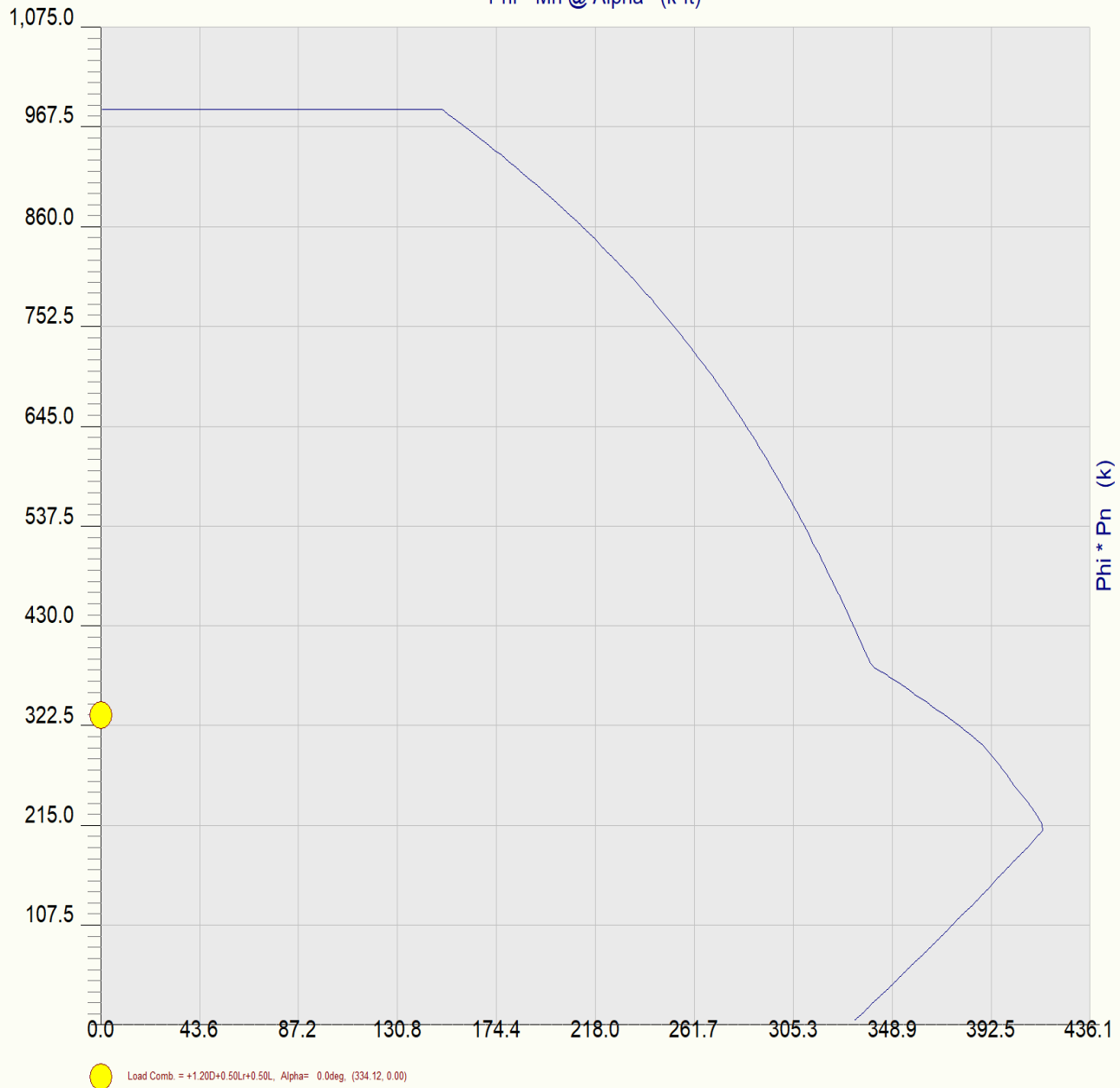
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Phi * Mn @ Alpha (k-ft)

Phi * Pn (k)



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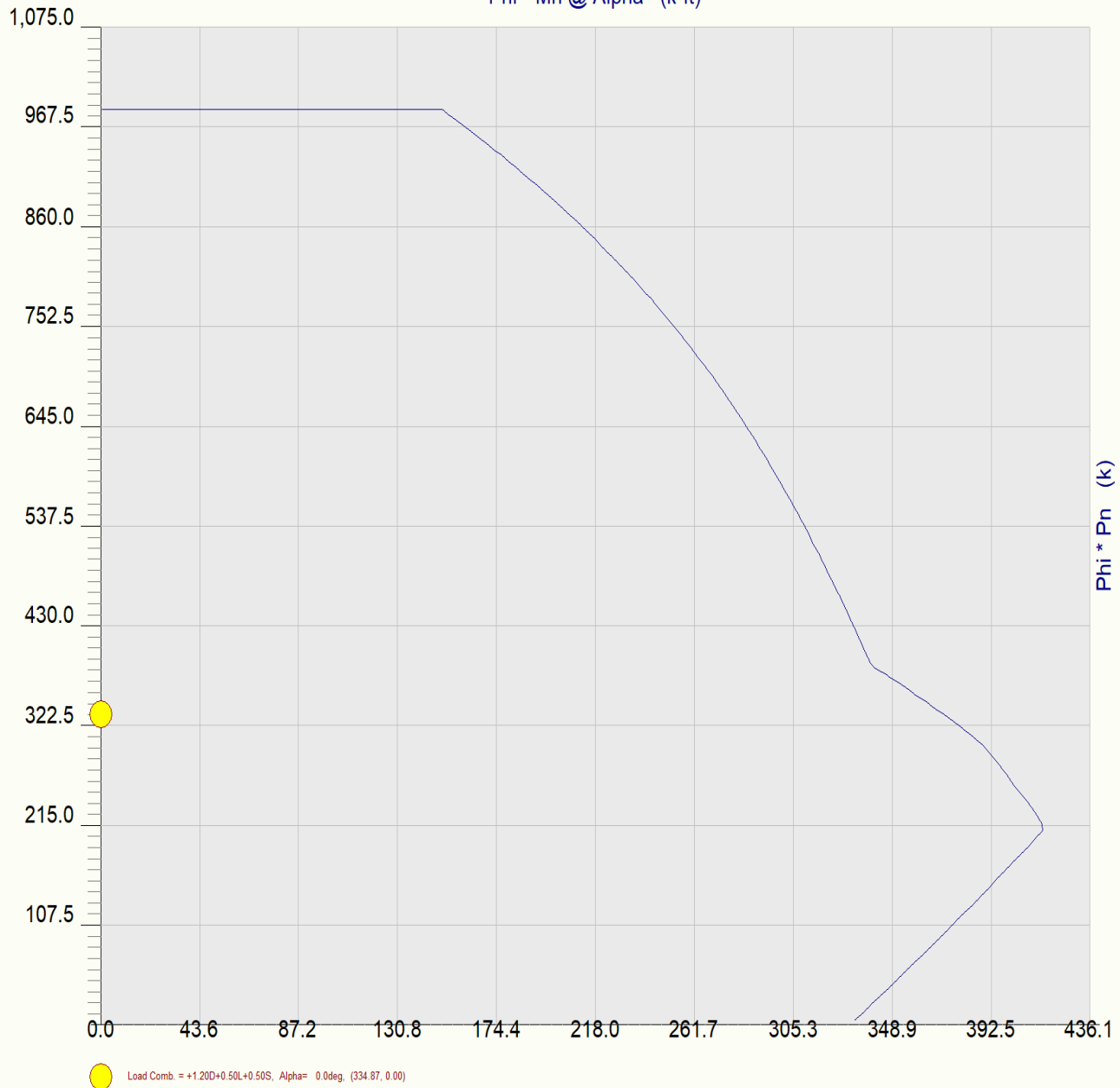
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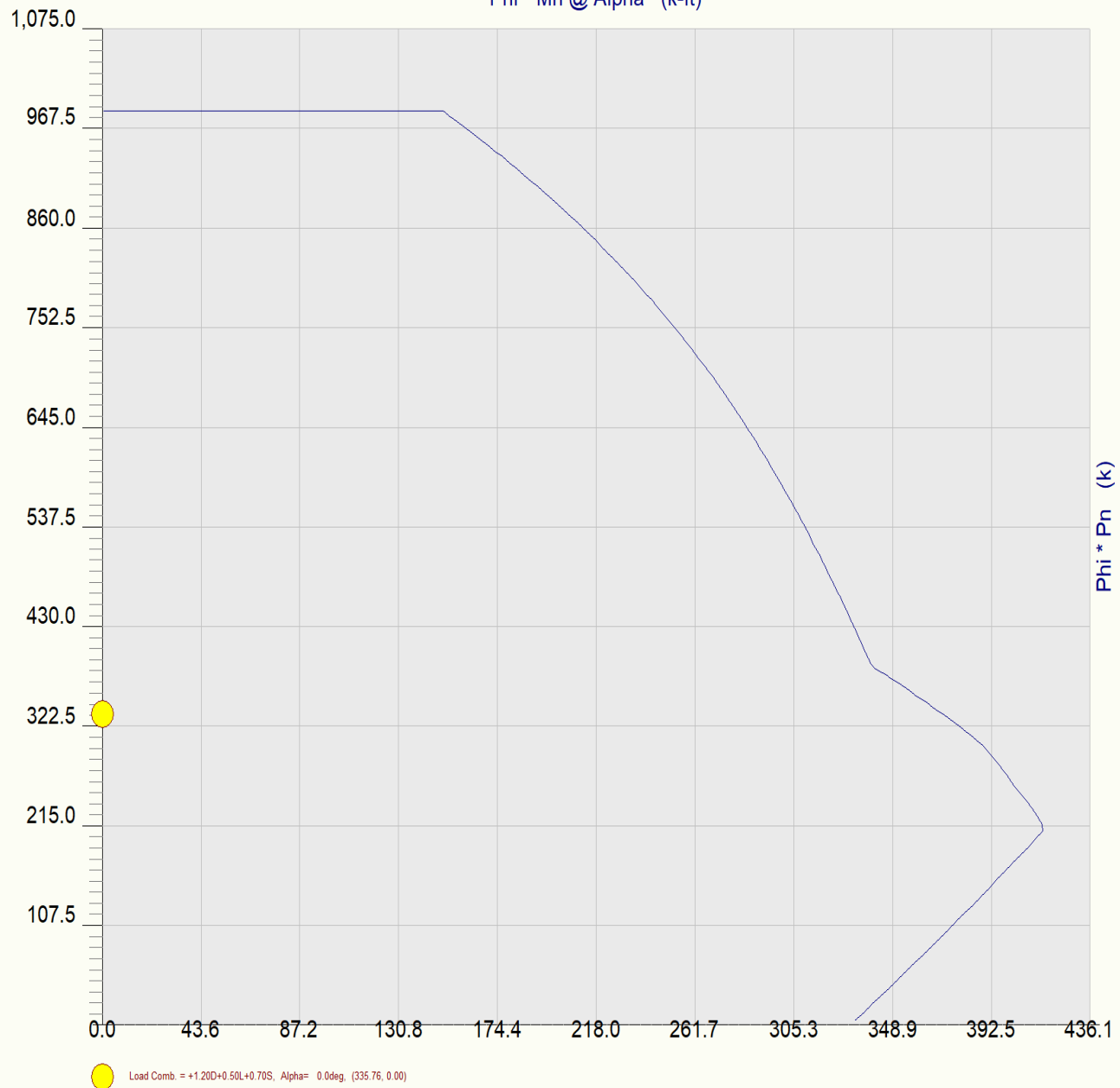
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Phi * Pn (k)



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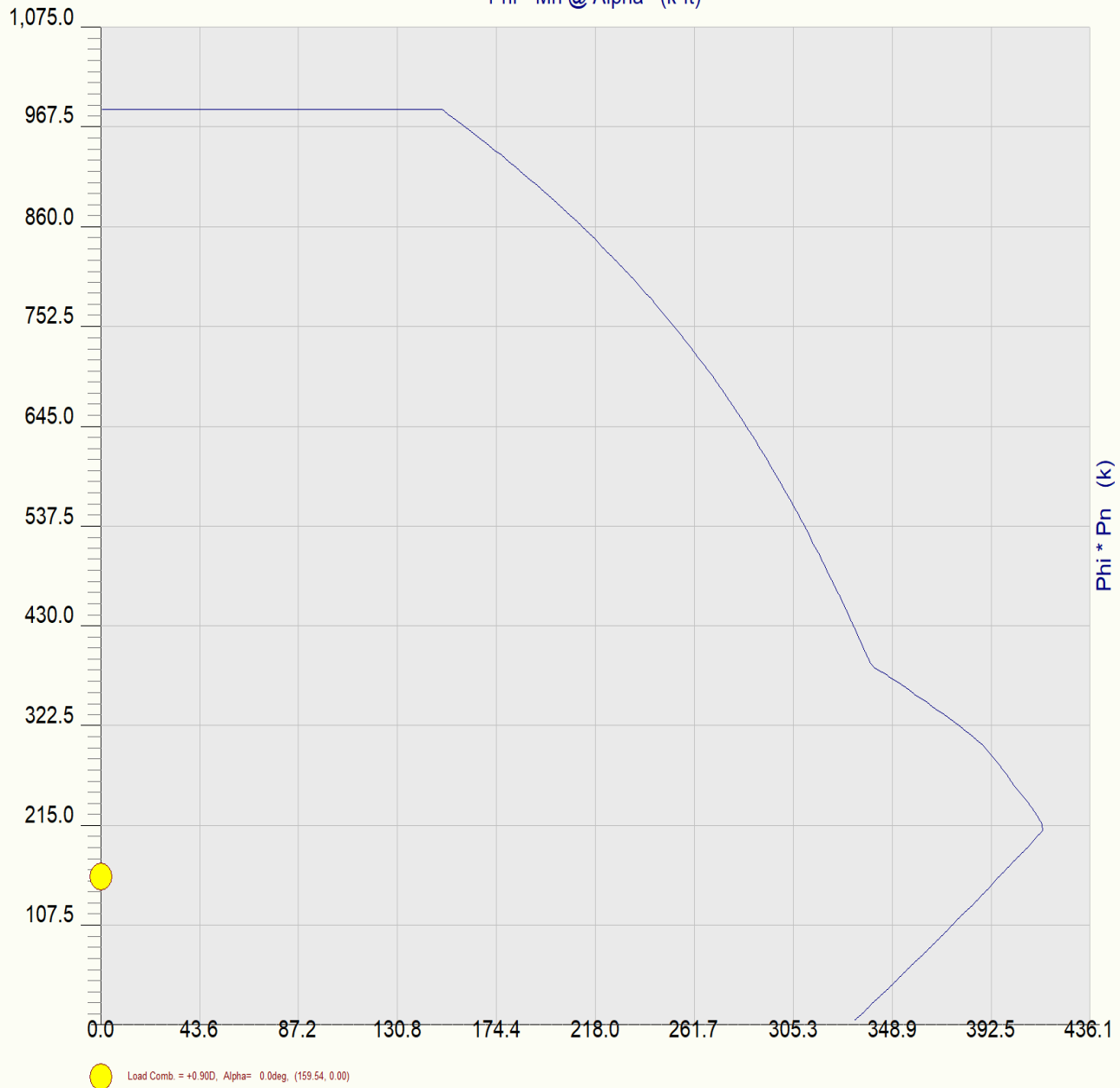
Lic. # : KW-06013597

DESCRIPTION: **G Floor Column**

Concrete Column P-M Interaction Diagram

Phi * Mn @ Alpha (k-ft)

Phi * Pn (k)



November 16, 2021

Thomas Rigg
EIP Holdings II
Two Allegheny Center
Pittsburgh, PA 15212
(603) 498-7462



Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
(919) 661-6351
Structures@tepgroup.net

Subject: Structural Analysis Report

Carrier Designation:

T-Mobile Reconfiguration

Carrier Site Number:

CT11410A

Carrier Site Name:

Stamford/Dwtn

Client Designation:

Site Number:

638283

Site Name:

Stamford #1 CO

Engineering Firm Designation:

TEP Project Number:

263252.614101

Site Data:

555 Main Street, Stamford, Fairfield County, CT 06901

Latitude 41° 3' 12.4", Longitude -73° 32' 83.09"

125± Foot - Self-Support Tower

Dear Thomas Rigg,

Tower Engineering Professionals is pleased to submit this "**Structural Analysis Report**" to determine the structural integrity of the above-mentioned tower.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the stress level for the tower and foundation structure, under the following load case, to be:

LC1: Existing + Proposed + Reserved Loading

Note: See Table 1 for the existing, proposed, and reserved loading

Sufficient Capacity

Structure Capacity	Foundation Capacity
78.7%	-

The analysis has been performed in accordance with the ANSI/TIA-222-G-2-2009 Structural Standard for Antenna Supporting Structures and Antennas – Addendum 2 and the 2018 Connecticut State Building Code.

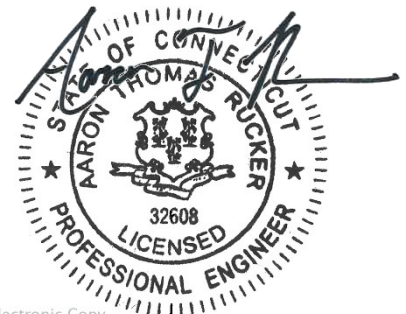
All modifications and equipment proposed in this report shall be installed in accordance with the appurtenances listed in Table 1 for the determined available structural capacity to be effective.

We at *Tower Engineering Professionals* appreciate the opportunity of providing our continuing professional services to you and *EIP Holdings II*. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by: Gautam Sopal, E.I. / TWC

Respectfully submitted by:

Aaron T. Rucker, P.E.



Electronic Copy

11/16/2021

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tnxTower Output

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1) INTRODUCTION

The tower is a 125± Foot Self-Support Tower mapped by Hightower Solutions, Inc. in April of 2015. The original design standard and wind speed were unavailable for review. The tower has been modified per reinforcement drawings prepared by MEI, Inc. in June of 2015. The tower is located on rooftop. The bottom of tower is at 106.5-ft above ground level, bringing the total tower height to 231.5-ft. All information provided to TEP was assumed to be accurate and complete.

2) ANALYSIS CRITERIA

TIA-222 Revision:	ANSI/TIA-222-G-2-2009
Type of Analysis:	Feasibility Study
Risk Category:	II
Wind Speed:	91 mph (Ultimate)
Exposure Category:	C
Topographic Procedure:	Method 2 (Kzt = 1.0)
Ice Thickness:	1.0 in
Wind Speed with Ice:	50 mph
Seismic Design Category:	B
Seismic Ss:	0.261
Seismic S1:	0.058
Service Wind Speed:	60 mph

Table 1 - Existing, Proposed, and Reserved Antenna and Cable Information

Existing/ Proposed/ Reserved	Mount Level (ft)	Ant CL (ft)	Qty	Antenna Model	Mount Type	Qty Coax	Coax Size	Coax Location	Owner/ Tenant
Existing	235.0	235.0	6	CCI HPA-45R-BUU-H6	Platform w/ handrails + Mods	12 6 3	1-5/8 3/4 DC 3/8 Fiber	B Leg	AT&T
			2	CCI TPA45R-KU6AA					
			2	CCI OPA-65R-LCUU-H6					
			1	Kathrein 80010964					
			1	Powerwave P65-15-XLH-RR					
			9	Ericsson RRUS 32					
			3	Ericsson Radio 4478					
			3	Ericsson RRUS 11 B12					
			6	Powerwave LGP21401					
			2	CCI TPX-070821					
			2	Raycap DC6-48-60-18-8F					
			1	Raycap DC6-48-60-18-8C					
Existing	229.0	229.0	1	1.5'x 2 Element Yagi	Platform	1	1/2	B Leg	Frontier
Existing	223.5	223.5	1	10' Ø HP Dish	Pipe mount	2	EW90	B Leg	Frontier
Existing	221.5	221.5	-	-	-	2	3/8	B Leg	Unknown
Existing	221.0	221.0	1	1' Ø HP Dish	Pipe mount	1	3/8	B Leg	Frontier
Proposed	206.5	210.0	3	Ericsson AIR6449 B41	(3) SitePro VFA12- HD	6	HCS 6x24	DA Face	T-Mobile
Existing	206.5	210.0	3	Ericsson Air 32 KRD901146-1_B66A_B2A		6	1-5/8	DA Face	T-Mobile
			3	Ericsson Generic Twin Style 1B-AWS		1 1	Hybrid 1" Ø		

Existing/ Proposed/ Reserved	Mount Level (ft)	Ant CL (ft)	Qty	Antenna Model	Mount Type	Qty Coax	Coax Size	Coax Location	Owner/ Tenant
To Be Removed	206.5	210.0	3	Ericsson AIR 21 KRC118023-1_B2A_B4p	(3) Sector Mounts	23	1-5/8	DA Face	T-Mobile
			3	Ericsson RRUS 11 B12					
Proposed	203.0	203.0	3	RFS APXVAALL24_43-U-NA20	(3) SitePro VFA12- HD	-	-	-	T-Mobile
			3	Ericsson 4480 B71+B85					
			3	Ericsson 4415 B25					
			3	Commscope SDX1926Q-43					
To Be Removed	203.0	203.0	3	Andrew LNX-6516DS-A1M	(3) Sector Mounts	-	-	-	T-Mobile
Existing	132.0	132.0	1	4' 7-Element Yagi	Standoff	1	1/2	B Leg	Frontier

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Source
Tower Mapping Report	Hightower Solutions, Inc., dated April 6, 2015 Site No. CT11410A	T-Mobile
Post Modification Inspection	MEI, Inc., dated October 8, 2015 Project No. CT02768S-15V3	T-Mobile
Previous Structural Analysis	MEI, Inc., dated July 9, 2019 Project No. CT02768S-20V0	T-Mobile
Previous Structural Analysis	MEI, Inc., dated May 15, 2020 Project No. CT02768S-19V0	T-Mobile
Tower Inspection Report	Tower Engineering Professionals, Inc., dated May 6, 2021 TEP No. 263252.513145	TEP
Correspondence	Correspondence in reference to the existing, proposed, and reserved loading.	T-Mobile

3.1) Analysis Method

tnxTower (version 8.1.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Analysis Assumptions

- 1) The tower and foundation were built and maintained in accordance with the manufacturer's specification.
- 2) The configuration of existing antennas, transmission cables, mounts and other appurtenances are as specified in the tower mapping report by TEP.
- 3) Unless specified by the client or tower mapping, the location of the existing and proposed coax is assumed by TEP and listed in Table 1.
- 4) All tower components are in sufficient condition to carry their full design capacity.
- 5) Serviceability with respect to antenna twist, tilt, roll, or lateral translation, is not checked and is left to the carrier or tower owner to ensure conformance.
- 6) All antenna mounts and mounting hardware are structurally sufficient to carry the full design capacity requirements of appurtenance wind area and weight as provided by the original manufacturer specifications. It is the carrier's responsibility to ensure compliance to the structural limitations of the existing and/or proposed antenna mounts.
- 7) TEP assumed that tower geometry is correct per previous structural analysis by MEI, Inc., dated July 09, 2019 (Project No. CT02768S-19V0).

This analysis may be affected if any assumptions are not valid or have been made in error. Tower Engineering Professionals should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 3 - Section Capacity (Summary)¹

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (k)	ϕP_{allow} (k)	% Capacity	Pass / Fail
T1	231.5 - 229	Leg	L4x4x3/8	4	-7	90	67.2	Pass
T2	229 - 224.8	Leg	L4x4x3/8	11	-11	78	14.5	Pass
T3	224.8 - 220.7	Leg	L4x4x3/8	24	-20	79	25.2	Pass
T4	220.7 - 216.5	Leg	L4x4x3/8	40	-26	78	32.7	Pass
T5	216.5 - 211.5	Leg	L5x5x1/2	51	-34	133	25.6	Pass
T6	211.5 - 206.5	Leg	L5x5x1/2	67	-45	133	33.7	Pass
T7	206.5 - 201.5	Leg	L5x5x1/2	84	-57	133	42.7	Pass
T8	201.5 - 196.5	Leg	L5x5x1/2	96	-67	133	50.3	Pass
T9	196.5 - 191.5	Leg	L5x5x1/2	111	-78	133	58.6	Pass
T10	191.5 - 181.5	Leg	L6x6x5/8	123	-87	208	41.7	Pass
T11	181.5 - 171.5	Leg	L6x6x5/8	145	-108	209	51.8	Pass
T12	171.5 - 161.5	Leg	L6x6x5/8	165	-129	209	61.6	Pass
T13	161.5 - 151.5	Leg	L6x6x5/8	187	-149	209	71.2	Pass
T14	151.5 - 141.5	Leg	L6x6x3/4	207	-171	248	68.9	Pass
T15	141.5 - 131.5	Leg	L6x6x3/4	229	-207	287	72.0	Pass
T16	131.5 - 119	Leg	L6x6x7/8	297	-203	267	75.9	Pass
T17	119 - 106.5	Leg	L6x6x7/8	337	-226	314	72.0	Pass
T2	229 - 224.8	Diagonal	2L2 1/2x2 1/2x1/4x3/8	15	4	67	6.4 10.2 (b)	Pass
T3	224.8 - 220.7	Diagonal	2L2 1/2x2 1/2x1/4x3/8	35	4	67	6.2 9.8 (b)	Pass
T4	220.7 - 216.5	Diagonal	2L2 1/2x2 1/2x1/4x3/8	46	5	67	7.7 12.2 (b)	Pass
T5	216.5 - 211.5	Diagonal	L2 1/2x2x1/4	61	-5	21	25.6	Pass
T6	211.5 - 206.5	Diagonal	L2 1/2x2x1/4	77	-5	20	24.9	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (k)	σP_{allow} (k)	% Capacity	Pass / Fail
T7	206.5 - 201.5	Diagonal	L2 1/2x2x1/4	89	-6	19	33.0	Pass
T8	201.5 - 196.5	Diagonal	L2 1/2x2x1/4	105	-7	19	37.8	Pass
T9	196.5 - 191.5	Diagonal	L2 1/2x2x1/4	117	-7	18	39.4	Pass
T10	191.5 - 181.5	Diagonal	L3x3x1/4	135	-12	22	53.8	Pass
T11	181.5 - 171.5	Diagonal	L3x3x1/4	155	-12	21	56.3	Pass
T12	171.5 - 161.5	Diagonal	L3x3x1/4	177	-12	20	60.5	Pass
T13	161.5 - 151.5	Diagonal	L3x3x1/4	197	-13	19	65.8	Pass
T14	151.5 - 141.5	Diagonal	L3x3x1/4	219	-12	18	66.4	Pass
T15	141.5 - 131.5	Diagonal	L3x3x1/4	251	-14	27	50.4 56.6 (b)	Pass
T16	131.5 - 119	Diagonal	2L2 1/2x2 1/2x1/4x3/8	320	-19	30	65.1	Pass
T17	119 - 106.5	Diagonal	2L2 1/2x2 1/2x1/4x3/8	377	-20	44	45.9 46.6 (b)	Pass
T15	141.5 - 131.5	Horizontal	L2 1/2x2x1/4	242	-3	10	32.0	Pass
T10	191.5 - 181.5	Secondary Horizontal	L2 1/2x2x1/4	140	-1	13	9.9	Pass
T11	181.5 - 171.5	Secondary Horizontal	L2 1/2x2x1/4	160	-2	11	15.0	Pass
T12	171.5 - 161.5	Secondary Horizontal	L2 1/2x2x3/16	182	-2	7	27.5	Pass
T13	161.5 - 151.5	Secondary Horizontal	L2 1/2x2 1/2x1/4	202	-2	14	15.6	Pass
T14	151.5 - 141.5	Secondary Horizontal	L2 1/2x2x1/4	224	-3	6	39.4	Pass
T1	231.5 - 229	Top Girt	C8x11.5	8	-1	67	17.3	Pass
T3	224.8 - 220.7	Top Girt	L2 1/2x2 1/2x1/4	25	-1	19	6.9	Pass
T5	216.5 - 211.5	Top Girt	C7x9.8	53	-1	53	2.4 3.3 (b)	Pass
T6	211.5 - 206.5	Top Girt	L2 1/2x2x1/4	69	-1	14	7.3	Pass
T8	201.5 - 196.5	Top Girt	L2 1/2x2 1/2x1/4	99	-1	16	6.3	Pass
T10	191.5 - 181.5	Top Girt	L2 1/2x2 1/2x1/4	130	-3	14	21.8	Pass
T11	181.5 - 171.5	Top Girt	L2 1/2x2 1/2x1/4	150	-5	12	45.9	Pass
T12	171.5 - 161.5	Top Girt	L2 1/2x2 1/2x1/4	172	-6	10	59.1	Pass
T13	161.5 - 151.5	Top Girt	L2 1/2x2 1/2x1/4	192	-7	9	72.4	Pass
T14	151.5 - 141.5	Top Girt	L2 1/2x2 1/2x1/4	214	-6	8	78.7	Pass
T15	141.5 - 131.5	Top Girt	L2 1/2x2 1/2x1/4	234	-6	11	55.9	Pass
T16	131.5 - 119	Top Girt	2L2 1/2x2 1/2x1/4x3/8	301	-9	50	17.5 22.5 (b)	Pass
T17	119 - 106.5	Top Girt	2L2 1/2x2 1/2x1/4x3/8	341	-9	47	19.2 21.4 (b)	Pass
T15	141.5 - 131.5	Redund Horiz 1 Bracing	L2 1/2x2x3/16	247	-3	17	17.8 39.7 (b)	Pass
T16	131.5 - 119	Redund Horiz 1 Bracing	L2 1/2x2x3/16	317	-3	17	18.0 39.7 (b)	Pass
T17	119 - 106.5	Redund Horiz 1 Bracing	L2 1/2x2x3/16	365	-3	17	20.3 43.3 (b)	Pass
T15	141.5 - 131.5	Redund Diag 1 Bracing	L2 1/2x2x3/16	278	-2	15	13.7 26.8 (b)	Pass
T16	131.5 - 119	Redund Diag 1 Bracing	L2 1/2x2x3/16	318	-4	7	51.6	Pass
T17	119 - 106.5	Redund Diag 1 Bracing	L2 1/2x2x3/16	366	-5	13	38.1 55.7 (b)	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (k)	ϕP_{allow} (k)	% Capacity	Pass / Fail
T15	141.5 - 131.5	Redund Hip 1 Bracing	L2x2x1/4	249	0	16	0.4	Pass
T16	131.5 - 119	Redund Hip 1 Bracing	L2x2x1/4	334	0	15	0.7	Pass
T17	119 - 106.5	Redund Hip 1 Bracing	L2x2x1/4	391	0	14	0.9	Pass
T17	119 - 106.5	Redund Hip Diagonal 1 Bracing	L2x2x1/4	392	0	3	4.2	Pass
T17	119 - 106.5	Redund Sub Horz Bracing	L2 1/2x2x3/16	370	4	23	17.8 28.3 (b)	Pass
T17	119 - 106.5	Redund Sub Diagonal Bracing	L2 1/2x2x3/16	369	-5	17	27.8 28.4 (b)	Pass
T10	191.5 - 181.5	Inner Bracing	L2 1/2x2 1/2x3/16	126	1	31	1.9	Pass
T12	171.5 - 161.5	Inner Bracing	L2 1/2x2 1/2x3/16	167	1	31	3.7	Pass
T14	151.5 - 141.5	Inner Bracing	L2x2 1/2x3/16	210	1	28	3.7	Pass
T16	131.5 - 119	Inner Bracing	L3x3x3/16	304	0	9	0.8	Pass
T17	119 - 106.5	Inner Bracing	L3x3x3/16	344	0	8	0.9	Pass
							Summary	
						Leg (T16)	75.9	Pass
						Diagonal (T14)	66.4	Pass
						Horizontal (T15)	32.0	Pass
						Secondary Horizontal (T14)	39.4	Pass
						Top Girt (T14)	78.7	Pass
						Redund Horz 1 Bracing (T17)	43.3	Pass
						Redund Diag 1 Bracing (T17)	55.7	Pass
						Redund Hip 1 Bracing (T17)	0.9	Pass
						Redund Hip Diagonal 1 Bracing (T17)	4.2	Pass
						Redund Sub Horz Bracing (T17)	28.3	Pass
						Redund Sub Diagonal Bracing (T17)	28.4	Pass
						Inner Bracing (T12)	3.7	Pass
						Bolt Checks	53.9	Pass
						Rating =	78.7	Pass

Structure Rating (max from all components) =	78.7%
---	--------------

Table 4 - Dish Twist/Sway Results for 60 mph Service Wind Speed

Elevation (ft)	Dish Model	Beam Deflection		
		Deflection (in)	Tilt (deg)	Twist (deg)
223.5	10' Ø HP Dish	1.965	0.1456	0.0153
221.0	1' Ø HP Dish	1.888	0.1434	0.0151

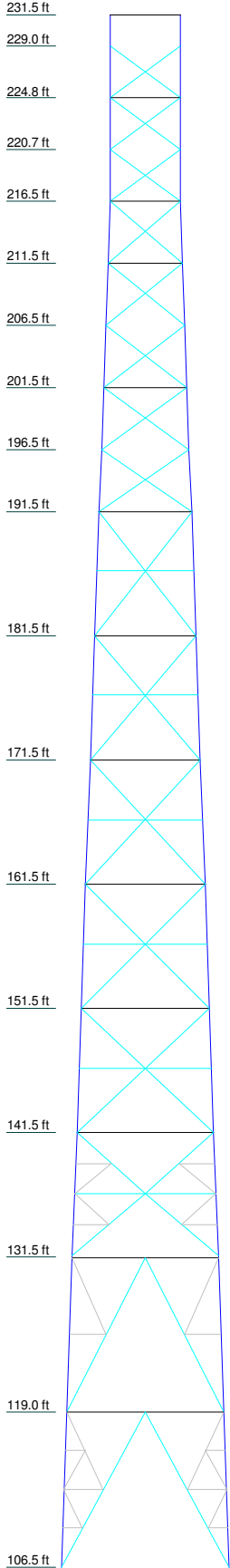
4.1) Recommendations

- 1) If the load differs from that described in Table 1 of this report or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
- 2) The tower has sufficient capacity to carry the existing, proposed, and reserved loading. No modifications are required at this time.
- 3) TEP did not have sufficient information to perform a foundation analysis. Provide TEP with foundation drawings and/or a geotechnical report for this site in order to determine the substructure capacity. If this information is not available, TEP recommends a foundation mapping and/or geotechnical investigation.
- 4) Prior to acceptance of changed configuration a comprehensive structural analysis shall be performed in order to determine the overall stability and the adequacy of the structural members, foundations and connections.

APPENDIX A

TNX TOWER OUTPUT

Section:	T17	T16	T15	T14	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	L6x6x7/8	L6x6x3/4	L6x6x5/8	A36	L3x3x1/4	A36	L2 1/2x2 1/2x1/4	L2 1/2x2 3/16	L2 1/2x2 1/2x1/4	L2 1/2x2 3/16	L2 1/2x2 1/2x1/4	L2 1/2x2 3/16	L2 1/2x2 1/2x1/4	L2 1/2x2 3/16	L2 1/2x2 1/2x1/4	L2 1/2x2 3/16	L2 1/2x2 1/2x1/4
Leg Grade	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8
Diagonals	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8
Top Girts	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8
Horizontal	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Sec. Horizontal	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16
Red. Horizontal	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16
Red. Diagonal	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16
Red. Sub-Diag	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16
Inner Bracing	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16
Face Width (ft)	13.5833	12.6766	11.7699	11.0445	10.3191	9.59373	8.86836	8.14298	7.41761	6.69223	6.32954	5.96685	5.60417	5.24149	4.87881	4.51613	4.15345
# Panels @ (ft)	1 @ 12.5	1 @ 12.4167	1 @ 12.4167	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833
Weight (K)	25.6	3.9	3.5	2.6	2.2	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Top Platform Mount	235	2.4" Dia x 8-ft Mount Pipe	206.5
2.4" Dia x 6-ft Pipe	235	AIR 32 KRD901146-1 w/ Mount Pipe	206.5
2.4" Dia x 6-ft Pipe	235	AIR 32 KRD901146-1 w/ Mount Pipe	206.5
Unused I-Beam Mount	235	AIR 32 KRD901146-1 w/ Mount Pipe	206.5
(3) HPA-45R-BUU-H6 w/ Mount Pipe	235	AIR 6449 B41 w/ Mount Pipe	206.5
(3) HPA-45R-BUU-H6 w/ Mount Pipe	235	AIR 6449 B41 w/ Mount Pipe	206.5
TPA45R-KU6A w/ Mount Pipe	235	AIR 6449 B41 w/ Mount Pipe	206.5
TPA45R-KU6A w/ Mount Pipe	235	Style 1B Twin AWS	206.5
P65-15-XLH-RR w/ Mount Pipe	235	Style 1B Twin AWS	206.5
80010964 w/ Mount Pipe	235	Style 1B Twin AWS	206.5
(2) OPA-65R-LCUU-H6 w/ Mount Pipe	235	Site Pro 1 VFA12-HD	206.5
(3) RRUS 32	235	Site Pro 1 VFA12-HD	206.5
(3) RRUS 32	235	Site Pro 1 VFA12-HD	203
(3) RRUS 32	235	2.4" Dia x 8-ft Mount Pipe	203
(2) RRUS 4478	235	2.4" Dia x 8-ft Mount Pipe	203
RRUS 4478	235	2.4" Dia x 8-ft Mount Pipe	203
(2) RRUS 11 B12	235	APXVAALL24_43-U-NA20 w/ mount pipe	203
RRUS 11 B12	235	APXVAALL24_43-U-NA20 w/ mount pipe	203
(2) LGP21401	235	APXVAALL24_43-U-NA20 w/ mount pipe	203
(2) LGP21401	235	APXVAALL24_43-U-NA20 w/ mount pipe	203
(2) LGP21401	235	RADIO 4480 B71_TMO	203
(2) TPX-070821	235	RADIO 4480 B71_TMO	203
(2) DC6-48-60-18-8F	235	RADIO 4480 B71_TMO	203
DC9-48-60-24-8C-EV	235	RADIO 4415 B25	203
(2) 12" x 24" Beacon	231.5	RADIO 4415 B25	203
5/8" x 4" Lightning Rod	231.5	RADIO 4415 B25	203
13" T Beam Mount	231.5	SDX1926Q-43	203
17" 3 element yagi	229	SDX1926Q-43	203
Pipe Mount [PM 601-1]	223.5	SDX1926Q-43	203
Andrew HP10	223.5	Site Pro 1 VFA12-HD	203
Pipe Mount [PM 601-1]	221	Site Pro 1 VFA12-HD	203
1-ft dish w/ shroud	221	2.4" Dia x 6-ft Pipe	132
4' L x 6' W Rest Platform	216.5	4-ft x 7 Element Yagi	132
4' L x 6' W Rest Platform	216.5	Side Arm Mount [SO 901-1]	132
Site Pro 1 VFA12-HD	206.5	2.4" Dia x 6-ft Pipe	132
2.4" Dia x 8-ft Mount Pipe	206.5		
2.4" Dia x 8-ft Mount Pipe	206.5		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	C8x11.5	C	L2 1/2x2x1/4
B	L2 1/2x2 1/2x1/4	D	1 @ 2.5

MATERIAL STRENGTH

ALL REACT
ARE FACTO

GRADE	Fy	Fu	GRADE	Fy	Fu
A36	36 ksi	58 ksi			

MAX. CORNER REACTIONS AT BASE:

DOWN: 255 K

SHEAR: 1. Tower is located in Fairfield County, Connecticut.

2. Tower designed for Exposure C to the TIA-222-G Standard.

3. Tower designed for a 91 mph basic wind in accordance with the TIA-222-G Standard.

UPLIFT: 4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to

SHEAR: < 1 increase in thickness with height.

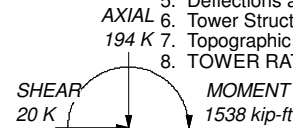
5. Deflections are based upon a 60 mph wind.

6. Tower Structure Class II.

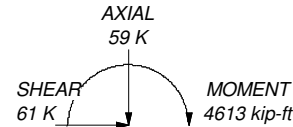
7. Topographic Category 1 with Crest Height of 0.00 ft

8. TOWER RATING: 78.7%

TOWER DESIGN NOTES



TORQUE 13 kip-ft
50 mph WIND - 1.0000 in ICE



TORQUE 23 kip-ft
REACTIONS - 91 mph WIND



Tower Engineering Professionals

Tower Engineering Professionals

326 Tryon Road
Raleigh, NC 27603
Phone: (919) 661-6351
FAX: (919) 661-6350

Job: **Stamford #1 CO (638283)**

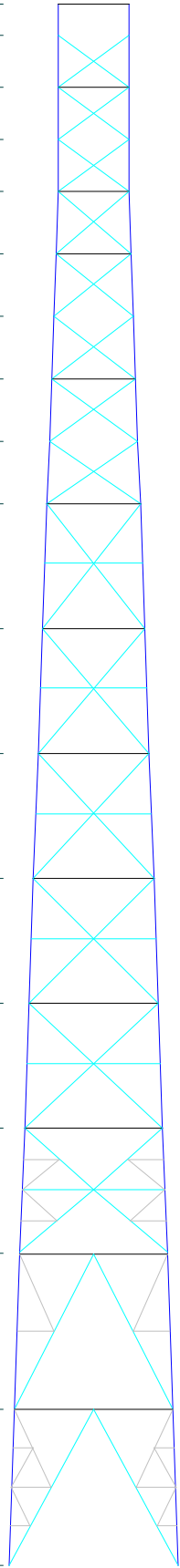
Project: **TEP No. 263252.614101**

Client: Everest Infrastructure | Drawn by: APJ | App'd: |

Code: TIA-222-G | Date: 11/16/21 | Scale: NTS |

Path: | Dwg No. E-1

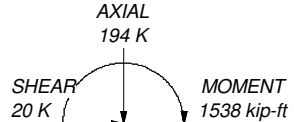
Section	T17	T16	T15	T14	T13	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	L6x6x7/8	L6x6x3/4	L6x6x5/8	A36	L5x5x1/2	L4x4x3/8											
Leg Grade	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8
Diagonals	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8
Top Girts	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8	2L2 1/2x2 1/2x1/4x3/8
Horizontal	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Sec. Horizontal	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16
Red. Horizontal	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16
Red. Sub-Diags	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16	L2 1/2x2x3/16
Inner Bracing	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16	L3x3x3/16
Face Width (ft)	12.6766	11.7699	11.0445	10.3191	9.59373	8.86836	8.14298	7.41761	6.69223	6.32954	5.96685	5.60417	5.24149	4.87881	4.51613	4.15345	3.79077
# Panels @ (ft)	1 @ 12.5	1 @ 12.4167	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833	2 @ 4.95833
Weight (K)	25.6	3.9	2.6	2.2	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9



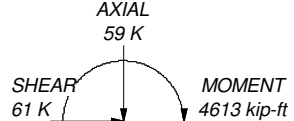
ALL REACTIONS
ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 255 K
SHEAR: 23 K

UPLIFT: -229 K
SHEAR: 21 K



TORQUE 13 kip-ft
50 mph WIND - 1.0000 in ICE



TORQUE 23 kip-ft
REACTIONS - 91 mph WIND

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	C8x11.5	C	L2 1/2x2x1/4
B	L2 1/2x2 1/2x1/4	D	1 @ 2.5

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A36	36 ksi	58 ksi			

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 91 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 78.7%



Tower Engineering Professionals

Tower Engineering Professionals

326 Tryon Road
Raleigh, NC 27603
Phone: (919) 661-6351
FAX: (919) 661-6350

Job: **Stamford #1 CO (638283)**

Project: **TEP No. 263252.614101**

Client: Everest Infrastructure | Drawn by: APJ | App'd:

Code: TIA-222-G | Date: 11/16/21 | Scale: NTS

Path: | Dwg No. E-1

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Tower Input Data

The main tower is a 4x free standing tower with an overall height of 231.50 ft above the ground line.

The base of the tower is set at an elevation of 106.50 ft above the ground line.

The face width of the tower is 5.60 ft at the top and 13.58 ft at the base.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

Tower is located in Fairfield County, Connecticut.

Basic wind speed of 91 mph.

Structure Class II.

Exposure Category C.

Topographic Category 1.

Crest Height 0.00 ft.

Nominal ice thickness of 1.0000 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 50 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

Pressures are calculated at each section.

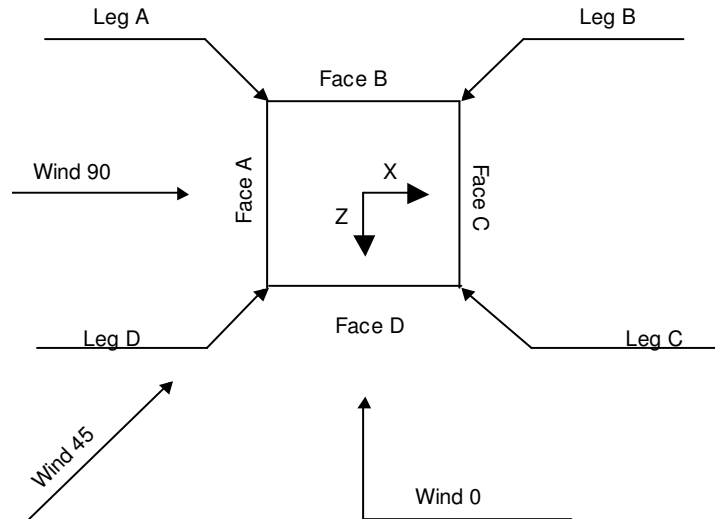
Stress ratio used in tower member design is 1.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	√ Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	√ SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist. Exemption
√ Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
√ Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
√ SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances
		Outside and Inside Corner Radii Are
		Known

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Square Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	<i>ft</i>			<i>ft</i>		<i>ft</i>
T1	231.50-229.00			5.60	1	2.50
T2	229.00-224.80			5.60	1	4.20
T3	224.80-220.70			5.60	1	4.10
T4	220.70-216.50			5.60	1	4.20
T5	216.50-211.50			5.60	1	5.00
T6	211.50-206.50			5.97	1	5.00
T7	206.50-201.50			6.33	1	5.00
T8	201.50-196.50			6.69	1	5.00
T9	196.50-191.50			7.05	1	5.00
T10	191.50-181.50			7.42	1	10.00
T11	181.50-171.50			8.14	1	10.00
T12	171.50-161.50			8.87	1	10.00
T13	161.50-151.50			9.59	1	10.00
T14	151.50-141.50			10.32	1	10.00
T15	141.50-131.50			11.04	1	10.00
T16	131.50-119.00			11.77	1	12.50
T17	119.00-106.50			12.68	1	12.50

Tower Section Geometry (cont'd)

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	<i>ft</i>	<i>ft</i>				<i>in</i>	<i>in</i>
T1	231.50-229.00	2.50	X Brace	No	Yes	0.0000	0.0000
T2	229.00-224.80	4.20	X Brace	No	No	0.0000	0.0000

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<i>Tower Section</i>	<i>Tower Elevation</i>	<i>Diagonal Spacing</i>	<i>Bracing Type</i>	<i>Has K Brace End Panels</i>	<i>Has Horizontals</i>	<i>Top Girt Offset</i>	<i>Bottom Girt Offset</i>
	<i>ft</i>	<i>ft</i>				<i>in</i>	<i>in</i>
T3	224.80-220.70	4.10	X Brace	No	No	0.0000	0.0000
T4	220.70-216.50	4.20	X Brace	No	No	0.0000	0.0000
T5	216.50-211.50	5.00	X Brace	No	Yes	0.0000	0.0000
T6	211.50-206.50	5.00	X Brace	No	Yes	0.0000	0.0000
T7	206.50-201.50	5.00	X Brace	No	No	0.0000	0.0000
T8	201.50-196.50	5.00	X Brace	No	No	0.0000	0.0000
T9	196.50-191.50	5.00	X Brace	No	No	0.0000	0.0000
T10	191.50-181.50	10.00	X Brace	No	Yes	0.0000	0.0000
T11	181.50-171.50	10.00	X Brace	No	Yes	0.0000	0.0000
T12	171.50-161.50	10.00	X Brace	No	Yes	0.0000	0.0000
T13	161.50-151.50	10.00	X Brace	No	Yes	0.0000	0.0000
T14	151.50-141.50	10.00	X Brace	No	Yes	0.0000	0.0000
T15	141.50-131.50	4.96	Double K1	No	Yes	0.0000	1.0000
T16	131.50-119.00	12.42	K1 Down	No	Yes	1.0000	0.0000
T17	119.00-106.50	12.50	K1B Down	No	Yes	0.0000	0.0000

Tower Section Geometry (cont'd)

<i>Tower Elevation</i>	<i>Leg Type</i>	<i>Leg Size</i>	<i>Leg Grade</i>	<i>Diagonal Type</i>	<i>Diagonal Size</i>	<i>Diagonal Grade</i>
<i>ft</i>						
T1 231.50-229.00	Equal Angle	L4x4x3/8	A36 (36 ksi)	Double Angle		A36 (36 ksi)
T2 229.00-224.80	Equal Angle	L4x4x3/8	A36 (36 ksi)	Double Angle	2L2 1/2x2 1/2x1/4x3/8	A36 (36 ksi)
T3 224.80-220.70	Equal Angle	L4x4x3/8	A36 (36 ksi)	Double Angle	2L2 1/2x2 1/2x1/4x3/8	A36 (36 ksi)
T4 220.70-216.50	Equal Angle	L4x4x3/8	A36 (36 ksi)	Double Angle	2L2 1/2x2 1/2x1/4x3/8	A36 (36 ksi)
T5 216.50-211.50	Equal Angle	L5x5x1/2	A36 (36 ksi)	Single Angle	L2 1/2x2x1/4	A36 (36 ksi)
T6 211.50-206.50	Equal Angle	L5x5x1/2	A36 (36 ksi)	Single Angle	L2 1/2x2x1/4	A36 (36 ksi)
T7 206.50-201.50	Equal Angle	L5x5x1/2	A36 (36 ksi)	Single Angle	L2 1/2x2x1/4	A36 (36 ksi)
T8 201.50-196.50	Equal Angle	L5x5x1/2	A36 (36 ksi)	Single Angle	L2 1/2x2x1/4	A36 (36 ksi)
T9 196.50-191.50	Equal Angle	L5x5x1/2	A36 (36 ksi)	Single Angle	L2 1/2x2x1/4	A36 (36 ksi)
T10 191.50-181.50	Equal Angle	L6x6x5/8	A36 (36 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T11 181.50-171.50	Equal Angle	L6x6x5/8	A36 (36 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T12 171.50-161.50	Equal Angle	L6x6x5/8	A36 (36 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T13 161.50-151.50	Equal Angle	L6x6x5/8	A36 (36 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T14 151.50-141.50	Equal Angle	L6x6x3/4	A36 (36 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T15 141.50-131.50	Equal Angle	L6x6x3/4	A36 (36 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T16 131.50-119.00	Equal Angle	L6x6x7/8	A36 (36 ksi)	Double Angle	2L2 1/2x2 1/2x1/4x3/8	A36 (36 ksi)
T17 119.00-106.50	Equal Angle	L6x6x7/8	A36 (36 ksi)	Double Angle	2L2 1/2x2 1/2x1/4x3/8	A36 (36 ksi)

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Tower Section Geometry (cont'd)

<i>Tower Elevation ft</i>	<i>Top Girt Type</i>	<i>Top Girt Size</i>	<i>Top Girt Grade</i>	<i>Bottom Girt Type</i>	<i>Bottom Girt Size</i>	<i>Bottom Girt Grade</i>
T1 231.50-229.00	Channel	C8x11.5	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T3 224.80-220.70	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T5 216.50-211.50	Channel	C7x9.8	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T6 211.50-206.50	Single Angle	L2 1/2x2x1/4	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T8 201.50-196.50	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T10 191.50-181.50	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T11 181.50-171.50	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T12 171.50-161.50	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T13 161.50-151.50	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T14 151.50-141.50	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T15 141.50-131.50	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T16 131.50-119.00	Double Angle	2L2 1/2x2 1/2x1/4x3/8	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T17 119.00-106.50	Double Angle	2L2 1/2x2 1/2x1/4x3/8	A36 (36 ksi)	Equal Angle		A36 (36 ksi)

Tower Section Geometry (cont'd)

<i>Tower Elevation ft</i>	<i>No. of Mid Girts</i>	<i>Mid Girt Type</i>	<i>Mid Girt Size</i>	<i>Mid Girt Grade</i>	<i>Horizontal Type</i>	<i>Horizontal Size</i>	<i>Horizontal Grade</i>
T15 141.50-131.50	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2x1/4	A36 (36 ksi)
T16 131.50-119.00	None	Flat Bar		A36 (36 ksi)	Double Equal Angle	2L2 1/2x2 1/2x1/4x3/8	A36 (36 ksi)
T17 119.00-106.50	None	Flat Bar		A36 (36 ksi)	Double Equal Angle	2L2 1/2x2 1/2x1/4x3/8	A36 (36 ksi)

Tower Section Geometry (cont'd)

<i>Tower Elevation ft</i>	<i>Secondary Horizontal Type</i>	<i>Secondary Horizontal Size</i>	<i>Secondary Horizontal Grade</i>	<i>Inner Bracing Type</i>	<i>Inner Bracing Size</i>	<i>Inner Bracing Grade</i>

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<i>Tower Elevation</i>	<i>Secondary Horizontal Type</i>	<i>Secondary Horizontal Size</i>	<i>Secondary Horizontal Grade</i>	<i>Inner Bracing Type</i>	<i>Inner Bracing Size</i>	<i>Inner Bracing Grade</i>
<i>ft</i>						
T10 191.50-181.50	Single Angle	L2 1/2x2x1/4	A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T11 181.50-171.50	Single Angle	L2 1/2x2x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T12 171.50-161.50	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T13 161.50-151.50	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T14 151.50-141.50	Single Angle	L2 1/2x2x1/4	A36 (36 ksi)	Single Angle	L2x2 1/2x3/16	A36 (36 ksi)
T16 131.50-119.00	Single Angle		A36 (36 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)
T17 119.00-106.50	Single Angle		A36 (36 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)

Tower Section Geometry (cont'd)

<i>Tower Elevation</i>	<i>Redundant Bracing Grade</i>	<i>Redundant Type</i>	<i>Redundant Size</i>	<i>K Factor</i>
<i>ft</i>				
T15 141.50-131.50	A36 (36 ksi)	Horizontal (1) Diagonal (1) Hip (1)	Single Angle Single Angle L2x2x1/4	1 1 1
T16 131.50-119.00	A36 (36 ksi)	Horizontal (1) Diagonal (1) Hip (1)	Single Angle Single Angle L2x2x1/4	1 1 1
T17 119.00-106.50	A36 (36 ksi)	Horizontal (1) Diagonal (1) Sub-Diagonal Sub-Horizontal Hip (1) Hip Diagonal (1)	Single Angle Single Angle Single Angle Single Angle Single Angle Single Angle	1 1 1 1 1 1

Tower Section Geometry (cont'd)

<i>Tower Elevation</i>	<i>Gusset Area (per face)</i>	<i>Gusset Thickness</i>	<i>Gusset Grade</i>	<i>Adjust. Factor A_f</i>	<i>Adjust. Factor A_r</i>	<i>Weight Mult.</i>	<i>Double Angle Stitch Bolt Spacing Diagonals</i>	<i>Double Angle Stitch Bolt Spacing Horizontals</i>	<i>Double Angle Stitch Bolt Spacing Redundants</i>
<i>ft</i>	<i>ft²</i>	<i>in</i>					<i>in</i>	<i>in</i>	<i>in</i>
T1 231.50-229.00	0.00	0.3750	A36 (36 ksi)	1.03	1	1.05	36.0000	36.0000	36.0000
T2 229.00-224.80	0.00	0.3750	A36 (36 ksi)	1.03	1	1.05	11.0000	36.0000	36.0000
T3 224.80-220.70	0.00	0.3750	A36 (36 ksi)	1.03	1	1.05	11.0000	36.0000	36.0000
T4 220.70-216.50	0.00	0.3750	A36 (36 ksi)	1.03	1	1.05	11.0000	36.0000	36.0000
T5 216.50-211.50	0.00	0.5000	A36 (36 ksi)	1.03	1	1.05	36.0000	36.0000	36.0000
T6	0.00	0.5000	A36	1.03	1	1.05	36.0000	36.0000	36.0000

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<i>Tower Elevation</i>	<i>Gusset Area (per face)</i>	<i>Gusset Thickness</i>	<i>Gusset Grade</i>	<i>Adjust. Factor A_f</i>	<i>Adjust. Factor A_r</i>	<i>Weight Mult.</i>	<i>Double Angle Stitch Bolt Spacing Diagonals in</i>	<i>Double Angle Stitch Bolt Spacing Horizontals in</i>	<i>Double Angle Stitch Bolt Spacing Redundants in</i>
<i>ft</i>	<i>ft²</i>	<i>in</i>							
211.50-206.50			(36 ksi)						
T7	0.00	0.5000	A36	1.03	1	1.05	36.0000	36.0000	36.0000
206.50-201.50			(36 ksi)						
T8	0.00	0.5000	A36	1.03	1	1.05	36.0000	36.0000	36.0000
201.50-196.50			(36 ksi)						
T9	0.00	0.5000	A36	1.03	1	1.05	36.0000	36.0000	36.0000
196.50-191.50			(36 ksi)						
T10	0.00	0.6250	A36	1.03	1	1.05	36.0000	36.0000	36.0000
191.50-181.50			(36 ksi)						
T11	0.00	0.6250	A36	1.03	1	1.05	36.0000	36.0000	36.0000
181.50-171.50			(36 ksi)						
T12	0.00	0.6250	A36	1.03	1	1.05	36.0000	36.0000	36.0000
171.50-161.50			(36 ksi)						
T13	0.00	0.6250	A36	1.03	1	1.05	36.0000	36.0000	36.0000
161.50-151.50			(36 ksi)						
T14	0.00	0.7500	A36	1.03	1	1.05	36.0000	36.0000	36.0000
151.50-141.50			(36 ksi)						
T15	0.00	0.7500	A36	1.03	1	1.05	36.0000	36.0000	36.0000
141.50-131.50			(36 ksi)						
T16	0.00	0.8750	A36	1.03	1	1.05	22.2500	23.2500	36.0000
131.50-119.00			(36 ksi)						
T17	0.00	0.8750	A36	1.03	1	1.05	22.2500	23.2500	36.0000
119.00-106.50			(36 ksi)						

Tower Section Geometry (*cont'd*)

<i>Tower Elevation</i>	<i>Calc K Single Angles</i>	<i>Calc K Solid Rounds</i>	<i>Legs</i>	<i>K Factors¹</i>						
				<i>X Brace Diags</i>	<i>K Brace Diags</i>	<i>Single Diags</i>	<i>Girts</i>	<i>Horiz.</i>	<i>Sec. Horiz.</i>	<i>Inner Brace</i>
				<i>X Y</i>	<i>X Y</i>	<i>X Y</i>	<i>X Y</i>	<i>X Y</i>	<i>X Y</i>	<i>X Y</i>
<i>ft</i>										
T1	Yes	No	1	1	1	1	1	1	1	1
231.50-229.00				1	1	1	1	1	1	1
T2	Yes	No	1	1	1	1	1	1	1	1
229.00-224.80				1	1	1	1	1	1	1
T3	Yes	No	1	1	1	1	1	1	1	1
224.80-220.70				1	1	1	1	1	1	1
T4	Yes	No	1	1	1	1	1	1	1	1
220.70-216.50				1	1	1	1	1	1	1
T5	Yes	No	1	1	1	1	1	1	1	1
216.50-211.50				1	1	1	1	1	1	1
T6	Yes	No	1	1	1	1	1	1	1	1
211.50-206.50				1	1	1	1	1	1	1
T7	Yes	No	1	1	1	1	1	1	1	1
206.50-201.50				1	1	1	1	1	1	1
T8	Yes	No	1	1	1	1	1	1	1	1
201.50-196.50				1	1	1	1	1	1	1
T9	Yes	No	1	1	1	1	1	1	1	1
196.50-191.50				1	1	1	1	1	1	1
T10	Yes	No	1	1	1	1	1	1	1	1
191.50-181.50				1	1	1	1	1	1	1
T11	Yes	No	1	1	1	1	1	1	1	1
181.50-171.50				1	1	1	1	1	1	1
T12	Yes	No	1	1	1	1	1	1	1	1

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Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T16 131.50-119.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T17 119.00-106.50	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub-Diagonal		Redundant Sub-Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 231.50-229.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 229.00-224.80	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 224.80-220.70	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 220.70-216.50	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 216.50-211.50	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 211.50-206.50	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 206.50-201.50	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 201.50-196.50	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 196.50-191.50	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 191.50-181.50	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 181.50-171.50	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T12 171.50-161.50	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T13 161.50-151.50	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T14 151.50-141.50	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T15 141.50-131.50	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T16 131.50-119.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T17 119.00-106.50	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry (cont'd)

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Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub-Diagonal		Redundant Sub-Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T7	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
206.50-201.50	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T8	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
201.50-196.50	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T9	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
196.50-191.50	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T10	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
191.50-181.50	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T11	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
181.50-171.50	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T12	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
171.50-161.50	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T13	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
161.50-151.50	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T14	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0	0.6250	0
151.50-141.50	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T15	0.6250	1	0.6250	1	0.6250	2	0.6250	2	0.6250	0	0.6250	2	0.6250	0
141.50-131.50	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T16	0.6250	1	0.6250	1	0.6250	2	0.6250	2	0.6250	0	0.6250	2	0.6250	0
131.50-119.00	A325N		A325N		A325N		A325N		A325N		A325N		A325N	
T17	0.6250	1	0.6250	1	0.6250	2	0.6250	2	0.6250	0	0.6250	2	0.6250	2
119.00-106.50	A325N		A325N		A325N		A325N		A325N		A325N		A325N	

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Climbing Ladder (Af)	B	No	No	Af (CaAa)	231.50 - 106.50	-6.0000	0.45	1	1	3.0000	3.0000		4.00
Safety Line 3/8 *** ****	B	No	No	Ar (CaAa)	231.50 - 106.50	-6.0000	0.45	1	1	0.3750	0.3750		0.22
Feedline Ladder (Af)	B	No	No	Af (CaAa)	212.50 - 111.75	-10.000 0	0.4	1	1	3.0000	3.0000		8.40
Feedline Ladder (Af)	D	No	No	Af (CaAa)	206.50 - 108.00	-12.000 0	0.4	1	1	3.0000	3.0000		8.40
Feedline Ladder (Af) **	A	No	No	Af (CaAa)	200.50 - 108.00	0.0000	-0.4	1	1	3.0000	3.0000		8.40
3/8" Coax	B	No	No	Ar (CaAa)	221.50 - 111.50	-5.0000	0.38	2	2	0.3750	0.3750		0.07
EW90(ELLIP TICAL)	B	No	No	Ar (CaAa)	223.50 - 111.50	-5.0000	0.4	2	1	0.5000	1.2800		0.32
LDF7-50A(1- 5/8)	C	No	No	Ar (CaAa)	231.50 - 106.50	-18.000 0	-0.36	12	12	0.5000	1.9800		0.82
1/2" dia. coax	C	No	No	Ar (CaAa)	132.00 - 111.50	-12.000 0	-0.35	2	2	0.5000	0.5000		0.15
1/2" dia. coax	C	No	No	Ar (CaAa)	229.00 - 132.00	-12.000 0	-0.35	1	1	0.5000	0.5000		0.15
3/4" DC	C	No	No	Ar (CaAa)	231.50 - 106.50	-12.000 0	-0.33	6	3	0.5000	0.7500		1.24

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Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
5/8" dia. coax	C	No	No	Ar (CaAa)	231.50 - 106.50	-12.000 0	-0.34	3	3	0.5000	0.6250		0.15
**													
**													
LDF7-50A(1-5/8)	A	No	No	Ar (CaAa)	206.50 - 111.50	0.0000	-0.4	7	4	0.5000	1.9800		0.82
HB158-21U6S	A	No	No	Ar (CaAa)	206.50 - 111.50	3.5000	-0.4	6	3	0.5000	1.9960		2.50
24-xxM_TMO (1-5/8)													
1" Feedline	A	No	No	Ar (CaAa)	206.50 - 111.50	8.0000	-0.4	1	1	0.5000	1.0000		0.20
**													
1" Metal Conduit	A	No	No	Ar (CaAa)	231.50 - 111.50	0.0000	0.28	1	1	1.0000	1.0000		1.13
**													

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	CAAA ft²/ft	Weight plf

**								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft²	A _F ft²	CAAA In Face ft²	CAAA Out Face ft²	Weight K
T1	231.50-229.00	A	0.000	0.000	0.250	0.000	0
		B	0.000	0.000	1.344	0.000	0
		C	0.000	0.000	7.534	0.000	0
		D	0.000	0.000	0.000	0.000	0
T2	229.00-224.80	A	0.000	0.000	0.420	0.000	0
		B	0.000	0.000	2.257	0.000	0
		C	0.000	0.000	12.867	0.000	0
		D	0.000	0.000	0.000	0.000	0
T3	224.80-220.70	A	0.000	0.000	0.410	0.000	0
		B	0.000	0.000	2.981	0.000	0
		C	0.000	0.000	12.560	0.000	0
		D	0.000	0.000	0.000	0.000	0
T4	220.70-216.50	A	0.000	0.000	0.420	0.000	0
		B	0.000	0.000	3.648	0.000	0
		C	0.000	0.000	12.867	0.000	0
		D	0.000	0.000	0.000	0.000	0
T5	216.50-211.50	A	0.000	0.000	0.500	0.000	0
		B	0.000	0.000	4.843	0.000	0
		C	0.000	0.000	15.317	0.000	0
		D	0.000	0.000	0.000	0.000	0

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<i>Tower Section</i>	<i>Tower Elevation ft</i>	<i>Face</i>	<i>A_R ft²</i>	<i>A_F ft²</i>	<i>C_AA_A In Face ft²</i>	<i>C_AA_A Out Face ft²</i>	<i>Weight K</i>
T6	211.50-206.50	A	0.000	0.000	0.500	0.000	0
		B	0.000	0.000	6.842	0.000	0
		C	0.000	0.000	15.317	0.000	0
		D	0.000	0.000	0.000	0.000	0
T7	206.50-201.50	A	0.000	0.000	13.918	0.000	0
		B	0.000	0.000	6.842	0.000	0
		C	0.000	0.000	15.317	0.000	0
		D	0.000	0.000	2.500	0.000	0
T8	201.50-196.50	A	0.000	0.000	15.918	0.000	0
		B	0.000	0.000	6.842	0.000	0
		C	0.000	0.000	15.317	0.000	0
		D	0.000	0.000	2.500	0.000	0
T9	196.50-191.50	A	0.000	0.000	16.418	0.000	0
		B	0.000	0.000	6.842	0.000	0
		C	0.000	0.000	15.317	0.000	0
		D	0.000	0.000	2.500	0.000	0
T10	191.50-181.50	A	0.000	0.000	32.836	0.000	0
		B	0.000	0.000	13.685	0.000	0
		C	0.000	0.000	30.635	0.000	0
		D	0.000	0.000	5.000	0.000	0
T11	181.50-171.50	A	0.000	0.000	32.836	0.000	0
		B	0.000	0.000	13.685	0.000	0
		C	0.000	0.000	30.635	0.000	0
		D	0.000	0.000	5.000	0.000	0
T12	171.50-161.50	A	0.000	0.000	32.836	0.000	0
		B	0.000	0.000	13.685	0.000	0
		C	0.000	0.000	30.635	0.000	0
		D	0.000	0.000	5.000	0.000	0
T13	161.50-151.50	A	0.000	0.000	32.836	0.000	0
		B	0.000	0.000	13.685	0.000	0
		C	0.000	0.000	30.635	0.000	0
		D	0.000	0.000	5.000	0.000	0
T14	151.50-141.50	A	0.000	0.000	32.836	0.000	0
		B	0.000	0.000	13.685	0.000	0
		C	0.000	0.000	30.635	0.000	0
		D	0.000	0.000	5.000	0.000	0
T15	141.50-131.50	A	0.000	0.000	32.836	0.000	0
		B	0.000	0.000	13.685	0.000	0
		C	0.000	0.000	30.660	0.000	0
		D	0.000	0.000	5.000	0.000	0
T16	131.50-119.00	A	0.000	0.000	41.045	0.000	0
		B	0.000	0.000	17.106	0.000	0
		C	0.000	0.000	38.919	0.000	0
		D	0.000	0.000	6.250	0.000	0
T17	119.00-106.50	A	0.000	0.000	26.377	0.000	0
		B	0.000	0.000	12.826	0.000	0
		C	0.000	0.000	38.419	0.000	0
		D	0.000	0.000	5.500	0.000	0

Feed Line/Linear Appurtenances Section Areas - With Ice

<i>Tower Section</i>	<i>Tower Elevation ft</i>	<i>Face or Leg</i>	<i>Ice Thickness in</i>	<i>A_R ft²</i>	<i>A_F ft²</i>	<i>C_AA_A In Face ft²</i>	<i>C_AA_A Out Face ft²</i>	<i>Weight K</i>
T1	231.50-229.00	A	2.429	0.000	0.000	1.464	0.000	0
		B		0.000	0.000	3.773	0.000	0
		C		0.000	0.000	17.154	0.000	0
		D		0.000	0.000	0.000	0.000	0

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Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
T2	229.00-224.80	A	2.425	0.000	0.000	2.457	0.000	0
		B		0.000	0.000	6.332	0.000	0
		C		0.000	0.000	31.052	0.000	1
		D		0.000	0.000	0.000	0.000	0
T3	224.80-220.70	A	2.421	0.000	0.000	2.395	0.000	0
		B		0.000	0.000	10.465	0.000	0
		C		0.000	0.000	30.291	0.000	1
		D		0.000	0.000	0.000	0.000	0
T4	220.70-216.50	A	2.416	0.000	0.000	2.450	0.000	0
		B		0.000	0.000	15.712	0.000	0
		C		0.000	0.000	31.007	0.000	1
		D		0.000	0.000	0.000	0.000	0
T5	216.50-211.50	A	2.411	0.000	0.000	2.911	0.000	0
		B		0.000	0.000	19.659	0.000	0
		C		0.000	0.000	36.882	0.000	1
		D		0.000	0.000	0.000	0.000	0
T6	211.50-206.50	A	2.405	0.000	0.000	2.905	0.000	0
		B		0.000	0.000	23.550	0.000	0
		C		0.000	0.000	36.848	0.000	1
		D		0.000	0.000	0.000	0.000	0
T7	206.50-201.50	A	2.400	0.000	0.000	25.785	0.000	1
		B		0.000	0.000	23.512	0.000	0
		C		0.000	0.000	36.813	0.000	1
		D		0.000	0.000	4.900	0.000	0
T8	201.50-196.50	A	2.394	0.000	0.000	29.667	0.000	1
		B		0.000	0.000	23.474	0.000	0
		C		0.000	0.000	36.778	0.000	1
		D		0.000	0.000	4.894	0.000	0
T9	196.50-191.50	A	2.388	0.000	0.000	30.606	0.000	1
		B		0.000	0.000	23.434	0.000	0
		C		0.000	0.000	36.741	0.000	1
		D		0.000	0.000	4.888	0.000	0
T10	191.50-181.50	A	2.378	0.000	0.000	61.091	0.000	1
		B		0.000	0.000	46.746	0.000	1
		C		0.000	0.000	73.370	0.000	1
		D		0.000	0.000	9.756	0.000	0
T11	181.50-171.50	A	2.365	0.000	0.000	60.922	0.000	1
		B		0.000	0.000	46.575	0.000	1
		C		0.000	0.000	73.214	0.000	1
		D		0.000	0.000	9.730	0.000	0
T12	171.50-161.50	A	2.351	0.000	0.000	60.743	0.000	1
		B		0.000	0.000	46.396	0.000	1
		C		0.000	0.000	73.050	0.000	1
		D		0.000	0.000	9.703	0.000	0
T13	161.50-151.50	A	2.337	0.000	0.000	60.555	0.000	1
		B		0.000	0.000	46.207	0.000	1
		C		0.000	0.000	72.877	0.000	1
		D		0.000	0.000	9.674	0.000	0
T14	151.50-141.50	A	2.321	0.000	0.000	60.356	0.000	1
		B		0.000	0.000	46.006	0.000	1
		C		0.000	0.000	72.693	0.000	1
		D		0.000	0.000	9.643	0.000	0
T15	141.50-131.50	A	2.305	0.000	0.000	60.143	0.000	1
		B		0.000	0.000	45.793	0.000	1
		C		0.000	0.000	72.740	0.000	1
		D		0.000	0.000	9.610	0.000	0
T16	131.50-119.00	A	2.285	0.000	0.000	74.859	0.000	2
		B		0.000	0.000	56.920	0.000	1
		C		0.000	0.000	96.348	0.000	2
		D		0.000	0.000	11.963	0.000	0
T17	119.00-106.50	A	2.261	0.000	0.000	48.016	0.000	1

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Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
		B		0.000	0.000	40.891	0.000	1
		C		0.000	0.000	91.045	0.000	1
		D		0.000	0.000	10.475	0.000	0

Feed Line Center of Pressure

Section	Elevation ft	CP _X in	CP _Z in	CP _X Ice in	CP _Z Ice in
T1	231.50-229.00	2.0835	-7.0138	3.4052	-8.0113
T2	229.00-224.80	2.7625	-8.5068	4.7236	-9.8880
T3	224.80-220.70	2.8405	-8.2009	3.6394	-7.4178
T4	220.70-216.50	3.4769	-9.1061	6.4386	-11.2437
T5	216.50-211.50	3.0635	-7.9400	4.3429	-7.8542
T6	211.50-206.50	4.3796	-9.3825	6.6934	-10.7185
T7	206.50-201.50	-1.8774	-3.0547	0.8798	-6.5460
T8	201.50-196.50	-2.7666	-2.3071	-0.3059	-4.9606
T9	196.50-191.50	-3.2770	-2.3629	-0.6230	-5.9236
T10	191.50-181.50	-3.0434	-2.3348	-0.4500	-5.8831
T11	181.50-171.50	-3.1088	-2.5050	-0.3015	-6.4730
T12	171.50-161.50	-3.1727	-2.6682	-0.1548	-7.0379
T13	161.50-151.50	-3.2346	-2.8247	-0.0118	-7.5804
T14	151.50-141.50	-3.2940	-2.9745	0.1264	-8.1031
T15	141.50-131.50	-2.9990	-2.8535	0.2146	-7.0194
T16	131.50-119.00	-3.6530	-3.6389	0.7120	-9.8482
T17	119.00-106.50	-1.4305	-5.9675	2.9514	-11.3343

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T1	1	Climbing Ladder (Af)	229.00 - 231.50	0.6000	0.3873
T1	2	Safety Line 3/8	229.00 - 231.50	0.6000	0.3873
T1	11	LDF7-50A(1-5/8)	229.00 - 231.50	0.6000	0.3873
T1	14	3/4" DC	229.00 - 231.50	0.6000	0.3873
T1	15	5/8" dia. coax	229.00 - 231.50	0.6000	0.3873
T1	25	1" Metal Conduit	229.00 - 231.50	0.6000	0.3873
T2	1	Climbing Ladder (Af)	224.80 - 229.00	0.6000	0.4455
T2	2	Safety Line 3/8	224.80 - 229.00	0.6000	0.4455
T2	11	LDF7-50A(1-5/8)	224.80 - 229.00	0.6000	0.4455
T2	13	1/2" dia. coax	224.80 - 229.00	0.6000	0.4455

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<i>Tower Section</i>	<i>Feed Line Record No.</i>	<i>Description</i>	<i>Feed Line Segment Elev.</i>	<i>K_a No Ice</i>	<i>K_a Ice</i>
T2	14	3/4" DC	224.80 - 229.00	0.6000	0.4455
T2	15	5/8" dia. coax	224.80 - 229.00	0.6000	0.4455
T2	25	1" Metal Conduit	224.80 - 229.00	0.6000	0.4455
T3	1	Climbing Ladder (Af)	220.70 - 224.80	0.6000	0.3130
T3	2	Safety Line 3/8	220.70 - 224.80	0.6000	0.3130
T3	9	3/8" Coax	220.70 - 221.50	0.6000	0.3130
T3	10	EW90(ELLIPTICAL)	220.70 - 223.50	0.6000	0.3130
T3	11	LDF7-50A(1-5/8)	220.70 - 224.80	0.6000	0.3130
T3	13	1/2" dia. coax	220.70 - 224.80	0.6000	0.3130
T3	14	3/4" DC	220.70 - 224.80	0.6000	0.3130
T3	15	5/8" dia. coax	220.70 - 224.80	0.6000	0.3130
T3	25	1" Metal Conduit	220.70 - 224.80	0.6000	0.3130
T4	1	Climbing Ladder (Af)	216.50 - 220.70	0.6000	0.4467
T4	2	Safety Line 3/8	216.50 - 220.70	0.6000	0.4467
T4	9	3/8" Coax	216.50 - 220.70	0.6000	0.4467
T4	10	EW90(ELLIPTICAL)	216.50 - 220.70	0.6000	0.4467
T4	11	LDF7-50A(1-5/8)	216.50 - 220.70	0.6000	0.4467
T4	13	1/2" dia. coax	216.50 - 220.70	0.6000	0.4467
T4	14	3/4" DC	216.50 - 220.70	0.6000	0.4467
T4	15	5/8" dia. coax	216.50 - 220.70	0.6000	0.4467
T4	25	1" Metal Conduit	216.50 - 220.70	0.6000	0.4467
T5	1	Climbing Ladder (Af)	211.50 - 216.50	0.6000	0.3067
T5	2	Safety Line 3/8	211.50 - 216.50	0.6000	0.3067
T5	5	Feedline Ladder (Af)	211.50 - 212.50	0.6000	0.3067
T5	9	3/8" Coax	211.50 - 216.50	0.6000	0.3067
T5	10	EW90(ELLIPTICAL)	211.50 - 216.50	0.6000	0.3067
T5	11	LDF7-50A(1-5/8)	211.50 - 216.50	0.6000	0.3067
T5	13	1/2" dia. coax	211.50 - 216.50	0.6000	0.3067
T5	14	3/4" DC	211.50 - 216.50	0.6000	0.3067
T5	15	5/8" dia. coax	211.50 - 216.50	0.6000	0.3067
T5	25	1" Metal Conduit	211.50 - 216.50	0.6000	0.3067

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<i>Tower Section</i>	<i>Feed Line Record No.</i>	<i>Description</i>	<i>Feed Line Segment Elev.</i>	<i>K_a No Ice</i>	<i>K_a Ice</i>
T6	1	Climbing Ladder (Af)	206.50 - 211.50	0.6000	0.3863
T6	2	Safety Line 3/8	206.50 - 211.50	0.6000	0.3863
T6	5	Feedline Ladder (Af)	206.50 - 211.50	0.6000	0.3863
T6	9	3/8" Coax	206.50 - 211.50	0.6000	0.3863
T6	10	EW90(ELLIPTICAL)	206.50 - 211.50	0.6000	0.3863
T6	11	LDF7-50A(1-5/8)	206.50 - 211.50	0.6000	0.3863
T6	13	1/2" dia. coax	206.50 - 211.50	0.6000	0.3863
T6	14	3/4" DC	206.50 - 211.50	0.6000	0.3863
T6	15	5/8" dia. coax	206.50 - 211.50	0.6000	0.3863
T6	25	1" Metal Conduit	206.50 - 211.50	0.6000	0.3863
T7	1	Climbing Ladder (Af)	201.50 - 206.50	0.6000	0.5034
T7	2	Safety Line 3/8	201.50 - 206.50	0.6000	0.5034
T7	5	Feedline Ladder (Af)	201.50 - 206.50	0.6000	0.5034
T7	6	Feedline Ladder (Af)	201.50 - 206.50	0.6000	0.5034
T7	9	3/8" Coax	201.50 - 206.50	0.6000	0.5034
T7	10	EW90(ELLIPTICAL)	201.50 - 206.50	0.6000	0.5034
T7	11	LDF7-50A(1-5/8)	201.50 - 206.50	0.6000	0.5034
T7	13	1/2" dia. coax	201.50 - 206.50	0.6000	0.5034
T7	14	3/4" DC	201.50 - 206.50	0.6000	0.5034
T7	15	5/8" dia. coax	201.50 - 206.50	0.6000	0.5034
T7	20	LDF7-50A(1-5/8)	201.50 - 206.50	0.6000	0.5034
T7	21	HB158-21U6S24-xxM_TMO (1-5/8)	201.50 - 206.50	0.6000	0.5034
T7	22	1" Feedline	201.50 - 206.50	0.6000	0.5034
T7	25	1" Metal Conduit	201.50 - 206.50	0.6000	0.5034
T8	1	Climbing Ladder (Af)	196.50 - 201.50	0.6000	0.4157
T8	2	Safety Line 3/8	196.50 - 201.50	0.6000	0.4157
T8	5	Feedline Ladder (Af)	196.50 - 201.50	0.6000	0.4157
T8	6	Feedline Ladder (Af)	196.50 - 201.50	0.6000	0.4157
T8	7	Feedline Ladder (Af)	196.50 - 200.50	0.6000	0.4157
T8	9	3/8" Coax	196.50 - 201.50	0.6000	0.4157
T8	10	EW90(ELLIPTICAL)	196.50 - 201.50	0.6000	0.4157

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<i>Tower Section</i>	<i>Feed Line Record No.</i>	<i>Description</i>	<i>Feed Line Segment Elev.</i>	<i>K_a No Ice</i>	<i>K_a Ice</i>
T8	11	LDF7-50A(1-5/8)	196.50 - 201.50	0.6000	0.4157
T8	13	1/2" dia. coax	196.50 - 201.50	0.6000	0.4157
T8	14	3/4" DC	196.50 - 201.50	0.6000	0.4157
T8	15	5/8" dia. coax	196.50 - 201.50	0.6000	0.4157
T8	20	LDF7-50A(1-5/8)	196.50 - 201.50	0.6000	0.4157
T8	21	HB158-21U6S24-xxM_TMO (1-5/8)	196.50 - 201.50	0.6000	0.4157
T8	22	1" Feedline	196.50 - 201.50	0.6000	0.4157
T8	25	1" Metal Conduit	196.50 - 201.50	0.6000	0.4157
T9	1	Climbing Ladder (Af)	191.50 - 196.50	0.6000	0.5315
T9	2	Safety Line 3/8	191.50 - 196.50	0.6000	0.5315
T9	5	Feedline Ladder (Af)	191.50 - 196.50	0.6000	0.5315
T9	6	Feedline Ladder (Af)	191.50 - 196.50	0.6000	0.5315
T9	7	Feedline Ladder (Af)	191.50 - 196.50	0.6000	0.5315
T9	9	3/8" Coax	191.50 - 196.50	0.6000	0.5315
T9	10	EW90(ELLIPTICAL)	191.50 - 196.50	0.6000	0.5315
T9	11	LDF7-50A(1-5/8)	191.50 - 196.50	0.6000	0.5315
T9	13	1/2" dia. coax	191.50 - 196.50	0.6000	0.5315
T9	14	3/4" DC	191.50 - 196.50	0.6000	0.5315
T9	15	5/8" dia. coax	191.50 - 196.50	0.6000	0.5315
T9	20	LDF7-50A(1-5/8)	191.50 - 196.50	0.6000	0.5315
T9	21	HB158-21U6S24-xxM_TMO (1-5/8)	191.50 - 196.50	0.6000	0.5315
T9	22	1" Feedline	191.50 - 196.50	0.6000	0.5315
T9	25	1" Metal Conduit	191.50 - 196.50	0.6000	0.5315
T10	1	Climbing Ladder (Af)	181.50 - 191.50	0.6000	0.4988
T10	2	Safety Line 3/8	181.50 - 191.50	0.6000	0.4988
T10	5	Feedline Ladder (Af)	181.50 - 191.50	0.6000	0.4988
T10	6	Feedline Ladder (Af)	181.50 - 191.50	0.6000	0.4988
T10	7	Feedline Ladder (Af)	181.50 - 191.50	0.6000	0.4988
T10	9	3/8" Coax	181.50 - 191.50	0.6000	0.4988
T10	10	EW90(ELLIPTICAL)	181.50 - 191.50	0.6000	0.4988
T10	11	LDF7-50A(1-5/8)	181.50 - 191.50	0.6000	0.4988

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<i>Tower Section</i>	<i>Feed Line Record No.</i>	<i>Description</i>	<i>Feed Line Segment Elev.</i>	<i>K_a No Ice</i>	<i>K_a Ice</i>
T10	13	1/2" dia. coax	181.50 - 191.50	0.6000	0.4988
T10	14	3/4" DC	181.50 - 191.50	0.6000	0.4988
T10	15	5/8" dia. coax	181.50 - 191.50	0.6000	0.4988
T10	20	LDF7-50A(1-5/8)	181.50 - 191.50	0.6000	0.4988
T10	21	HB158-21U6S24-xxM_TMO (1-5/8)	181.50 - 191.50	0.6000	0.4988
T10	22	1" Feedline	181.50 - 191.50	0.6000	0.4988
T10	25	1" Metal Conduit	181.50 - 191.50	0.6000	0.4988
T11	1	Climbing Ladder (Af)	171.50 - 181.50	0.6000	0.5229
T11	2	Safety Line 3/8	171.50 - 181.50	0.6000	0.5229
T11	5	Feedline Ladder (Af)	171.50 - 181.50	0.6000	0.5229
T11	6	Feedline Ladder (Af)	171.50 - 181.50	0.6000	0.5229
T11	7	Feedline Ladder (Af)	171.50 - 181.50	0.6000	0.5229
T11	9	3/8" Coax	171.50 - 181.50	0.6000	0.5229
T11	10	EW90(ELLIPTICAL)	171.50 - 181.50	0.6000	0.5229
T11	11	LDF7-50A(1-5/8)	171.50 - 181.50	0.6000	0.5229
T11	13	1/2" dia. coax	171.50 - 181.50	0.6000	0.5229
T11	14	3/4" DC	171.50 - 181.50	0.6000	0.5229
T11	15	5/8" dia. coax	171.50 - 181.50	0.6000	0.5229
T11	20	LDF7-50A(1-5/8)	171.50 - 181.50	0.6000	0.5229
T11	21	HB158-21U6S24-xxM_TMO (1-5/8)	171.50 - 181.50	0.6000	0.5229
T11	22	1" Feedline	171.50 - 181.50	0.6000	0.5229
T11	25	1" Metal Conduit	171.50 - 181.50	0.6000	0.5229
T12	1	Climbing Ladder (Af)	161.50 - 171.50	0.6000	0.5434
T12	2	Safety Line 3/8	161.50 - 171.50	0.6000	0.5434
T12	5	Feedline Ladder (Af)	161.50 - 171.50	0.6000	0.5434
T12	6	Feedline Ladder (Af)	161.50 - 171.50	0.6000	0.5434
T12	7	Feedline Ladder (Af)	161.50 - 171.50	0.6000	0.5434
T12	9	3/8" Coax	161.50 - 171.50	0.6000	0.5434
T12	10	EW90(ELLIPTICAL)	161.50 - 171.50	0.6000	0.5434
T12	11	LDF7-50A(1-5/8)	161.50 - 171.50	0.6000	0.5434
T12	13	1/2" dia. coax	161.50 - 171.50	0.6000	0.5434

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<i>Tower Section</i>	<i>Feed Line Record No.</i>	<i>Description</i>	<i>Feed Line Segment Elev.</i>	<i>K_a No Ice</i>	<i>K_a Ice</i>
T12	14	3/4" DC	161.50 - 171.50	0.6000	0.5434
T12	15	5/8" dia. coax	161.50 - 171.50	0.6000	0.5434
T12	20	LDF7-50A(1-5/8)	161.50 - 171.50	0.6000	0.5434
T12	21	HB158-21U6S24-xxM_TMO (1-5/8)	161.50 - 171.50	0.6000	0.5434
T12	22	1" Feedline	161.50 - 171.50	0.6000	0.5434
T12	25	1" Metal Conduit	161.50 - 171.50	0.6000	0.5434
T13	1	Climbing Ladder (Af)	151.50 - 161.50	0.6000	0.5612
T13	2	Safety Line 3/8	151.50 - 161.50	0.6000	0.5612
T13	5	Feedline Ladder (Af)	151.50 - 161.50	0.6000	0.5612
T13	6	Feedline Ladder (Af)	151.50 - 161.50	0.6000	0.5612
T13	7	Feedline Ladder (Af)	151.50 - 161.50	0.6000	0.5612
T13	9	3/8" Coax	151.50 - 161.50	0.6000	0.5612
T13	10	EW90(ELLIPTICAL)	151.50 - 161.50	0.6000	0.5612
T13	11	LDF7-50A(1-5/8)	151.50 - 161.50	0.6000	0.5612
T13	13	1/2" dia. coax	151.50 - 161.50	0.6000	0.5612
T13	14	3/4" DC	151.50 - 161.50	0.6000	0.5612
T13	15	5/8" dia. coax	151.50 - 161.50	0.6000	0.5612
T13	20	LDF7-50A(1-5/8)	151.50 - 161.50	0.6000	0.5612
T13	21	HB158-21U6S24-xxM_TMO (1-5/8)	151.50 - 161.50	0.6000	0.5612
T13	22	1" Feedline	151.50 - 161.50	0.6000	0.5612
T13	25	1" Metal Conduit	151.50 - 161.50	0.6000	0.5612
T14	1	Climbing Ladder (Af)	141.50 - 151.50	0.6000	0.5770
T14	2	Safety Line 3/8	141.50 - 151.50	0.6000	0.5770
T14	5	Feedline Ladder (Af)	141.50 - 151.50	0.6000	0.5770
T14	6	Feedline Ladder (Af)	141.50 - 151.50	0.6000	0.5770
T14	7	Feedline Ladder (Af)	141.50 - 151.50	0.6000	0.5770
T14	9	3/8" Coax	141.50 - 151.50	0.6000	0.5770
T14	10	EW90(ELLIPTICAL)	141.50 - 151.50	0.6000	0.5770
T14	11	LDF7-50A(1-5/8)	141.50 - 151.50	0.6000	0.5770
T14	13	1/2" dia. coax	141.50 - 151.50	0.6000	0.5770
T14	14	3/4" DC	141.50 - 151.50	0.6000	0.5770

<i>tnxTower</i> <i>Tower Engineering Professionals</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job	Stamford #1 CO (638283)	Page	20 of 53
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<i>Tower Section</i>	<i>Feed Line Record No.</i>	<i>Description</i>	<i>Feed Line Segment Elev.</i>	<i>K_a No Ice</i>	<i>K_a Ice</i>
T14	15	5/8" dia. coax	141.50 - 151.50	0.6000	0.5770
T14	20	LDF7-50A(1-5/8)	141.50 - 151.50	0.6000	0.5770
T14	21	HB158-21U6S24-xxM_TMO (1-5/8)	141.50 - 151.50	0.6000	0.5770
T14	22	1" Feedline	141.50 - 151.50	0.6000	0.5770
T14	25	1" Metal Conduit	141.50 - 151.50	0.6000	0.5770
T15	1	Climbing Ladder (Af)	131.50 - 141.50	0.6000	0.4714
T15	2	Safety Line 3/8	131.50 - 141.50	0.6000	0.4714
T15	5	Feedline Ladder (Af)	131.50 - 141.50	0.6000	0.4714
T15	6	Feedline Ladder (Af)	131.50 - 141.50	0.6000	0.4714
T15	7	Feedline Ladder (Af)	131.50 - 141.50	0.6000	0.4714
T15	9	3/8" Coax	131.50 - 141.50	0.6000	0.4714
T15	10	EW90(ELLIPTICAL)	131.50 - 141.50	0.6000	0.4714
T15	11	LDF7-50A(1-5/8)	131.50 - 141.50	0.6000	0.4714
T15	12	1/2" dia. coax	131.50 - 132.00	0.6000	0.4714
T15	13	1/2" dia. coax	132.00 - 141.50	0.6000	0.4714
T15	14	3/4" DC	131.50 - 141.50	0.6000	0.4714
T15	15	5/8" dia. coax	131.50 - 141.50	0.6000	0.4714
T15	20	LDF7-50A(1-5/8)	131.50 - 141.50	0.6000	0.4714
T15	21	HB158-21U6S24-xxM_TMO (1-5/8)	131.50 - 141.50	0.6000	0.4714
T15	22	1" Feedline	131.50 - 141.50	0.6000	0.4714
T15	25	1" Metal Conduit	131.50 - 141.50	0.6000	0.4714
T16	1	Climbing Ladder (Af)	119.00 - 131.50	0.6000	0.6000
T16	2	Safety Line 3/8	119.00 - 131.50	0.6000	0.6000
T16	5	Feedline Ladder (Af)	119.00 - 131.50	0.6000	0.6000
T16	6	Feedline Ladder (Af)	119.00 - 131.50	0.6000	0.6000
T16	7	Feedline Ladder (Af)	119.00 - 131.50	0.6000	0.6000
T16	9	3/8" Coax	119.00 - 131.50	0.6000	0.6000
T16	10	EW90(ELLIPTICAL)	119.00 - 131.50	0.6000	0.6000
T16	11	LDF7-50A(1-5/8)	119.00 - 131.50	0.6000	0.6000
T16	12	1/2" dia. coax	119.00 - 131.50	0.6000	0.6000
T16	14	3/4" DC	119.00 - 131.50	0.6000	0.6000

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<i>Tower Section</i>	<i>Feed Line Record No.</i>	<i>Description</i>	<i>Feed Line Segment Elev.</i>	<i>K_a No Ice</i>	<i>K_a Ice</i>
T16	15	5/8" dia. coax	119.00 - 131.50	0.6000	0.6000
T16	20	LDF7-50A(1-5/8)	119.00 - 131.50	0.6000	0.6000
T16	21	HB158-21U6S24-xxM_TMO (1-5/8)	119.00 - 131.50	0.6000	0.6000
T16	22	1" Feedline	119.00 - 131.50	0.6000	0.6000
T16	25	1" Metal Conduit	119.00 - 131.50	0.6000	0.6000
T17	1	Climbing Ladder (Af)	106.50 - 119.00	0.6000	0.6000
T17	2	Safety Line 3/8	106.50 - 119.00	0.6000	0.6000
T17	5	Feedline Ladder (Af)	111.75 - 119.00	0.6000	0.6000
T17	6	Feedline Ladder (Af)	108.00 - 119.00	0.6000	0.6000
T17	7	Feedline Ladder (Af)	108.00 - 119.00	0.6000	0.6000
T17	9	3/8" Coax	111.50 - 119.00	0.6000	0.6000
T17	10	EW90(ELLIPTICAL)	111.50 - 119.00	0.6000	0.6000
T17	11	LDF7-50A(1-5/8)	106.50 - 119.00	0.6000	0.6000
T17	12	1/2" dia. coax	111.50 - 119.00	0.6000	0.6000
T17	14	3/4" DC	106.50 - 119.00	0.6000	0.6000
T17	15	5/8" dia. coax	106.50 - 119.00	0.6000	0.6000
T17	20	LDF7-50A(1-5/8)	111.50 - 119.00	0.6000	0.6000
T17	21	HB158-21U6S24-xxM_TMO (1-5/8)	111.50 - 119.00	0.6000	0.6000
T17	22	1" Feedline	111.50 - 119.00	0.6000	0.6000
T17	25	1" Metal Conduit	111.50 - 119.00	0.6000	0.6000

Discrete Tower Loads

<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>	<i>C_AA_A Front ft²</i>	<i>C_AA_A Side ft²</i>	<i>Weight K</i>
**								
(2) 12" x 24" Beacon	B	From Face	0.00 0.00 14.00	0.0000	231.50	No Ice 1/2" Ice 1" Ice	1.00 1.58 1.77	0 0 0
5/8" x 4' Lightning Rod	B	From Face	0.00	0.0000	231.50	No Ice	0.25	0

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
13' T Beam Mount	B	From Face	0.00	0.0000	231.50	1/2" Ice	0.66	0
			13.00			1" Ice	0.97	0
			0.00			No Ice	10.50	0
			0.00			1/2" Ice	14.00	0
			6.50			1" Ice	17.50	0
**								
Top Platform Mount	C	None		0.0000	235.00	No Ice	72.25	6
						1/2" Ice	90.00	8
						1" Ice	107.75	10
2.4" Dia x 6-ft Pipe	B	From Face	4.00	0.0000	235.00	No Ice	1.43	0
			0.00			1/2" Ice	1.93	0
			0.00			1" Ice	2.30	0
2.4" Dia x 6-ft Pipe	D	From Face	4.00	0.0000	235.00	No Ice	1.43	0
			0.00			1/2" Ice	1.93	0
			0.00			1" Ice	2.30	0
Unused I-Beam Mount	A	From Face	4.00	0.0000	235.00	No Ice	2.50	0
			0.00			1/2" Ice	4.00	0
			0.00			1" Ice	5.50	0
(3) HPA-45R-BUU-H6 w/ Mount Pipe	B	From Centroid-Fa ce	4.00	0.0000	235.00	No Ice	12.13	0
			0.00			1/2" Ice	12.72	0
			0.00			1" Ice	13.28	0
(3) HPA-45R-BUU-H6 w/ Mount Pipe	D	From Centroid-Fa ce	4.00	0.0000	235.00	No Ice	12.13	0
			0.00			1/2" Ice	12.72	0
			0.00			1" Ice	13.28	0
TPA45R-KU6A w/ Mount Pipe	B	From Centroid-Fa ce	4.00	0.0000	235.00	No Ice	11.25	0
			0.00			1/2" Ice	11.86	0
			0.00			1" Ice	12.45	0
TPA45R-KU6A w/ Mount Pipe	D	From Centroid-Fa ce	4.00	0.0000	235.00	No Ice	11.25	0
			0.00			1/2" Ice	11.86	0
			0.00			1" Ice	12.45	0
P65-15-XLH-RR w/ Mount Pipe	C	From Centroid-Fa ce	4.00	0.0000	235.00	No Ice	5.30	0
			0.00			1/2" Ice	5.69	0
			0.00			1" Ice	6.09	0
80010964 w/ Mount Pipe	C	From Centroid-Fa ce	4.00	0.0000	235.00	No Ice	10.23	0
			0.00			1/2" Ice	10.74	0
			0.00			1" Ice	11.24	0
(2) OPA-65R-LCUU-H6 w/ Mount Pipe	A	From Centroid-Fa ce	4.00	0.0000	235.00	No Ice	9.90	0
			0.00			1/2" Ice	10.47	0
			0.00			1" Ice	11.01	0
(3) RRUS 32	B	From Centroid-Fa ce	4.00	0.0000	235.00	No Ice	2.86	0
			0.00			1/2" Ice	3.08	0
			0.00			1" Ice	3.32	0
(3) RRUS 32	C	From Centroid-Fa ce	4.00	0.0000	235.00	No Ice	2.86	0
			0.00			1/2" Ice	3.08	0
			0.00			1" Ice	3.32	0
(3) RRUS 32	D	From Centroid-Fa ce	4.00	0.0000	235.00	No Ice	2.86	0
			0.00			1/2" Ice	3.08	0
			0.00			1" Ice	3.32	0
(2) RRUS 4478	B	From Centroid-Fa ce	4.00	0.0000	235.00	No Ice	1.84	0
			0.00			1/2" Ice	2.01	0
			0.00			1" Ice	2.19	0
RRUS 4478	D	From Centroid-Fa ce	4.00	0.0000	235.00	No Ice	1.84	0
			0.00			1/2" Ice	2.01	0
			0.00			1" Ice	2.19	0
(2) RRUS 11 B12	B	From Centroid-Fa ce	4.00	0.0000	235.00	No Ice	2.79	0
			0.00			1/2" Ice	3.00	0
			0.00			1" Ice	3.21	0

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<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>	<i>C_{AA} Front ft²</i>	<i>C_{AA} Side ft²</i>	<i>Weight K</i>	
RRUS 11 B12	D	From	4.00	0.0000	235.00	No Ice	2.79	1.19	0
		Centroid-Fa	0.00			1/2" Ice	3.00	1.34	0
		ce	0.00			1" Ice	3.21	1.50	0
(2) LGP21401	B	From	4.00	0.0000	235.00	No Ice	1.10	0.21	0
		Centroid-Fa	0.00			1/2" Ice	1.24	0.27	0
		ce	0.00			1" Ice	1.38	0.35	0
(2) LGP21401	C	From	4.00	0.0000	235.00	No Ice	1.10	0.21	0
		Centroid-Fa	0.00			1/2" Ice	1.24	0.27	0
		ce	0.00			1" Ice	1.38	0.35	0
(2) LGP21401	D	From	4.00	0.0000	235.00	No Ice	1.10	0.21	0
		Centroid-Fa	0.00			1/2" Ice	1.24	0.27	0
		ce	0.00			1" Ice	1.38	0.35	0
(2) TPX-070821	C	From	4.00	0.0000	235.00	No Ice	0.47	0.10	0
		Centroid-Fa	0.00			1/2" Ice	0.56	0.15	0
		ce	0.00			1" Ice	0.66	0.20	0
(2) DC6-48-60-18-8F	B	From	4.00	0.0000	235.00	No Ice	1.21	1.21	0
		Centroid-Fa	0.00			1/2" Ice	1.89	1.89	0
		ce	0.00			1" Ice	2.11	2.11	0
DC9-48-60-24-8C-EV	D	From	4.00	0.0000	235.00	No Ice	1.14	1.14	0
		Centroid-Fa	0.00			1/2" Ice	1.79	1.79	0
		ce	0.00			1" Ice	2.00	2.00	0
17" 3 element yagi	C	From	4.00	0.0000	229.00	No Ice	0.11	0.25	0
		Centroid-Fa	0.00			1/2" Ice	0.20	0.51	0
		ce	0.00			1" Ice	0.29	0.77	0
**									
Pipe Mount [PM 601-1]	A	From Face	1.50	0.0000	223.50	No Ice	1.32	1.32	0
			0.00			1/2" Ice	1.58	1.58	0
			0.00			1" Ice	1.84	1.84	0
**									
Pipe Mount [PM 601-1]	C	From Face	1.50	0.0000	221.00	No Ice	1.32	1.32	0
			0.00			1/2" Ice	1.58	1.58	0
			0.00			1" Ice	1.84	1.84	0
**									
4' L x 6' W Rest Platform	B	From Face	2.00	0.0000	216.50	No Ice	15.00	15.00	1
			0.00			1/2" Ice	22.50	22.50	1
			0.00			1" Ice	30.00	30.00	2
4' L x 6' W Rest Platform	D	From Face	2.00	0.0000	216.50	No Ice	15.00	15.00	1
			0.00			1/2" Ice	22.50	22.50	1
			0.00			1" Ice	30.00	30.00	2
**									
Site Pro 1 VFA12-HD	A	From Leg	2.00	0.0000	206.50	No Ice	13.20	9.20	1
			0.00			1/2" Ice	19.50	14.60	1
			0.00			1" Ice	25.80	19.50	1
Site Pro 1 VFA12-HD	B	From Leg	2.00	0.0000	206.50	No Ice	13.20	9.20	1
			0.00			1/2" Ice	19.50	14.60	1
			0.00			1" Ice	25.80	19.50	1
Site Pro 1 VFA12-HD	D	From Leg	2.00	0.0000	206.50	No Ice	13.20	9.20	1
			0.00			1/2" Ice	19.50	14.60	1
			0.00			1" Ice	25.80	19.50	1
2.4" Dia x 8-ft Mount Pipe	A	From Leg	4.00	0.0000	206.50	No Ice	1.90	1.90	0
			0.00			1/2" Ice	2.73	2.73	0
			0.00			1" Ice	3.40	3.40	0
2.4" Dia x 8-ft Mount Pipe	B	From Leg	4.00	0.0000	206.50	No Ice	1.90	1.90	0
			0.00			1/2" Ice	2.73	2.73	0
			0.00			1" Ice	3.40	3.40	0
2.4" Dia x 8-ft Mount Pipe	D	From Leg	4.00	0.0000	206.50	No Ice	1.90	1.90	0
			0.00			1/2" Ice	2.73	2.73	0

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<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>	<i>C_{AA} Front ft²</i>	<i>C_{AA} Side ft²</i>	<i>Weight K</i>
AIR 32 KRD901146-1 w/ Mount Pipe	A	From Leg	0.00 4.00 0.00 3.50	0.0000	206.50	1" Ice 3.40 No Ice 4.00 1/2" Ice 4.47 1" Ice 4.96	3.40 3.43 4.26 4.96	0 0 0 0
AIR 32 KRD901146-1 w/ Mount Pipe	B	From Leg	4.00 0.00 3.50	0.0000	206.50	No Ice 4.00 1/2" Ice 4.47 1" Ice 4.96	3.43 4.26 4.96	0 0 0
AIR 32 KRD901146-1 w/ Mount Pipe	D	From Leg	4.00 0.00 3.50	0.0000	206.50	No Ice 4.00 1/2" Ice 4.47 1" Ice 4.96	3.43 4.26 4.96	0 0 0
AIR 6449 B41 w/ Mount Pipe	A	From Leg	4.00 0.00 3.50	0.0000	206.50	No Ice 6.81 1/2" Ice 7.23 1" Ice 7.65	3.54 4.05 4.57	0 0 0
AIR 6449 B41 w/ Mount Pipe	B	From Leg	4.00 0.00 3.50	0.0000	206.50	No Ice 6.81 1/2" Ice 7.23 1" Ice 7.65	3.54 4.05 4.57	0 0 0
AIR 6449 B41 w/ Mount Pipe	D	From Leg	4.00 0.00 3.50	0.0000	206.50	No Ice 6.81 1/2" Ice 7.23 1" Ice 7.65	3.54 4.05 4.57	0 0 0
Style 1B Twin AWS	A	From Leg	4.00 0.00 3.50	0.0000	206.50	No Ice 0.53 1/2" Ice 0.63 1" Ice 0.74	0.19 0.26 0.34	0 0 0
Style 1B Twin AWS	B	From Leg	4.00 0.00 3.50	0.0000	206.50	No Ice 0.53 1/2" Ice 0.63 1" Ice 0.74	0.19 0.26 0.34	0 0 0
Style 1B Twin AWS	D	From Leg	4.00 0.00 3.50	0.0000	206.50	No Ice 0.53 1/2" Ice 0.63 1" Ice 0.74	0.19 0.26 0.34	0 0 0
**								
Site Pro 1 VFA12-HD	A	From Leg	2.00 0.00 0.00	0.0000	203.00	No Ice 13.20 1/2" Ice 19.50 1" Ice 25.80	9.20 14.60 19.50	1 1 1
Site Pro 1 VFA12-HD	B	From Leg	2.00 0.00 0.00	0.0000	203.00	No Ice 13.20 1/2" Ice 19.50 1" Ice 25.80	9.20 14.60 19.50	1 1 1
Site Pro 1 VFA12-HD	D	From Leg	2.00 0.00 0.00	0.0000	203.00	No Ice 13.20 1/2" Ice 19.50 1" Ice 25.80	9.20 14.60 19.50	1 1 1
2.4" Dia x 8-ft Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	203.00	No Ice 1.90 1/2" Ice 2.73 1" Ice 3.40	1.90 2.73 3.40	0 0 0
2.4" Dia x 8-ft Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	203.00	No Ice 1.90 1/2" Ice 2.73 1" Ice 3.40	1.90 2.73 3.40	0 0 0
2.4" Dia x 8-ft Mount Pipe	D	From Leg	4.00 0.00 0.00	0.0000	203.00	No Ice 1.90 1/2" Ice 2.73 1" Ice 3.40	1.90 2.73 3.40	0 0 0
APXVAALL24_43-U-NA20 w/ mount pipe	A	From Leg	4.00 0.00 0.00	0.0000	203.00	No Ice 20.24 1/2" Ice 20.89 1" Ice 21.55	11.03 12.46 13.56	0 0 0
APXVAALL24_43-U-NA20 w/ mount pipe	B	From Leg	4.00 0.00 0.00	0.0000	203.00	No Ice 20.24 1/2" Ice 20.89 1" Ice 21.55	11.03 12.46 13.56	0 0 0
APXVAALL24_43-U-NA20 w/ mount pipe	D	From Leg	4.00 0.00 0.00	0.0000	203.00	No Ice 20.24 1/2" Ice 20.89 1" Ice 21.55	11.03 12.46 13.56	0 0 0
RADIO 4480 B71_TMO	A	From Leg	4.00	0.0000	203.00	No Ice 2.85	1.38	0

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<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert</i> <i>ft ft ft</i>	<i>Azimuth Adjustment</i> <i>°</i>	<i>Placement</i> <i>ft</i>	<i>C_{AA} Front</i> <i>ft²</i>	<i>C_{AA} Side</i> <i>ft²</i>	<i>Weight</i> <i>K</i>
			0.00			1/2" Ice 3.06	1.54	0
			0.00			1" Ice 3.28	1.71	0
RADIO 4480 B71_TMO	B	From Leg	4.00	0.0000	203.00	No Ice 2.85	1.38	0
			0.00			1/2" Ice 3.06	1.54	0
			0.00			1" Ice 3.28	1.71	0
RADIO 4480 B71_TMO	D	From Leg	4.00	0.0000	203.00	No Ice 2.85	1.38	0
			0.00			1/2" Ice 3.06	1.54	0
			0.00			1" Ice 3.28	1.71	0
RADIO 4415 B25	A	From Leg	4.00	0.0000	203.00	No Ice 1.84	0.82	0
			0.00			1/2" Ice 2.01	0.94	0
			0.00			1" Ice 2.19	1.07	0
RADIO 4415 B25	B	From Leg	4.00	0.0000	203.00	No Ice 1.84	0.82	0
			0.00			1/2" Ice 2.01	0.94	0
			0.00			1" Ice 2.19	1.07	0
RADIO 4415 B25	D	From Leg	4.00	0.0000	203.00	No Ice 1.84	0.82	0
			0.00			1/2" Ice 2.01	0.94	0
			0.00			1" Ice 2.19	1.07	0
SDX1926Q-43	A	From Leg	4.00	0.0000	203.00	No Ice 0.24	0.10	0
			0.00			1/2" Ice 0.31	0.14	0
			0.00			1" Ice 0.38	0.19	0
SDX1926Q-43	B	From Leg	4.00	0.0000	203.00	No Ice 0.24	0.10	0
			0.00			1/2" Ice 0.31	0.14	0
			0.00			1" Ice 0.38	0.19	0
SDX1926Q-43	D	From Leg	4.00	0.0000	203.00	No Ice 0.24	0.10	0
			0.00			1/2" Ice 0.31	0.14	0
			0.00			1" Ice 0.38	0.19	0
**								
Side Arm Mount [SO 901-1]	B	From Leg	1.00	0.0000	132.00	No Ice 0.33	0.62	0
			0.00			1/2" Ice 0.46	0.78	0
			0.00			1" Ice 0.62	0.97	0
2.4" Dia x 6-ft Pipe	B	From Leg	2.00	0.0000	132.00	No Ice 1.43	1.43	0
			0.00			1/2" Ice 1.93	1.93	0
			0.00			1" Ice 2.30	2.30	0
2.4" Dia x 6-ft Pipe	B	From Leg	2.50	0.0000	132.00	No Ice 1.43	1.43	0
			0.00			1/2" Ice 1.93	1.93	0
			0.00			1" Ice 2.30	2.30	0
4-ft x 7 Element Yagi	B	From Leg	2.50	0.0000	132.00	No Ice 1.05	1.65	0
			0.00			1/2" Ice 2.05	2.96	0
			0.00			1" Ice 3.04	4.28	0

Dishes

<i>Description</i>	<i>Face or Leg</i>	<i>Dish Type</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert</i> <i>ft ft ft</i>	<i>Azimuth Adjustment</i> <i>°</i>	<i>3 dB Beam Width</i> <i>°</i>	<i>Elevation</i> <i>ft</i>	<i>Outside Diameter</i> <i>ft</i>	<i>Aperture Area</i> <i>ft²</i>	<i>Weight</i> <i>K</i>
Andrew HP10	A	Paraboloid w/Shroud (HP)	From Face	1.50	0.0000		223.50	10.00	No Ice 78.54	1
				0.00					1/2" Ice 79.85	1
				0.00					1" Ice 81.17	2
1-ft dish w/ shroud	C	Paraboloid	From	1.50	0.0000		221.00	1.00	No Ice 3.14	0

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Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight K
		w/Shroud (HP)	Face	0.00				1/2" Ice	3.41	0
				0.00				1" Ice	3.68	0

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 45 deg - No Ice
5	0.9 Dead+1.6 Wind 45 deg - No Ice
6	1.2 Dead+1.6 Wind 90 deg - No Ice
7	0.9 Dead+1.6 Wind 90 deg - No Ice
8	1.2 Dead+1.6 Wind 135 deg - No Ice
9	0.9 Dead+1.6 Wind 135 deg - No Ice
10	1.2 Dead+1.6 Wind 180 deg - No Ice
11	0.9 Dead+1.6 Wind 180 deg - No Ice
12	1.2 Dead+1.6 Wind 225 deg - No Ice
13	0.9 Dead+1.6 Wind 225 deg - No Ice
14	1.2 Dead+1.6 Wind 270 deg - No Ice
15	0.9 Dead+1.6 Wind 270 deg - No Ice
16	1.2 Dead+1.6 Wind 315 deg - No Ice
17	0.9 Dead+1.6 Wind 315 deg - No Ice
18	1.2 Dead+1.0 Ice+1.0 Temp
19	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
20	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
21	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
22	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
23	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
24	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
25	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
26	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 45 deg - Service
29	Dead+Wind 90 deg - Service
30	Dead+Wind 135 deg - Service
31	Dead+Wind 180 deg - Service
32	Dead+Wind 225 deg - Service
33	Dead+Wind 270 deg - Service
34	Dead+Wind 315 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	231.5 - 229	Leg	Max Tension	5	4	-2	-1
			Max. Compression	20	-10	0	0
			Max. Mx	2	2	-4	2
			Max. My	12	-2	4	-4
			Max. Vy	8	-3	2	-2
			Max. Vx	12	-3	-2	2

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T2	229 - 224.8	Top Girt	Max Tension	2	1	2	0
			Max. Compression	3	-1	-2	0
		Leg	Max. Mx	12	1	4	0
			Max. My	3	-1	-2	0
			Max. Vy	10	-1	-4	0
			Max. Vx	13	0	-4	0
			Max Tension	17	6	0	1
			Max. Compression	20	-11	0	0
			Max. Mx	8	-2	2	-2
			Max. My	12	-2	-2	2
			Max. Vy	17	-1	-2	2
			Max. Vx	5	-1	2	-2
		Diagonal	Max Tension	17	4	0	0
			Max. Compression	8	-4	0	0
			Max. Mx	22	1	0	0
			Max. My	10	4	0	0
			Max. Vy	22	0	0	0
			Max. Vx	10	0	0	0
T3	224.8 - 220.7	Leg	Max Tension	5	14	0	0
			Max. Compression	16	-20	0	0
			Max. Mx	2	9	-1	0
			Max. My	10	8	0	-1
			Max. Vy	8	-1	0	0
			Max. Vx	4	-1	0	0
		Diagonal	Max Tension	10	4	0	0
			Max. Compression	10	-4	0	0
			Max. Mx	26	-1	0	0
			Max. My	2	-4	0	0
			Max. Vy	19	0	0	0
			Max. Vx	2	0	0	0
		Top Girt	Max Tension	2	1	0	0
			Max. Compression	3	-1	0	0
			Max. Mx	18	0	0	0
			Max. Vy	18	0	0	0
T4	220.7 - 216.5	Leg	Max Tension	17	20	0	0
			Max. Compression	16	-26	0	0
			Max. Mx	4	-4	1	0
			Max. My	8	-4	0	1
			Max. Vy	6	0	0	0
			Max. Vx	9	0	0	0
		Diagonal	Max Tension	7	5	0	0
			Max. Compression	6	-5	0	0
			Max. Mx	26	1	0	0
			Max. My	2	-4	0	0
			Max. Vy	26	0	0	0
			Max. Vx	2	0	0	0
		Leg	Max Tension	5	28	0	0
			Max. Compression	4	-34	0	0
			Max. Mx	16	-34	0	0
			Max. My	8	-34	0	0
			Max. Vy	6	0	0	0
			Max. Vx	14	0	0	0
T5	216.5 - 211.5	Diagonal	Max Tension	7	5	0	0
			Max. Compression	6	-5	0	0
			Max. Mx	26	0	0	0
			Max. My	19	-2	0	0
			Max. Vy	26	0	0	0
			Max. Vx	19	0	0	0
		Top Girt	Max Tension	2	2	0	0
			Max. Compression	3	-1	0	0
			Max. Mx	18	0	0	0

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T6	211.5 - 206.5	Leg	Max. My	18	0	0	0
			Max. Vy	18	0	0	0
			Max. Vx	18	0	0	0
			Max Tension	5	37	0	0
			Max. Compression	4	-45	0	0
			Max. Mx	4	-4	1	-1
		Diagonal	Max. My	12	-5	-1	1
			Max. Vy	8	0	1	-1
			Max. Vx	16	0	-1	1
			Max Tension	6	5	0	0
			Max. Compression	6	-5	0	0
			Max. Mx	19	1	0	0
		Top Girt	Max. My	19	-1	0	0
			Max. Vy	19	0	0	0
			Max. Vx	19	0	0	0
			Max Tension	2	1	0	0
			Max. Compression	3	-1	0	0
			Max. Mx	18	1	0	0
T7	206.5 - 201.5	Leg	Max. My	18	1	0	0
			Max. Vy	18	0	0	0
			Max. Vx	18	0	0	0
			Max Tension	5	46	0	0
			Max. Compression	16	-57	0	0
			Max. Mx	4	-5	1	-1
		Diagonal	Max. My	12	-7	-1	1
			Max. Vy	4	-1	0	0
			Max. Vx	10	-1	0	0
			Max Tension	7	6	0	0
			Max. Compression	6	-6	0	0
			Max. Mx	26	1	0	0
		Top Girt	Max. My	25	1	0	0
			Max. Vy	26	0	0	0
			Max. Vx	25	0	0	0
			Max Tension	5	55	0	0
			Max. Compression	16	-67	0	0
			Max. Mx	16	-8	1	-1
T8	201.5 - 196.5	Leg	Max. My	4	-7	-1	1
			Max. Vy	12	0	1	-1
			Max. Vx	4	0	-1	1
			Max Tension	6	7	0	0
			Max. Compression	6	-7	0	0
			Max. Mx	19	2	0	0
		Diagonal	Max. My	25	-3	0	0
			Max. Vy	19	0	0	0
			Max. Vx	25	0	0	0
			Max Tension	14	1	0	0
			Max. Compression	15	-1	0	0
			Max. Mx	18	0	0	0
		Top Girt	Max. My	18	0	0	0
			Max. Vy	18	0	0	0
			Max. Vx	18	0	0	0
			Max Tension	5	66	0	0
			Max. Compression	4	-78	0	0
			Max. Mx	16	-8	1	-1
T9	196.5 - 191.5	Leg	Max. My	4	-8	-1	1
			Max. Vy	16	0	1	-1
			Max. Vx	16	0	-1	1
			Max Tension	6	7	0	0
			Max. Compression	6	-7	0	0
			Max. Mx	26	2	0	0
		Diagonal	Max. My	25	2	0	0

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T10	191.5 - 181.5	Leg	Max. Vy	26	0	0	0
			Max. Vx	25	0	0	0
			Max Tension	5	76	0	0
			Max. Compression	4	-87	0	0
			Max. Mx	6	-60	-1	0
			Max. My	14	-61	0	-1
		Diagonal	Max. Vy	4	0	0	0
			Max. Vx	12	0	0	-1
			Max Tension	13	11	0	0
			Max. Compression	4	-12	0	0
			Max. Mx	26	-1	0	0
			Max. My	12	-12	0	0
		Secondary Horizontal	Max. Vy	26	0	0	0
			Max. Vx	20	0	0	0
			Max Tension	14	0	0	0
			Max. Compression	14	0	0	0
			Max. Mx	21	0	0	0
			Max. My	25	0	0	0
		Top Girt	Max. Vy	21	0	0	0
			Max. Vx	25	0	0	0
			Max Tension	14	3	0	0
			Max. Compression	7	-3	0	0
			Max. Mx	18	1	0	0
			Max. My	18	1	0	0
		Inner Bracing	Max. Vy	18	0	0	0
			Max. Vx	18	0	0	0
			Max Tension	25	1	0	0
			Max. Compression	1	0	0	0
			Max. Mx	18	1	0	0
			Max. Vy	18	0	0	0
T11	181.5 - 171.5	Leg	Max Tension	5	95	0	0
			Max. Compression	4	-108	0	0
			Max. Mx	6	-74	-1	0
			Max. My	14	-75	0	-1
			Max. Vy	4	0	-1	-1
			Max. Vx	12	0	-1	-1
		Diagonal	Max Tension	13	11	0	0
			Max. Compression	4	-12	0	0
			Max. Mx	26	-1	0	0
			Max. My	20	-6	0	0
			Max. Vy	26	0	0	0
			Max. Vx	25	0	0	0
		Secondary Horizontal	Max Tension	4	1	0	0
			Max. Compression	5	-1	0	0
			Max. Mx	21	0	0	0
			Max. My	4	0	0	0
			Max. Vy	21	0	0	0
			Max. Vx	26	0	0	0
		Top Girt	Max Tension	14	7	0	0
			Max. Compression	7	-5	0	0
			Max. Mx	18	2	0	0
			Max. My	18	2	0	0
			Max. Vy	18	0	0	0
			Max. Vx	18	0	0	0
T12	171.5 - 161.5	Leg	Max Tension	5	114	0	0
			Max. Compression	4	-129	1	0
			Max. Mx	6	-89	-1	0
			Max. My	14	-90	0	-1
			Max. Vy	4	0	-1	-1

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T13	161.5 - 151.5	Diagonal	Max. Vx	4	0	-1	-1
			Max Tension	13	11	0	0
			Max. Compression	4	-12	0	0
			Max. Mx	26	-1	0	0
			Max. My	20	-6	0	0
			Max. Vy	26	0	0	0
		Secondary Horizontal	Max. Vx	20	0	0	0
			Max Tension	4	1	0	0
			Max. Compression	5	-1	0	0
			Max. Mx	21	0	0	0
			Max. My	4	-1	0	0
			Max. Vy	21	0	0	0
		Top Girt	Max. Vx	26	0	0	0
			Max Tension	6	7	0	0
			Max. Compression	7	-6	0	0
			Max. Mx	18	1	0	0
			Max. My	18	1	0	0
			Max. Vy	18	0	0	0
		Inner Bracing	Max. Vx	18	0	0	0
			Max Tension	21	1	0	0
			Max. Compression	1	0	0	0
			Max. Mx	18	1	0	0
			Max. Vy	18	0	0	0
			Max. Vx	18	0	0	0
		Leg	Max Tension	5	133	0	0
			Max. Compression	4	-149	1	1
			Max. Mx	6	-103	-1	0
			Max. My	14	-104	0	-1
			Max. Vy	4	0	-1	-1
			Max. Vx	4	0	-1	-1
		Diagonal	Max Tension	13	11	0	0
			Max. Compression	4	-13	0	0
			Max. Mx	26	-1	0	0
			Max. My	20	-6	0	0
			Max. Vy	26	0	0	0
			Max. Vx	25	0	0	0
		Secondary Horizontal	Max Tension	4	1	0	0
			Max. Compression	5	-1	0	0
			Max. Mx	21	0	0	0
			Max. My	26	0	0	0
			Max. Vy	21	0	0	0
			Max. Vx	26	0	0	0
		Top Girt	Max Tension	6	8	0	0
			Max. Compression	7	-7	0	0
			Max. Mx	18	2	0	0
			Max. My	18	2	0	0
			Max. Vy	18	0	0	0
			Max. Vx	18	0	0	0
T14	151.5 - 141.5	Leg	Max Tension	5	153	-1	-1
			Max. Compression	4	-171	1	1
			Max. Mx	12	-169	1	1
			Max. My	4	-171	1	1
			Max. Vy	12	-1	-1	-1
			Max. Vx	4	-1	-1	-1
		Diagonal	Max Tension	13	11	0	0
			Max. Compression	4	-12	0	0
			Max. Mx	26	0	0	0
			Max. My	20	-6	0	0
			Max. Vy	26	0	0	0
			Max. Vx	20	0	0	0

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T15	141.5 - 131.5	Secondary Horizontal	Max Tension	4	1	0	0
			Max. Compression	5	-1	0	0
		Top Girt	Max. Mx	21	0	0	0
			Max. My	26	0	0	0
			Max. Vy	21	0	0	0
			Max. Vx	26	0	0	0
			Max Tension	6	7	0	0
			Max. Compression	7	-6	0	0
			Max. Mx	18	1	0	0
			Max. My	18	1	0	0
			Max. Vy	18	0	0	0
			Max. Vx	18	0	0	0
		Inner Bracing	Max Tension	21	1	0	0
			Max. Compression	1	0	0	0
			Max. Mx	18	1	1	0
		Leg	Max. Vy	18	0	0	0
			Max Tension	5	186	-2	-2
			Max. Compression	4	-207	2	2
			Max. Mx	6	-134	4	0
		Diagonal	Max. My	14	-131	0	4
			Max. Vy	12	9	2	2
			Max. Vx	4	9	2	2
			Max Tension	5	13	0	0
			Max. Compression	4	-14	0	0
			Max. Mx	4	4	0	0
		Horizontal	Max. My	4	-4	0	0
			Max. Vy	26	0	0	0
			Max. Vx	4	0	0	0
			Max Tension	8	1	0	0
			Max. Compression	5	-1	0	0
			Max. Mx	25	0	0	0
		Top Girt	Max. My	6	1	0	0
			Max. Vy	25	0	0	0
			Max. Vx	6	0	0	0
			Max Tension	6	7	0	0
			Max. Compression	7	-6	0	0
			Max. Mx	18	2	0	0
		Redund Horz 1 Bracing	Max. My	18	2	0	0
			Max. Vy	18	0	0	0
			Max. Vx	18	0	0	0
			Max Tension	6	3	0	0
			Max. Compression	7	-2	0	0
			Max. Mx	18	0	0	0
		Redund Diag 1 Bracing	Max. My	18	1	0	0
			Max. Vy	18	0	0	0
			Max. Vx	18	0	0	0
			Max Tension	7	2	0	0
			Max. Compression	4	-2	0	0
			Max. Mx	18	0	0	0
		Redund Hip 1 Bracing	Max. My	18	0	0	0
			Max. Vy	18	0	0	0
			Max. Vx	18	0	0	0
			Max Tension	5	0	0	0
			Max. Compression	4	0	0	0
			Max. Mx	18	0	0	0
T16	131.5 - 119	Leg	Max. Vy	18	0	0	0
			Max Tension	5	186	-2	-2

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T17	119 - 106.5	Diagonal	Max. Compression	4	-207	1	1
			Max. Mx	6	-144	5	0
			Max. My	14	-141	0	5
			Max. Vy	12	9	1	1
			Max. Vx	4	9	1	1
			Max Tension	7	19	0	0
			Max. Compression	6	-19	0	0
			Max. Mx	4	14	0	0
			Max. My	4	-16	0	0
			Max. Vy	26	0	0	0
		Top Girt	Max. Vx	4	0	0	0
			Max Tension	4	9	0	0
			Max. Compression	13	-9	0	0
			Max. Mx	25	3	0	0
			Max. My	6	-3	0	0
			Max. Vy	25	0	0	0
			Max. Vx	6	0	0	0
		Redund Horz 1 Bracing	Max Tension	6	2	0	0
			Max. Compression	7	-2	0	0
			Max. Mx	18	0	0	0
			Max. My	18	0	0	0
			Max. Vy	18	0	0	0
		Redund Diag 1 Bracing	Max. Vx	18	0	0	0
			Max Tension	7	3	0	0
			Max. Compression	6	-3	0	0
			Max. Mx	18	0	0	0
			Max. My	18	0	0	0
		Redund Hip 1 Bracing	Max. Vy	18	0	0	0
			Max. Vx	18	0	0	0
			Max Tension	4	0	0	0
			Max. Compression	5	0	0	0
			Max. Mx	18	0	0	0
		Inner Bracing	Max. Vy	18	0	0	0
			Max Tension	5	0	0	0
			Max. Compression	4	0	0	0
			Max. Mx	18	0	0	0
			Max. Vy	18	0	0	0
		Leg	Max Tension	5	202	-1	-1
			Max. Compression	4	-226	-3	-3
			Max. Mx	6	-158	5	0
			Max. My	14	-154	0	5
			Max. Vy	4	2	-4	-4
			Max. Vx	12	2	-4	-4
			Max Tension	7	19	0	0
			Max. Compression	6	-20	0	0
			Max. Mx	4	-13	0	0
			Max. My	4	-15	0	0
		Top Girt	Max. Vy	4	0	0	0
			Max. Vx	4	0	0	0
			Max Tension	7	9	0	0
			Max. Compression	6	-9	0	0
			Max. Mx	25	0	0	0
		Redund Horz 1 Bracing	Max. My	6	1	0	0
			Max. Vy	25	0	0	0
			Max. Vx	21	0	0	0
			Max Tension	12	1	0	0
			Max. Compression	5	-1	0	0

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	18	0	0	0
			Max. My	18	0	0	0
			Max. Vy	18	0	0	0
			Max. Vx	18	0	0	0
		Redund Diag 1 Bracing	Max Tension	5	4	0	0
			Max. Compression	4	-5	0	0
			Max. Mx	4	-5	0	0
			Max. My	24	0	0	0
			Max. Vy	26	0	0	0
			Max. Vx	21	0	0	0
		Redund Hip 1 Bracing	Max Tension	4	0	0	0
			Max. Compression	13	0	0	0
			Max. Mx	18	0	0	0
			Max. Vy	18	0	0	0
		Redund Hip Diagonal 1 Bracing	Max Tension	14	0	0	0
			Max. Compression	6	0	0	0
			Max. Mx	18	0	0	0
			Max. Vy	18	0	0	0
		Redund Sub Horz Bracing	Max Tension	4	4	0	0
			Max. Compression	5	-4	0	0
			Max. Mx	18	1	0	0
			Max. My	18	1	0	0
			Max. Vy	18	0	0	0
			Max. Vx	18	0	0	0
		Redund Sub Diagonal Bracing	Max Tension	5	4	0	0
			Max. Compression	4	-5	0	0
			Max. Mx	18	-1	0	0
			Max. My	18	-1	0	0
			Max. Vy	18	0	0	0
			Max. Vx	18	0	0	0
		Inner Bracing	Max Tension	7	0	0	0
			Max. Compression	14	0	0	0
			Max. Mx	18	0	0	0
			Max. Vy	18	0	0	0

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg D	Max. Vert	12	252	16	-16
	Max. H _x	12	252	16	-16
	Max. H _z	5	-229	-15	15
	Min. Vert	5	-229	-15	15
	Min. H _x	5	-229	-15	15
	Min. H _z	12	252	16	-16
Leg C	Max. Vert	8	250	-16	-16
	Max. H _x	17	-224	15	15
	Max. H _z	17	-224	15	15
	Min. Vert	17	-224	15	15
	Min. H _x	8	250	-16	-16
	Min. H _z	8	250	-16	-16

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Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg B	Max. Vert	4	255	-17	16
	Max. H _x	13	-226	15	-14
	Max. H _z	4	255	-17	16
	Min. Vert	13	-226	15	-14
	Min. H _x	4	255	-17	16
	Min. H _z	13	-226	15	-14
Leg A	Max. Vert	16	250	16	16
	Max. H _x	16	250	16	16
	Max. H _z	16	250	16	16
	Min. Vert	9	-225	-15	-14
	Min. H _x	9	-225	-15	-14
	Min. H _z	9	-225	-15	-14

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	49	0	0	-11	17	0
1.2 Dead+1.6 Wind 0 deg - No Ice	59	0	-50	-3923	22	-22
0.9 Dead+1.6 Wind 0 deg - No Ice	44	0	-50	-3920	17	-22
1.2 Dead+1.6 Wind 45 deg - No Ice	59	44	-42	-3187	-3333	-19
0.9 Dead+1.6 Wind 45 deg - No Ice	44	44	-42	-3183	-3338	-19
1.2 Dead+1.6 Wind 90 deg - No Ice	59	59	0	-46	-4452	-23
0.9 Dead+1.6 Wind 90 deg - No Ice	44	59	0	-43	-4457	-23
1.2 Dead+1.6 Wind 135 deg - No Ice	59	44	42	3114	-3287	-14
0.9 Dead+1.6 Wind 135 deg - No Ice	44	44	42	3117	-3292	-14
1.2 Dead+1.6 Wind 180 deg - No Ice	59	-1	50	3897	88	22
0.9 Dead+1.6 Wind 180 deg - No Ice	44	-1	50	3900	83	22
1.2 Dead+1.6 Wind 225 deg - No Ice	59	-43	42	3153	3300	22
0.9 Dead+1.6 Wind 225 deg - No Ice	44	-43	42	3157	3295	22
1.2 Dead+1.6 Wind 270 deg - No Ice	59	-58	0	20	4412	23
0.9 Dead+1.6 Wind 270 deg - No Ice	44	-58	0	23	4407	23
1.2 Dead+1.6 Wind 315 deg - No Ice	59	-43	-42	-3133	3254	10
0.9 Dead+1.6 Wind 315 deg - No Ice	44	-43	-42	-3130	3249	10
1.2 Dead+1.0 Ice+1.0 Temp	194	0	0	-75	31	0
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	194	0	-17	-1413	31	-4
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	194	14	-14	-1106	-1044	-8
1.2 Dead+1.0 Wind 90 deg+1.0	194	19	0	-82	-1439	-13

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Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Ice+1.0 Temp						
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	194	14	14	946	-1033	-7
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	194	0	17	1263	45	4
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	194	-14	14	955	1091	9
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	194	-19	0	-68	1485	13
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	194	-14	-14	-1095	1080	7
Dead+Wind 0 deg - Service	49	0	-14	-1073	17	-6
Dead+Wind 45 deg - Service	49	12	-12	-873	-895	-5
Dead+Wind 90 deg - Service	49	16	0	-20	-1199	-6
Dead+Wind 135 deg - Service	49	12	11	839	-882	-4
Dead+Wind 180 deg - Service	49	0	14	1052	35	6
Dead+Wind 225 deg - Service	49	-12	12	849	908	6
Dead+Wind 270 deg - Service	49	-16	0	-2	1210	6
Dead+Wind 315 deg - Service	49	-12	-11	-859	895	3

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0	-49	0	0	49	0	0.000%
2	0	-59	-50	0	59	50	0.000%
3	0	-44	-50	0	44	50	0.000%
4	44	-59	-42	-44	59	42	0.000%
5	44	-44	-42	-44	44	42	0.000%
6	59	-59	0	-59	59	0	0.000%
7	59	-44	0	-59	44	0	0.000%
8	44	-59	42	-44	59	-42	0.000%
9	44	-44	42	-44	44	-42	0.000%
10	-1	-59	50	1	59	-50	0.000%
11	-1	-44	50	1	44	-50	0.000%
12	-43	-59	42	43	59	-42	0.000%
13	-43	-44	42	43	44	-42	0.000%
14	-58	-59	0	58	59	0	0.000%
15	-58	-44	0	58	44	0	0.000%
16	-43	-59	-42	43	59	42	0.000%
17	-43	-44	-42	43	44	42	0.000%
18	0	-194	0	0	194	0	0.000%
19	0	-194	-17	0	194	17	0.000%
20	14	-194	-14	-14	194	14	0.000%
21	19	-194	0	-19	194	0	0.000%
22	14	-194	14	-14	194	-14	0.000%
23	0	-194	17	0	194	-17	0.000%
24	-14	-194	14	14	194	-14	0.000%
25	-19	-194	0	19	194	0	0.000%
26	-14	-194	-14	14	194	14	0.000%
27	0	-49	-14	0	49	14	0.000%
28	12	-49	-12	-12	49	12	0.000%
29	16	-49	0	-16	49	0	0.000%
30	12	-49	11	-12	49	-11	0.000%
31	0	-49	14	0	49	-14	0.000%
32	-12	-49	12	12	49	-12	0.000%
33	-16	-49	0	16	49	0	0.000%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
34	-12	-49	-11	12	49	11	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	231.5 - 229	2.241	34	0.1488	0.0165
T2	229 - 224.8	2.136	34	0.1481	0.0154
T3	224.8 - 220.7	2.004	34	0.1465	0.0153
T4	220.7 - 216.5	1.879	34	0.1431	0.0151
T5	216.5 - 211.5	1.753	34	0.1385	0.0147
T6	211.5 - 206.5	1.605	34	0.1344	0.0140
T7	206.5 - 201.5	1.462	28	0.1293	0.0133
T8	201.5 - 196.5	1.326	28	0.1232	0.0122
T9	196.5 - 191.5	1.196	28	0.1159	0.0109
T10	191.5 - 181.5	1.072	28	0.1081	0.0098
T11	181.5 - 171.5	0.844	28	0.0972	0.0079
T12	171.5 - 161.5	0.640	28	0.0848	0.0064
T13	161.5 - 151.5	0.462	28	0.0712	0.0051
T14	151.5 - 141.5	0.313	28	0.0567	0.0040
T15	141.5 - 131.5	0.193	28	0.0437	0.0031
T16	131.5 - 119	0.099	28	0.0303	0.0023
T17	119 - 106.5	0.029	28	0.0154	0.0011

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
235.00	Top Platform Mount	34	2.241	0.1488	0.0165	7638
231.50	(2) 12" x 24" Beacon	34	2.241	0.1488	0.0165	7638
229.00	17" 3 element yagi	34	2.136	0.1481	0.0154	7638
223.50	Andrew HP10	34	1.965	0.1456	0.0153	162137
221.00	1-ft dish w/ shroud	34	1.888	0.1434	0.0151	213275
216.50	4' L x 6' W Rest Platform	34	1.753	0.1385	0.0147	98323
206.50	Site Pro 1 VFA12-HD	28	1.462	0.1293	0.0133	62486
203.00	Site Pro 1 VFA12-HD	28	1.366	0.1252	0.0126	52017
132.00	Side Arm Mount [SO 901-1]	28	0.103	0.0309	0.0024	34825

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	231.5 - 229	8.221	5	0.5375	0.0608
T2	229 - 224.8	7.837	5	0.5348	0.0566
T3	224.8 - 220.7	7.363	5	0.5291	0.0563

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T4	220.7 - 216.5	6.908	5	0.5174	0.0555
T5	216.5 - 211.5	6.453	5	0.5012	0.0543
T6	211.5 - 206.5	5.917	5	0.4869	0.0514
T7	206.5 - 201.5	5.398	5	0.4682	0.0488
T8	201.5 - 196.5	4.895	5	0.4475	0.0450
T9	196.5 - 191.5	4.413	5	0.4227	0.0403
T10	191.5 - 181.5	3.957	5	0.3955	0.0362
T11	181.5 - 171.5	3.116	5	0.3569	0.0291
T12	171.5 - 161.5	2.362	5	0.3124	0.0234
T13	161.5 - 151.5	1.705	5	0.2630	0.0188
T14	151.5 - 141.5	1.156	5	0.2096	0.0148
T15	141.5 - 131.5	0.710	5	0.1615	0.0114
T16	131.5 - 119	0.365	5	0.1118	0.0085
T17	119 - 106.5	0.106	4	0.0569	0.0040

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
235.00	Top Platform Mount	5	8.221	0.5375	0.0608	2079
231.50	(2) 12" x 24" Beacon	5	8.221	0.5375	0.0608	2079
229.00	17" 3 element yagi	5	7.837	0.5348	0.0566	2079
223.50	Andrew HP10	5	7.222	0.5262	0.0563	48051
221.00	1-ft dish w/ shroud	5	6.942	0.5185	0.0556	66922
216.50	4' L x 6' W Rest Platform	5	6.453	0.5012	0.0543	27932
206.50	Site Pro 1 VFA12-HD	5	5.398	0.4682	0.0488	18237
203.00	Site Pro 1 VFA12-HD	5	5.044	0.4540	0.0463	15436
132.00	Side Arm Mount [SO 901-1]	5	0.379	0.1142	0.0087	9464

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load Allowable	Allowable Ratio	Criteria
T1	231.5	Top Girt	A325N	0.7500	2	1	15	0.039	1.05	Member Bearing
T2	229	Diagonal	A325N	0.7500	2	2	21	0.102	1.05	Member Block Shear
T3	224.8	Leg	A325N	0.7500	8	2	30	0.060	1.05	Bolt Tension
		Diagonal	A325N	0.7500	2	2	21	0.098	1.05	Member Block Shear
		Top Girt	A325N	0.7500	2	1	10	0.067	1.05	Member Block Shear
T4	220.7	Diagonal	A325N	0.7500	2	3	21	0.122	1.05	Member Block Shear
T5	216.5	Diagonal	A325N	0.7500	2	2	10	0.226	1.05	Member Block Shear
T6	211.5	Top Girt	A325N	0.7500	3	1	15	0.033	1.05	Member Bearing
		Diagonal	A325N	0.7500	2	2	10	0.238	1.05	Member Block Shear
		Top Girt	A325N	0.7500	2	1	10	0.065	1.05	Member Block

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Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load Allowable	Allowable Ratio	Criteria
T7	206.5	Diagonal	A325N	0.7500	2	3	10	0.293	1.05	Shear Member Block Shear
T8	201.5	Leg	A325N	0.7500	12	5	30	0.153	1.05	Bolt Tension
		Diagonal	A325N	0.7500	2	3	10	0.329	1.05	Member Block Shear
		Top Girt	A325N	0.7500	2	1	10	0.048	1.05	Member Block Shear
T9	196.5	Diagonal	A325N	0.7500	2	4	10	0.338	1.05	Member Block Shear
T10	191.5	Diagonal	A325N	0.7500	2	5	11	0.476	1.05	Member Block Shear
		Secondary Horizontal	A325N	0.7500	2	1	10	0.062	1.05	Member Block Shear
		Top Girt	A325N	0.7500	2	2	10	0.163	1.05	Member Block Shear
T11	181.5	Leg	A325N	0.7500	16	6	30	0.199	1.05	Bolt Tension
		Diagonal	A325N	0.7500	2	5	11	0.480	1.05	Member Block Shear
		Secondary Horizontal	A325N	0.7500	2	1	10	0.077	1.05	Member Block Shear
		Top Girt	A325N	0.7500	2	3	10	0.318	1.05	Member Block Shear
T12	171.5	Diagonal	A325N	0.7500	2	5	11	0.492	1.05	Member Block Shear
		Secondary Horizontal	A325N	0.7500	2	1	8	0.123	1.05	Member Block Shear
		Top Girt	A325N	0.7500	2	3	10	0.330	1.05	Member Block Shear
T13	161.5	Leg	A325N	0.7500	20	7	30	0.223	1.05	Bolt Tension
		Diagonal	A325N	0.7500	2	6	11	0.508	1.05	Member Block Shear
		Secondary Horizontal	A325N	0.7500	2	1	10	0.107	1.05	Member Block Shear
		Top Girt	A325N	0.7500	2	4	10	0.374	1.05	Member Block Shear
T14	151.5	Diagonal	A325N	0.7500	2	5	11	0.489	1.05	Member Block Shear
		Secondary Horizontal	A325N	0.7500	2	1	10	0.122	1.05	Member Block Shear
		Top Girt	A325N	0.7500	2	4	10	0.341	1.05	Member Block Shear
T15	141.5	Leg	A325N	0.7500	20	9	30	0.311	1.05	Bolt Tension
		Diagonal	A325N	0.7500	2	6	11	0.566	1.05	Member Block Shear
		Horizontal	A325N	0.7500	2	2	10	0.148	1.05	Member Block Shear
		Top Girt	A325N	0.7500	2	4	10	0.352	1.05	Member Block Shear
		Redund Horiz 1 Bracing	A325N	0.6250	1	3	8	0.397	1.05	Member Bearing
		Redund Diag 1 Bracing	A325N	0.6250	1	2	8	0.268	1.05	Member Bearing
		Redund Hip 1 Bracing	A325N	0.6250	2	0	8	0.001	1.05	Member Block Shear
		Diagonal	A325N	0.7500	2	9	21	0.448	1.05	Member Block Shear
T16	131.5	Top Girt	A325N	0.7500	2	5	21	0.225	1.05	Member Block Shear
		Redund Horiz 1	A325N	0.6250	1	3	8	0.397	1.05	Member Bearing

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Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load Allowable	Allowable Ratio	Criteria
T17	119	Bracing								
		Redund Diag 1	A325N	0.6250	1	4	8	0.457	1.05	Member Bearing
		Bracing								
		Redund Hip 1	A325N	0.6250	2	0	8	0.006	1.05	Member Block Shear
		Bracing								
		Leg	A325N	0.7500	28	7	30	0.241	1.05	Bolt Tension
		Diagonal	A325N	0.7500	2	10	21	0.466	1.05	Member Block Shear
		Top Girt	A325N	0.7500	2	4	21	0.214	1.05	Member Block Shear
		Redund Horz 1	A325N	0.6250	1	3	8	0.433	1.05	Member Bearing
		Bracing								
		Redund Diag 1	A325N	0.6250	1	4	8	0.557	1.05	Member Bearing
		Bracing								
		Redund Hip 1	A325N	0.6250	2	0	8	0.008	1.05	Member Block Shear
		Bracing								
		Redund Hip	A325N	0.6250	2	0	8	0.007	1.05	Member Block Shear
		Diagonal 1								
		Bracing								
		Redund Sub	A325N	0.6250	2	2	7	0.283	1.05	Member Block Shear
		Horz Bracing								
		Redund Sub	A325N	0.6250	2	2	7	0.284	1.05	Member Block Shear
		Diagonal								
		Bracing								

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	231.5 - 229	L4x4x3/8	2.50	2.50	38.1 K=1.00	2.8600	-7	86	0.083
T2	229 - 224.8	L4x4x3/8	4.20	4.20	64.0 K=1.00	2.8600	-11	75	0.152 ¹
T3	224.8 - 220.7	L4x4x3/8	4.10	4.10	62.4 K=1.00	2.8600	-20	75	0.264 ¹
T4	220.7 - 216.5	L4x4x3/8	4.20	4.20	64.0 K=1.00	2.8600	-26	75	0.344 ¹
T5	216.5 - 211.5	L5x5x1/2	5.01	5.01	61.1 K=1.00	4.7500	-34	126	0.269 ¹
T6	211.5 - 206.5	L5x5x1/2	5.01	5.01	61.1 K=1.00	4.7500	-45	126	0.354 ¹
T7	206.5 - 201.5	L5x5x1/2	5.01	5.01	61.1 K=1.00	4.7500	-57	126	0.448 ¹
T8	201.5 - 196.5	L5x5x1/2	5.01	5.01	61.1 K=1.00	4.7500	-67	126	0.529 ¹
T9	196.5 - 191.5	L5x5x1/2	5.01	5.01	61.1 K=1.00	4.7500	-78	126	0.615 ¹
T10	191.5 - 181.5	L6x6x5/8	10.01	5.24	53.3 K=1.00	7.1100	-87	198	0.438 ¹

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T11	181.5 - 171.5	L6x6x5/8	10.01	5.22	53.1 K=1.00	7.1100	-108	199	0.544 ¹
T12	171.5 - 161.5	L6x6x5/8	10.01	5.20	52.9 K=1.00	7.1100	-129	199	0.647 ¹
T13	161.5 - 151.5	L6x6x5/8	10.01	5.19	52.8 K=1.00	7.1100	-149	199	0.748 ¹
T14	151.5 - 141.5	L6x6x3/4	10.01	5.18	53.1 K=1.00	8.4400	-171	236	0.723 ¹
T15	141.5 - 131.5	L6x6x3/4	10.01	0.08	0.9 K=1.00	8.4400	-207	273	0.756 ¹
T16	131.5 - 119	L6x6x7/8	12.52	6.22	63.8 K=1.00	9.7300	-203	255	0.797 ¹
T17	119 - 106.5	L6x6x7/8	12.52	3.13	32.1 K=1.00	9.7300	-226	299	0.756 ¹

¹ P_u / φP_n controls

Leg Bending Design Data (Compression)

Section No.	Elevation ft	Size	M _{ux} kip-ft	φM _{ux} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M _{uy} kip-ft	φM _{uy} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
T1	231.5 - 229	L4x4x3/8	-4	10	0.380	2	5	0.284
T2	229 - 224.8	L4x4x3/8	0	10	0.000	0	5	0.000
T3	224.8 - 220.7	L4x4x3/8	0	10	0.000	0	5	0.000
T4	220.7 - 216.5	L4x4x3/8	0	10	0.000	0	5	0.000
T5	216.5 - 211.5	L5x5x1/2	0	22	0.000	0	11	0.000
T6	211.5 - 206.5	L5x5x1/2	0	22	0.000	0	11	0.000
T7	206.5 - 201.5	L5x5x1/2	0	22	0.000	0	11	0.000
T8	201.5 - 196.5	L5x5x1/2	0	22	0.000	0	11	0.000
T9	196.5 - 191.5	L5x5x1/2	0	22	0.000	0	11	0.000
T10	191.5 - 181.5	L6x6x5/8	0	39	0.000	0	20	0.000
T11	181.5 - 171.5	L6x6x5/8	0	39	0.000	0	20	0.000
T12	171.5 - 161.5	L6x6x5/8	0	39	0.000	0	20	0.000
T13	161.5 - 151.5	L6x6x5/8	0	39	0.000	0	20	0.000
T14	151.5 - 141.5	L6x6x3/4	0	46	0.000	0	23	0.000
T15	141.5 - 131.5	L6x6x3/4	0	46	0.000	0	23	0.000
T16	131.5 - 119	L6x6x7/8	0	52	0.000	0	27	0.000
T17	119 - 106.5	L6x6x7/8	0	52	0.000	0	27	0.000

Leg Interaction Design Data (Compression)

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	Ratio $\frac{M_{uy}}{\phi M_{uy}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	231.5 - 229	L4x4x3/8	0.083	0.380	0.284	0.706	1.050	4.8.1
T2	229 - 224.8	L4x4x3/8	0.152	0.000	0.000	0.152 ¹	1.050	4.8.1
T3	224.8 - 220.7	L4x4x3/8	0.264	0.000	0.000	0.264 ¹	1.050	4.8.1
T4	220.7 - 216.5	L4x4x3/8	0.344	0.000	0.000	0.344 ¹	1.050	4.8.1
T5	216.5 - 211.5	L5x5x1/2	0.269	0.000	0.000	0.269 ¹	1.050	4.8.1
T6	211.5 - 206.5	L5x5x1/2	0.354	0.000	0.000	0.354 ¹	1.050	4.8.1
T7	206.5 - 201.5	L5x5x1/2	0.448	0.000	0.000	0.448 ¹	1.050	4.8.1

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Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T8	201.5 - 196.5	L5x5x1/2	0.529	0.000	0.000	0.529 ¹	1.050	4.8.1
T9	196.5 - 191.5	L5x5x1/2	0.615	0.000	0.000	0.615 ¹	1.050	4.8.1
T10	191.5 - 181.5	L6x6x5/8	0.438	0.000	0.000	0.438 ¹	1.050	4.8.1
T11	181.5 - 171.5	L6x6x5/8	0.544	0.000	0.000	0.544 ¹	1.050	4.8.1
T12	171.5 - 161.5	L6x6x5/8	0.647	0.000	0.000	0.647 ¹	1.050	4.8.1
T13	161.5 - 151.5	L6x6x5/8	0.748	0.000	0.000	0.748 ¹	1.050	4.8.1
T14	151.5 - 141.5	L6x6x3/4	0.723	0.000	0.000	0.723 ¹	1.050	4.8.1
T15	141.5 - 131.5	L6x6x3/4	0.756	0.000	0.000	0.756 ¹	1.050	4.8.1
T16	131.5 - 119	L6x6x7/8	0.797	0.000	0.000	0.797 ¹	1.050	4.8.1
T17	119 - 106.5	L6x6x7/8	0.756	0.000	0.000	0.756 ¹	1.050	4.8.1

¹ $P_u / \phi P_n$ controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in ²	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T2	229 - 224.8	2L2 1/2x2 1/2x1/4x3/8	7.00	3.06	47.8 K=1.00	2.3800	-4	68	0.064 ¹
T3	224.8 - 220.7	2L2 1/2x2 1/2x1/4x3/8	6.94	3.04	47.4 K=1.00	2.3800	-4	69	0.058 ¹
T4	220.7 - 216.5	2L2 1/2x2 1/2x1/4x3/8	7.00	3.06	47.8 K=1.00	2.3800	-5	68	0.077 ¹
T5	216.5 - 211.5	L2 1/2x2x1/4	7.65	3.44	103.0 K=1.06	1.0600	-5	20	0.269 ¹
T6	211.5 - 206.5	L2 1/2x2x1/4	7.93	3.58	106.0 K=1.05	1.0600	-5	19	0.261 ¹
T7	206.5 - 201.5	L2 1/2x2x1/4	8.21	3.73	109.1 K=1.03	1.0600	-6	18	0.347 ¹
T8	201.5 - 196.5	L2 1/2x2x1/4	8.50	3.88	112.3 K=1.02	1.0600	-7	18	0.397 ¹
T9	196.5 - 191.5	L2 1/2x2x1/4	8.80	4.03	115.5 K=1.01	1.0600	-7	17	0.414 ¹
T10	191.5 - 181.5	L3x3x1/4	12.68	6.00	122.3 K=0.99	1.4400	-12	21	0.565 ¹
T11	181.5 - 171.5	L3x3x1/4	13.13	6.23	126.0 K=0.99	1.4400	-12	20	0.592 ¹
T12	171.5 - 161.5	L3x3x1/4	13.61	6.48	129.8 K=0.98	1.4400	-12	19	0.635 ¹
T13	161.5 - 151.5	L3x3x1/4	14.12	6.73	133.8 K=0.97	1.4400	-13	18	0.691 ¹
T14	151.5 - 141.5	L3x3x1/4	14.64	7.00	137.9 K=0.96	1.4400	-12	17	0.697 ¹
T15	141.5 - 131.5	L3x3x1/4	7.70	6.91	104.8 K=1.17	1.4400	-14	26	0.529 ¹
T16	131.5 - 119	2L2 1/2x2 1/2x1/4x3/8	13.95	12.94	138.1 K=1.00	2.3800	-19	28	0.683 ¹
T17	119 - 106.5	2L2 1/2x2 1/2x1/4x3/8	14.23	6.89	107.5 K=1.00	2.3800	-20	42	0.482 ¹

¹ $P_u / \phi P_n$ controls

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Horizontal Design Data (Compression)

Section No.	Elevation	Size	L	L _u	Kl/r	A	P _u	φP _n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in ²	K	K	
T15	141.5 - 131.5	L2 1/2x2x1/4	11.40	7.95	161.0 K=1.00	1.0600	-3	9	0.336 ¹

¹ P_u / φP_n controls

Secondary Horizontal Design Data (Compression)

Section No.	Elevation	Size	L	L _u	Kl/r	A	P _u	φP _n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in ²	K	K	
T10	191.5 - 181.5	L2 1/2x2x1/4	7.76	6.81	137.8 K=1.00	1.0600	-1	13	0.104 ¹
T11	181.5 - 171.5	L2 1/2x2x1/4	8.49	7.53	152.6 K=1.00	1.0600	-2	10	0.158 ¹
T12	171.5 - 161.5	L2 1/2x2x3/16	9.22	8.26	165.2 K=1.00	0.8090	-2	7	0.288 ¹
T13	161.5 - 151.5	L2 1/2x2 1/2x1/4	9.94	8.98	140.2 K=1.00	1.1900	-2	14	0.163 ¹
T14	151.5 - 141.5	L2 1/2x2x1/4	10.67	9.71	196.7 K=1.00	1.0600	-3	6	0.414 ¹

¹ P_u / φP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation	Size	L	L _u	Kl/r	A	P _u	φP _n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in ²	K	K	
T1	231.5 - 229	C8x11.5	5.60	5.27	101.2 K=1.00	3.3800	-1	64	0.011
T3	224.8 - 220.7	L2 1/2x2 1/2x1/4	5.60	4.81	118.8 K=1.01	1.1900	-1	18	0.073 ¹
T5	216.5 - 211.5	C7x9.8	5.60	5.19	107.1 K=1.00	2.8700	-1	51	0.025 ¹
T6	211.5 - 206.5	L2 1/2x2x1/4	5.97	5.09	134.8 K=0.94	1.0600	-1	13	0.076 ¹
T8	201.5 - 196.5	L2 1/2x2 1/2x1/4	6.69	5.82	133.6 K=0.94	1.1900	-1	15	0.067 ¹
T10	191.5 - 181.5	L2 1/2x2 1/2x1/4	7.42	6.46	143.3 K=0.91	1.1900	-3	13	0.229 ¹
T11	181.5 - 171.5	L2 1/2x2 1/2x1/4	8.14	7.18	154.2 K=0.88	1.1900	-5	11	0.482 ¹
T12	171.5 - 161.5	L2 1/2x2 1/2x1/4	8.87	7.91	165.1 K=0.85	1.1900	-6	10	0.620 ¹
T13	161.5 - 151.5	L2 1/2x2 1/2x1/4	9.59	8.64	176.0 K=0.83	1.1900	-7	9	0.760 ¹
T14	151.5 - 141.5	L2 1/2x2 1/2x1/4	10.32	9.36	186.9 K=0.82	1.1900	-6	8	0.826 ¹

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T15	141.5 - 131.5	L2 1/2x2 1/2x1/4	11.04	7.45	158.2 K=0.87	1.1900	-6	11	0.587 ¹
T16	131.5 - 119	2L2 1/2x2 1/2x1/4x3/8	11.78	8.23	95.5 K=1.00	2.3800	-9	48	0.184 ¹
T17	119 - 106.5	2L2 1/2x2 1/2x1/4x3/8	12.68	8.90	101.5 K=1.00	2.3800	-9	45	0.202 ¹

¹ P_u / φP_n controls

Top Girt Bending Design Data

Section No.	Elevation ft	Size	M _{ux} kip-ft	φM _{ux} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M _{uy} kip-ft	φM _{uy} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
T1	231.5 - 229	C8x11.5	-4	22	0.176	0	3	0.000
T3	224.8 - 220.7	L2 1/2x2 1/2x1/4	0	3	0.000	0	1	0.000
T5	216.5 - 211.5	C7x9.8	0	17	0.000	0	3	0.000
T6	211.5 - 206.5	L2 1/2x2x1/4	0	2	0.000	0	1	0.000
T8	201.5 - 196.5	L2 1/2x2 1/2x1/4	0	3	0.000	0	1	0.000
T10	191.5 - 181.5	L2 1/2x2 1/2x1/4	0	3	0.000	0	1	0.000
T11	181.5 - 171.5	L2 1/2x2 1/2x1/4	0	3	0.000	0	1	0.000
T12	171.5 - 161.5	L2 1/2x2 1/2x1/4	0	3	0.000	0	1	0.000
T13	161.5 - 151.5	L2 1/2x2 1/2x1/4	0	3	0.000	0	1	0.000
T14	151.5 - 141.5	L2 1/2x2 1/2x1/4	0	3	0.000	0	1	0.000
T15	141.5 - 131.5	L2 1/2x2 1/2x1/4	0	3	0.000	0	1	0.000
T16	131.5 - 119	2L2 1/2x2 1/2x1/4x3/8	0	3	0.000	0	5	0.000
T17	119 - 106.5	2L2 1/2x2 1/2x1/4x3/8	0	3	0.000	0	5	0.000

Top Girt Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	Ratio $\frac{M_{uy}}{\phi M_{uy}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	231.5 - 229	C8x11.5	0.011	0.176	0.000	0.182	1.050	4.8.1
T3	224.8 - 220.7	L2 1/2x2 1/2x1/4	0.073	0.000	0.000	0.073 ¹	1.050	4.8.1
T5	216.5 - 211.5	C7x9.8	0.025	0.000	0.000	0.025 ¹	1.050	4.8.1
T6	211.5 - 206.5	L2 1/2x2x1/4	0.076	0.000	0.000	0.076 ¹	1.050	4.8.1
T8	201.5 - 196.5	L2 1/2x2 1/2x1/4	0.067	0.000	0.000	0.067 ¹	1.050	4.8.1
T10	191.5 - 181.5	L2 1/2x2 1/2x1/4	0.229	0.000	0.000	0.229 ¹	1.050	4.8.1
T11	181.5 - 171.5	L2 1/2x2 1/2x1/4	0.482	0.000	0.000	0.482 ¹	1.050	4.8.1
T12	171.5 - 161.5	L2 1/2x2 1/2x1/4	0.620	0.000	0.000	0.620 ¹	1.050	4.8.1
T13	161.5 - 151.5	L2 1/2x2 1/2x1/4	0.760	0.000	0.000	0.760 ¹	1.050	4.8.1
T14	151.5 - 141.5	L2 1/2x2 1/2x1/4	0.826	0.000	0.000	0.826 ¹	1.050	4.8.1
T15	141.5 - 131.5	L2 1/2x2 1/2x1/4	0.587	0.000	0.000	0.587 ¹	1.050	4.8.1
T16	131.5 - 119	2L2 1/2x2 1/2x1/4x3/8	0.184	0.000	0.000	0.184 ¹	1.050	4.8.1
T17	119 - 106.5	2L2 1/2x2 1/2x1/4x3/8	0.202	0.000	0.000	0.202 ¹	1.050	4.8.1

¹ P_u / φP_n controls

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Redundant Horizontal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T15	141.5 - 131.5	L2 1/2x2x3/16	2.85	2.36	93.2 K=1.40	0.8090	-3	17	0.187 ¹
T16	131.5 - 119	L2 1/2x2x3/16	2.94	2.45	94.5 K=1.37	0.8090	-3	16	0.190 ¹
T17	119 - 106.5	L2 1/2x2x3/16	3.17	2.68	97.7 K=1.30	0.8090	-3	16	0.213 ¹

¹ P_u / φP_n controls

Redundant Diagonal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T15	141.5 - 131.5	L2 1/2x2x3/16	3.85	3.27	106.0 K=1.15	0.8090	-2	15	0.144 ¹
T16	131.5 - 119	L2 1/2x2x3/16	6.78	5.92	166.4 K=1.00	0.8090	-4	7	0.542 ¹
T17	119 - 106.5	L2 1/2x2x3/16	6.91	6.09	121.8 K=1.00	0.8090	-5	12	0.400 ¹

¹ P_u / φP_n controls

Redundant Hip (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T15	141.5 - 131.5	L2x2x1/4	4.03	3.64	115.8 K=1.04	0.9380	0	15	0.002 ¹
T16	131.5 - 119	L2x2x1/4	4.16	3.77	117.8 K=1.02	0.9380	0	15	0.007 ¹
T17	119 - 106.5	L2x2x1/4	4.48	4.09	125.4 K=1.00	0.9380	0	13	0.010 ¹

¹ P_u / φP_n controls

Redundant Hip Diagonal (1) Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T17	119 - 106.5	L2x2x1/4	9.53	9.13	280.3 K=1.00	0.9380	0	3	0.044 ¹
KL/R > 250 (C) - 392									

¹ P_u / φP_n controls

Redundant Sub-Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T17	119 - 106.5	L2 1/2x2x3/16	1.58	0.94	73.2 K=2.77	0.8090	-4	20	0.181 ¹

¹ P_u / φP_n controls

Redundant Sub Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T17	119 - 106.5	L2 1/2x2x3/16	3.56	2.64	97.1 K=1.31	0.8090	-5	16	0.292 ¹

¹ P_u / φP_n controls

Inner Bracing Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T16	131.5 - 119	L3x3x3/16	8.33	8.33	167.7 K=1.00	1.0900	0	9	0.006 ¹
T17	119 - 106.5	L3x3x3/16	8.96	8.96	180.5 K=1.00	1.0900	0	8	0.006 ¹

¹ P_u / φP_n controls

Tension Checks

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Leg Design Data (Tension)

Section No.	Elevation	Size	L	L _u	Kl/r	A	P _u	φP _n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in ²	K	K	
T1	231.5 - 229	L4x4x3/8	2.50	2.50	24.4	2.8600	3	93	0.029
T2	229 - 224.8	L4x4x3/8	4.20	4.20	41.0	2.8600	6	93	0.064 ¹
T3	224.8 - 220.7	L4x4x3/8	4.10	4.10	40.0	2.8600	14	93	0.155 ¹
T4	220.7 - 216.5	L4x4x3/8	4.20	4.20	41.0	2.8600	20	93	0.214 ¹
T5	216.5 - 211.5	L5x5x1/2	5.01	5.01	39.0	4.7500	28	154	0.180 ¹
T6	211.5 - 206.5	L5x5x1/2	5.01	5.01	39.0	4.7500	37	154	0.240 ¹
T7	206.5 - 201.5	L5x5x1/2	5.01	5.01	39.0	4.7500	46	154	0.296 ¹
T8	201.5 - 196.5	L5x5x1/2	5.01	5.01	39.0	4.7500	55	154	0.357 ¹
T9	196.5 - 191.5	L5x5x1/2	5.01	5.01	39.0	4.7500	66	154	0.427 ¹
T10	191.5 - 181.5	L6x6x5/8	10.01	4.77	31.1	7.1100	76	230	0.328 ¹
T11	181.5 - 171.5	L6x6x5/8	10.01	4.79	31.3	7.1100	95	230	0.414 ¹
T12	171.5 - 161.5	L6x6x5/8	10.01	4.81	31.4	7.1100	114	230	0.497 ¹
T13	161.5 - 151.5	L6x6x5/8	10.01	4.82	31.5	7.1100	133	230	0.578 ¹
T14	151.5 - 141.5	L6x6x3/4	10.01	4.84	31.7	8.4400	153	273	0.560 ¹
T15	141.5 - 131.5	L6x6x3/4	10.01	0.08	0.5	8.4400	186	273	0.679 ¹
T16	131.5 - 119	L6x6x7/8	12.52	0.08	0.6	9.7300	186	315	0.589 ¹
T17	119 - 106.5	L6x6x7/8	12.52	3.13	20.7	9.7300	202	315	0.640 ¹

¹ P_u / φP_n controls

Leg Bending Design Data (Tension)

Section No.	Elevation	Size	M _{ux}	φM _{rx}	Ratio $\frac{M_{ux}}{\phi M_{rx}}$	M _{uy}	φM _{ry}	Ratio $\frac{M_{uy}}{\phi M_{ry}}$
	ft		kip-ft	kip-ft		kip-ft	kip-ft	
T1	231.5 - 229	L4x4x3/8	-4	10	0.381	-2	5	0.290
T2	229 - 224.8	L4x4x3/8	0	10	0.000	0	5	0.000
T3	224.8 - 220.7	L4x4x3/8	0	10	0.000	0	5	0.000
T4	220.7 - 216.5	L4x4x3/8	0	10	0.000	0	5	0.000
T5	216.5 - 211.5	L5x5x1/2	0	22	0.000	0	11	0.000
T6	211.5 - 206.5	L5x5x1/2	0	22	0.000	0	11	0.000
T7	206.5 - 201.5	L5x5x1/2	0	22	0.000	0	11	0.000
T8	201.5 - 196.5	L5x5x1/2	0	22	0.000	0	11	0.000
T9	196.5 - 191.5	L5x5x1/2	0	22	0.000	0	11	0.000
T10	191.5 - 181.5	L6x6x5/8	0	39	0.000	0	20	0.000
T11	181.5 - 171.5	L6x6x5/8	0	39	0.000	0	20	0.000
T12	171.5 - 161.5	L6x6x5/8	0	39	0.000	0	20	0.000
T13	161.5 - 151.5	L6x6x5/8	0	39	0.000	0	20	0.000
T14	151.5 - 141.5	L6x6x3/4	0	46	0.000	0	23	0.000
T15	141.5 - 131.5	L6x6x3/4	0	46	0.000	0	23	0.000
T16	131.5 - 119	L6x6x7/8	0	52	0.000	0	27	0.000
T17	119 - 106.5	L6x6x7/8	0	52	0.000	0	27	0.000

Leg Interaction Design Data (Tension)

Section No.	Elevation	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{rx}}$	Ratio $\frac{M_{uy}}{\phi M_{ry}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	ft							
T1	231.5 - 229	L4x4x3/8	0.029	0.381	0.290	0.686	1.050	4.8.1

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Section No.	Elevation ft	Size	Ratio P_u ϕP_n	Ratio M_{ux} ϕM_{nx}	Ratio M_{uy} ϕM_{ny}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T2	229 - 224.8	L4x4x3/8	0.064	0.000	0.000	0.064 ¹	1.050	4.8.1
T3	224.8 - 220.7	L4x4x3/8	0.155	0.000	0.000	0.155 ¹	1.050	4.8.1
T4	220.7 - 216.5	L4x4x3/8	0.214	0.000	0.000	0.214 ¹	1.050	4.8.1
T5	216.5 - 211.5	L5x5x1/2	0.180	0.000	0.000	0.180 ¹	1.050	4.8.1
T6	211.5 - 206.5	L5x5x1/2	0.240	0.000	0.000	0.240 ¹	1.050	4.8.1
T7	206.5 - 201.5	L5x5x1/2	0.296	0.000	0.000	0.296 ¹	1.050	4.8.1
T8	201.5 - 196.5	L5x5x1/2	0.357	0.000	0.000	0.357 ¹	1.050	4.8.1
T9	196.5 - 191.5	L5x5x1/2	0.427	0.000	0.000	0.427 ¹	1.050	4.8.1
T10	191.5 - 181.5	L6x6x5/8	0.328	0.000	0.000	0.328 ¹	1.050	4.8.1
T11	181.5 - 171.5	L6x6x5/8	0.414	0.000	0.000	0.414 ¹	1.050	4.8.1
T12	171.5 - 161.5	L6x6x5/8	0.497	0.000	0.000	0.497 ¹	1.050	4.8.1
T13	161.5 - 151.5	L6x6x5/8	0.578	0.000	0.000	0.578 ¹	1.050	4.8.1
T14	151.5 - 141.5	L6x6x3/4	0.560	0.000	0.000	0.560 ¹	1.050	4.8.1
T15	141.5 - 131.5	L6x6x3/4	0.679	0.000	0.000	0.679 ¹	1.050	4.8.1
T16	131.5 - 119	L6x6x7/8	0.589	0.000	0.000	0.589 ¹	1.050	4.8.1
T17	119 - 106.5	L6x6x7/8	0.640	0.000	0.000	0.640 ¹	1.050	4.8.1

¹ $P_u / \phi P_n$ controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in ²	P_u K	ϕP_n K	Ratio P_u ϕP_n
T2	229 - 224.8	2L2 1/2x2 1/2x1/4x3/8	7.00	3.06	51.4	1.4569	4	63	0.067 ¹
T3	224.8 - 220.7	2L2 1/2x2 1/2x1/4x3/8	6.94	3.04	51.0	1.4569	4	63	0.065 ¹
T4	220.7 - 216.5	2L2 1/2x2 1/2x1/4x3/8	7.00	3.06	51.4	1.4569	5	63	0.080 ¹
T5	216.5 - 211.5	L2 1/2x2x1/4	7.65	3.44	74.3	0.6309	5	27	0.173 ¹
T6	211.5 - 206.5	L2 1/2x2x1/4	7.93	3.58	77.2	0.6309	5	27	0.181 ¹
T7	206.5 - 201.5	L2 1/2x2x1/4	8.21	3.73	80.2	0.6309	6	27	0.223 ¹
T8	201.5 - 196.5	L2 1/2x2x1/4	8.50	3.88	83.2	0.6309	7	27	0.251 ¹
T9	196.5 - 191.5	L2 1/2x2x1/4	8.80	4.03	86.2	0.6309	7	27	0.258 ¹
T10	191.5 - 181.5	L3x3x1/4	12.68	6.00	80.7	0.9159	11	40	0.267 ¹
T11	181.5 - 171.5	L3x3x1/4	13.13	6.23	83.7	0.9159	11	40	0.269 ¹
T12	171.5 - 161.5	L3x3x1/4	13.61	6.48	86.9	0.9159	11	40	0.275 ¹
T13	161.5 - 151.5	L3x3x1/4	14.12	6.73	90.2	0.9159	11	40	0.284 ¹
T14	151.5 - 141.5	L3x3x1/4	14.64	7.00	93.6	0.9159	11	40	0.274 ¹
T15	141.5 - 131.5	L3x3x1/4	7.70	6.91	95.5	0.9159	13	40	0.317 ¹
T16	131.5 - 119	2L2 1/2x2 1/2x1/4x3/8	13.95	12.94	135.1	1.4569	19	63	0.296 ¹
T17	119 - 106.5	2L2 1/2x2 1/2x1/4x3/8	14.23	6.89	111.1	1.4569	19	63	0.308 ¹

¹ $P_u / \phi P_n$ controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in ²	P_u K	ϕP_n K	Ratio P_u ϕP_n
T15	141.5 - 131.5	L2 1/2x2x1/4	11.40	7.95	165.7	0.6309	3	27	0.113 ¹

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¹ $P_u / \phi P_n$ controls

Secondary Horizontal Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in ²	K	K	
T10	191.5 - 181.5	L2 1/2x2x1/4	7.76	6.81	147.1	0.6309	1	27	0.048 ¹
T11	181.5 - 171.5	L2 1/2x2x1/4	8.49	7.53	161.9	0.6309	2	27	0.059 ¹
T12	171.5 - 161.5	L2 1/2x2x3/16	9.22	8.26	174.4	0.4837	2	21	0.092 ¹
T13	161.5 - 151.5	L2 1/2x2 1/2x1/4	9.94	8.98	147.4	0.7284	2	32	0.070 ¹
T14	151.5 - 141.5	L2 1/2x2x1/4	10.67	9.71	206.0	0.6309	3	27	0.093 ¹

¹ $P_u / \phi P_n$ controls

Top Girt Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in ²	K	K	
T1	231.5 - 229	C8x11.5	5.60	5.27	101.2	2.3906	1	104	0.007
T3	224.8 - 220.7	L2 1/2x2 1/2x1/4	5.60	4.81	82.2	0.7284	1	32	0.044 ¹
T5	216.5 - 211.5	C7x9.8	5.60	5.19	107.1	2.0147	2	88	0.017 ¹
T6	211.5 - 206.5	L2 1/2x2x1/4	5.97	5.09	112.4	0.6309	1	27	0.050 ¹
T8	201.5 - 196.5	L2 1/2x2 1/2x1/4	6.69	5.82	97.9	0.7284	1	32	0.032 ¹
T10	191.5 - 181.5	L2 1/2x2 1/2x1/4	7.42	6.46	107.9	0.7284	3	32	0.108 ¹
T11	181.5 - 171.5	L2 1/2x2 1/2x1/4	8.14	7.18	119.3	0.7284	7	32	0.210 ¹
T12	171.5 - 161.5	L2 1/2x2 1/2x1/4	8.87	7.91	130.6	0.7284	7	32	0.218 ¹
T13	161.5 - 151.5	L2 1/2x2 1/2x1/4	9.59	8.64	141.9	0.7284	8	32	0.247 ¹
T14	151.5 - 141.5	L2 1/2x2 1/2x1/4	10.32	9.36	153.2	0.7284	7	32	0.225 ¹
T15	141.5 - 131.5	L2 1/2x2 1/2x1/4	11.04	7.45	164.5	0.7284	7	32	0.232 ¹
T16	131.5 - 119	2L2 1/2x2 1/2x1/4x3/8	11.78	8.23	88.0	1.4569	9	63	0.149 ¹
T17	119 - 106.5	2L2 1/2x2 1/2x1/4x3/8	12.68	8.90	95.0	1.4569	9	63	0.141 ¹

¹ $P_u / \phi P_n$ controls

Top Girt Bending Design Data

Section No.	Elevation	Size	M_{ux}	ϕM_{nx}	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy}	ϕM_{ny}	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
	ft		kip-ft	kip-ft		kip-ft	kip-ft	
T1	231.5 - 229	C8x11.5	4	22	0.177	0	3	0.000
T3	224.8 - 220.7	L2 1/2x2 1/2x1/4	0	3	0.000	0	1	0.000
T5	216.5 - 211.5	C7x9.8	0	17	0.000	0	3	0.000
T6	211.5 - 206.5	L2 1/2x2x1/4	0	2	0.000	0	1	0.000
T8	201.5 - 196.5	L2 1/2x2 1/2x1/4	0	3	0.000	0	1	0.000
T10	191.5 - 181.5	L2 1/2x2 1/2x1/4	0	3	0.000	0	1	0.000
T11	181.5 - 171.5	L2 1/2x2 1/2x1/4	0	3	0.000	0	1	0.000
T12	171.5 - 161.5	L2 1/2x2 1/2x1/4	0	3	0.000	0	1	0.000
T13	161.5 - 151.5	L2 1/2x2 1/2x1/4	0	3	0.000	0	1	0.000
T14	151.5 - 141.5	L2 1/2x2 1/2x1/4	0	3	0.000	0	1	0.000

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Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{ux} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M_{uy} kip-ft	ϕM_{uy} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
T15	141.5 - 131.5	L2 1/2x2 1/2x1/4	0	3	0.000	0	1	0.000
T16	131.5 - 119	2L2 1/2x2 1/2x1/4x3/8	0	3	0.000	0	5	0.000
T17	119 - 106.5	2L2 1/2x2 1/2x1/4x3/8	0	3	0.000	0	5	0.000

Top Girt Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	Ratio $\frac{M_{uy}}{\phi M_{uy}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	231.5 - 229	C8x11.5	0.007	0.177	0.000	0.181	1.050	4.8.1
T3	224.8 - 220.7	L2 1/2x2 1/2x1/4	0.044	0.000	0.000	0.044 ¹	1.050	4.8.1
T5	216.5 - 211.5	C7x9.8	0.017	0.000	0.000	0.017 ¹	1.050	4.8.1
T6	211.5 - 206.5	L2 1/2x2x1/4	0.050	0.000	0.000	0.050 ¹	1.050	4.8.1
T8	201.5 - 196.5	L2 1/2x2 1/2x1/4	0.032	0.000	0.000	0.032 ¹	1.050	4.8.1
T10	191.5 - 181.5	L2 1/2x2 1/2x1/4	0.108	0.000	0.000	0.108 ¹	1.050	4.8.1
T11	181.5 - 171.5	L2 1/2x2 1/2x1/4	0.210	0.000	0.000	0.210 ¹	1.050	4.8.1
T12	171.5 - 161.5	L2 1/2x2 1/2x1/4	0.218	0.000	0.000	0.218 ¹	1.050	4.8.1
T13	161.5 - 151.5	L2 1/2x2 1/2x1/4	0.247	0.000	0.000	0.247 ¹	1.050	4.8.1
T14	151.5 - 141.5	L2 1/2x2 1/2x1/4	0.225	0.000	0.000	0.225 ¹	1.050	4.8.1
T15	141.5 - 131.5	L2 1/2x2 1/2x1/4	0.232	0.000	0.000	0.232 ¹	1.050	4.8.1
T16	131.5 - 119	2L2 1/2x2 1/2x1/4x3/8	0.149	0.000	0.000	0.149 ¹	1.050	4.8.1
T17	119 - 106.5	2L2 1/2x2 1/2x1/4x3/8	0.141	0.000	0.000	0.141 ¹	1.050	4.8.1

¹ $P_u / \phi P_n$ controls

Redundant Horizontal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in ²	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T15	141.5 - 131.5	L2 1/2x2x3/16	2.85	2.36	52.0	0.5013	3	22	0.142 ¹
T16	131.5 - 119	L2 1/2x2x3/16	2.94	2.45	53.9	0.5013	3	22	0.142 ¹
T17	119 - 106.5	L2 1/2x2x3/16	3.17	2.68	58.4	0.5013	3	22	0.155 ¹

¹ $P_u / \phi P_n$ controls

Redundant Diagonal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in ²	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T15	141.5 - 131.5	L2 1/2x2x3/16	3.85	3.27	70.3	0.5013	2	22	0.096 ¹
T16	131.5 - 119	L2 1/2x2x3/16	6.78	5.92	123.2	0.5013	4	22	0.164 ¹
T17	119 - 106.5	L2 1/2x2x3/16	6.91	6.09	126.6	0.5013	4	22	0.200 ¹

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	Client Everest Infrastructure	Designed by APJ

¹ $P_u / \phi P_n$ controls

Redundant Hip (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T15	141.5 - 131.5	L2x2x1/4	4.03	3.64	79.4	0.5629	0	24	0.001 ¹
T16	131.5 - 119	L2x2x1/4	4.16	3.77	82.0	0.5629	0	24	0.004 ¹
T17	119 - 106.5	L2x2x1/4	4.48	4.09	88.3	0.5629	0	24	0.005 ¹

¹ $P_u / \phi P_n$ controls

Redundant Hip Diagonal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T17	119 - 106.5	L2x2x1/4	9.53	9.13	187.8	0.5629	0	24	0.005 ¹

¹ $P_u / \phi P_n$ controls

Redundant Sub-Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T17	119 - 106.5	L2 1/2x2x3/16	1.58	0.94	26.7	0.5013	4	22	0.186 ¹

¹ $P_u / \phi P_n$ controls

Redundant Sub Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T17	119 - 106.5	L2 1/2x2x3/16	3.56	2.64	60.7	0.5013	4	22	0.187 ¹

¹ $P_u / \phi P_n$ controls

Inner Bracing Design Data (Tension)

<i>tnxTower</i> <i>Tower Engineering Professionals</i> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Job Stamford #1 CO (638283)	Page 51 of 53
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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T10	191.5 - 181.5	L2 1/2x2 1/2x3/16	10.49	9.99	154.1	0.9020	1	29	0.020 ¹
T12	171.5 - 161.5	L2 1/2x2 1/2x3/16	12.54	12.04	185.7	0.9020	1	29	0.039 ¹
T14	151.5 - 141.5	L2x2 1/2x3/16	14.59	14.09	282.0	0.8090	1	26	0.038 ^{*1}
T16	131.5 - 119	L3x3x3/16	8.33	8.33	106.4	1.0900	0	35	0.001 ¹
T17	119 - 106.5	L3x3x3/16	8.96	8.96	114.6	1.0900	0	35	0.001 ¹

* DL controls

¹ P_u / φP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	φP _{allow} K	% Capacity	Pass Fail
T1	231.5 - 229	Leg	L4x4x3/8	4	-7	90	67.2	Pass
T2	229 - 224.8	Leg	L4x4x3/8	11	-11	78	14.5	Pass
T3	224.8 - 220.7	Leg	L4x4x3/8	24	-20	79	25.2	Pass
T4	220.7 - 216.5	Leg	L4x4x3/8	40	-26	78	32.7	Pass
T5	216.5 - 211.5	Leg	L5x5x1/2	51	-34	133	25.6	Pass
T6	211.5 - 206.5	Leg	L5x5x1/2	67	-45	133	33.7	Pass
T7	206.5 - 201.5	Leg	L5x5x1/2	84	-57	133	42.7	Pass
T8	201.5 - 196.5	Leg	L5x5x1/2	96	-67	133	50.3	Pass
T9	196.5 - 191.5	Leg	L5x5x1/2	111	-78	133	58.6	Pass
T10	191.5 - 181.5	Leg	L6x6x5/8	123	-87	208	41.7	Pass
T11	181.5 - 171.5	Leg	L6x6x5/8	145	-108	209	51.8	Pass
T12	171.5 - 161.5	Leg	L6x6x5/8	165	-129	209	61.6	Pass
T13	161.5 - 151.5	Leg	L6x6x5/8	187	-149	209	71.2	Pass
T14	151.5 - 141.5	Leg	L6x6x3/4	207	-171	248	68.9	Pass
T15	141.5 - 131.5	Leg	L6x6x3/4	229	-207	287	72.0	Pass
T16	131.5 - 119	Leg	L6x6x7/8	297	-203	267	75.9	Pass
T17	119 - 106.5	Leg	L6x6x7/8	337	-226	314	72.0	Pass
T2	229 - 224.8	Diagonal	2L2 1/2x2 1/2x1/4x3/8	15	4	67	6.4	Pass
							10.2 (b)	
T3	224.8 - 220.7	Diagonal	2L2 1/2x2 1/2x1/4x3/8	35	4	67	6.2	Pass
							9.8 (b)	
T4	220.7 - 216.5	Diagonal	2L2 1/2x2 1/2x1/4x3/8	46	5	67	7.7	Pass
							12.2 (b)	
T5	216.5 - 211.5	Diagonal	L2 1/2x2x1/4	61	-5	21	25.6	Pass
T6	211.5 - 206.5	Diagonal	L2 1/2x2x1/4	77	-5	20	24.9	Pass
T7	206.5 - 201.5	Diagonal	L2 1/2x2x1/4	89	-6	19	33.0	Pass
T8	201.5 - 196.5	Diagonal	L2 1/2x2x1/4	105	-7	19	37.8	Pass
T9	196.5 - 191.5	Diagonal	L2 1/2x2x1/4	117	-7	18	39.4	Pass
T10	191.5 - 181.5	Diagonal	L3x3x1/4	135	-12	22	53.8	Pass
T11	181.5 - 171.5	Diagonal	L3x3x1/4	155	-12	21	56.3	Pass
T12	171.5 - 161.5	Diagonal	L3x3x1/4	177	-12	20	60.5	Pass
T13	161.5 - 151.5	Diagonal	L3x3x1/4	197	-13	19	65.8	Pass
T14	151.5 - 141.5	Diagonal	L3x3x1/4	219	-12	18	66.4	Pass
T15	141.5 - 131.5	Diagonal	L3x3x1/4	251	-14	27	50.4	Pass
							56.6 (b)	
T16	131.5 - 119	Diagonal	2L2 1/2x2 1/2x1/4x3/8	320	-19	30	65.1	Pass
T17	119 - 106.5	Diagonal	2L2 1/2x2 1/2x1/4x3/8	377	-20	44	45.9	Pass
							46.6 (b)	
T15	141.5 - 131.5	Horizontal	L2 1/2x2x1/4	242	-3	10	32.0	Pass
T10	191.5 - 181.5	Secondary Horizontal	L2 1/2x2x1/4	140	-1	13	9.9	Pass
T11	181.5 - 171.5	Secondary Horizontal	L2 1/2x2x1/4	160	-2	11	15.0	Pass
T12	171.5 - 161.5	Secondary Horizontal	L2 1/2x2x3/16	182	-2	7	27.5	Pass
T13	161.5 - 151.5	Secondary Horizontal	L2 1/2x2 1/2x1/4	202	-2	14	15.6	Pass

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Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T14	151.5 - 141.5	Secondary Horizontal	L2 1/2x2x1/4	224	-3	6	39.4	Pass
T1	231.5 - 229	Top Girt	C8x11.5	8	-1	67	17.3	Pass
T3	224.8 - 220.7	Top Girt	L2 1/2x2 1/2x1/4	25	-1	19	6.9	Pass
T5	216.5 - 211.5	Top Girt	C7x9.8	53	-1	53	2.4	Pass
							3.3 (b)	
T6	211.5 - 206.5	Top Girt	L2 1/2x2x1/4	69	-1	14	7.3	Pass
T8	201.5 - 196.5	Top Girt	L2 1/2x2 1/2x1/4	99	-1	16	6.3	Pass
T10	191.5 - 181.5	Top Girt	L2 1/2x2 1/2x1/4	130	-3	14	21.8	Pass
T11	181.5 - 171.5	Top Girt	L2 1/2x2 1/2x1/4	150	-5	12	45.9	Pass
T12	171.5 - 161.5	Top Girt	L2 1/2x2 1/2x1/4	172	-6	10	59.1	Pass
T13	161.5 - 151.5	Top Girt	L2 1/2x2 1/2x1/4	192	-7	9	72.4	Pass
T14	151.5 - 141.5	Top Girt	L2 1/2x2 1/2x1/4	214	-6	8	78.7	Pass
T15	141.5 - 131.5	Top Girt	L2 1/2x2 1/2x1/4	234	-6	11	55.9	Pass
T16	131.5 - 119	Top Girt	2L2 1/2x2 1/2x1/4x3/8	301	-9	50	17.5	Pass
							22.5 (b)	
T17	119 - 106.5	Top Girt	2L2 1/2x2 1/2x1/4x3/8	341	-9	47	19.2	Pass
							21.4 (b)	
T15	141.5 - 131.5	Redund Horz 1 Bracing	L2 1/2x2x3/16	247	-3	17	17.8	Pass
							39.7 (b)	
T16	131.5 - 119	Redund Horz 1 Bracing	L2 1/2x2x3/16	317	-3	17	18.0	Pass
							39.7 (b)	
T17	119 - 106.5	Redund Horz 1 Bracing	L2 1/2x2x3/16	365	-3	17	20.3	Pass
							43.3 (b)	
T15	141.5 - 131.5	Redund Diag 1 Bracing	L2 1/2x2x3/16	278	-2	15	13.7	Pass
							26.8 (b)	
T16	131.5 - 119	Redund Diag 1 Bracing	L2 1/2x2x3/16	318	-4	7	51.6	Pass
T17	119 - 106.5	Redund Diag 1 Bracing	L2 1/2x2x3/16	366	-5	13	38.1	Pass
							55.7 (b)	
T15	141.5 - 131.5	Redund Hip 1 Bracing	L2x2x1/4	249	0	16	0.4	Pass
T16	131.5 - 119	Redund Hip 1 Bracing	L2x2x1/4	334	0	15	0.7	Pass
T17	119 - 106.5	Redund Hip 1 Bracing	L2x2x1/4	391	0	14	0.9	Pass
T17	119 - 106.5	Redund Hip Diagonal 1 Bracing	L2x2x1/4	392	0	3	4.2	Pass
T17	119 - 106.5	Redund Sub Horz Bracing	L2 1/2x2x3/16	370	4	23	17.8	Pass
							28.3 (b)	
T17	119 - 106.5	Redund Sub Diagonal Bracing	L2 1/2x2x3/16	369	-5	17	27.8	Pass
							28.4 (b)	
T10	191.5 - 181.5	Inner Bracing	L2 1/2x2 1/2x3/16	126	1	31	1.9	Pass
T12	171.5 - 161.5	Inner Bracing	L2 1/2x2 1/2x3/16	167	1	31	3.7	Pass
T14	151.5 - 141.5	Inner Bracing	L2x2 1/2x3/16	210	1	28	3.7	Pass
T16	131.5 - 119	Inner Bracing	L3x3x3/16	304	0	9	0.8	Pass
T17	119 - 106.5	Inner Bracing	L3x3x3/16	344	0	8	0.9	Pass
							Summary	
							Leg (T16)	Pass
							Diagonal (T14)	Pass
							Horizontal (T15)	Pass
							Secondary Horizontal (T14)	Pass
							Top Girt (T14)	Pass
							Redund Horz 1 Bracing (T17)	Pass

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<i>Section No.</i>	<i>Elevation ft</i>	<i>Component Type</i>	<i>Size</i>	<i>Critical Element</i>	<i>P K</i>	ϕP_{allow} <i>K</i>	<i>% Capacity</i>	<i>Pass Fail</i>
						Redund Diag 1 Bracing (T17)	55.7	Pass
						Redund Hip 1 Bracing (T17)	0.9	Pass
						Redund Hip Diagonal 1 Bracing (T17)	4.2	Pass
						Redund Sub Horz Bracing (T17)	28.3	Pass
						Redund Sub Diagonal Bracing (T17)	28.4	Pass
						Inner Bracing (T12)	3.7	Pass
						Bolt Checks	53.9	Pass
						RATING =	78.7	Pass

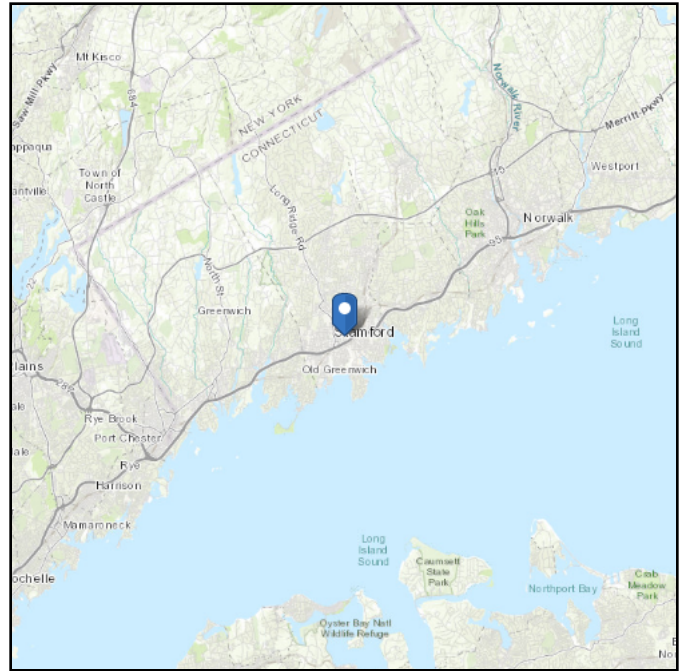
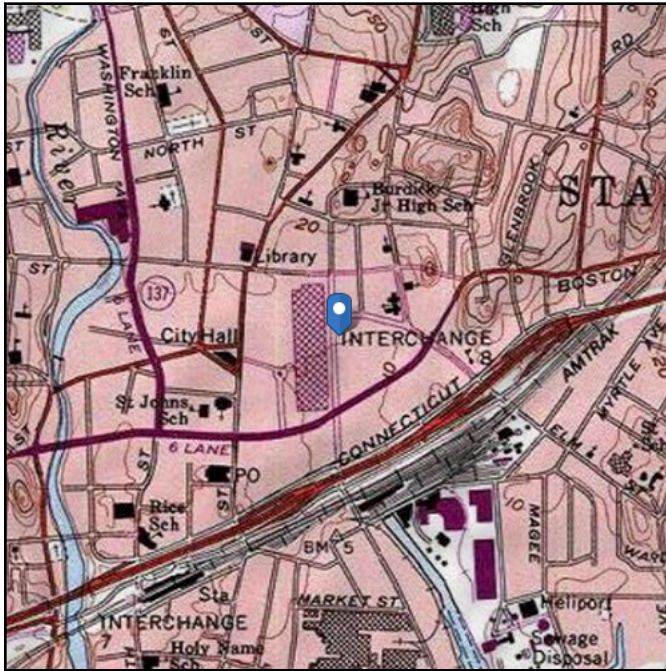
APPENDIX B
ADDITIONAL CALCULATIONS

ASCE 7 Hazards Report

Address:
No Address at This
Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see
Section 11.4.3)

Elevation: 11.24 ft (NAVD 88)
Latitude: 41.053444
Longitude: -73.535639



Wind

Results:

Wind Speed:	117 Vmph
10-year MRI	75 Vmph
25-year MRI	85 Vmph
50-year MRI	90 Vmph
100-year MRI	97 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2

Date Accessed: Tue Oct 19 2021

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

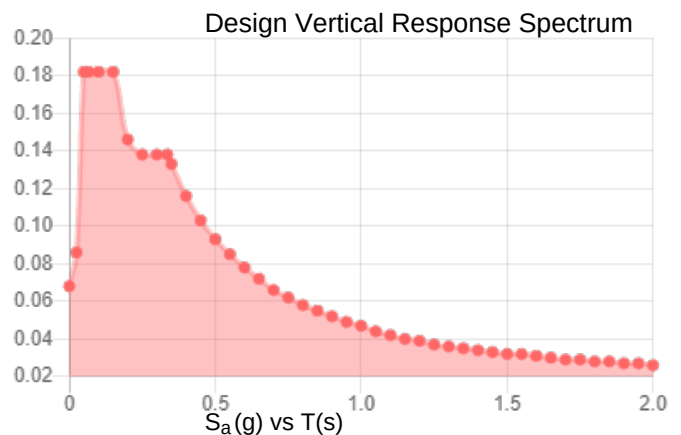
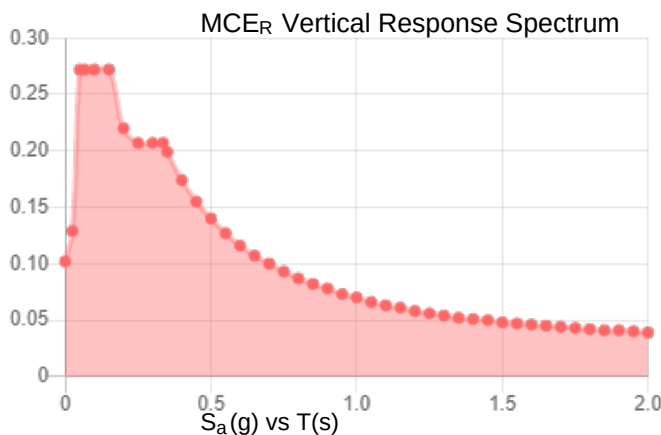
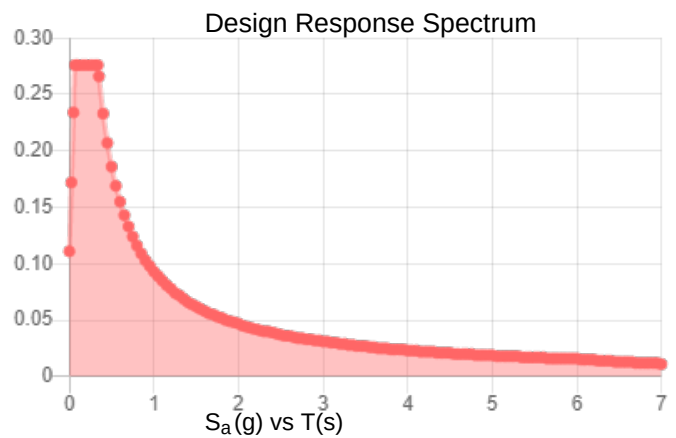
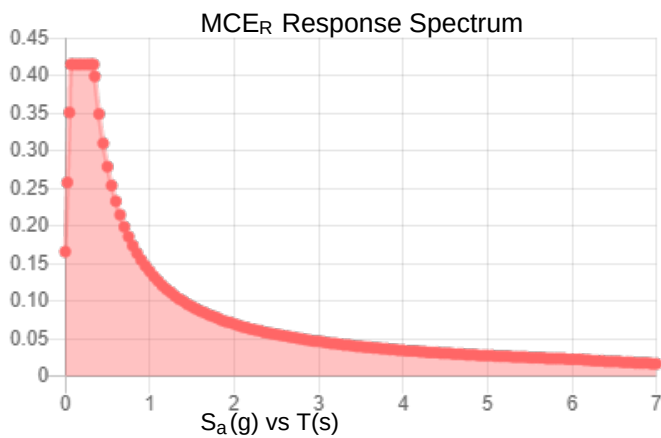
Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Site Soil Class: D - Default (see Section 11.4.3)

Results:

S_S :	0.261	S_{D1} :	0.093
S_1 :	0.058	T_L :	6
F_a :	1.592	PGA :	0.157
F_v :	2.4	PGA _M :	0.233
S_{MS} :	0.415	F_{PGA} :	1.487
S_{M1} :	0.14	I_e :	1
S_{DS} :	0.276	C_v :	0.821

Seismic Design Category B



Data Accessed:

Tue Oct 19 2021

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness: 1.00 in.
Concurrent Temperature: 15 F
Gust Speed: 50 mph

Data Source: Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8

Date Accessed: Tue Oct 19 2021

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided "as is" and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

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Exhibit E

Mount Analysis

Date: 5/28/2021

To: T-Mobile Northeast, LLC
35 Griffin Road South
Bloomfield, CT 06002

Subject: Mount Structural Analysis Report

T-Mobile Designation: Site ID: CT11410A
Site Name: Stamford / Dwtn

EFI Designation: Project Number: 049.01315 - 2175008

Site Data: 555 Main Street, Stamford, CT 06901
Latitude: 41.053535°, Longitude: -73.535579°

EFI Global, Inc. is pleased to submit this “**Mount Structural Analysis Report**” to determine the structural capacity of the antenna mount utilized by T-Mobile at the above referenced site.

The purpose of the analysis is to determine acceptability of the mount stress level for the changes proposed by T-Mobile. Under the following load case we have determined the mount to have:

Existing + Proposed Equipment

Adequate Capacity (48.7%)

Note: See Analysis Criteria for loading configuration

The analysis has been performed in accordance with TIA-222-G Standard and the 2018 Connecticut State Building Code (2015 IBC).

We at *EFI Global, Inc.* appreciate the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this or any other projects, please give us a call.

Sincerely,
EFI Global, Inc.
License No: PEC0001245


5/28/2021


Ahmet Colakoglu, PE
Connecticut Professional Engineer
License No: 27057

1) ANALYSIS CRITERIA

The analysis was performed for the existing and proposed appurtenances as specified in the loading information referenced below, and per the following loading criteria of Table 1.

Table 1 - Loading and Analysis Criteria

Rad Center	210' / 203'
Structure Type	Self-Support on Rooftop
Exposure Category	B
Nominal Wind Speed	93 mph
Ice Loading	0.75" with 50 mph Wind
Risk Category	II
Topographic Factor	$K_{zt} = 1.0$

Table 1.1 - Existing Appurtenance Configuration

Qty	Model
3	Ericsson AIR21 B2A/B4P - Antennas
3	Ericsson AIR32 B66A/B2A - Antennas
3	Andrew LNX-6515DS-A1M - Antennas
3	Generic Twin Style 1B - AWS - TMAs
3	RRUS11 B12 - RRUs

Table 1.2 - Proposed and Final Appurtenance Configuration

Qty	Model
3	Ericsson AIR6449 B41 - RRUs
3	Ericsson AIR32 B66A/B2A - Antennas
3	RFS APXVAALL24_43-U-NA20 - Antennas
3	Generic Twin Style 1B - AWS - TMAs*
3	Commscope SDX1926Q-43 - Diplexers*
3	Radio 4480 B71+B85 - RRUs*
3	Radio 4415 B25 - RRUs*

*** To be mounted behind antennas.**

Table 1.3 - Assumed Material Properties: Hot Rolled

Member Type	ASTM Material Designation	Fy (ksi)	Fu (ksi)
Pipes	A53 Gr. B	35	60
Angles/Channels	A36	36	58
Rectangular HSS	A500 Gr. B - 46	46	58
Round HSS	A500 Gr. B - 42	42	58
Others (UNO)	A572 Gr. 50	50	65

2) ANALYSIS PROCEDURE

The analysis is based on the following information:

Table 2 - Documents

Document	Provided By	Date
RFDS	T-Mobile	5/10/2021
Structural Analysis Report	Malouf Engineering	5/22/2017

2.1) Analysis Method

Risa-3D, a commercially available analysis software package, was used to create a three-dimensional model of the mount and calculate member stresses for various loading cases. Selected output from the analysis is included in the Appendix

2.2) Analysis Conditions and Assumptions

- 1) The mount was built and installed in accordance with the manufacturer's specifications.
- 2) The mount has been maintained and will be maintained in accordance with the manufacturer's specifications. All structural members and connections of the mount are in good condition and can achieve theoretical strength.
- 3) The configuration of antennas is as specified in "1) Analysis Criteria".
- 4) The analysis was performed for the subject mount only. It does not include an evaluation of the other mounts or the building, which should be analyzed by others.
- 5) The evaluation does not include any antenna rigging loads. The equipment should not be rigged using the subject antenna mount as the support.
- 6) The analysis includes a minimum 250 lbf maintenance point load at the worst-case location on the mount, as well as a minimum 250 lbf maintenance point load at each antenna location in conjunction with a 30 mph wind load.
- 7) Any steel grating represented in this model is for loading purposes only and it is not considered to provide any structural restraint or support.
- 8) Member sizes per the available mount specifications and assumed based on our experience with similar structures. Please refer to calculation output in the appendix of this report for sizes and lengths assumed.
- 9) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.

EFI Global, Inc. (EFI) must be notified immediately if any of these assumptions are discovered to be incorrect. The results of this analysis may be affected if any of the assumptions are not valid or have been made in error.

3) ANALYSIS RESULTS AND CONCLUSION

The analysis results are shown on the table below.

Table 3.1 - Mount Component Stresses vs. Capacity - 210'

Component	% Capacity	Pass / Fail
Horizontal Face Pipe	27.0	Pass
Horizontal Standoff Pipe	32.5	Pass
Vertical Standoff Solid Rod	38.0	Pass
Diagonal Standoff Solid Rod	< 20.0	Pass
Antenna Mount Pipe	42.3	Pass
Connection Plates	32.9	Pass
Pipe Kicker	< 20.0	Pass

Table 3.2 - Mount Component Stresses vs. Capacity - 203'

Component	% Capacity	Pass / Fail
Horizontal Face Pipe	23.8	Pass
Horizontal Standoff Pipe	30.2	Pass
Vertical Standoff Solid Rod	40.7	Pass
Diagonal Standoff Solid Rod	< 20.0	Pass
Antenna Mount Pipe	48.7	Pass
Connection Plates	33.4	Pass
Pipe Kicker	< 20.0	Pass

Sector Mounts: The proposed sector mounts have **adequate** capacity for the proposed changes by T-Mobile. **The existing sector mounts at each sector should be replaced with two (2) Valmont/Site Pro 1 12'-6" Heavy Duty V-Frame Assemblies with Two Stiff Arms (P/N: VFA12-HD), specifications as attached on Appendix.** For the code specified load combinations and as a maximum, the mount members at 203' are stressed to **48.7%** of their structural capacity. The mount members at 210' are stressed to **42.3%** of their structural capacity.

The analysis also assumes the following:

- The mount centerline is equal to the RAD centerline.
- (4) 96" long 2.0 STD mount pipes are equally spaced along the face.
- The (2) tieback arms are attached directly to the adjacent mount's tower legs.

APPENDIX

**INPUT LOADS
ANALYSIS OUTPUT
MOUNT SPECIFICATIONS**

CLIENT: Foresite LLC

PROJECT: CT11410A

SUBJECT: Antenna Loads -TIA 222 G Standard (chapter 16 revisions)

Tower Height

231.50

ft

Type of MountPlatform

Basic Wind Speed, V

93

mph (=Ultimate Speed*Sqrt(0.6))

Basic Wind Speed with Ice, V_i

50

mph

Maintenance Load Factor, L_{FM}

0.1041

Load Factor for Maint. Load Cases (Basic Wind Speed=30 mph)

Design Ice Thickness, t_i

0.75

inches

Table 2-3 Importance Factors

Structure Classification	Wind Load Without Ice	Wind Load With Ice	Ice Thickness	Earthquake
II	1	1	1	1

1

Table 2-4 Exposure Category Coefficients

Exposure Category	Zg	α	Kzmin	Ke	m
B	1200	7	0.7	0.9	0.55

Table 2-5 Topographic Categories

Kzt1.000

Table 2-2 Wind Directionality Factor, Kd

Structure Type	Kd
1	0.95
Lattice Tower	DOES NOT CHANGE

Gust Effect Factor Gh

Structure Type	Gh
1	1.00
Lattice Tower	DOES NOT CHANGE

Shielding Factor, Ka

Structure Type	Ka
	0.90
Lattice Tower	DOES NOT CHANGE

Seismic Factors

Ss	0.825
S1	0.281
Fa	1.17
Fv	1.838
R	3

Truss or Pole

CLIENT: Foresite LLC

PROJECT: CT11410A

SUBJECT: Antenna Loads -TIA 222 G Standard (chapter 16 revisions)

Rad Center210.00ft

Antenna AND Mount Without Ice

Antenna AND Mount Without Ice																	Pounds							
Mounting Pole	Height (ft)	Model Number	#	Weight (lbs)	H (in)	*W (in)	D (in)	Ka	**A _N (ft2)	***A _T (ft2)	Aspect (FRONT)	Aspect (SIDE)	Ca (FRONT)	Ca (SIDE)	K _z	q _z (psf)	Wind Load (Front)	Wind Load (Side)	Dead Load	Total Wind Load (Front)	Total Wind Load (Side)	Total Dead Load	Lateral Load (Seismic)	Vertical Load (Seismic)
Pos. 1 Upper Mount	210.00	Ericsson AIR6449 B41	1	103.0	33.1	20.5	8.3	0.90	4.71	1.91	1.61	3.99	1.20	1.27	1.222	25.7	130.8	55.9	103	131	56	103	10	13
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	-	0.0	0.0	0				
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	-	0.0	0.0	0				
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	-	0.0	0.0	0				
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	-	0.0	0.0	0				
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	-	0.0	0.0	0				
Pos. 2 Upper Mount	210.00	Ericsson AIR32 B66A/B2A	1	132.0	56.6	12.9	8.7	0.90	5.07	3.42	4.39	6.51	1.28	1.38	1.222	25.7	150.5	109.0	132	151	109	132	13	17
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	-	0.0	0.0	0				
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	-	0.0	0.0	0				
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	-	0.0	0.0	0				
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	-	0.0	0.0	0				
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	-	0.0	0.0	0				
Pos.3 Lower Mount	210.00	RFS APXVAALL24_43-U-NA20	1	153.3	95.9	24.0	8.7	0.90	15.98	5.79	4.00	11.02	1.27	1.53	1.222	25.7	468.1	205.5	153.3	468	325	295	29	38
		TMA - Generic Twin Sytle 1B - AWS	1	12.0	7.7	N/A	7.5	0.90	-	0.40	-	1.03	-	1.20	1.222	25.7	0.0	11.1	12					
		Radio 4480 B71+B85	1	84.0	21.8	N/A	15.7	0.90	-	2.38	-	1.39	-	1.20	1.222	25.7	0.0	66.0	84					
		Radio 4415 B25	1	46.0	16.5	N/A	13.4	0.90	-	1.54	-	1.23	-	1.20	1.222	25.7	0.0	42.6	46					
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	-	0.0	0.0	0				
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	-	0.0	0.0	0				
Pos. 3-4 (Upper) Pos. 1,2,4 (Lower) Empty		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0	0	0	0	0	0
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0					
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0					
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0					
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0					
		Empty		0.0	-	-	-	0.90	-	-	-	-	-	-	-	-	0.0	0.0	0					
																	66	28	52	5	7			
																	76	55	66	6	8			
																	235	163	148	14	19			
																	0	0	0	0	0			
																	0	0	0	0	0			

* Enter N/A in the W column for front shielded appurtenances.

** A_N is the product of H and W

*** A_T is the product of H and D

DL530

Mount	Height (ft)	Member	*L (in)	**W (in)	D (in)	Weight (lb/ft)	*** Ca	K _z	q _z (psf)	Wind Load (PLF)	Lateral Load (Seismic)	Vertical Load (Seismic)
	210.00	5/8" SR	12.00	0.63	0.00		1.20	1.222	23.1	1	-	-
	210.00	3/4" SR	12.00	0.75	0.00		1.20	1.222	23.1	2	-	-
	210.00	2.0 STD Pipe	12.00	2.38	0.00		1.20	1.222	23.1	5	-	-
	210.00	2.5 STD Pipe	12.00	2.88	0.00		1.20	1.222	23.1	7	-	-
	210.00	Single Angle	0.00	0.00	0.00		-	-	-	-	-	-
	210.00	Single Angle	0.00	0.00	0.00		-	-	-	-	-	-
	210.00	Single Angle	0.00	0.00	0.00		-	-	-	-	-	-
	210.00	Single Angle	0.00	0.00	0.00		-	-	-	-	-	-
	210.00	Plate Horizontal (P3.5x0.625)	12.00	0.63	3.50		2.00	1.222	23.1	2	-	-
	210.00	Plate Horizontal	0.00	0.00	0.00		-	-	-	-	-	-
	210.00	Tube Horizontal	0.00	0.00	0.00		-	-	-	-	-	-
	210.00	Double Angle	0.00	0.00	0.00		-	-	-	-	-	-
	210.00	Double Angle	0.00	0.00	0.00		-	-	-	-	-	-
	210.00	Channel (Weak Axis Bending)	0.00	0.00	0.00		-	-	-	-	-	-
	210.00	Channel (Weak Axis Bending)	0.00	0.00	0.00		-	-	-	-	-	-
							-	-	-	-	-	-

* The dimension L is the longest dimension of the member

** The dimension W is the height or width of the member that resists wind load

*** Ca will equal 1.2 for round members and 2.0 for flat members

CLIENT: Foresite LLC

PROJECT: CT11410A

SUBJECT: Antenna Loads -TIA 222 G Standard (chapter 16 revisions)

Antenna AND Mount With Ice																Pounds									
Mounting Pole	Height (ft)	Model Number	#	H (in)	W (in)	D (in)	Ka	*A _N (ft2)	*A _T (ft2)	*Volume Ice (ft3)	*Weight Ice (lbs)	**Ca (FRONT)	**Ca (SIDE)	Kz	q _z (psf)	Ice Wind Load (Front)	Ice Wind Load (Side)	Combined Wind Load (Front)	Combined Wind Load (Side)	Ice Dead Load	**Total Wind Load (Front)	**Total Wind Load (Side)	Total Ice Load		
Pos. 1 Upper Mount	210.00	Ericsson AIR6449 B41	1	33.1	20.5	8.3	0.90	1.43	1.13	2.84	159.09	0.70	0.71	1.222	7.4	6.7	5.4	44.5	21.5	159	45	22	159		
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0					
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0					
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0					
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0					
Pos. 2 Upper Mount	210.00	Ericsson AIR32 B66A/B2A	1	56.6	12.9	8.7	0.90	1.83	1.73	3.41	190.70	0.73	0.75	1.222	7.4	8.9	8.7	52.4	40.2	191	23	11	80		
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	52	40	191		
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0					
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0					
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0					
Pos.3 Lower Mount	210.00	RFS APXVAALL24_43-U-NA20	1	95.9	24.0	8.7	0.90	3.10	2.71	7.98	447.12	0.72	0.82	1.222	7.4	15.0	14.9	150.3	74.4	447	27	21	96		
		TMA - Generic Twin Sytle 1B - AWS	1	7.7	3.4	7.5	0.90	-	0.47	0.40	22.18	0.70	0.70	1.222	7.4	0.0	2.2	0.0	5.4	22	150	120	626		
		Radio 4480 B71+B85	1	21.8	7.5	15.7	0.90	-	1.03	1.67	93.47	0.70	0.70	1.222	7.4	0.0	4.8	0.0	23.9	93					
		Radio 4415 B25	1	16.5	5.9	13.4	0.90	-	0.84	1.13	63.15	0.70	0.70	1.222	7.4	0.0	3.9	0.0	16.2	63					
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0					
Pos. 3-4 (Upper) Pos. 1,2,4 (Lower) Empty		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0	0	0	0		
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0					
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0					
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0					
		Empty		-	-	-	0.90	-	-	-	0.00	-	-	-	-	0.0	0.0	0.0	0.0	0					

* A_N ,A_T, Volume Ice and Weight Ice are calculated per unit

** Ca will equal 1.2 for all ice load calculations

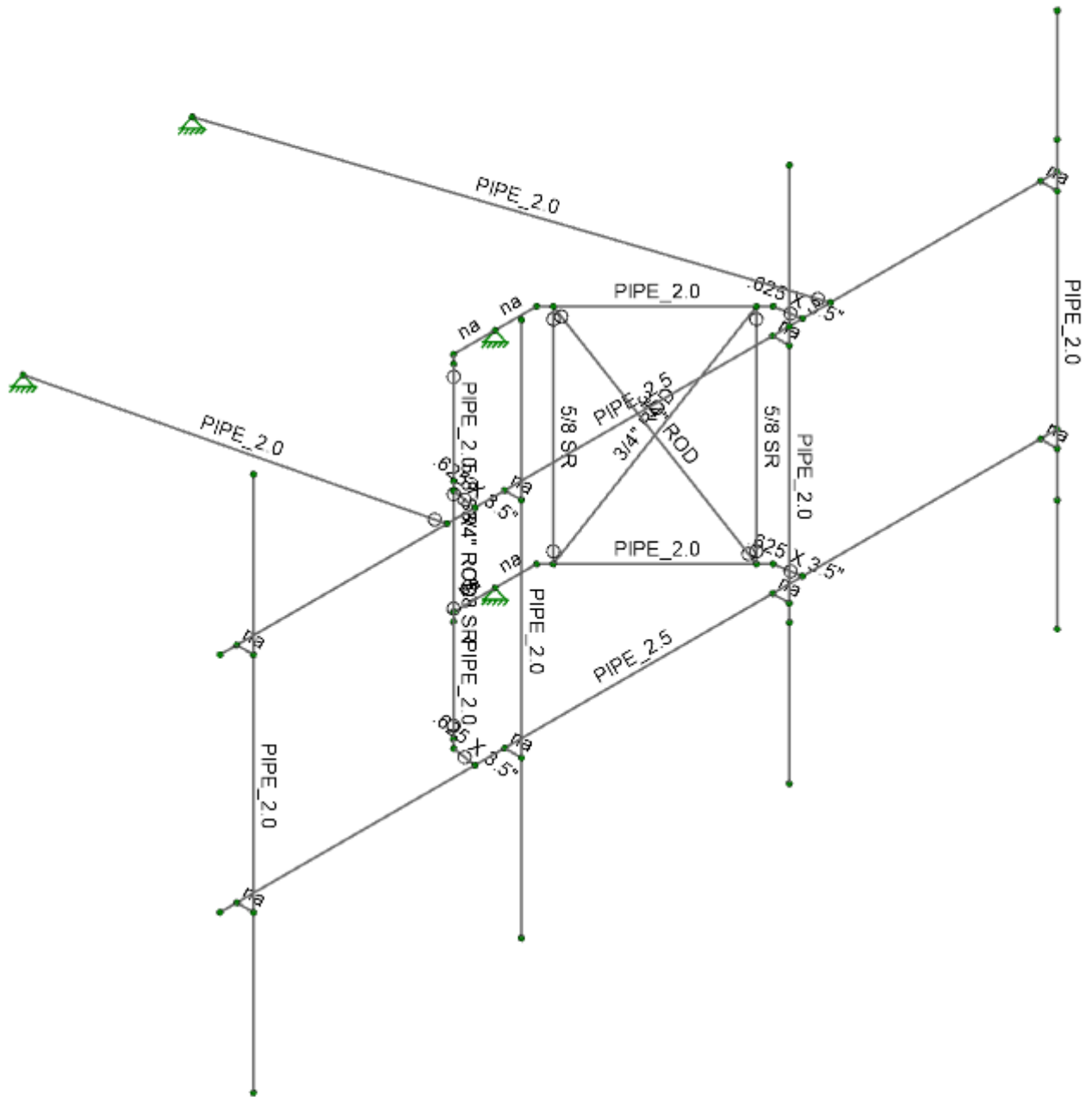
Mount	Height (ft)	Member	*L (in)	**W (in)	D (in)	***A _N (ft2)	Volume Ice (ft3)	Weight Ice (lbs)	****Ca (FRONT)	Kz	q _z (psf)	PLF		
												Ice Wind Load (Front)	Combined Wind Load (Front)	Ice Dead Load
	210.00	5/8" SR	12.00	0.63	0.00	0.41	0.10	5.36	1.20	1.222	6.7	3.3	3.7	5
	210.00	3/4" SR	12.00	0.75	0.00	0.41	0.10	5.63	1.20	1.222	6.7	3.3	3.8	6
	210.00	2.0 STD Pipe	12.00	2.38	0.00	0.45	0.16	9.22	1.20	1.222	6.7	3.6	5.2	9
	210.00	2.5 STD Pipe	12.00	2.88	0.00	0.46	0.18	10.32	1.20	1.222	6.7	3.7	5.6	10
	210.00	Single Angle	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-
	210.00	Single Angle	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-
	210.00	Single Angle	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-
	210.00	Plate Horizontal (P3.5x0.625)	12.00	0.63	3.50	0.41	0.26	14.38	1.20	1.222	6.7	3.3	4.0	14
	210.00	Plate Horizontal	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-
	210.00	Tube Horizontal	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-
	210.00	Double Angle	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-
	210.00	Double Angle	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-
	210.00	Channel (Weak Axis Bending)	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-
	210.00	Channel (Weak Axis Bending)	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-
	210.00	Channel (Weak Axis Bending)	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-
	210.00	Channel (Weak Axis Bending)	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-
	210.00	Channel (Weak Axis Bending)	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-
	210.00	Channel (Weak Axis Bending)	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-
	210.00	Channel (Weak Axis Bending)	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-

* The dimension L is the longest dimension of the member

** The dimension W is the height or width of the member that resists wind load

*** A_N is the area of ice built up on the LW plane

**** Ca will equal 1.2 for all ice load calculations



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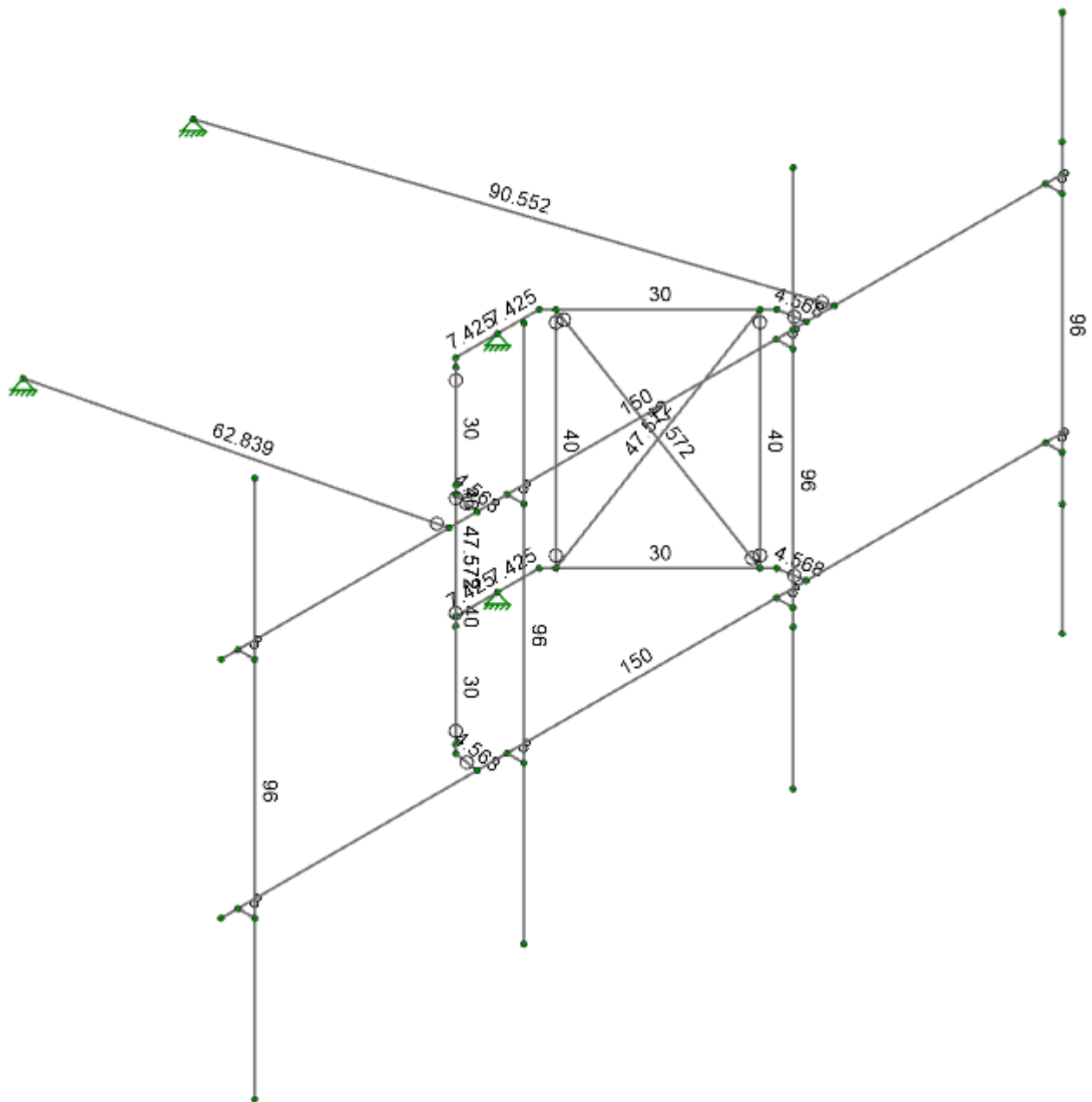
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CT11410A - 210' RAD Center

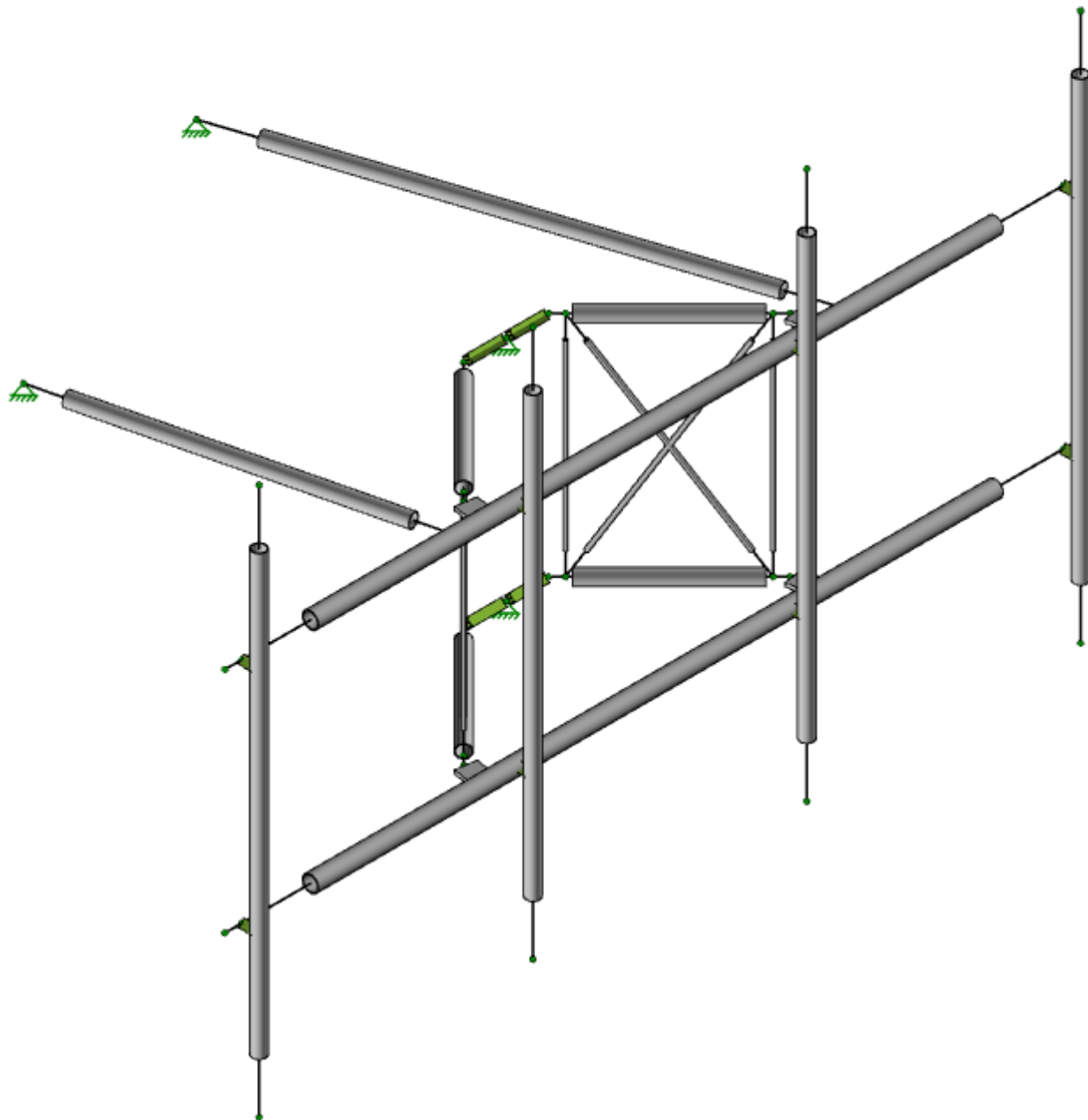
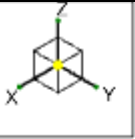
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Member Length (in) Displayed
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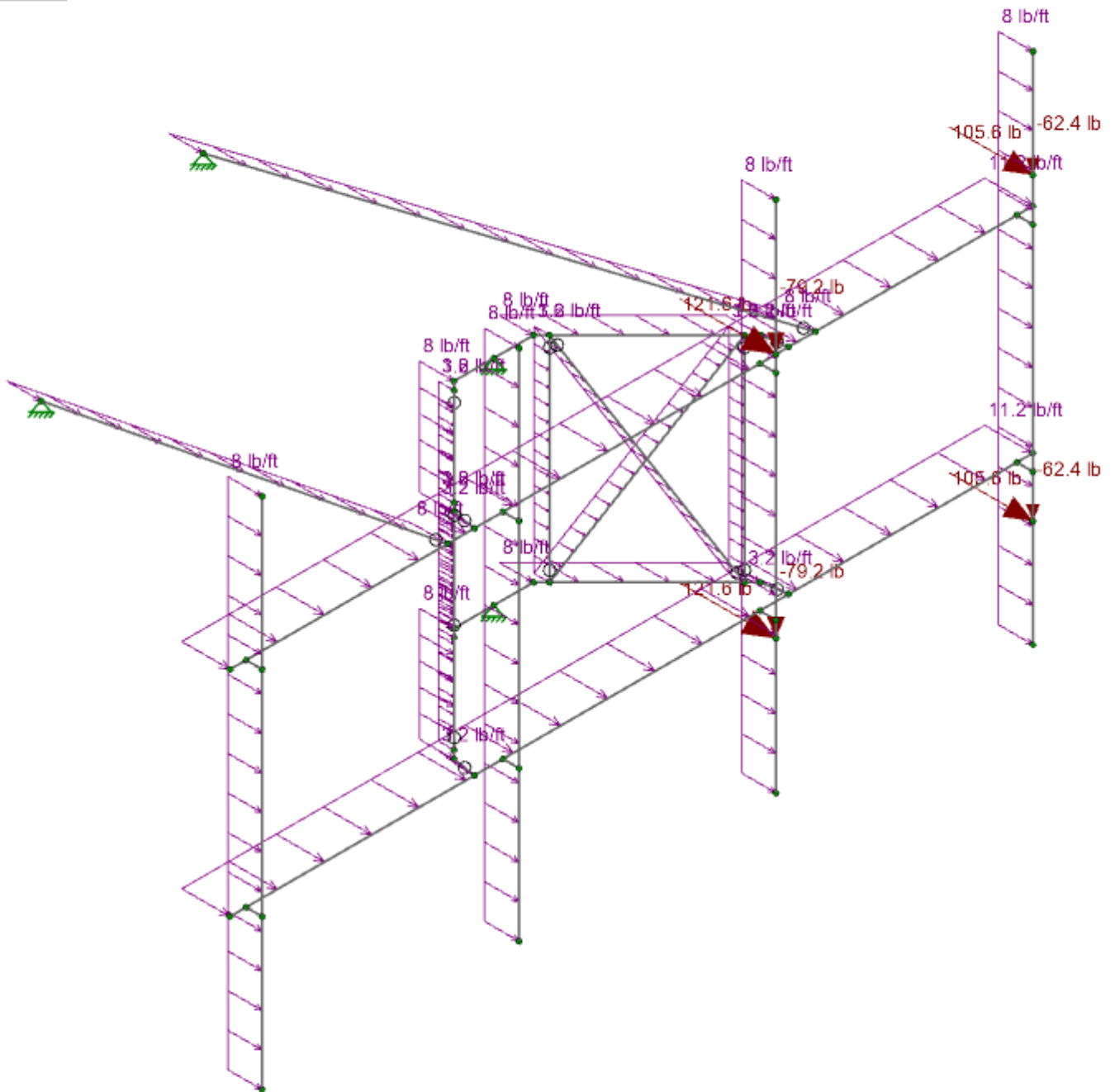
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CT11410A - 210' RAD Center

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CT11410A - VFA12-HD - 210'.r3d



Loads: LC 1, DL + WL (NO ICE) 0 Degree
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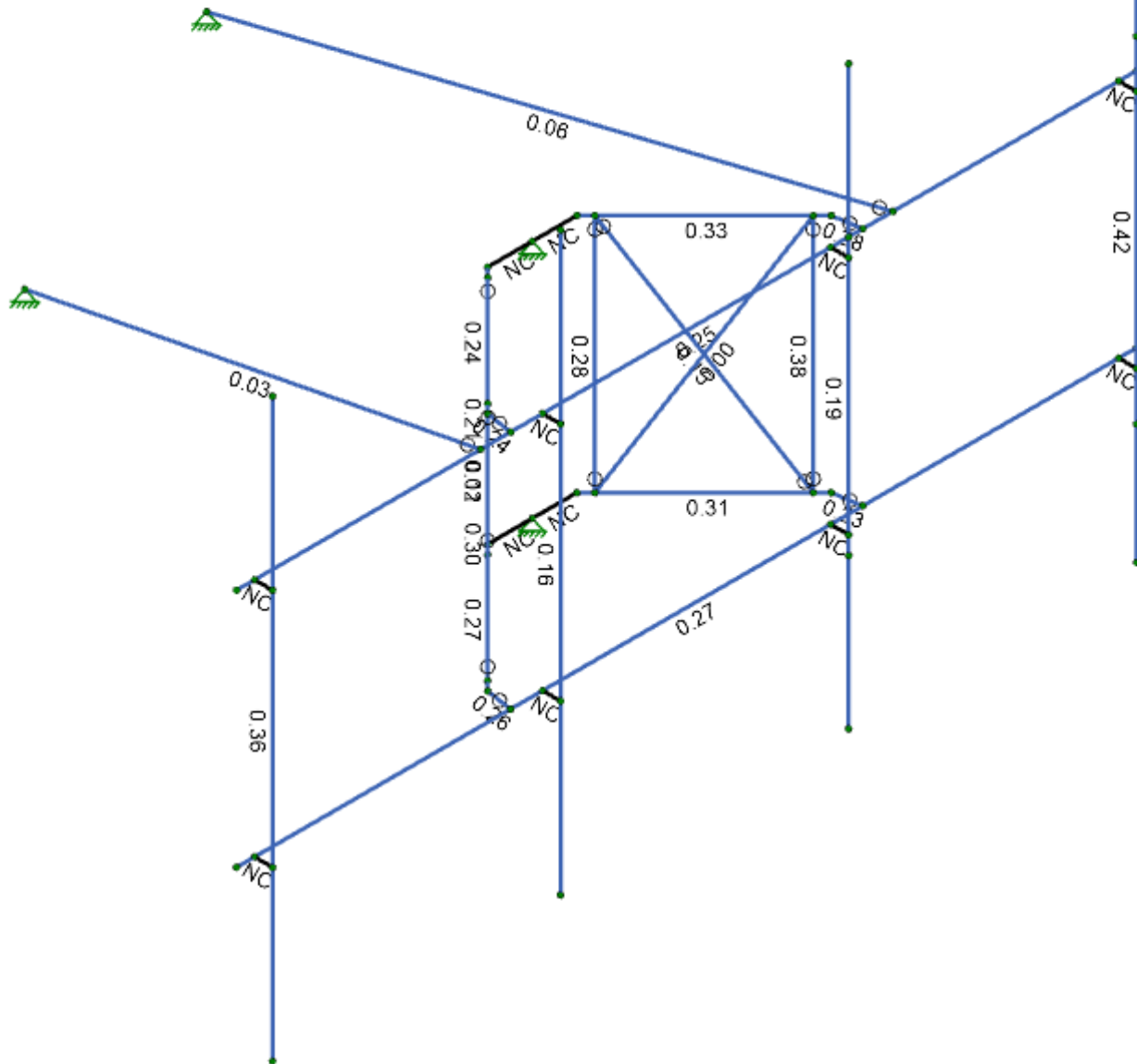
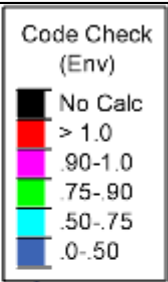
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Member Code Checks Displayed (Enveloped)
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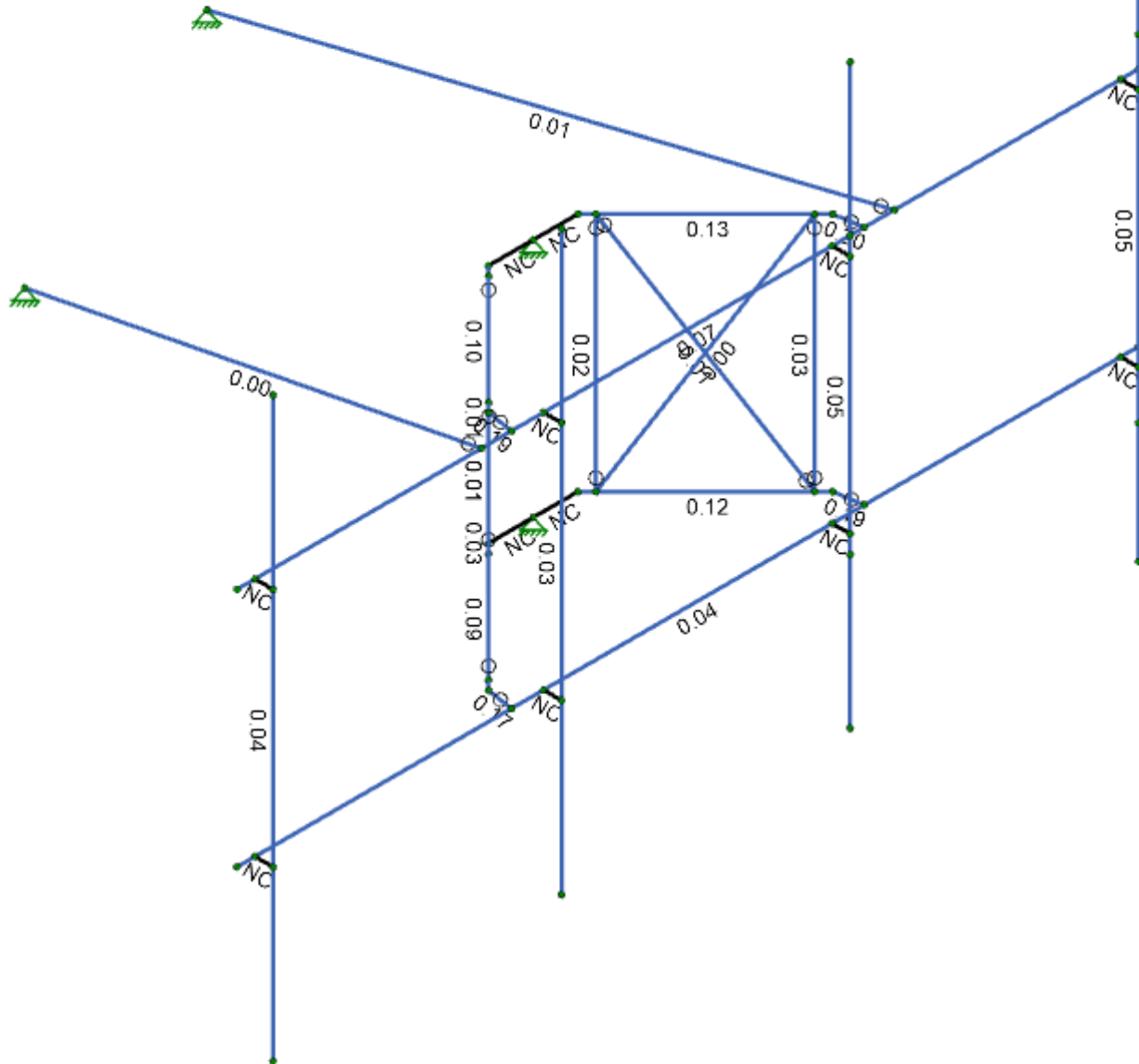
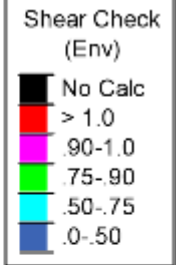
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CT11410A - 210' RAD Center

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CT11410A - VFA12-HD - 210'.r3d



Member Shear Checks Displayed (Enveloped)
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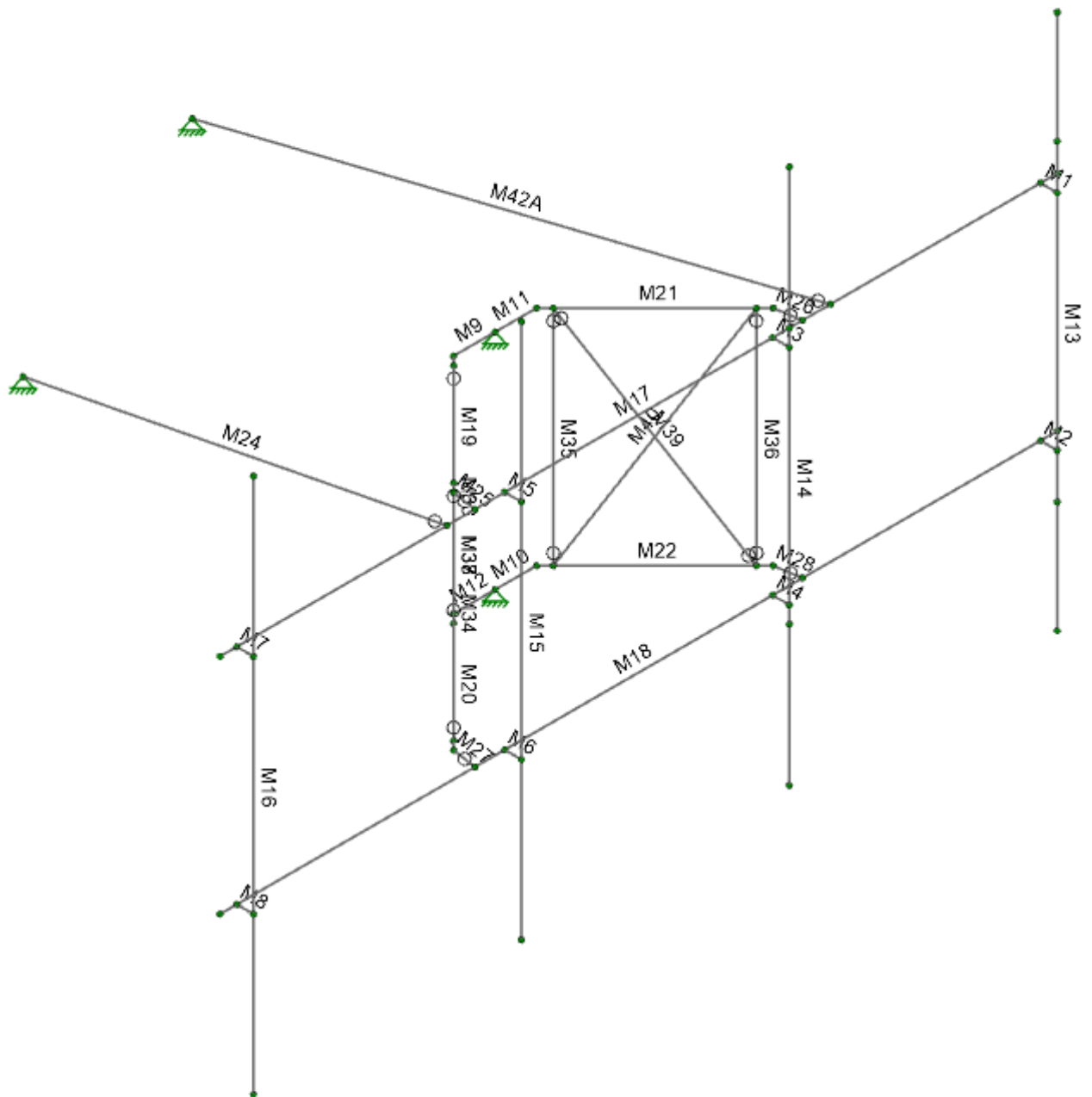
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CT11410A - 210' RAD Center

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CT11410A - VFA12-HD - 210'.r3d



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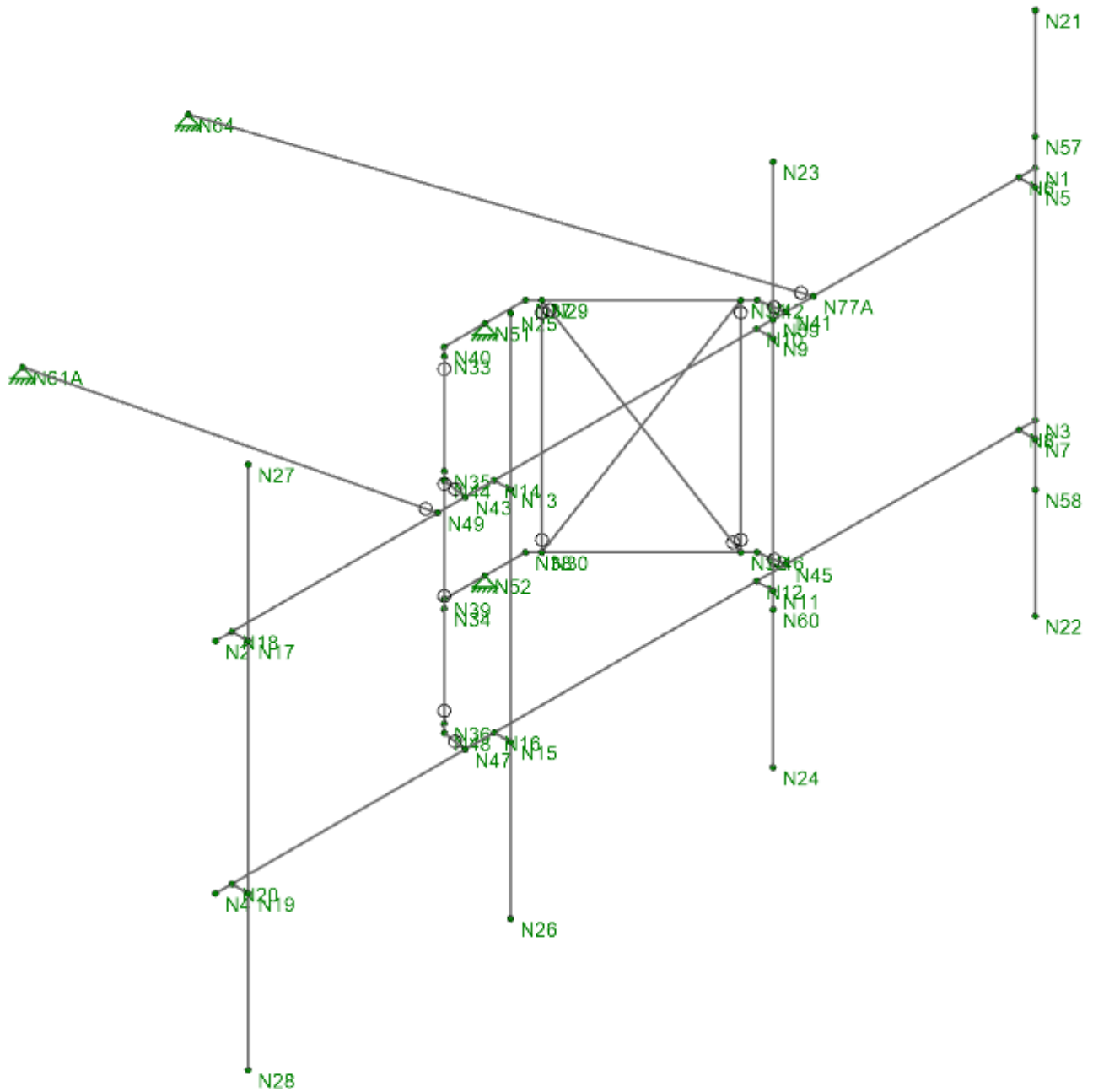
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CT11410A - 210' RAD Center

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CT11410A - 210' RAD Center

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May 28, 2021

CT11410A - VFA12-HD - 210'.r3d

Model Settings

Number of Reported Sections	5
Number of Internal Sections	97
Member Area Load Mesh Size (in ²)	144
Consider Shear Deformation	Yes
Consider Torsional Warping	Yes
Approximate Mesh Size (in)	12
Transfer Forces Between Intersecting Wood Walls	No
Increase Wood Wall Nailing Capacity for Wind Loads	Yes
Include P-Delta for Walls	Yes
Optimize Masonry and Wood Walls	Yes
Maximum Number of Iterations	3
Single	No
Multiple (Optimum)	Yes
Maximum	No
Global Axis corresponding to vertical direction	Z
Convert Existing Data	Yes
Default Global Plane for z-axis	XZ
Plate Local Axis Orientation	Nodal
Hot Rolled Steel	AISC 14th (360-10): LRFD
Stiffness Adjustment	Yes (Iterative)
Notional Annex	None
Connections	AISC 14th (360-10): LRFD
Cold Formed Steel	AISI NAS-01: ASD
Stiffness Adjustment	Yes (Iterative)
Wood	AF&PA NDS-05/08: ASD
Temperature	< 100F
Concrete	ACI 318-05
Masonry	ACI 530-05: ASD
Aluminum	AA ADM1-05: ASD
Structure Type	Building
Stiffness Adjustment	Yes (Iterative)
Stainless	AISC 14th (360-10): ASD
Stiffness Adjustment	Yes (Iterative)
Analysis Methodology	Exact Integration Method
Paralle Beta Factor	0.65
Compression Stress Block	Rectangular Stress Block
Analyze using Cracked Sections	Yes
Leave room for horizontal rebar splices (2*d bar spacing)	No
List forces which were ignored for design in the Detail Report	Yes
Column Min Steel	1
Column Max Steel	8
Rebar Material Spec	ASTM A615
Warn if beam-column framing arrangement is not understood	No
Number of Shear Regions	4
Region 2 & 3 Spacing Increase Increment (in)	4
Code	ASCE 7-05

Model Settings (Continued)

Risk Category	I
Drift Cat	Other
Base Elevation (ft)	-999999
Include the weight of the structure in base shear calcs	Yes

$S_x(g)$	1
$SD_x(g)$	1
$SD_y(g)$	1
$T_x(sec)$	-1

$T(sec)$	
$T(sec)$	
C_r	0.035
C_r	0.035
$C_{Exp.}$	0.75
$C_{Exp.}$	0.75
R	8.5
R	8.5
Ω_x	1
Ω_y	1
C_w	4
C_w	4
ρ	1
ρ	1

Line Project Grid

No Data to Print...

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. C...	Density [k...	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.2
3	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.2
4	A500 Gr.42	29000	11154	0.3	0.65	0.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	0.3	0.65	0.49	46	1.2	58	1.1
6	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.5	60	1.2
7	A529 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.2

Cold Formed Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff...	Density [k/ft³]	Yield [ksi]	Fu [ksi]
1	A570_33	29500	11346	0.3	0.65	0.49	33	52
2	A607_C1_55	29500	11346	0.3	0.65	0.49	55	70

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	HR1A	C15X50	Beam	None	A36 Gr.36	Typical	14.7	11	404	2.65

Cold Formed Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	CF1A	1.5CU1.2...	Beam	None	A570_33	Typical	0.131	0.022	0.052	5.4e-05

Primary Member Properties

	Label	I Node	J Node	K Node	Rotate(deg)	Section/S...	Type	Design List	Material	Design Rule
1	M12	N52	N39			RIGID	None	None	LINK	Typical
2	M11	N51	N37			RIGID	None	None	LINK	Typical
3	M10	N38	N52			RIGID	None	None	LINK	Typical
4	M9	N40	N51			RIGID	None	None	LINK	Typical
5	M8	N19	N20			RIGID	None	None	LINK	Typical
6	M7	N17	N18			RIGID	None	None	LINK	Typical
7	M6	N15	N16			RIGID	None	None	LINK	Typical
8	M5	N13	N14			RIGID	None	None	LINK	Typical
9	M4	N11	N12			RIGID	None	None	LINK	Typical
10	M3	N9	N10			RIGID	None	None	LINK	Typical
11	M2	N7	N8			RIGID	None	None	LINK	Typical
12	M1	N5	N6			RIGID	None	None	LINK	Typical
13	M18	N3	N4			PIPE_2.5	Beam	None	A53 Gr.B	Typical
14	M17	N1	N2			PIPE_2.5	Beam	None	A53 Gr.B	Typical
15	M24	N49	N61A			PIPE_2.0	Beam	None	A53 Gr.B	Typical
16	M22	N38	N46			PIPE_2.0	Beam	None	A53 Gr.B	Typical
17	M21	N37	N42			PIPE_2.0	Beam	None	A53 Gr.B	Typical
18	M20	N39	N48			PIPE_2.0	Beam	None	A53 Gr.B	Typical
19	M19	N40	N44			PIPE_2.0	Beam	None	A53 Gr.B	Typical
20	M16	N27	N28			PIPE_2.0	Beam	None	A53 Gr.B	Typical
21	M15	N25	N26			PIPE_2.0	Beam	None	A53 Gr.B	Typical
22	M14	N23	N24			PIPE_2.0	Beam	None	A53 Gr.B	Typical
23	M13	N21	N22			PIPE_2.0	Beam	None	A53 Gr.B	Typical
24	M42A	N77A	N64			PIPE_2.0	Beam	None	A53 Gr.B	Typical
25	M36	N31	N32			5/8 SR	Beam	None	A36 Gr.36	Typical
26	M35	N29	N30			5/8 SR	Beam	None	A36 Gr.36	Typical
27	M34	N35	N36			5/8 SR	Beam	None	A36 Gr.36	Typical
28	M33	N33	N34			5/8 SR	Beam	None	A36 Gr.36	Typical
29	M40	N31	N30			3/4" ROD	Beam	None	A36 Gr.36	Typical
30	M39	N29	N32			3/4" ROD	Beam	None	A36 Gr.36	Typical

Primary Member Properties (Continued)

	Label	I Node	J Node	K Node	Rotate(deg)	Section/S...	Type	Design List	Material	Design Rule
31	M38	N33	N36			3/4" ROD	Beam	None	A36 Gr.36	Typical
32	M37	N35	N34			3/4" ROD	Beam	None	A36 Gr.36	Typical
33	M28	N46	N45			.625 X 3.5"	None	None	A36 Gr.36	Typical
34	M27	N48	N47			.625 X 3.5"	None	None	A36 Gr.36	Typical
35	M26	N42	N41			.625 X 3.5"	None	None	A36 Gr.36	Typical
36	M25	N44	N43			.625 X 3.5"	None	None	A36 Gr.36	Typical

Advanced Member Properties

	Label	I Release	J Release	I Offset [in]	J Offset [in]	T/C Only	Physical	Deflectio...	Analysis...	Activation	Seismic...
1	M12						Yes	** NA **			None
2	M11						Yes	** NA **			None
3	M10						Yes	** NA **			None
4	M9						Yes	** NA **			None
5	M8						Yes	** NA **			None
6	M7						Yes	** NA **			None
7	M6						Yes	** NA **			None
8	M5						Yes	** NA **			None
9	M4						Yes	** NA **			None
10	M3						Yes	** NA **			None
11	M2						Yes	** NA **			None
12	M1						Yes	** NA **			None
13	M18						Yes				None
14	M17						Yes				None
15	M24	BenPIN					Yes				None
16	M22						Yes				None
17	M21						Yes				None
18	M20						Yes				None
19	M19						Yes				None
20	M16						Yes				None
21	M15						Yes				None
22	M14						Yes				None
23	M13						Yes				None
24	M42A	BenPIN					Yes				None
25	M36	BenPIN	BenPIN				Yes				None
26	M35	BenPIN	BenPIN				Yes				None
27	M34	BenPIN	BenPIN				Yes				None
28	M33	BenPIN	BenPIN				Yes				None
29	M40					Tension...	Yes				None
30	M39	BenPIN	BenPIN				Yes				None
31	M38	BenPIN	BenPIN				Yes				None
32	M37					Tension...	Yes				None
33	M28		BenPIN				Yes	** NA **			None
34	M27		BenPIN				Yes	** NA **			None
35	M26		BenPIN				Yes	** NA **			None
36	M25		BenPIN				Yes	** NA **			None

Hot Rolled Member Properties

	Label	Shape	Length [in]	Lb y-y [in]	Lb z-z [in]	Lcomp t...	Lcomp...	L-Torqu...	K y-y	K z-z	Cb	Function
1	M18	PIPE_2.5	150									Lateral
2	M17	PIPE_2.5	150									Lateral
3	M24	PIPE_2.0	62.839									Lateral
4	M22	PIPE_2.0	30									Lateral
5	M21	PIPE_2.0	30									Lateral
6	M20	PIPE_2.0	30									Lateral
7	M19	PIPE_2.0	30									Lateral
8	M16	PIPE_2.0	96									Lateral
9	M15	PIPE_2.0	96									Lateral

Hot Rolled Member Properties (Continued)

	Label	Shape	Length [in]	Lb y-y [in]	Lb z-z [in]	Lcomp t...	Lcomp...	L-Torqu...	K y-y	K z-z	Cb	Function
10	M14	PIPE 2.0	96									Lateral
11	M13	PIPE 2.0	96									Lateral
12	M42A	PIPE 2.0	90.552									Lateral
13	M36	5/8 SR	40	33.62	33.62				0.7	0.7		Lateral
14	M35	5/8 SR	40	33.62	33.62				0.7	0.7		Lateral
15	M34	5/8 SR	40	33.62	33.62				0.7	0.7		Lateral
16	M33	5/8 SR	40	33.62	33.62				0.7	0.7		Lateral
17	M40	3/4" ROD	47.572									Lateral
18	M39	3/4" ROD	47.572						0.7	0.7		Lateral
19	M38	3/4" ROD	47.572						0.7	0.7		Lateral
20	M37	3/4" ROD	47.572									Lateral
21	M28	.625 X...	4.568									Lateral
22	M27	.625 X...	4.568									Lateral
23	M26	.625 X...	4.568									Lateral
24	M25	.625 X...	4.568									Lateral

Cold Formed Member Properties

No Data to Print...

Nodes

	Label	X [in]	Y [in]	Z [in]	Temp [deg F]	Detach From Dia...
1	N1	-75	0	40		
2	N2	75	0	40		
3	N3	-75	0	0		
4	N4	75	0	0		
5	N5	-72	3	40		
6	N6	-72	0	40		
7	N7	-72	3	0		
8	N8	-72	0	0		
9	N9	-24	3	40		
10	N10	-24	0	40		
11	N11	-24	3	0		
12	N12	-24	0	0		
13	N13	24	3	40		
14	N14	24	0	40		
15	N15	24	3	0		
16	N16	24	0	0		
17	N17	72	3	40		
18	N18	72	0	40		
19	N19	72	3	0		
20	N20	72	0	0		
21	N21	-72	3	68		
22	N22	-72	3	-28		
23	N23	-24	3	68		
24	N24	-24	3	-28		
25	N25	24	3	68		
26	N26	24	3	-28		
27	N27	72	3	68		
28	N28	72	3	-28		
29	N29	-8.927223	-24.223102	40		
30	N30	-8.927223	-24.223102	0		
31	N31	-27.135223	-6.015102	40		
32	N32	-27.135223	-6.015102	0		
33	N33	8.927223	-24.223102	40		
34	N34	8.927223	-24.223102	0		
35	N35	27.135223	-6.015102	40		
36	N36	27.135223	-6.015102	0		

Nodes (Continued)

	Label	X [in]	Y [in]	Z [in]	Temp [deg F]	Detach From Dia...
37	N37	-7.424621	-25.725704	40		
38	N38	-7.424621	-25.725704	0		
39	N39	7.424621	-25.725704	0		
40	N40	7.424621	-25.725704	40		
41	N41	-29.35	0	40		
42	N42	-28.637825	-4.5125	40		
43	N43	29.35	0	40		
44	N44	28.637825	-4.5125	40		
45	N45	-29.35	0	-0.		
46	N46	-28.637825	-4.5125	0		
47	N47	29.35	0	0.		
48	N48	28.637825	-4.5125	0		
49	N49	34.35	0	39.999996		
50	N51	0	-25.725704	40		
51	N52	0	-25.725704	0		
52	N77A	-34.35	0	39.999996		
53	N64	-6	-86	39.999998		
54	N57	-72	3	48		
55	N58	-72	3	-8		
56	N59	-24	3	43		
57	N60	-24	3	-3		
58	N61A	49.199072	-61.059004	40		

Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot [k-ft/rad]	Y Rot [k-ft/rad]	Z Rot [k-ft/rad]
1	N51	Reaction	Reaction	Reaction			
2	N52	Reaction	Reaction	Reaction			
3	N64	Reaction	Reaction	Reaction			
4	N61A	Reaction	Reaction	Reaction			

Basic Load Cases

	BLC Desc...	Category	X Gravity	Y Gravity	Z Gravity	Nodal	Point	Distributed	Area(Me...	Surface(P...
1	DEAD LO...	None			-1	4				
2	DEAD LO...	None				4		24		
3	WIND LO...	None				4		24		
4	WIND LO...	None				4		24		
5	WIND LO...	None				4		24		
6	WIND LO...	None				4		24		
7	LIVE LOA...	None				1				
8	LIVE LOA...	None				1				
9	LIVE LOA...	None								
10	MAINTEN...	None				1				
11	MAINTEN...	None				1				
12	MAINTEN...	None				1				
13	MAINTEN...	None				1				

Node Loads and Enforced Displacements (BLC 1 : DEAD LOAD)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), ...]	Inactive [(lb, k-ft), (in, ...)]
1	N57	L	Z	-52	Active
2	N58	L	Z	-52	Active
3	N60	L	Z	-66	Active
4	N59	L	Z	-66	Active

Node Loads and Enforced Displacements (BLC 2 : DEAD LOAD ICE)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft),...]	Inactive [(lb, k-ft), (in,...)]
1	N57	L	Z	-80	Active
2	N58	L	Z	-80	Active
3	N60	L	Z	-96	Active
4	N59	L	Z	-96	Active

Node Loads and Enforced Displacements (BLC 3 : WIND LOAD (NO ICE) FRONT)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft),...]	Inactive [(lb, k-ft), (in,...)]
1	N57	L	Y	66	Active
2	N58	L	Y	66	Active
3	N60	L	Y	76	Active
4	N59	L	Y	76	Active

Node Loads and Enforced Displacements (BLC 4 : WIND LOAD (NO ICE) SIDE)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft),...]	Inactive [(lb, k-ft), (in,...)]
1	N57	L	X	28	Active
2	N58	L	X	28	Active
3	N60	L	X	55	Active
4	N59	L	X	55	Active

Node Loads and Enforced Displacements (BLC 5 : WIND LOAD (ICE) FRONT)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft),...]	Inactive [(lb, k-ft), (in,...)]
1	N57	L	Y	23	Active
2	N58	L	Y	23	Active
3	N60	L	Y	27	Active
4	N59	L	Y	27	Active

Node Loads and Enforced Displacements (BLC 6 : WIND LOAD (ICE) SIDE)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft),...]	Inactive [(lb, k-ft), (in,...)]
1	N57	L	X	11	Active
2	N58	L	X	11	Active
3	N60	L	X	21	Active
4	N59	L	X	21	Active

Node Loads and Enforced Displacements (BLC 7 : LIVE LOAD1)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft),...]	Inactive [(lb, k-ft), (in,...)]
1	N3	L	Z	-250	Active

Node Loads and Enforced Displacements (BLC 8 : LIVE LOAD2)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft),...]	Inactive [(lb, k-ft), (in,...)]
1	N4	L	Z	-250	Active

Node Loads and Enforced Displacements (BLC 10 : MAINTENANCE LOAD 1)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft),...]	Inactive [(lb, k-ft), (in,...)]
1	N22	L	Z	-500	Active

Node Loads and Enforced Displacements (BLC 11 : MAINTENANCE LOAD 2)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft),...]	Inactive [(lb, k-ft), (in,...)]
1	N24	L	Z	-500	Active

Node Loads and Enforced Displacements (BLC 12 : MAINTENANCE LOAD 3)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft),...]	Inactive [(lb, k-ft), (in,...)]
1	N26	L	Z	-500	Active

Node Loads and Enforced Displacements (BLC 13 : MAINTENANCE LOAD 4)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft),...]	Inactive [(lb, k-ft), (in,...)]
1	N28	L	Z	-500	Active

Member Distributed Loads (BLC 2 : DEAD LOAD ICE)

	Member Label	Direction	Start Magnitud...	End Magnitude...	Start Location [...]	End Location [(...]	Inactive [(lb, k-...
1	M18	Z	-10	-10	0	%100	Active
2	M17	Z	-10	-10	0	%100	Active
3	M24	Z	-9	-9	0	%100	Active
4	M22	Z	-9	-9	0	%100	Active
5	M21	Z	-9	-9	0	%100	Active
6	M20	Z	-9	-9	0	%100	Active
7	M19	Z	-9	-9	0	%100	Active
8	M16	Z	-9	-9	0	%100	Active
9	M15	Z	-9	-9	0	%100	Active
10	M14	Z	-9	-9	0	%100	Active
11	M13	Z	-9	-9	0	%100	Active
12	M42A	Z	-9	-9	0	%100	Active
13	M36	Z	-5	-5	0	%100	Active
14	M35	Z	-5	-5	0	%100	Active
15	M34	Z	-5	-5	0	%100	Active
16	M33	Z	-5	-5	0	%100	Active
17	M40	Z	-6	-6	0	%100	Active
18	M39	Z	-6	-6	0	%100	Active
19	M38	Z	-6	-6	0	%100	Active
20	M37	Z	-6	-6	0	%100	Active
21	M28	Z	-14	-14	0	%100	Active
22	M27	Z	-14	-14	0	%100	Active
23	M26	Z	-14	-14	0	%100	Active
24	M25	Z	-14	-14	0	%100	Active

Member Distributed Loads (BLC 3 : WIND LOAD (NO ICE) FRONT)

	Member Label	Direction	Start Magnitud...	End Magnitude...	Start Location [...]	End Location [(...]	Inactive [(lb, k-...
1	M18	PY	7	7	0	%100	Active
2	M17	PY	7	7	0	%100	Active
3	M24	PY	5	5	0	%100	Active
4	M22	PY	5	5	0	%100	Active
5	M21	PY	5	5	0	%100	Active
6	M20	PY	5	5	0	%100	Active
7	M19	PY	5	5	0	%100	Active
8	M16	PY	5	5	0	%100	Active
9	M15	PY	5	5	0	%100	Active
10	M14	PY	5	5	0	%100	Active
11	M13	PY	5	5	0	%100	Active
12	M42A	PY	5	5	0	%100	Active
13	M36	PY	1	1	0	%100	Active
14	M35	PY	1	1	0	%100	Active
15	M34	PY	1	1	0	%100	Active
16	M33	PY	1	1	0	%100	Active
17	M40	PY	2	2	0	%100	Active
18	M39	PY	2	2	0	%100	Active
19	M38	PY	2	2	0	%100	Active
20	M37	PY	2	2	0	%100	Active
21	M28	PY	2	2	0	%100	Active
22	M27	PY	2	2	0	%100	Active
23	M26	PY	2	2	0	%100	Active
24	M25	PY	2	2	0	%100	Active

Member Distributed Loads (BLC 4 : WIND LOAD (NO ICE) SIDE)

	Member Label	Direction	Start Magnitud...	End Magnitude...	Start Location [...	End Location [...	Inactive [(lb, k-...
1	M18	PX	7	7	0	%100	Active
2	M17	PX	7	7	0	%100	Active
3	M24	PX	5	5	0	%100	Active
4	M22	PX	5	5	0	%100	Active
5	M21	PX	5	5	0	%100	Active
6	M20	PX	5	5	0	%100	Active
7	M19	PX	5	5	0	%100	Active
8	M16	PX	5	5	0	%100	Active
9	M15	PX	5	5	0	%100	Active
10	M14	PX	5	5	0	%100	Active
11	M13	PX	5	5	0	%100	Active
12	M42A	PX	5	5	0	%100	Active
13	M36	PX	1	1	0	%100	Active
14	M35	PX	1	1	0	%100	Active
15	M34	PX	1	1	0	%100	Active
16	M33	PX	1	1	0	%100	Active
17	M40	PX	2	2	0	%100	Active
18	M39	PX	2	2	0	%100	Active
19	M38	PX	2	2	0	%100	Active
20	M37	PX	2	2	0	%100	Active
21	M28	PX	2	2	0	%100	Active
22	M27	PX	2	2	0	%100	Active
23	M26	PX	2	2	0	%100	Active
24	M25	PX	2	2	0	%100	Active

Member Distributed Loads (BLC 5 : WIND LOAD (ICE) FRONT)

	Member Label	Direction	Start Magnitud...	End Magnitude...	Start Location [...	End Location [...	Inactive [(lb, k-...
1	M18	PY	5.6	5.6	0	%100	Active
2	M17	PY	5.6	5.6	0	%100	Active
3	M24	PY	5.2	5.2	0	%100	Active
4	M22	PY	5.2	5.2	0	%100	Active
5	M21	PY	5.2	5.2	0	%100	Active
6	M20	PY	5.2	5.2	0	%100	Active
7	M19	PY	5.2	5.2	0	%100	Active
8	M16	PY	5.2	5.2	0	%100	Active
9	M15	PY	5.2	5.2	0	%100	Active
10	M14	PY	5.2	5.2	0	%100	Active
11	M13	PY	5.2	5.2	0	%100	Active
12	M42A	PY	5.2	5.2	0	%100	Active
13	M36	PY	3.7	3.7	0	%100	Active
14	M35	PY	3.7	3.7	0	%100	Active
15	M34	PY	3.7	3.7	0	%100	Active
16	M33	PY	3.7	3.7	0	%100	Active
17	M40	PY	3.8	3.8	0	%100	Active
18	M39	PY	3.8	3.8	0	%100	Active
19	M38	PY	3.8	3.8	0	%100	Active
20	M37	PY	3.8	3.8	0	%100	Active
21	M28	PY	4	4	0	%100	Active
22	M27	PY	4	4	0	%100	Active
23	M26	PY	4	4	0	%100	Active
24	M25	PY	4	4	0	%100	Active

Member Distributed Loads (BLC 6 : WIND LOAD (ICE) SIDE)

	Member Label	Direction	Start Magnitud...	End Magnitude...	Start Location [...	End Location [...	Inactive [(lb, k-...
1	M18	PX	5.6	5.6	0	%100	Active
2	M17	PX	5.6	5.6	0	%100	Active
3	M24	PX	5.2	5.2	0	%100	Active

Member Distributed Loads (BLC 6 : WIND LOAD (ICE) SIDE) (Continued)

	Member Label	Direction	Start Magnitud...	End Magnitude...	Start Location [...]	End Location [...]	Inactive [(lb, k-...
4	M22	PX	5.2	5.2	0	%100	Active
5	M21	PX	5.2	5.2	0	%100	Active
6	M20	PX	5.2	5.2	0	%100	Active
7	M19	PX	5.2	5.2	0	%100	Active
8	M16	PX	5.2	5.2	0	%100	Active
9	M15	PX	5.2	5.2	0	%100	Active
10	M14	PX	5.2	5.2	0	%100	Active
11	M13	PX	5.2	5.2	0	%100	Active
12	M42A	PX	5.2	5.2	0	%100	Active
13	M36	PX	3.7	3.7	0	%100	Active
14	M35	PX	3.7	3.7	0	%100	Active
15	M34	PX	3.7	3.7	0	%100	Active
16	M33	PX	3.7	3.7	0	%100	Active
17	M40	PX	3.8	3.8	0	%100	Active
18	M39	PX	3.8	3.8	0	%100	Active
19	M38	PX	3.8	3.8	0	%100	Active
20	M37	PX	3.8	3.8	0	%100	Active
21	M28	PX	4	4	0	%100	Active
22	M27	PX	4	4	0	%100	Active
23	M26	PX	4	4	0	%100	Active
24	M25	PX	4	4	0	%100	Active

Load Combinations

	De...	So...	PD...	SR...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...
1	DL...	Yes	Y		1	1.2		3	1.6						
2	DL...	Yes	Y		1	1.2		3	1.3...	4	0.8				
3	DL...	Yes	Y		1	1.2		3	0.8	4	1.3...				
4	DL...	Yes	Y		1	1.2				4	1.6				
5	DL...	Yes	Y		1	1.2		3	-0.8	4	1.3...				
6	DL...	Yes	Y		1	1.2		3	-1...	4	0.8				
7	DL...	Yes	Y		1	1.2		3	-1.6						
8	DL...	Yes	Y		1	1.2		3	-1...	4	-0.8				
9	DL...	Yes	Y		1	1.2		3	-0.8	4	-1...				
10	DL...	Yes	Y		1	1.2				4	-1.6				
11	DL...	Yes	Y		1	1.2		3	0.8	4	-1...				
12	DL...	Yes	Y		1	1.2		3	1.3...	4	-0.8				
13	DL...	Yes	Y		1	1.2	2	1	5	1					
14	DL...	Yes	Y		1	1.2	2	1	5	0.8...	6	0.5			
15	DL...	Yes	Y		1	1.2	2	1	5	0.5	6	0.8...			
16	DL...	Yes	Y		1	1.2	2	1		6	1				
17	DL...	Yes	Y		1	1.2	2	1	5	-0.5	6	0.8...			
18	DL...	Yes	Y		1	1.2	2	1	5	-0...	6	0.5			
19	DL...	Yes	Y		1	1.2	2	1	5	-1					
20	DL...	Yes	Y		1	1.2	2	1	5	-0...	6	-0.5			
21	DL...	Yes	Y		1	1.2	2	1	5	-0.5	6	-0...			
22	DL...	Yes	Y		1	1.2	2	1		6	-1				
23	DL...	Yes	Y		1	1.2	2	1	5	0.5	6	-0...			
24	DL...	Yes	Y		1	1.2	2	1	5	0.8...	6	-0.5			
25	DE...	Yes	Y		1	1.2				7	1.5				
26	DE...	Yes	Y		1	1.2				8	1.5				
27	DE...	Yes	Y		1	1.2				9	1.5				
28	DL...	Yes	Y		1	1.2	10	1.5	3	0.1...					
29	DL...	Yes	Y		1	1.2	11	1.5	3	0.1...					
30	DL...	Yes	Y		1	1.2	12	1.5	3	0.1...					
31	DL...	Yes	Y		1	1.2	13	1.5	3	0.1...					
32	DL...	Yes	Y		1	1.2	10	1.5	4	0.1...					
33	DL...	Yes	Y		1	1.2	11	1.5	4	0.1...					
34	DL...	Yes	Y		1	1.2	12	1.5	4	0.1...					

Load Combinations (Continued)

De...	So...	PD...	SR...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...
35 DL...	Yes	Y		1	1.2	13	1.5	4	0.1...					
36 DL...	Yes	Y		1	1.2	10	1.5	3	-0...					
37 DL...	Yes	Y		1	1.2	11	1.5	3	-0...					
38 DL...	Yes	Y		1	1.2	12	1.5	3	-0...					
39 DL...	Yes	Y		1	1.2	13	1.5	3	-0...					
40 DL...	Yes	Y		1	1.2	10	1.5	4	-0...					
41 DL...	Yes	Y		1	1.2	11	1.5	4	-0...					
42 DL...	Yes	Y		1	1.2	12	1.5	4	-0...					
43 DL...	Yes	Y		1	1.2	13	1.5	4	-0...					

Node Reactions

	Node...		X [lbs]	LC	Y [lbs]	LC	Z [lbs]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N51	max	1491.2...	36	336.309	12	1562.72	13	0	43	0	43	0	43
2		min	-939.54	31	-1400....	39	566.938	7	0	1	0	1	0	1
3	N52	max	1043.8...	43	1464.3...	19	391.456	19	0	43	0	43	0	43
4		min	-1689....	32	-104.754	1	106.142	2	0	1	0	1	0	1
5	N64	max	377.894	1	992.23	7	50.232	13	0	43	0	43	0	43
6		min	-324.24	7	-1156....	1	15.206	7	0	1	0	1	0	1
7	N61A	max	120.796	11	321.076	5	34.473	18	0	43	0	43	0	43
8		min	-95.13	5	-426.454	11	10.635	35	0	1	0	1	0	1
9	Totals:	max	749.234	10	1144.7...	7	2012.8...	14						
10		min	-749.236	4	-1144....	1	734.644	7						

Node Displacements

	Node...		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rota...	LC	Y Rota...	LC	Z Rota...	LC
1	N1	max	0.02	31	0.23	1	0.025	43	1.113e...	3	6.673e...	39	7.01e-03	7
2		min	-0.032	36	-0.243	7	-0.479	32	-1.198...	39	-6.612...	28	-6.689...	1
3	N2	max	0.021	31	0.079	1	0.122	32	1.34e-03	8	5.306e...	43	2.095e...	1
4		min	-0.03	36	-0.097	7	-0.378	43	-1.511...	2	-1.942...	32	-2.511...	7
5	N3	max	0.065	32	0.323	1	0.025	43	2.892e...	2	6.72e-04	43	7.205e...	7
6		min	-0.046	43	-0.33	7	-0.479	32	-3.059...	8	-6.648...	32	-7.001...	1
7	N4	max	0.064	32	0.058	12	0.122	32	1.081e...	26	5.329e...	43	2.298e...	1
8		min	-0.047	43	-0.09	36	-0.378	43	-1.25e...	3	-1.941...	32	-2.651...	7
9	N5	max	0.031	2	0.21	1	0.02	43	1.113e...	3	6.674e...	39	7.01e-03	7
10		min	-0.043	8	-0.222	7	-0.458	32	-1.198...	39	-6.612...	28	-6.689...	1
11	N6	max	0.02	31	0.21	1	0.023	43	1.113e...	3	6.674e...	39	7.01e-03	7
12		min	-0.032	36	-0.222	7	-0.459	32	-1.198...	39	-6.612...	28	-6.689...	1
13	N7	max	0.075	2	0.302	1	0.02	43	2.892e...	2	6.721e...	43	7.204e...	7
14		min	-0.057	8	-0.309	7	-0.459	32	-3.059...	8	-6.648...	32	-7.001...	1
15	N8	max	0.065	32	0.302	1	0.023	43	2.892e...	2	6.721e...	43	7.204e...	7
16		min	-0.046	43	-0.309	7	-0.46	32	-3.059...	8	-6.648...	32	-7.001...	1
17	N9	max	0.022	31	0.011	7	0.012	31	4.126e...	4	7.358e...	43	1.674e...	8
18		min	-0.034	36	-0.01	1	-0.079	36	-6.591...	43	-4.282...	32	-1.342...	2
19	N10	max	0.02	31	0.011	7	0.014	31	4.126e...	4	7.358e...	43	1.674e...	8
20		min	-0.031	36	-0.01	1	-0.08	36	-6.591...	43	-4.282...	32	-1.342...	2
21	N11	max	0.066	28	0.035	3	0.012	31	1.318e...	2	7.569e...	43	3.525e...	8
22		min	-0.048	39	-0.03	9	-0.079	36	-1.599...	8	-4.231...	32	-3.543...	2
23	N12	max	0.064	32	0.035	3	0.014	31	1.318e...	2	7.569e...	43	3.525e...	8
24		min	-0.046	43	-0.03	9	-0.079	36	-1.599...	8	-4.231...	32	-3.543...	2
25	N13	max	0.019	31	0.01	7	0.035	36	9.277e...	8	3.217e...	43	9.061e...	1
26		min	-0.028	36	-0.008	1	-0.054	31	-1.089...	2	-1.739...	32	-1.219...	7
27	N14	max	0.021	31	0.01	7	0.036	36	9.277e...	8	3.217e...	43	9.061e...	1
28		min	-0.031	36	-0.008	1	-0.055	31	-1.089...	2	-1.739...	32	-1.219...	7
29	N15	max	0.068	32	0.048	8	0.035	36	3.602e...	10	3.178e...	43	1.019e...	43
30		min	-0.05	43	-0.053	2	-0.054	31	-7.648...	34	-1.749...	32	-1.326...	32
31	N16	max	0.064	32	0.048	8	0.037	36	3.602e...	10	3.178e...	43	1.019e...	43
32		min	-0.047	43	-0.053	2	-0.054	31	-7.648...	34	-1.749...	32	-1.326...	32

Node Displacements (Continued)

	Node...		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rota...	LC	Y Rota...	LC	Z Rota...	LC
33	N17	max	0.019	35	0.073	1	0.114	32	1.34e-03	8	5.306e...	43	2.094e...	1
34		min	-0.026	40	-0.09	7	-0.362	43	-1.511...	2	-1.942...	32	-2.51e...	7
35	N18	max	0.021	31	0.073	1	0.116	32	1.34e-03	8	5.306e...	43	2.094e...	1
36		min	-0.03	36	-0.09	7	-0.362	43	-1.511...	2	-1.942...	32	-2.51e...	7
37	N19	max	0.067	32	0.054	31	0.114	32	1.081e...	26	5.329e...	43	2.298e...	1
38		min	-0.05	43	-0.086	36	-0.363	43	-1.25e...	3	-1.941...	32	-2.651...	7
39	N20	max	0.064	32	0.054	31	0.116	32	1.081e...	26	5.329e...	43	2.298e...	1
40		min	-0.047	43	-0.086	36	-0.362	43	-1.25e...	3	-1.941...	32	-2.651...	7
41	N21	max	0.039	31	0.197	1	0.02	43	9.133e...	3	6.676e...	39	7.01e-03	7
42		min	-0.219	36	-0.206	7	-0.458	32	-1.197...	43	-6.613...	28	-6.689...	1
43	N22	max	0.249	28	0.391	1	0.02	43	3.243e...	1	6.892e...	43	7.204e...	7
44		min	-0.066	39	-0.402	7	-0.459	32	-3.406...	7	-6.531...	32	-7.001...	1
45	N23	max	0.042	31	0.019	43	0.012	31	4.127e...	4	7.333e...	35	1.674e...	8
46		min	-0.154	36	-0.014	3	-0.079	36	-6.592...	43	-4.282...	40	-1.342...	2
47	N24	max	0.185	32	0.075	2	0.012	31	1.497e...	1	7.695e...	43	3.525e...	8
48		min	-0.069	43	-0.078	8	-0.079	36	-1.777...	8	-4.243...	32	-3.543...	2
49	N25	max	0.109	31	0.025	2	0.035	36	1.073e...	8	3.211e...	31	9.061e...	1
50		min	-0.076	36	-0.019	8	-0.054	31	-1.235...	2	-1.735...	36	-1.219...	7
51	N26	max	0.117	32	0.05	9	0.035	36	3.602e...	10	3.189e...	43	1.019e...	43
52		min	-0.139	43	-0.063	3	-0.054	31	-7.495...	34	-1.76e...	32	-1.326...	32
53	N27	max	0.166	35	0.109	2	0.114	32	1.486e...	8	5.302e...	39	2.094e...	1
54		min	-0.079	40	-0.121	8	-0.362	43	-1.657...	2	-1.937...	28	-2.51e...	7
55	N28	max	0.122	32	0.073	26	0.114	32	1.081e...	26	5.232e...	43	2.298e...	1
56		min	-0.197	43	-0.108	32	-0.364	43	-1.173...	4	-1.952...	32	-2.651...	7
57	N29	max	0.003	36	0.021	36	0.024	43	-4.119...	1	2.718e...	43	1.11e-03	31
58		min	-0.002	31	-0.013	31	-0.043	32	-1.339...	21	-4.16e...	32	-1.727...	36
59	N30	max	0.002	2	0.01	2	0.023	43	3.448e...	28	2.5e-03	43	1.993e...	8
60		min	-0.003	8	-0.018	8	-0.038	32	-5.629...	38	-3.856...	32	-1.355...	2
61	N31	max	0.01	35	0.006	7	0.03	31	-3.239...	2	1.231e...	31	2.549e...	36
62		min	-0.016	40	-0.005	1	-0.079	36	-2.237...	39	-2.992...	36	-1.639...	31
63	N32	max	0.041	2	0.049	2	0.031	31	-7.632...	3	9.261e...	31	2.915e...	43
64		min	-0.032	8	-0.048	8	-0.073	36	-2.375...	41	-3.228...	36	-4.291...	32
65	N33	max	0.003	36	0.014	31	0.04	32	-5.386...	9	2.549e...	43	1.21e-03	31
66		min	-0.002	31	-0.021	36	-0.027	43	-1.627...	15	-4.311...	32	-1.854...	36
67	N34	max	0.002	2	0.018	8	0.038	32	1.638e...	43	2.335e...	43	1.855e...	8
68		min	-0.003	8	-0.01	2	-0.024	43	-6.982...	14	-3.989...	32	-1.24e...	2
69	N35	max	0.008	31	0.005	35	0.054	36	-8.248...	9	2.106e...	31	2.822e...	36
70		min	-0.012	36	-0.007	40	-0.052	31	-2.593...	17	-1.97e...	36	-1.929...	31
71	N36	max	0.038	2	0.042	8	0.055	36	-7.485...	8	2.318e...	31	2.948e...	43
72		min	-0.028	8	-0.046	2	-0.048	31	-2.492...	14	-1.694...	36	-4.258...	32
73	N37	max	0	1	0.018	36	0.022	43	-5.538...	12	2.897e...	43	1.548e...	31
74		min	0	36	-0.011	31	-0.035	32	-1.544...	18	-4.679...	32	-2.4e-03	36
75	N38	max	0	36	0.008	2	0.02	43	2.776e...	28	2.667e...	43	2.007e...	8
76		min	0	31	-0.015	8	-0.032	32	-5.688...	13	-4.351...	32	-1.112...	2
77	N39	max	0	28	0.015	8	0.032	32	2.776e...	28	2.667e...	43	2.007e...	8
78		min	0	39	-0.008	2	-0.02	43	-5.688...	13	-4.351...	32	-1.112...	2
79	N40	max	0	35	0.011	31	0.035	32	-5.538...	12	2.897e...	43	1.548e...	31
80		min	0	40	-0.018	36	-0.022	43	-1.544...	18	-4.679...	32	-2.4e-03	36
81	N41	max	0.02	31	0.003	35	0.017	31	4.61e-04	3	5.048e...	43	2.093e...	7
82		min	-0.031	36	-0.004	40	-0.106	36	-7.312...	43	-5.677...	32	-1.72e...	1
83	N42	max	0.013	35	0.003	6	0.029	31	-5.019...	2	1.127e...	31	2.586e...	36
84		min	-0.02	40	-0.003	12	-0.086	36	-2.46e...	20	-3.356...	36	-1.657...	31
85	N43	max	0.021	31	0.003	7	0.045	36	9.641e...	8	4.451e...	43	1.111e...	2
86		min	-0.03	36	-0.003	1	-0.075	31	-1.138...	2	-1.667...	32	-1.486...	8
87	N44	max	0.011	31	0.002	39	0.054	36	-9.054...	10	2.413e...	31	3.07e-03	40
88		min	-0.016	36	-0.003	28	-0.058	31	-2.734...	17	-1.925...	36	-2.114...	35
89	N45	max	0.064	32	0.054	2	0.017	31	1.481e...	2	5.098e...	43	4.185e...	8
90		min	-0.046	43	-0.05	8	-0.105	36	-1.764...	8	-5.635...	32	-4.114...	2

Node Displacements (Continued)

	Node...		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rota...	LC	Y Rota...	LC	Z Rota...	LC
91	N46	max	0.045	2	0.052	2	0.029	31	-9.63e...	5	8.444e...	31	3.021e...	43
92		min	-0.033	8	-0.049	8	-0.081	36	-2.807...	41	-3.585...	36	-4.501...	32
93	N47	max	0.064	32	0.045	8	0.046	36	4.175e...	10	4.422e...	43	9.548e...	12
94		min	-0.047	43	-0.052	2	-0.075	31	-7.669...	34	-1.664...	32	-1.343...	36
95	N48	max	0.044	28	0.044	8	0.054	36	-8.458...	8	2.621e...	31	3.092e...	43
96		min	-0.033	39	-0.05	2	-0.054	31	-2.8e-03	30	-1.673...	36	-4.432...	32
97	N49	max	0.021	31	0.005	31	0.054	36	1.008e...	8	5.686e...	43	1.284e...	2
98		min	-0.03	36	-0.007	36	-0.101	31	-1.182...	2	-1.605...	32	-1.681...	8
99	N51	max	0	31	0	39	0	7	-5.538...	12	2.897e...	43	1.548e...	31
100		min	0	36	0	12	0	13	-1.544...	18	-4.679...	32	-2.4e-03	36
101	N52	max	0	32	0	1	0	2	2.776e...	28	2.667e...	43	2.007e...	8
102		min	0	43	0	19	0	19	-5.688...	13	-4.351...	32	-1.112...	2
103	N77A	max	0.02	31	0.009	2	0.019	31	5.374e...	3	2.561e...	43	2.88e-03	7
104		min	-0.031	36	-0.012	8	-0.139	36	-7.858...	43	-7.097...	32	-2.535...	1
105	N64	max	0	7	0	1	0	7	-8.613...	28	2.955e...	43	1.479e...	10
106		min	0	1	0	7	0	13	-2.265...	21	-7.205...	32	-1.349...	4
107	N57	max	0.027	31	0.205	1	0.02	43	9.438e...	3	6.675e...	39	7.01e-03	7
108		min	-0.087	36	-0.216	7	-0.458	32	-1.197...	43	-6.613...	28	-6.689...	1
109	N58	max	0.118	28	0.327	1	0.02	43	3.185e...	2	6.853e...	43	7.204e...	7
110		min	-0.053	8	-0.334	7	-0.459	32	-3.352...	8	-6.595...	32	-7.001...	1
111	N59	max	0.024	31	0.011	7	0.012	31	4.127e...	4	7.319e...	39	1.674e...	8
112		min	-0.047	36	-0.01	1	-0.079	36	-6.591...	43	-4.277...	28	-1.342...	2
113	N60	max	0.079	28	0.038	3	0.012	31	1.393e...	2	7.618e...	43	3.525e...	8
114		min	-0.051	39	-0.034	8	-0.079	36	-1.674...	8	-4.236...	32	-3.543...	2
115	N61A	max	0	5	0	11	0	35	9.247e...	36	4.916e...	31	7.6e-04	9
116		min	0	11	0	5	0	18	-3.101...	31	-1.245...	36	-5.808...	3

LRFD

	Member	Shape	Code...	Loc [in]	LC	Shear...	Loc [in]	Dir	LC	phi*P...	phi*P...	phi*M...	phi*M...	Cb	Eqn
1	M18	PIPE...	0.270	45.313	36	0.043	46.875		1	14558...	50715	3.596	3.596	2.101	H1-1b
2	M17	PIPE...	0.249	45.313	32	0.074	42.188		1	14558...	50715	3.596	3.596	1.52	H1-1b
3	M24	PIPE...	0.031	31.419	23	0.004	62.839		22	23127...	32130	1.872	1.872	1.136	H1-1b
4	M22	PIPE...	0.311	2.188	32	0.121	28.125		28	29810...	32130	1.872	1.872	1.417	H1-1b
5	M21	PIPE...	0.325	1.875	40	0.133	0		32	29810...	32130	1.872	1.872	1.677	H1-1b
6	M20	PIPE...	0.269	1.875	32	0.090	28.125		42	29810...	32130	1.872	1.872	1.493	H1-1b
7	M19	PIPE...	0.235	0	36	0.101	0		38	29810...	32130	1.872	1.872	1.328	H1-1b
8	M16	PIPE...	0.364	68	31	0.045	28		31	14916...	32130	1.872	1.872	3	H1-1b
9	M15	PIPE...	0.158	28	31	0.029	28		3	14916...	32130	1.872	1.872	3	H1-1b
10	M14	PIPE...	0.187	28	36	0.052	28		2	14916...	32130	1.872	1.872	3	H1-1b
11	M13	PIPE...	0.423	68	36	0.055	28		28	14916...	32130	1.872	1.872	3	H1-1b
12	M42A	PIPE...	0.064	90.552	7	0.005	90.552		16	16233...	32130	1.872	1.872	1.136	H1-1b*
13	M36	5/8 SR	0.380	25.417	32	0.030	40		32	2855....	9946.8	0.097	0.097	1	H1-1a
14	M35	5/8 SR	0.284	25.417	28	0.015	40		8	2855....	9946.8	0.097	0.097	1.136	H1-1a
15	M34	5/8 SR	0.296	25.417	39	0.031	40		32	2855....	9946.8	0.097	0.097	1.136	H1-1a
16	M33	5/8 SR	0.214	25.417	39	0.014	40		8	2855....	9946.8	0.097	0.097	1.136	H1-1a
17	M40	3/4" R...	0.000	47.572	43	0.000	47.572		43	1550....	14313...	0.179	0.179	1	H1-1a
18	M39	3/4" R...	0.154	23.786	17	0.014	47.572		3	3164....	14313...	0.179	0.179	1.136	H1-1b
19	M38	3/4" R...	0.108	23.786	21	0.013	47.572		3	3164....	14313...	0.179	0.179	1.136	H1-1b
20	M37	3/4" R...	0.015	0	28	0.008	47.572		40	1550....	14313...	0.179	0.179	2.407	H1-1b*
21	M28	.625...	0.329	0	32	0.192	0.666	y	28	68522...	70875	0.923	5.168	1.667	H1-1b
22	M27	.625...	0.258	0	39	0.168	0	y	43	68522...	70875	0.923	5.168	1.667	H1-1b
23	M26	.625...	0.280	0	28	0.201	0.666	y	28	68522...	70875	0.923	5.168	1.667	H1-1b
24	M25	.625...	0.239	0	39	0.185	0.666	y	39	68522...	70875	0.923	5.168	1.667	H1-1b

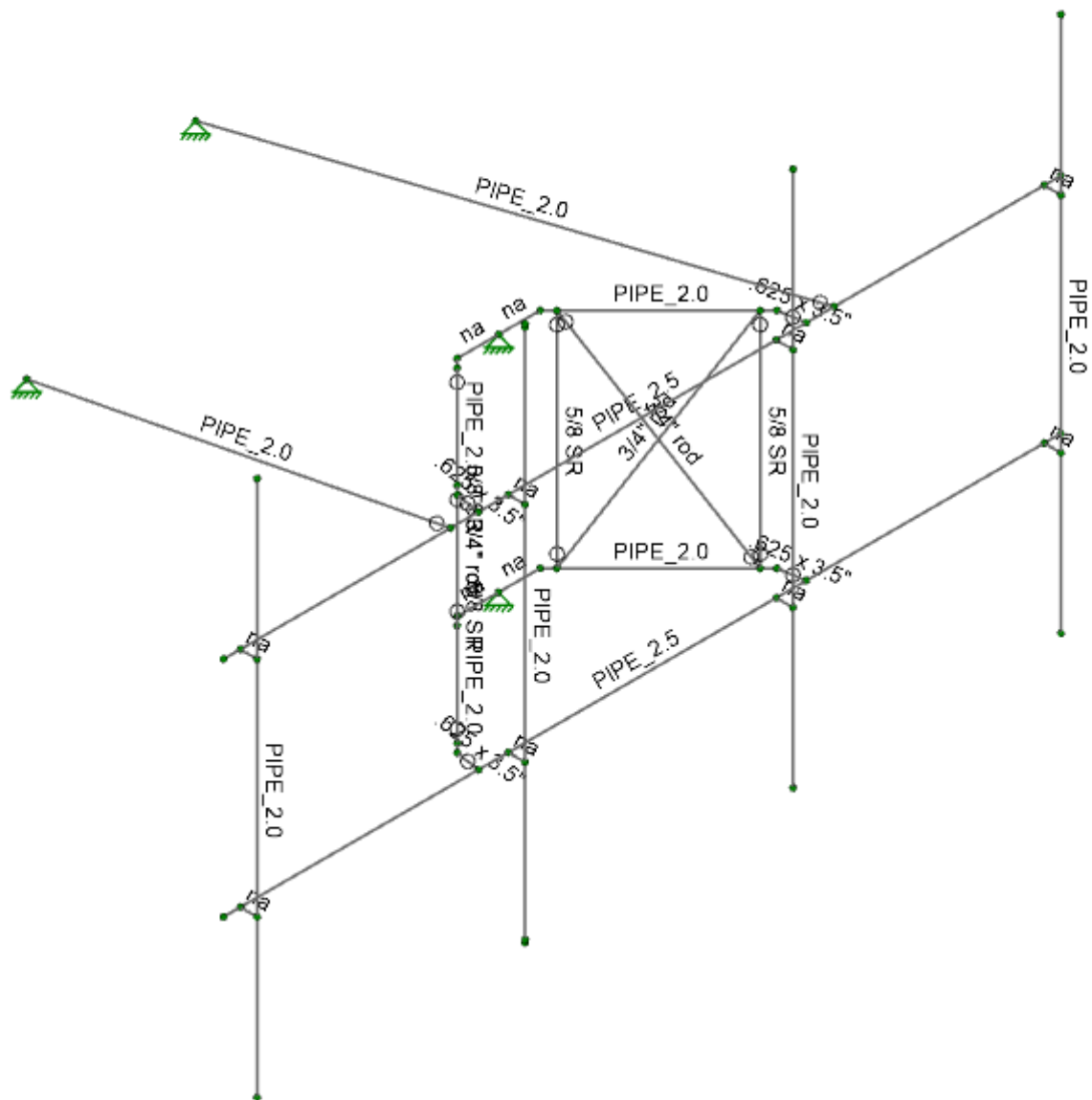


Company : Foresite LLC / EFI Global Inc.
Designer : EM
Job Number : 049.01315 - 2175008
Model Name : CT11410A - 210' RAD Center

5/28/2021
1:18:55 PM
Checked By : _____

Cold Formed Steel Code Checks

No Data to Print...



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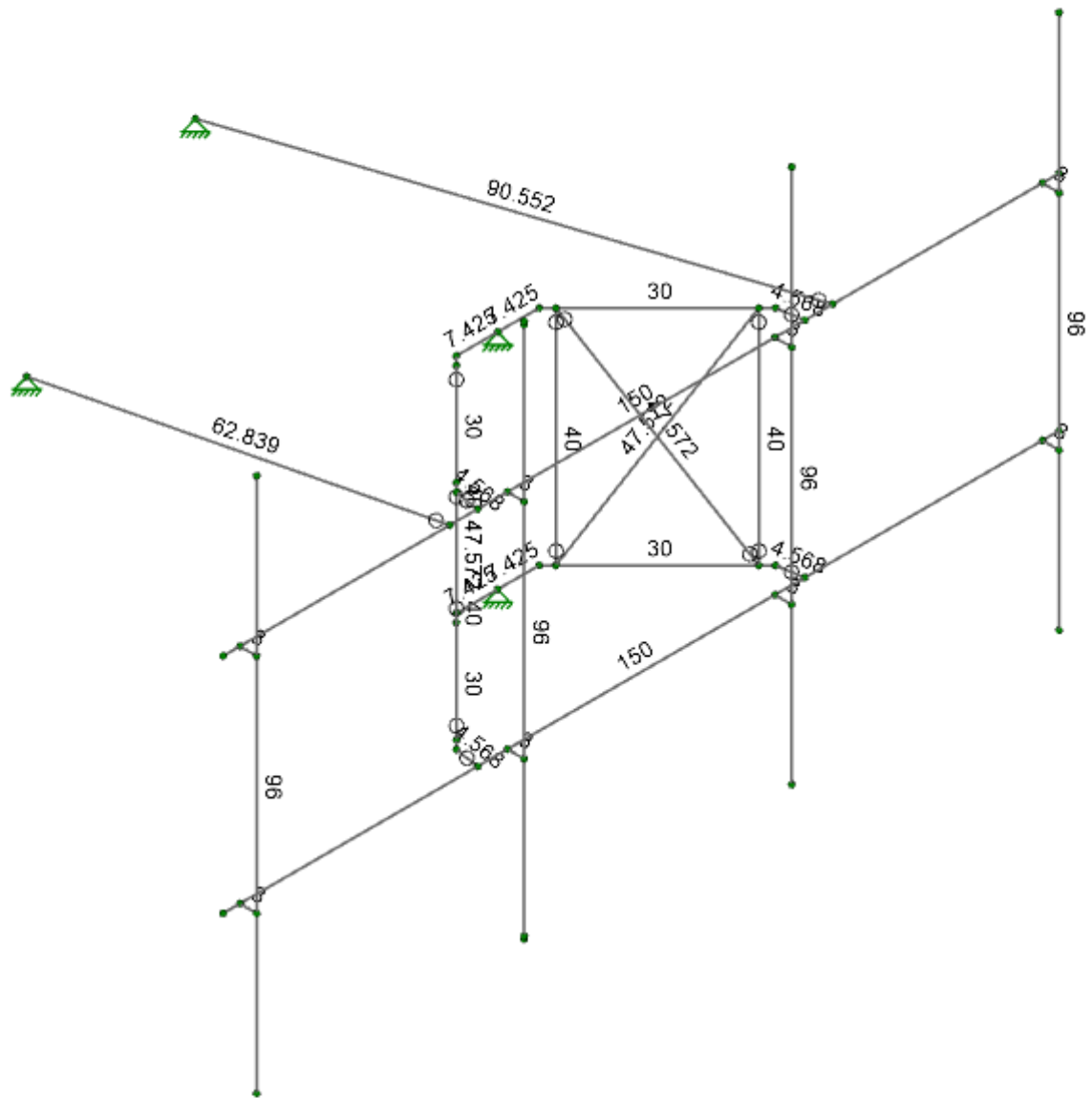
049.01315 - 2175008

CT11410A - 203' RAD Center

1

May 28, 2021

CT11410A - VFA12-HD - 203'.r3d



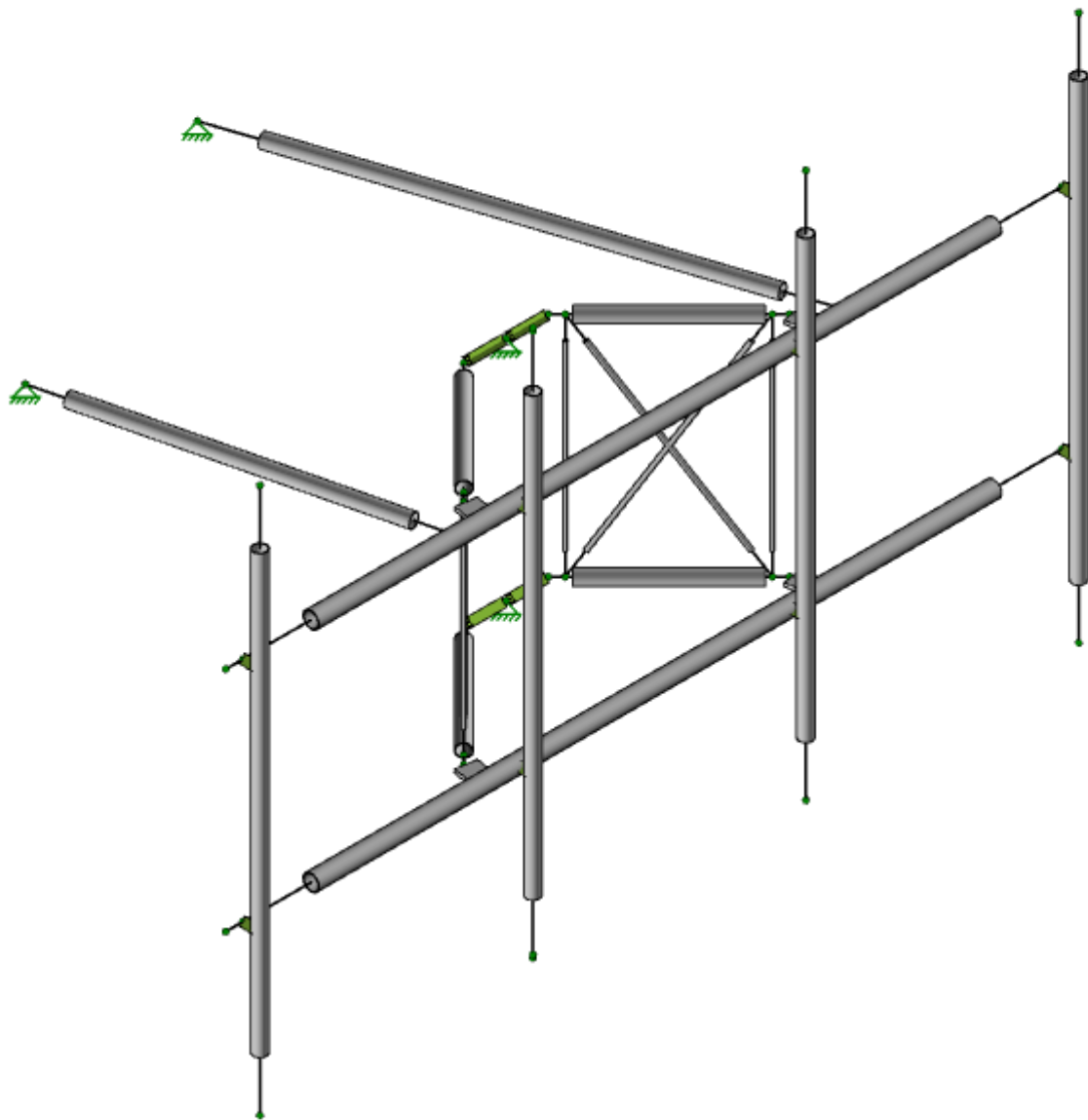
Foresite LLC / EFI Global Inc.
EM
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CT11410A - 203' RAD Center

2

May 28, 2021

CT11410A - VFA12-HD - 203'.r3d



Member Length (in) Displayed
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EM

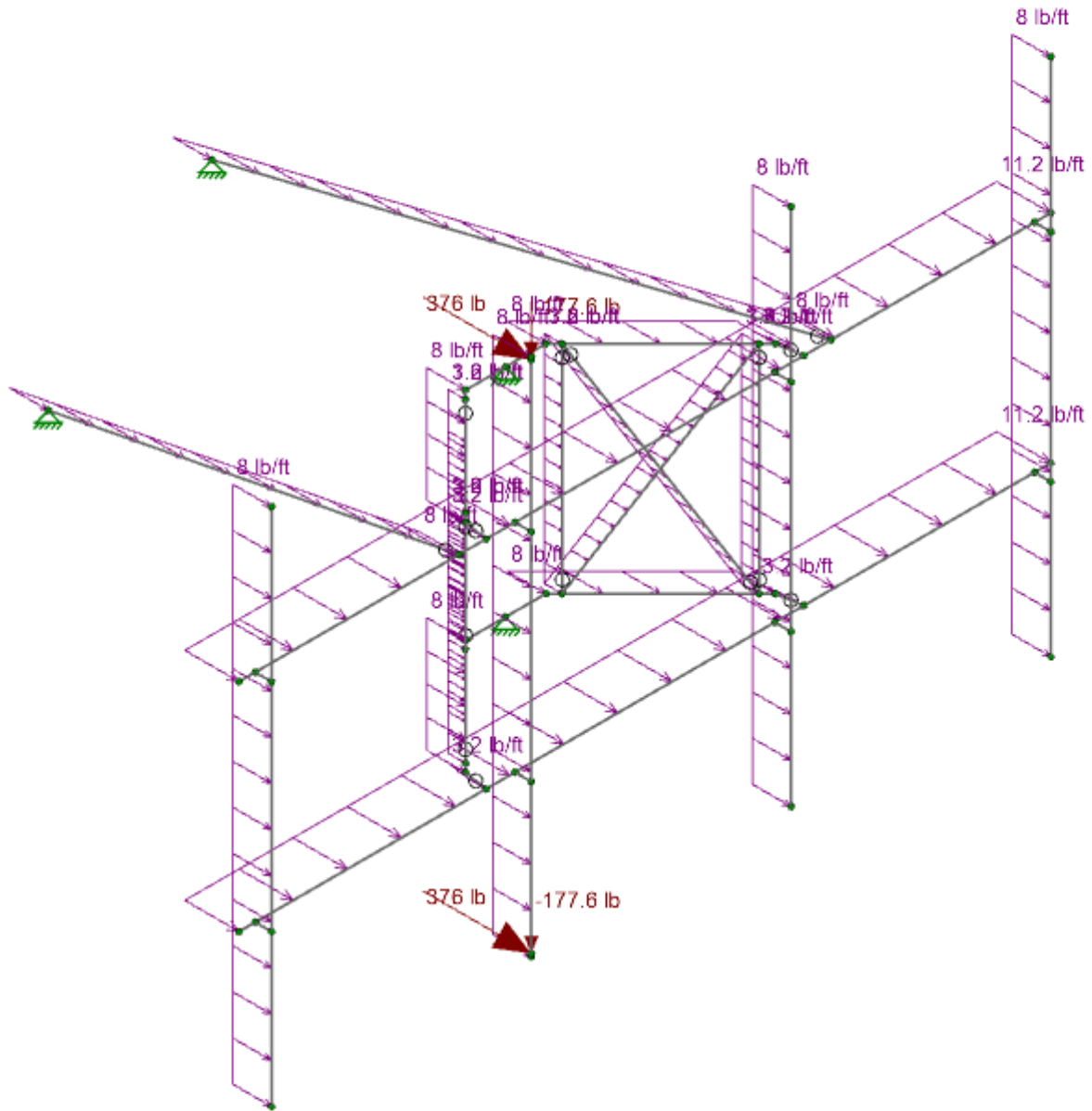
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CT11410A - 203' RAD Center

3

May 28, 2021

CT11410A - VFA12-HD - 203'.r3d



Loads: LC 1, DL + WL (NO ICE) 0 Degree
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CT11410A - 203' RAD Center

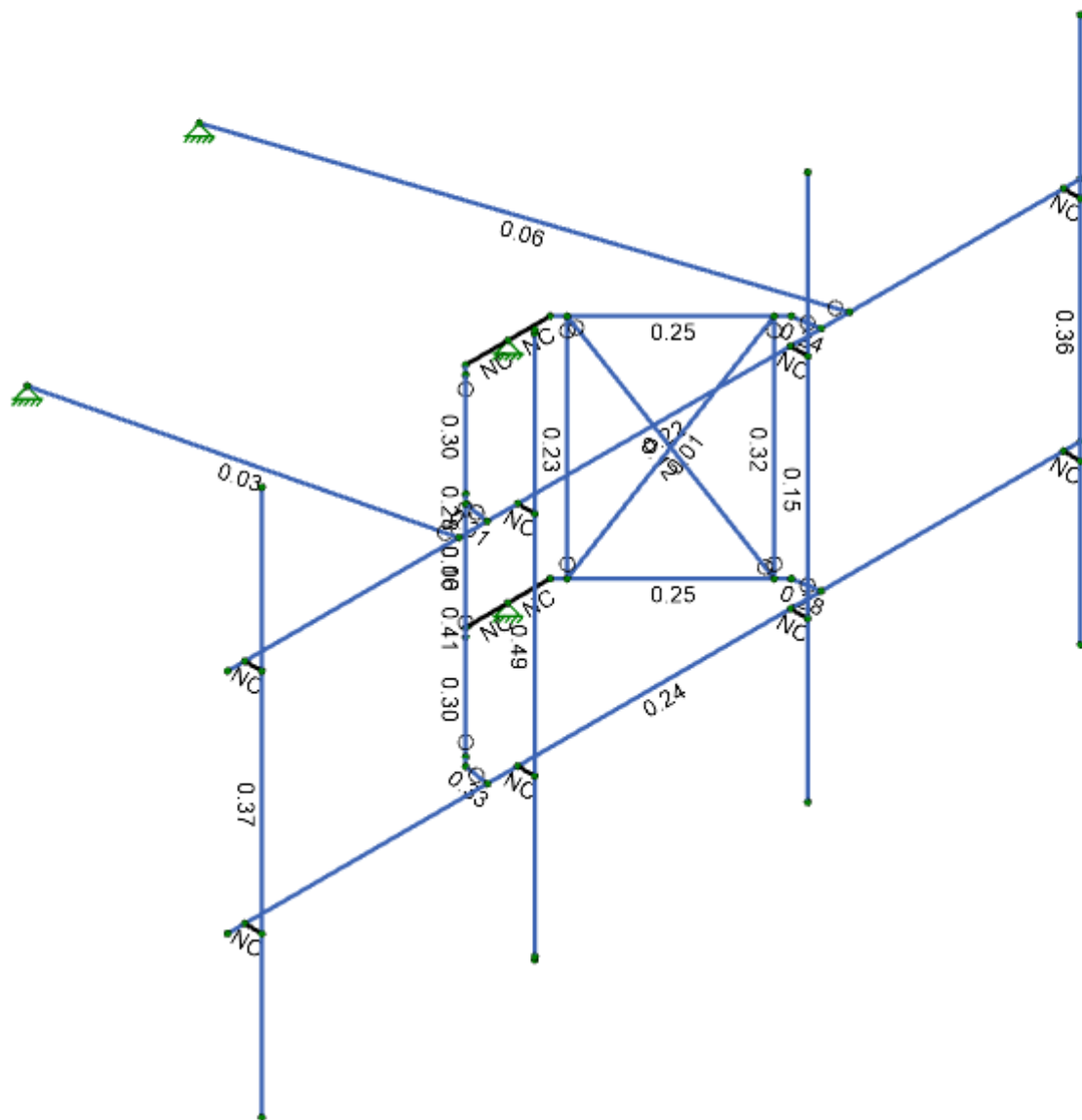
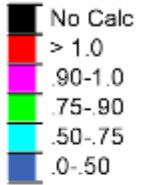
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CT11410A - VFA12-HD - 203'.r3d



Code Check
(Env)



Member Code Checks Displayed (Enveloped)
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CT11410A - 203' RAD Center

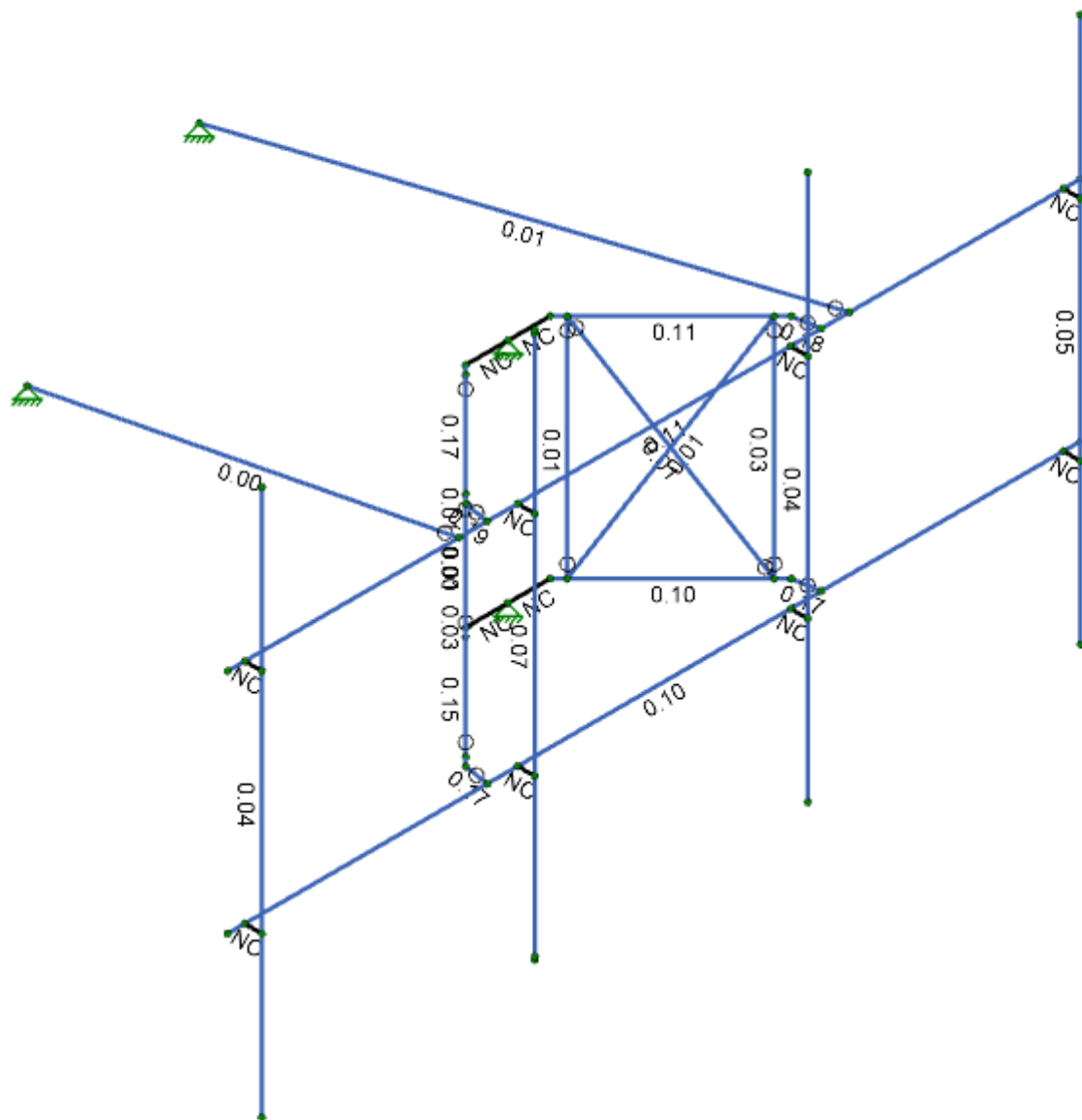
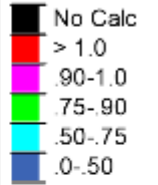
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Shear Check
(Env)



Member Shear Checks Displayed (Enveloped)
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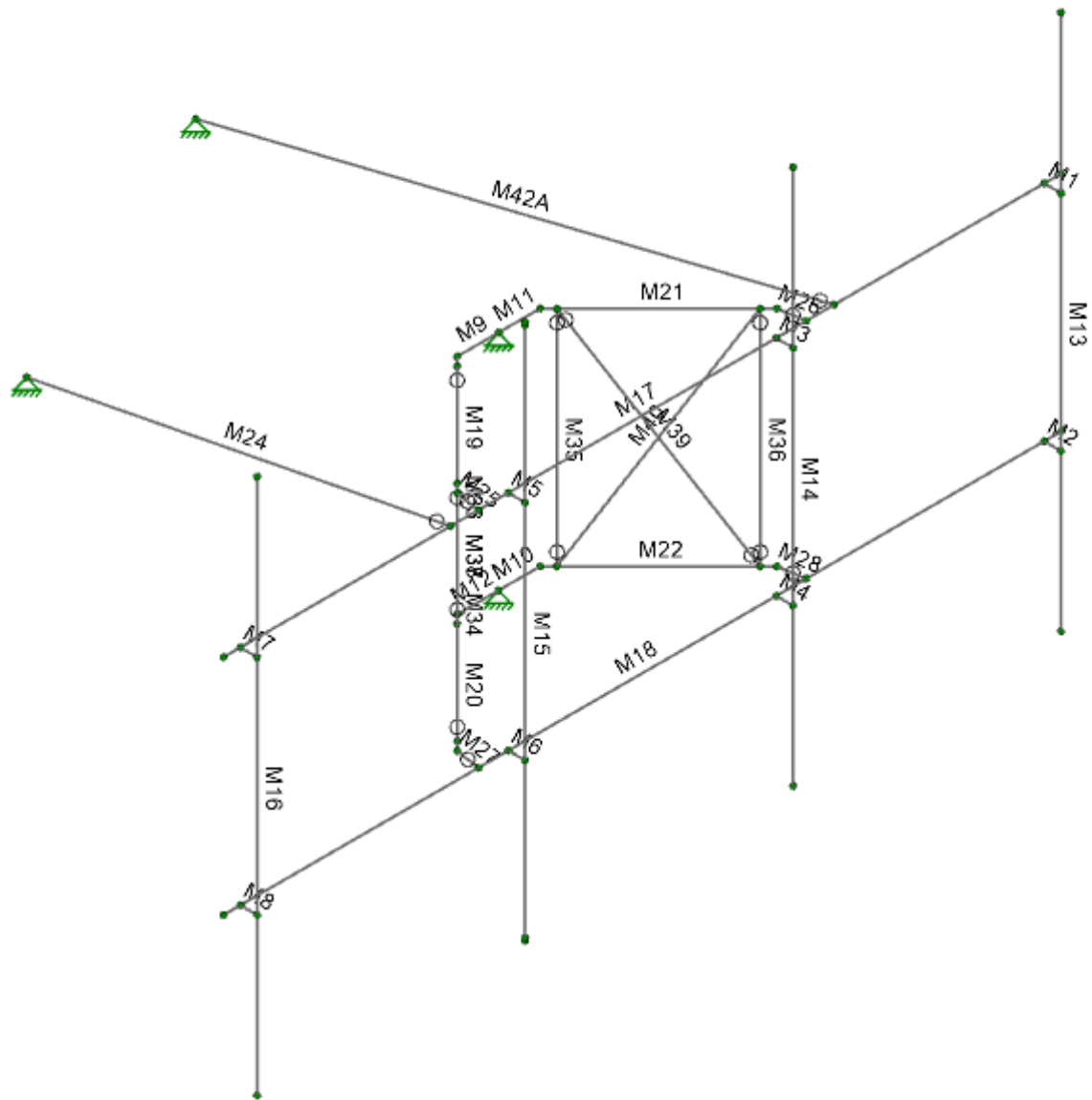
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CT11410A - 203' RAD Center

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CT11410A - VFA12-HD - 203'.r3d



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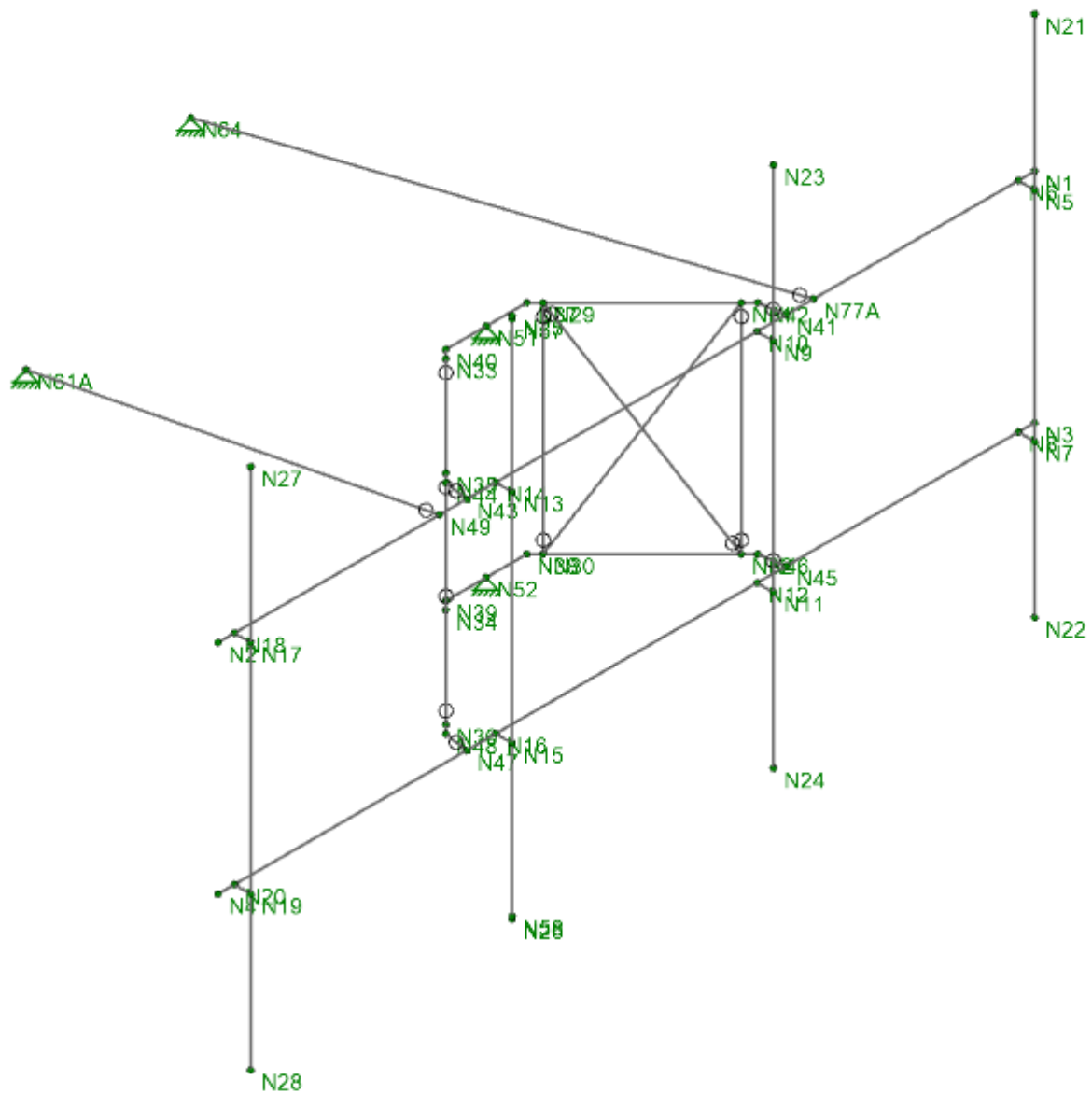
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CT11410A - 203' RAD Center

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CT11410A - VFA12-HD - 203'.r3d



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EM		May 28, 2021
049.01315 - 2175008		CT11410A - VFA12-HD - 203'.r3d

Cold Formed Steel Code Checks

No Data to Print...

Line Project Grid

No Data to Print...

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. C...	Density [k...	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.2
3	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.2
4	A500 Gr.42	29000	11154	0.3	0.65	0.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	0.3	0.65	0.49	46	1.2	58	1.1
6	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.5	60	1.2
7	A529 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.2

Cold Formed Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff...	Density [k/ft³]	Yield [ksi]	Fu [ksi]
1	A570_33	29500	11346	0.3	0.65	0.49	33	52
2	A607_C1_55	29500	11346	0.3	0.65	0.49	55	70

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	HR1A	C15X50	Beam	None	A36 Gr.36	Typical	14.7	11	404	2.65

Cold Formed Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	CF1A	1.5CU1.2...	Beam	None	A570_33	Typical	0.131	0.022	0.052	5.4e-05

Primary Member Properties

	Label	I Node	J Node	K Node	Rotate(deg)	Section/S...	Type	Design List	Material	Design Rule
1	M12	N52	N39			RIGID	None	None	LINK	Typical
2	M11	N51	N37			RIGID	None	None	LINK	Typical
3	M10	N38	N52			RIGID	None	None	LINK	Typical
4	M9	N40	N51			RIGID	None	None	LINK	Typical
5	M8	N19	N20			RIGID	None	None	LINK	Typical
6	M7	N17	N18			RIGID	None	None	LINK	Typical
7	M6	N15	N16			RIGID	None	None	LINK	Typical
8	M5	N13	N14			RIGID	None	None	LINK	Typical
9	M4	N11	N12			RIGID	None	None	LINK	Typical
10	M3	N9	N10			RIGID	None	None	LINK	Typical
11	M2	N7	N8			RIGID	None	None	LINK	Typical
12	M1	N5	N6			RIGID	None	None	LINK	Typical
13	M18	N3	N4			PIPE 2.5	Beam	None	A53 Gr.B	Typical
14	M17	N1	N2			PIPE 2.5	Beam	None	A53 Gr.B	Typical
15	M24	N49	N61A			PIPE 2.0	Beam	None	A53 Gr.B	Typical
16	M22	N38	N46			PIPE 2.0	Beam	None	A53 Gr.B	Typical
17	M21	N37	N42			PIPE 2.0	Beam	None	A53 Gr.B	Typical
18	M20	N39	N48			PIPE 2.0	Beam	None	A53 Gr.B	Typical
19	M19	N40	N44			PIPE 2.0	Beam	None	A53 Gr.B	Typical
20	M16	N27	N28			PIPE 2.0	Beam	None	A53 Gr.B	Typical
21	M15	N25	N26			PIPE 2.0	Beam	None	A53 Gr.B	Typical
22	M14	N23	N24			PIPE 2.0	Beam	None	A53 Gr.B	Typical
23	M13	N21	N22			PIPE 2.0	Beam	None	A53 Gr.B	Typical
24	M42A	N77A	N64			PIPE 2.0	Beam	None	A53 Gr.B	Typical
25	M36	N31	N32			5/8 SR	Beam	None	A36 Gr.36	Typical
26	M35	N29	N30			5/8 SR	Beam	None	A36 Gr.36	Typical

Primary Member Properties (Continued)

	Label	I Node	J Node	K Node	Rotate(deg)	Section/S...	Type	Design List	Material	Design Rule
27	M34	N35	N36			5/8 SR	Beam	None	A36 Gr.36	Typical
28	M33	N33	N34			5/8 SR	Beam	None	A36 Gr.36	Typical
29	M40	N31	N30			3/4" rod	Beam	None	A36 Gr.36	Typical
30	M39	N29	N32			3/4" rod	Beam	None	A36 Gr.36	Typical
31	M38	N33	N36			3/4" rod	Beam	None	A36 Gr.36	Typical
32	M37	N35	N34			3/4" rod	Beam	None	A36 Gr.36	Typical
33	M28	N46	N45			.625 x 3.5"	None	None	A36 Gr.36	Typical
34	M27	N48	N47			.625 x 3.5"	None	None	A36 Gr.36	Typical
35	M26	N42	N41			.625 x 3.5"	None	None	A36 Gr.36	Typical
36	M25	N44	N43			.625 x 3.5"	None	None	A36 Gr.36	Typical

Advanced Member Properties

	Label	I Release	J Release	I Offset [in]	J Offset [in]	T/C Only	Physical	Deflectio...	Analysis...	Activation	Seismic...
1	M12						Yes	** NA **			None
2	M11						Yes	** NA **			None
3	M10						Yes	** NA **			None
4	M9						Yes	** NA **			None
5	M8						Yes	** NA **			None
6	M7						Yes	** NA **			None
7	M6						Yes	** NA **			None
8	M5						Yes	** NA **			None
9	M4						Yes	** NA **			None
10	M3						Yes	** NA **			None
11	M2						Yes	** NA **			None
12	M1						Yes	** NA **			None
13	M18						Yes				None
14	M17						Yes				None
15	M24	BenPIN					Yes				None
16	M22						Yes				None
17	M21						Yes				None
18	M20						Yes				None
19	M19						Yes				None
20	M16						Yes				None
21	M15						Yes				None
22	M14						Yes				None
23	M13						Yes				None
24	M42A	BenPIN					Yes				None
25	M36	BenPIN	BenPIN				Yes				None
26	M35	BenPIN	BenPIN				Yes				None
27	M34	BenPIN	BenPIN				Yes				None
28	M33	BenPIN	BenPIN				Yes				None
29	M40					Tension...	Yes				None
30	M39	BenPIN	BenPIN				Yes				None
31	M38	BenPIN	BenPIN				Yes				None
32	M37					Tension...	Yes				None
33	M28		BenPIN				Yes	** NA **			None
34	M27		BenPIN				Yes	** NA **			None
35	M26		BenPIN				Yes	** NA **			None
36	M25		BenPIN				Yes	** NA **			None

Hot Rolled Member Properties

	Label	Shape	Length [in]	Lb y-y [in]	Lb z-z [in]	Lcomp t...	Lcomp...	L-Torqu...	K y-y	K z-z	Cb	Function
1	M18	PIPE_2.5	150									Lateral
2	M17	PIPE_2.5	150									Lateral
3	M24	PIPE_2.0	62.839									Lateral
4	M22	PIPE_2.0	30									Lateral
5	M21	PIPE_2.0	30									Lateral

Hot Rolled Member Properties (Continued)

	Label	Shape	Length [in]	Lb y-y [in]	Lb z-z [in]	Lcomp t...	Lcomp...	L-Torqu...	K y-y	K z-z	Cb	Function
6	M20	PIPE 2.0	30									Lateral
7	M19	PIPE 2.0	30									Lateral
8	M16	PIPE 2.0	96									Lateral
9	M15	PIPE 2.0	96									Lateral
10	M14	PIPE 2.0	96									Lateral
11	M13	PIPE 2.0	96									Lateral
12	M42A	PIPE 2.0	90.552									Lateral
13	M36	5/8 SR	40	33.62	33.62				0.7	0.7		Lateral
14	M35	5/8 SR	40	33.62	33.62				0.7	0.7		Lateral
15	M34	5/8 SR	40	33.62	33.62				0.7	0.7		Lateral
16	M33	5/8 SR	40	33.62	33.62				0.7	0.7		Lateral
17	M40	3/4" rod	47.572									Lateral
18	M39	3/4" rod	47.572						0.7	0.7		Lateral
19	M38	3/4" rod	47.572						0.7	0.7		Lateral
20	M37	3/4" rod	47.572									Lateral
21	M28	.625 x 3...	4.568									Lateral
22	M27	.625 x 3...	4.568									Lateral
23	M26	.625 x 3...	4.568									Lateral
24	M25	.625 x 3...	4.568									Lateral

Cold Formed Member Properties

No Data to Print...

Nodes

	Label	X [in]	Y [in]	Z [in]	Temp [deg F]	Detach From Dia...
1	N1	-75	0	40		
2	N2	75	0	40		
3	N3	-75	0	0		
4	N4	75	0	0		
5	N5	-72	3	40		
6	N6	-72	0	40		
7	N7	-72	3	0		
8	N8	-72	0	0		
9	N9	-24	3	40		
10	N10	-24	0	40		
11	N11	-24	3	0		
12	N12	-24	0	0		
13	N13	24	3	40		
14	N14	24	0	40		
15	N15	24	3	0		
16	N16	24	0	0		
17	N17	72	3	40		
18	N18	72	0	40		
19	N19	72	3	0		
20	N20	72	0	0		
21	N21	-72	3	68		
22	N22	-72	3	-28		
23	N23	-24	3	68		
24	N24	-24	3	-28		
25	N25	24	3	68		
26	N26	24	3	-28		
27	N27	72	3	68		
28	N28	72	3	-28		
29	N29	-8.927223	-24.223102	40		
30	N30	-8.927223	-24.223102	0		
31	N31	-27.135223	-6.015102	40		
32	N32	-27.135223	-6.015102	0		

Nodes (Continued)

	Label	X [in]	Y [in]	Z [in]	Temp [deg F]	Detach From Dia...
33	N33	8.927223	-24.223102	40		
34	N34	8.927223	-24.223102	0		
35	N35	27.135223	-6.015102	40		
36	N36	27.135223	-6.015102	0		
37	N37	-7.424621	-25.725704	40		
38	N38	-7.424621	-25.725704	0		
39	N39	7.424621	-25.725704	0		
40	N40	7.424621	-25.725704	40		
41	N41	-29.35	0	40		
42	N42	-28.637825	-4.5125	40		
43	N43	29.35	0	40		
44	N44	28.637825	-4.5125	40		
45	N45	-29.35	0	-0.		
46	N46	-28.637825	-4.5125	0		
47	N47	29.35	0	0.		
48	N48	28.637825	-4.5125	0		
49	N49	34.35	0	39.999996		
50	N51	0	-25.725704	40		
51	N52	0	-25.725704	0		
52	N77A	-34.35	0	39.999996		
53	N64	-6	-86	39.999998		
54	N57	24	3	67.5		
55	N58	24	3	-27.5		
56	N61A	49.199072	-61.059004	40		

Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot [k-ft/rad]	Y Rot [k-ft/rad]	Z Rot [k-ft/rad]
1	N51	Reaction	Reaction	Reaction			
2	N52	Reaction	Reaction	Reaction			
3	N64	Reaction	Reaction	Reaction			
4	N61A	Reaction	Reaction	Reaction			

Basic Load Cases

	BLC Desc...	Category	X Gravity	Y Gravity	Z Gravity	Nodal	Point	Distributed	Area(Me...	Surface(P...
1	DEAD LO...	None			-1	2				
2	DEAD LO...	None				2		24		
3	WIND LO...	None				2		24		
4	WIND LO...	None				2		24		
5	WIND LO...	None				2		24		
6	WIND LO...	None				2		24		
7	LIVE LOA...	None				1				
8	LIVE LOA...	None				1				
9	LIVE LOA...	None								
10	MAINTEN...	None				1				
11	MAINTEN...	None				1				
12	MAINTEN...	None				1				
13	MAINTEN...	None				1				

Node Loads and Enforced Displacements (BLC 1 : DEAD LOAD)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), ...]	Inactive [(lb, k-ft), (in, ...)]
1	N57	L	Z	-148	Active
2	N58	L	Z	-148	Active

Node Loads and Enforced Displacements (BLC 2 : DEAD LOAD ICE)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), ...]	Inactive [(lb, k-ft), (in, ...)]
1	N57	L	Z	-313	Active
2	N58	L	Z	-313	Active

Node Loads and Enforced Displacements (BLC 3 : WIND LOAD (NO ICE) FRONT)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), ...]	Inactive [(lb, k-ft), (in, ...)]
1	N57	L	Y	235	Active
2	N58	L	Y	235	Active

Node Loads and Enforced Displacements (BLC 4 : WIND LOAD (NO ICE) SIDE)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), ...]	Inactive [(lb, k-ft), (in, ...)]
1	N57	L	X	163	Active
2	N58	L	X	163	Active

Node Loads and Enforced Displacements (BLC 5 : WIND LOAD (ICE) FRONT)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), ...]	Inactive [(lb, k-ft), (in, ...)]
1	N57	L	Y	76	Active
2	N58	L	Y	76	Active

Node Loads and Enforced Displacements (BLC 6 : WIND LOAD (ICE) SIDE)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), ...]	Inactive [(lb, k-ft), (in, ...)]
1	N57	L	X	60	Active
2	N58	L	X	60	Active

Node Loads and Enforced Displacements (BLC 7 : LIVE LOAD1)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), ...]	Inactive [(lb, k-ft), (in, ...)]
1	N3	L	Z	-250	Active

Node Loads and Enforced Displacements (BLC 8 : LIVE LOAD2)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), ...]	Inactive [(lb, k-ft), (in, ...)]
1	N4	L	Z	-250	Active

Node Loads and Enforced Displacements (BLC 10 : MAINTENANCE LOAD 1)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), ...]	Inactive [(lb, k-ft), (in, ...)]
1	N22	L	Z	-500	Active

Node Loads and Enforced Displacements (BLC 11 : MAINTENANCE LOAD 2)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), ...]	Inactive [(lb, k-ft), (in, ...)]
1	N24	L	Z	-500	Active

Node Loads and Enforced Displacements (BLC 12 : MAINTENANCE LOAD 3)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), ...]	Inactive [(lb, k-ft), (in, ...)]
1	N26	L	Z	-500	Active

Node Loads and Enforced Displacements (BLC 13 : MAINTENANCE LOAD 4)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), ...]	Inactive [(lb, k-ft), (in, ...)]
1	N28	L	Z	-500	Active

Member Distributed Loads (BLC 2 : DEAD LOAD ICE)

	Member Label	Direction	Start Magnitud...	End Magnitude...	Start Location [...]	End Location [...]	Inactive [(lb, k-...
1	M18	Z	-10	-10	0	%100	Active
2	M17	Z	-10	-10	0	%100	Active
3	M24	Z	-9	-9	0	%100	Active
4	M22	Z	-9	-9	0	%100	Active

Member Distributed Loads (BLC 2 : DEAD LOAD ICE) (Continued)

	Member Label	Direction	Start Magnitud...	End Magnitude...	Start Location [...	End Location [...	Inactive [(lb, k-...
5	M21	Z	-9	-9	0	%100	Active
6	M20	Z	-9	-9	0	%100	Active
7	M19	Z	-9	-9	0	%100	Active
8	M16	Z	-9	-9	0	%100	Active
9	M15	Z	-9	-9	0	%100	Active
10	M14	Z	-9	-9	0	%100	Active
11	M13	Z	-9	-9	0	%100	Active
12	M42A	Z	-9	-9	0	%100	Active
13	M36	Z	-5	-5	0	%100	Active
14	M35	Z	-5	-5	0	%100	Active
15	M34	Z	-5	-5	0	%100	Active
16	M33	Z	-5	-5	0	%100	Active
17	M40	Z	-6	-6	0	%100	Active
18	M39	Z	-6	-6	0	%100	Active
19	M38	Z	-6	-6	0	%100	Active
20	M37	Z	-6	-6	0	%100	Active
21	M28	Z	-14	-14	0	%100	Active
22	M27	Z	-14	-14	0	%100	Active
23	M26	Z	-14	-14	0	%100	Active
24	M25	Z	-14	-14	0	%100	Active

Member Distributed Loads (BLC 3 : WIND LOAD (NO ICE) FRONT)

	Member Label	Direction	Start Magnitud...	End Magnitude...	Start Location [...	End Location [...	Inactive [(lb, k-...
1	M18	PY	7	7	0	%100	Active
2	M17	PY	7	7	0	%100	Active
3	M24	PY	5	5	0	%100	Active
4	M22	PY	5	5	0	%100	Active
5	M21	PY	5	5	0	%100	Active
6	M20	PY	5	5	0	%100	Active
7	M19	PY	5	5	0	%100	Active
8	M16	PY	5	5	0	%100	Active
9	M15	PY	5	5	0	%100	Active
10	M14	PY	5	5	0	%100	Active
11	M13	PY	5	5	0	%100	Active
12	M42A	PY	5	5	0	%100	Active
13	M36	PY	1	1	0	%100	Active
14	M35	PY	1	1	0	%100	Active
15	M34	PY	1	1	0	%100	Active
16	M33	PY	1	1	0	%100	Active
17	M40	PY	2	2	0	%100	Active
18	M39	PY	2	2	0	%100	Active
19	M38	PY	2	2	0	%100	Active
20	M37	PY	2	2	0	%100	Active
21	M28	PY	2	2	0	%100	Active
22	M27	PY	2	2	0	%100	Active
23	M26	PY	2	2	0	%100	Active
24	M25	PY	2	2	0	%100	Active

Member Distributed Loads (BLC 4 : WIND LOAD (NO ICE) SIDE)

	Member Label	Direction	Start Magnitud...	End Magnitude...	Start Location [...	End Location [...	Inactive [(lb, k-...
1	M18	PX	7	7	0	%100	Active
2	M17	PX	7	7	0	%100	Active
3	M24	PX	5	5	0	%100	Active
4	M22	PX	5	5	0	%100	Active
5	M21	PX	5	5	0	%100	Active
6	M20	PX	5	5	0	%100	Active
7	M19	PX	5	5	0	%100	Active

Member Distributed Loads (BLC 4 : WIND LOAD (NO ICE) SIDE) (Continued)

	Member Label	Direction	Start Magnitud...	End Magnitude...	Start Location [...]	End Location [...]	Inactive [(lb, k-...
8	M16	PX	5	5	0	%100	Active
9	M15	PX	5	5	0	%100	Active
10	M14	PX	5	5	0	%100	Active
11	M13	PX	5	5	0	%100	Active
12	M42A	PX	5	5	0	%100	Active
13	M36	PX	1	1	0	%100	Active
14	M35	PX	1	1	0	%100	Active
15	M34	PX	1	1	0	%100	Active
16	M33	PX	1	1	0	%100	Active
17	M40	PX	2	2	0	%100	Active
18	M39	PX	2	2	0	%100	Active
19	M38	PX	2	2	0	%100	Active
20	M37	PX	2	2	0	%100	Active
21	M28	PX	2	2	0	%100	Active
22	M27	PX	2	2	0	%100	Active
23	M26	PX	2	2	0	%100	Active
24	M25	PX	2	2	0	%100	Active

Member Distributed Loads (BLC 5 : WIND LOAD (ICE) FRONT)

	Member Label	Direction	Start Magnitud...	End Magnitude...	Start Location [...]	End Location [...]	Inactive [(lb, k-...
1	M18	PY	5.6	5.6	0	%100	Active
2	M17	PY	5.6	5.6	0	%100	Active
3	M24	PY	5.2	5.2	0	%100	Active
4	M22	PY	5.2	5.2	0	%100	Active
5	M21	PY	5.2	5.2	0	%100	Active
6	M20	PY	5.2	5.2	0	%100	Active
7	M19	PY	5.2	5.2	0	%100	Active
8	M16	PY	5.2	5.2	0	%100	Active
9	M15	PY	5.2	5.2	0	%100	Active
10	M14	PY	5.2	5.2	0	%100	Active
11	M13	PY	5.2	5.2	0	%100	Active
12	M42A	PY	5.2	5.2	0	%100	Active
13	M36	PY	3.7	3.7	0	%100	Active
14	M35	PY	3.7	3.7	0	%100	Active
15	M34	PY	3.7	3.7	0	%100	Active
16	M33	PY	3.7	3.7	0	%100	Active
17	M40	PY	3.8	3.8	0	%100	Active
18	M39	PY	3.8	3.8	0	%100	Active
19	M38	PY	3.8	3.8	0	%100	Active
20	M37	PY	3.8	3.8	0	%100	Active
21	M28	PY	4	4	0	%100	Active
22	M27	PY	4	4	0	%100	Active
23	M26	PY	4	4	0	%100	Active
24	M25	PY	4	4	0	%100	Active

Member Distributed Loads (BLC 6 : WIND LOAD (ICE) SIDE)

	Member Label	Direction	Start Magnitud...	End Magnitude...	Start Location [...]	End Location [...]	Inactive [(lb, k-...
1	M18	PX	5.6	5.6	0	%100	Active
2	M17	PX	5.6	5.6	0	%100	Active
3	M24	PX	5.2	5.2	0	%100	Active
4	M22	PX	5.2	5.2	0	%100	Active
5	M21	PX	5.2	5.2	0	%100	Active
6	M20	PX	5.2	5.2	0	%100	Active
7	M19	PX	5.2	5.2	0	%100	Active
8	M16	PX	5.2	5.2	0	%100	Active
9	M15	PX	5.2	5.2	0	%100	Active
10	M14	PX	5.2	5.2	0	%100	Active

Member Distributed Loads (BLC 6 : WIND LOAD (ICE) SIDE) (Continued)

	Member Label	Direction	Start Magnitud...	End Magnitude...	Start Location [...]	End Location [...]	Inactive [(lb, k-...
11	M13	PX	5.2	5.2	0	%100	Active
12	M42A	PX	5.2	5.2	0	%100	Active
13	M36	PX	3.7	3.7	0	%100	Active
14	M35	PX	3.7	3.7	0	%100	Active
15	M34	PX	3.7	3.7	0	%100	Active
16	M33	PX	3.7	3.7	0	%100	Active
17	M40	PX	3.8	3.8	0	%100	Active
18	M39	PX	3.8	3.8	0	%100	Active
19	M38	PX	3.8	3.8	0	%100	Active
20	M37	PX	3.8	3.8	0	%100	Active
21	M28	PX	4	4	0	%100	Active
22	M27	PX	4	4	0	%100	Active
23	M26	PX	4	4	0	%100	Active
24	M25	PX	4	4	0	%100	Active

Load Combinations

De...	So...	PD...	SR...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...
1	DL...	Yes	Y	1	1.2		3	1.6						
2	DL...	Yes	Y	1	1.2		3	1.3...	4	0.8				
3	DL...	Yes	Y	1	1.2		3	0.8	4	1.3...				
4	DL...	Yes	Y	1	1.2				4	1.6				
5	DL...	Yes	Y	1	1.2		3	-0.8	4	1.3...				
6	DL...	Yes	Y	1	1.2		3	-1...	4	0.8				
7	DL...	Yes	Y	1	1.2		3	-1.6						
8	DL...	Yes	Y	1	1.2		3	-1...	4	-0.8				
9	DL...	Yes	Y	1	1.2		3	-0.8	4	-1...				
10	DL...	Yes	Y	1	1.2				4	-1.6				
11	DL...	Yes	Y	1	1.2		3	0.8	4	-1...				
12	DL...	Yes	Y	1	1.2		3	1.3...	4	-0.8				
13	DL...	Yes	Y	1	1.2	2	1	5	1					
14	DL...	Yes	Y	1	1.2	2	1	5	0.8...	6	0.5			
15	DL...	Yes	Y	1	1.2	2	1	5	0.5	6	0.8...			
16	DL...	Yes	Y	1	1.2	2	1		6	1				
17	DL...	Yes	Y	1	1.2	2	1	5	-0.5	6	0.8...			
18	DL...	Yes	Y	1	1.2	2	1	5	-0...	6	0.5			
19	DL...	Yes	Y	1	1.2	2	1	5	-1					
20	DL...	Yes	Y	1	1.2	2	1	5	-0...	6	-0.5			
21	DL...	Yes	Y	1	1.2	2	1	5	-0.5	6	-0...			
22	DL...	Yes	Y	1	1.2	2	1		6	-1				
23	DL...	Yes	Y	1	1.2	2	1	5	0.5	6	-0...			
24	DL...	Yes	Y	1	1.2	2	1	5	0.8...	6	-0.5			
25	DE...	Yes	Y	1	1.2				7	1.5				
26	DE...	Yes	Y	1	1.2				8	1.5				
27	DE...	Yes	Y	1	1.2				9	1.5				
28	DL...	Yes	Y	1	1.2	10	1.5	3	0.1...					
29	DL...	Yes	Y	1	1.2	11	1.5	3	0.1...					
30	DL...	Yes	Y	1	1.2	12	1.5	3	0.1...					
31	DL...	Yes	Y	1	1.2	13	1.5	3	0.1...					
32	DL...	Yes	Y	1	1.2	10	1.5	4	0.1...					
33	DL...	Yes	Y	1	1.2	11	1.5	4	0.1...					
34	DL...	Yes	Y	1	1.2	12	1.5	4	0.1...					
35	DL...	Yes	Y	1	1.2	13	1.5	4	0.1...					
36	DL...	Yes	Y	1	1.2	10	1.5	3	-0...					
37	DL...	Yes	Y	1	1.2	11	1.5	3	-0...					
38	DL...	Yes	Y	1	1.2	12	1.5	3	-0...					
39	DL...	Yes	Y	1	1.2	13	1.5	3	-0...					
40	DL...	Yes	Y	1	1.2	10	1.5	4	-0...					
41	DL...	Yes	Y	1	1.2	11	1.5	4	-0...					

Load Combinations (Continued)

De...	So...	PD...	SR...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...	BLC Fa...
42 DL...	Yes	Y		1	1.2	12	1.5	4	-0.000					
43 DL...	Yes	Y		1	1.2	13	1.5	4	-0.000					

Node Reactions

	Node...		X [lbs]	LC	Y [lbs]	LC	Z [lbs]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N51	max	1015.0...	40	-116.019	9	1855.8...	15	0	43	0	43	0	43
2		min	-1419....	35	-1751....	17	585.523	10	0	1	0	1	0	1
3	N52	max	1584.7...	43	1736.7...	19	450.161	20	0	43	0	43	0	43
4		min	-1166....	32	-199.122	1	95.776	4	0	1	0	1	0	1
5	N64	max	102.88	28	344.333	43	49.679	14	0	43	0	43	0	43
6		min	-112.513	39	-314.332	32	15.698	8	0	1	0	1	0	1
7	N61A	max	186.564	11	738.937	5	34.785	23	0	43	0	43	0	43
8		min	-196.546	5	-696.741	11	10.363	35	0	1	0	1	0	1
9	Totals:	max	1005.2...	10	1442.3...	7	2358.8...	13						
10		min	-1005....	4	-1442.35	1	806.644	6						

Node Displacements

	Node...		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rota...	LC	Y Rota...	LC	Z Rota...	LC
1	N1	max	0.029	35	0.064	2	0.114	31	2.284e...	6	1.797e...	31	1.435e...	8
2		min	-0.023	40	-0.049	8	-0.39	36	-2.271...	12	-5.528...	36	-1.741...	2
3	N2	max	0.03	35	0.058	31	0.075	32	2.176e...	8	5.797e...	43	1.697e...	12
4		min	-0.022	40	-0.049	36	-0.429	43	-2.719...	2	-1.546...	32	-1.648...	6
5	N3	max	0.057	32	0.098	4	0.114	43	1.415e...	25	1.799e...	43	1.526e...	8
6		min	-0.057	43	-0.082	10	-0.39	32	-1.405...	9	-5.559...	32	-1.762...	2
7	N4	max	0.056	32	0.125	12	0.075	36	4.299e...	12	5.783e...	31	1.725e...	12
8		min	-0.057	43	-0.141	6	-0.43	31	-4.944...	6	-1.504...	36	-1.806...	6
9	N5	max	0.03	35	0.059	2	0.105	31	2.284e...	6	1.797e...	31	1.435e...	8
10		min	-0.024	40	-0.045	8	-0.372	36	-2.271...	12	-5.528...	36	-1.741...	2
11	N6	max	0.029	35	0.059	2	0.109	31	2.284e...	6	1.797e...	31	1.435e...	8
12		min	-0.023	40	-0.045	8	-0.373	36	-2.271...	12	-5.528...	36	-1.741...	2
13	N7	max	0.057	32	0.095	4	0.105	31	1.415e...	25	1.799e...	43	1.526e...	8
14		min	-0.056	11	-0.08	10	-0.372	36	-1.405...	9	-5.559...	32	-1.762...	2
15	N8	max	0.057	32	0.095	4	0.109	43	1.415e...	25	1.799e...	43	1.526e...	8
16		min	-0.057	43	-0.08	10	-0.374	32	-1.405...	9	-5.559...	32	-1.762...	2
17	N9	max	0.031	35	0.002	6	0.03	35	2.961e...	7	1.778e...	43	5.67e-04	40
18		min	-0.024	40	-0.002	12	-0.059	40	-2.971...	1	-3.288...	32	-6.449...	35
19	N10	max	0.029	35	0.002	6	0.032	31	2.961e...	7	1.778e...	43	5.67e-04	40
20		min	-0.022	40	-0.002	12	-0.06	36	-2.971...	1	-3.288...	32	-6.449...	35
21	N11	max	0.06	5	0.05	5	0.03	35	2.153e...	2	1.797e...	31	1.307e...	11
22		min	-0.06	11	-0.044	11	-0.059	40	-2.309...	8	-3.246...	36	-1.586...	5
23	N12	max	0.056	32	0.05	5	0.032	39	2.153e...	2	1.797e...	31	1.307e...	11
24		min	-0.057	43	-0.044	11	-0.06	28	-2.309...	8	-3.246...	36	-1.586...	5
25	N13	max	0.027	35	0.004	28	0.009	40	5.625e...	7	3.819e...	35	6.576e...	39
26		min	-0.02	40	-0.004	39	-0.082	35	-6.151...	1	-1.275...	40	-6.682...	28
27	N14	max	0.029	35	0.004	28	0.012	28	5.625e...	7	3.819e...	35	6.576e...	39
28		min	-0.022	40	-0.004	39	-0.083	39	-6.151...	1	-1.275...	40	-6.682...	28
29	N15	max	0.061	5	0.044	11	0.009	40	6.626e...	1	3.794e...	43	1.671e...	11
30		min	-0.062	11	-0.052	5	-0.082	35	-7.327...	7	-1.32e...	32	-1.842...	5
31	N16	max	0.056	32	0.044	11	0.013	36	6.626e...	1	3.794e...	43	1.671e...	11
32		min	-0.057	43	-0.052	5	-0.082	31	-7.327...	7	-1.32e...	32	-1.842...	5
33	N17	max	0.027	35	0.055	31	0.067	32	2.176e...	8	5.797e...	43	1.697e...	12
34		min	-0.019	40	-0.046	36	-0.413	43	-2.719...	2	-1.546...	32	-1.648...	6
35	N18	max	0.03	35	0.055	31	0.07	32	2.176e...	8	5.797e...	43	1.697e...	12
36		min	-0.022	40	-0.046	36	-0.412	43	-2.719...	2	-1.546...	32	-1.648...	6
37	N19	max	0.059	5	0.12	12	0.067	32	4.299e...	12	5.783e...	31	1.725e...	12
38		min	-0.061	43	-0.136	6	-0.413	43	-4.944...	6	-1.504...	36	-1.806...	6
39	N20	max	0.056	32	0.12	12	0.071	36	4.299e...	12	5.783e...	31	1.725e...	12

Node Displacements (Continued)

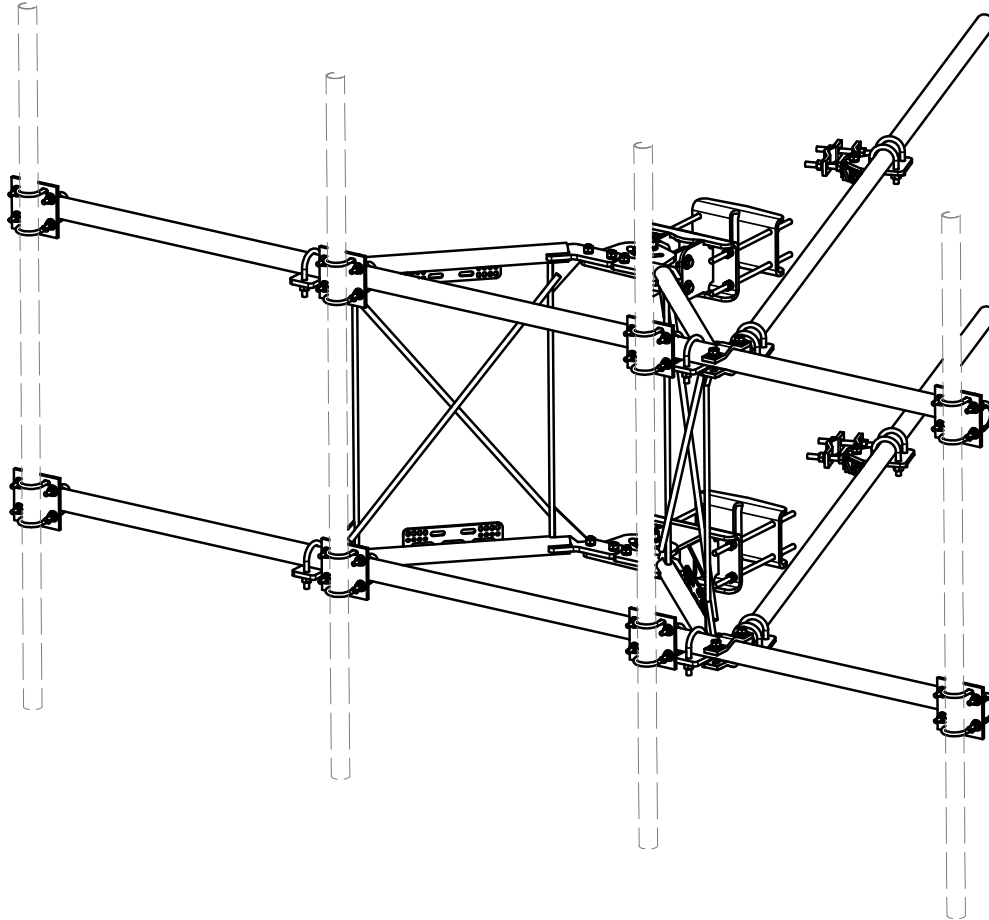
	Node...		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rota...	LC	Y Rota...	LC	Z Rota...	LC
40		min	-0.057	43	-0.136	6	-0.413	31	-4.944...	6	-1.504...	36	-1.806...	6
41	N21	max	0.08	31	0.107	1	0.105	31	2.43e-03	6	1.797e...	31	1.435e...	8
42		min	-0.178	36	-0.093	7	-0.372	36	-2.416...	12	-5.528...	36	-1.741...	2
43	N22	max	0.211	32	0.129	4	0.105	31	1.416e...	3	1.81e-03	43	1.526e...	8
44		min	-0.106	43	-0.116	10	-0.373	36	-1.489...	9	-5.459...	32	-1.762...	2
45	N23	max	0.079	35	0.085	1	0.03	35	3.129e...	7	1.768e...	43	5.67e-04	40
46		min	-0.115	40	-0.085	7	-0.059	40	-3.139...	1	-3.277...	32	-6.449...	35
47	N24	max	0.148	32	0.07	3	0.03	35	2.298e...	2	1.797e...	31	1.307e...	11
48		min	-0.107	43	-0.07	9	-0.059	40	-2.454...	8	-3.245...	36	-1.586...	5
49	N25	max	0.185	4	0.366	1	0.009	40	1.563e...	7	8.221e...	4	6.576e...	39
50		min	-0.163	10	-0.351	7	-0.082	35	-1.615...	1	-7.677...	10	-6.682...	28
51	N26	max	0.22	4	0.4	1	0.009	40	1.65e-02	1	8.669e...	10	1.671e...	11
52		min	-0.234	10	-0.428	7	-0.082	35	-1.72e...	7	-8.185...	4	-1.842...	5
53	N27	max	0.187	31	0.12	2	0.067	32	2.321e...	8	5.787e...	43	1.697e...	12
54		min	-0.06	36	-0.098	8	-0.413	43	-2.865...	2	-1.536...	32	-1.648...	6
55	N28	max	0.101	32	0.244	12	0.067	32	4.444e...	12	5.667e...	31	1.725e...	12
56		min	-0.22	43	-0.278	6	-0.414	43	-5.089...	6	-1.503...	36	-1.806...	6
57	N29	max	0.002	40	0.014	40	0.037	43	-5.767...	5	4.12e-03	43	1.615e...	35
58		min	-0.003	35	-0.02	35	-0.03	36	-2.166...	23	-2.776...	32	-1.185...	40
59	N30	max	0.003	6	0.017	6	0.036	43	8.286e...	28	3.807e...	31	1.098e...	12
60		min	-0.002	12	-0.009	12	-0.026	36	-9.988...	13	-2.545...	36	-1.863...	6
61	N31	max	0.015	35	0.001	6	0.051	35	-6.341...	2	2.013e...	43	1.8e-03	40
62		min	-0.011	40	-0.002	24	-0.056	36	-3.183...	20	-2.128...	32	-2.299...	35
63	N32	max	0.04	5	0.052	5	0.051	35	-5.254...	7	1.722e...	35	3.851e...	43
64		min	-0.038	11	-0.044	11	-0.051	36	-3.12e...	24	-2.343...	36	-3.464...	32
65	N33	max	0.002	40	0.02	35	0.026	36	-6.261...	26	3.923e...	31	1.786e...	35
66		min	-0.003	35	-0.015	40	-0.041	43	-1.937...	16	-2.999...	36	-1.291...	40
67	N34	max	0.003	6	0.009	12	0.026	32	1.8e-04	31	3.618e...	43	1.242e...	12
68		min	-0.002	12	-0.018	6	-0.037	43	-8.697...	17	-2.75e...	32	-2.034...	6
69	N35	max	0.011	35	0.007	35	0.032	28	5.798e...	12	2.561e...	35	2.045e...	40
70		min	-0.008	40	-0.005	40	-0.076	39	-3.478...	18	-1.641...	40	-2.781...	35
71	N36	max	0.043	5	0.046	11	0.033	40	1.763e...	7	2.812e...	43	3.879e...	43
72		min	-0.041	11	-0.057	5	-0.07	35	-3.613...	13	-1.327...	32	-3.436...	32
73	N37	max	0	35	0.012	40	0.033	43	-6.478...	5	4.442e...	43	2.278e...	35
74		min	0	40	-0.017	35	-0.024	36	-2.141...	23	-3.17e...	36	-1.657...	40
75	N38	max	0	36	0.015	6	0.031	43	-1.111...	31	4.121e...	43	1.006e...	12
76		min	0	31	-0.007	12	-0.022	32	-9.48e...	16	-2.917...	32	-1.954...	6
77	N39	max	0	28	0.007	12	0.022	32	-1.111...	31	4.121e...	43	1.006e...	12
78		min	0	39	-0.015	6	-0.031	43	-9.48e...	16	-2.917...	32	-1.954...	6
79	N40	max	0	35	0.017	35	0.024	36	-6.478...	5	4.442e...	43	2.278e...	35
80		min	0	40	-0.012	40	-0.033	43	-2.141...	23	-3.17e...	36	-1.657...	40
81	N41	max	0.029	35	0.004	35	0.041	31	2.846e...	7	1.693e...	43	5.786e...	40
82		min	-0.022	40	-0.003	40	-0.081	36	-2.866...	1	-4.518...	32	-8.039...	35
83	N42	max	0.019	35	0.003	5	0.05	35	-6.443...	2	1.962e...	43	1.825e...	40
84		min	-0.014	40	-0.002	11	-0.062	36	-3.413...	20	-2.452...	32	-2.3e-03	35
85	N43	max	0.029	35	0.003	1	0.019	28	5.174e...	7	4.958e...	31	9.587e...	35
86		min	-0.022	40	-0.002	7	-0.106	39	-5.713...	1	-1.253...	36	-8.537...	40
87	N44	max	0.015	35	0.003	2	0.031	28	5.992e...	1	2.901e...	35	2.233e...	40
88		min	-0.011	40	-0.002	8	-0.083	39	-3.963...	18	-1.561...	40	-3.047...	35
89	N45	max	0.056	32	0.057	5	0.041	39	2.029e...	2	1.703e...	31	1.144e...	10
90		min	-0.057	43	-0.051	11	-0.08	28	-2.184...	8	-4.489...	36	-1.405...	4
91	N46	max	0.044	5	0.056	5	0.05	35	-5.754...	7	1.692e...	35	4.008e...	43
92		min	-0.043	11	-0.049	11	-0.057	40	-3.377...	13	-2.659...	36	-3.627...	32
93	N47	max	0.056	32	0.052	11	0.019	36	6.328e...	1	4.944e...	43	1.561e...	11
94		min	-0.057	43	-0.061	5	-0.105	31	-7.03e...	7	-1.276...	32	-1.727...	5
95	N48	max	0.046	5	0.05	11	0.031	36	8.904e...	7	3.153e...	43	4.075e...	43
96		min	-0.045	11	-0.06	5	-0.078	31	-4.175...	13	-1.277...	32	-3.56e...	32
97	N49	max	0.029	35	0.006	35	0.024	28	4.764e...	7	6.184e...	31	1.164e...	35

Node Displacements (Continued)

	Node...		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rota...	LC	Y Rota...	LC	Z Rota...	LC
98		min	-0.022	40	-0.005	40	-0.134	39	-5.305...	1	-1.187...	36	-9.537...	40
99	N51	max	0	35	0	17	0	10	-6.478...	5	4.442e...	43	2.278e...	35
100		min	0	40	0	9	0	15	-2.141...	23	-3.17e...	36	-1.657...	40
101	N52	max	0	32	0	1	0	4	-1.111...	31	4.121e...	43	1.006e...	12
102		min	0	43	0	19	0	20	-9.48e...	16	-2.917...	32	-1.954...	6
103	N77A	max	0.029	35	0.008	35	0.049	31	2.75e-03	7	1.607e...	43	5.052e...	8
104		min	-0.022	40	-0.006	40	-0.107	36	-2.767...	1	-5.769...	32	-9.179...	14
105	N64	max	0	39	0	32	0	8	-6.145...	36	1.621e...	31	1.408e...	10
106		min	0	28	0	43	0	14	-2.449...	23	-5.938...	36	-1.488...	4
107	N57	max	0.181	4	0.358	1	0.009	40	1.563e...	7	8.221e...	4	6.576e...	39
108		min	-0.159	10	-0.343	7	-0.082	35	-1.615...	1	-7.677...	10	-6.682...	28
109	N58	max	0.215	4	0.392	1	0.009	40	1.65e-02	1	8.669e...	10	1.671e...	11
110		min	-0.23	10	-0.419	7	-0.082	35	-1.72e...	7	-8.185...	4	-1.842...	5
111	N61A	max	0	5	0	11	0	35	3.565e...	36	5.388e...	31	6.157e...	10
112		min	0	11	0	5	0	23	-3.723...	35	-1.543...	7	-7.292...	4

LRFD

Member	Shape	Code...	Loc [in]	LC	Shear...	Loc [in]	Dir	LC	phi*P...	phi*P...	phi*M...	phi*M...	Cb	Eqn
1	M18	PIPE...	0.238	45.313	32	0.103	51.563	6	14558...	50715	3.596	3.596	2.087	H1-1b
2	M17	PIPE...	0.224	104.688	43	0.109	103.125	7	14558...	50715	3.596	3.596	1.943	H1-1b
3	M24	PIPE...	0.033	62.839	5	0.004	62.839	16	23127...	32130	1.872	1.872	1.136	H1-1b*
4	M22	PIPE...	0.247	1.875	43	0.099	28.125	29	29810...	32130	1.872	1.872	1.501	H1-1b
5	M21	PIPE...	0.251	0	35	0.110	0	37	29810...	32130	1.872	1.872	1.74	H1-1b
6	M20	PIPE...	0.298	2.188	43	0.154	28.125	24	29810...	32130	1.872	1.872	1.418	H1-1b
7	M19	PIPE...	0.302	1.875	35	0.170	0	19	29810...	32130	1.872	1.872	1.249	H1-1b
8	M16	PIPE...	0.366	68	39	0.043	28	35	14916...	32130	1.872	1.872	3	H1-1b
9	M15	PIPE...	0.487	28	1	0.072	28	6	14916...	32130	1.872	1.872	1.344	H1-1b
10	M14	PIPE...	0.145	68	6	0.036	68	32	14916...	32130	1.872	1.872	2.402	H1-1b
11	M13	PIPE...	0.360	68	28	0.046	28	40	14916...	32130	1.872	1.872	3	H1-1b
12	M42A	PIPE...	0.060	45.276	21	0.005	90.552	22	16233...	32130	1.872	1.872	1.136	H1-1b
13	M36	5/8 SR	0.319	25.417	36	0.027	40	31	2855...	9946.8	0.097	0.097	1.136	H1-1a
14	M35	5/8 SR	0.230	25.417	32	0.013	40	35	2855...	9946.8	0.097	0.097	1	H1-1a
15	M34	5/8 SR	0.407	20.833	19	0.029	40	43	2855...	9946.8	0.097	0.097	1.136	H1-1a
16	M33	5/8 SR	0.283	25.417	31	0.014	40	35	2855...	9946.8	0.097	0.097	1.136	H1-1a
17	M40	3/4" rod	0.012	0	31	0.005	47.572	31	1550...	14313...	0.179	0.179	2.421	H1-1b*
18	M39	3/4" rod	0.122	23.786	17	0.013	47.572	5	3164...	14313...	0.179	0.179	1.136	H1-1b
19	M38	3/4" rod	0.161	23.786	21	0.015	47.572	11	3164...	14313...	0.179	0.179	1.136	H1-1b
20	M37	3/4" rod	0.000	47.572	43	0.000	47.572	43	1550...	14313...	0.179	0.179	1	H1-1a
21	M28	625 x...	0.275	0	32	0.173	0	y	68522...	70875	0.923	5.168	1.667	H1-1b
22	M27	625 x...	0.334	0	31	0.172	0	y	68522...	70875	0.923	5.168	1.667	H1-1b
23	M26	625 x...	0.235	0	36	0.182	0.666	y	68522...	70875	0.923	5.168	1.667	H1-1b
24	M25	625 x...	0.310	0	39	0.191	0.666	y	68522...	70875	0.923	5.168	1.667	H1-1b



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	2	X-VFAW	SUPPORT ARM		71.41	142.81
2	1	X-HDCAMTBW	CLAMP WELDMENT FOR BCAM-HD		33.86	33.86
3	1	X-MHTPHD	MULTI-HOLE TAPER PLATE WELDMENT		36.24	36.24
4	2	X-VFAPL4	VFA-HD PIVOT PLATE	12 in	15.88	31.77
5	2	X-LCBP4	BENT BACKING PLATE	13 in	19.00	38.01
6	1	X-HDCAMSS	ANGLE ADJUSTMENT WELDMENT FOR BCAM-HD		16.39	16.39
7	4	X-SPTB	SLIDING PIPE TIE BACK PLATE	5 1/2 in	5.87	23.49
8	1	X-HDCAMSP	POSITIONING PLATE WELDMENT FOR BCAM-HD		2.58	2.58
9	4	X-TBCA	TIE BACK CLIP ANGLE		2.01	8.02
10	8	SCX2	CROSSOVER PLATE	7 in	4.80	38.37
11	4	MCP	CLAMP HALF 1/2" THICK, 11-5/8" LONG	12 1/16 in	3.59	14.37
12	8	DCP	1/2" THICK, 5-3/4" CTR TO CENTER CLAMP HALF	8 1/8 in	2.36	18.90
13	2	P2126	2-3/8" X 126" (2" SCH. 40) GALVANIZED PIPE	126 in	40.75	81.50
14	2	P30150	2-7/8" X 150" (2-1/2" SCH. 40) GALVANIZED PIPE	150 in	76.94	153.87
15	4	A34212	3/4" x 2-1/2" UNC HEX BOLT (A325)	2 1/2 in	0.48	1.92
16	4	G34FW	3/4" HDG USS FLATWASHER		0.06	0.24
17	4	G34LW	3/4" HDG LOCKWASHER		0.04	0.17
18	4	G34NUT	3/4" HDG HEAVY 2H HEX NUT		0.21	0.85
19	8	G58R-18	5/8" x 18" THREADED ROD (HDG.)	18 in	0.40	3.19
20	4	G58R-12	5/8" x 12" THREADED ROD (HDG.)		1.05	4.18
21	4	G58R-8	5/8" x 8" THREADED ROD (HDG.)		0.70	2.79
22	4	X-UB5300	5/8" X 3" X 5-1/4" X 2-1/2" U-BOLT (HDG.)		1.15	4.60
23	8	X-UB5258	5/8" X 2-5/8" X 4-1/2" X 2" U-BOLT (HDG.)		1.00	8.00
24	2	G5807	5/8" x 7" HDG HEX BOLT GR5 FULL THREAD	7 in	0.70	1.41
25	1	G5806	5/8" x 6" HDG HEX BOLT GR5 FULL THREAD	6 in	0.62	0.62
26	8	G5804	5/8" x 4" HDG HEX BOLT GR5		0.44	3.55
27	4	G5802	5/8" x 2" HDG HEX BOLT GR5		0.27	1.08
28	8	A582114	5/8" x 2-1/4" HDG A325 HEX BOLT	2 1/4 in	0.31	2.50
29	25	G58FW	5/8" HDG USS FLATWASHER	1/8 in	0.07	1.76
30	66	G58LW	5/8" HDG LOCKWASHER		0.03	1.72
31	71	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	9.22
32	32	X-UB1300	1/2" X 3" X 5" X 2" GALV U-BOLT		0.74	23.64
33	16	X-UB1212	1/2" X 2" X 3" X 1-1/4" U-BOLT (HDG.)		0.60	9.56
34	64	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	2.18
35	64	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	0.89
36	64	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	4.58
					TOTAL WT. #	738.06

D	UPDATED BCAM VERSION 1 TO BCAM VERSION 2		CEK	6/29/2018
C	UPDATED PIN LEG CONNECTION TO B-CAM CONNECTION		CEK	12/7/2017
B	CHANGED TIE-BACK BACK CONNECTION		CEK	7/31/2017
A	CHANGED TIE-BACK FRONT CONNECTION		CEK	2/2/2017
REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
REVISION HISTORY				

TOLERANCE NOTES

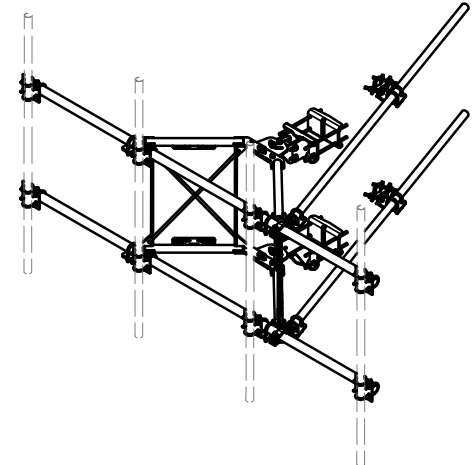
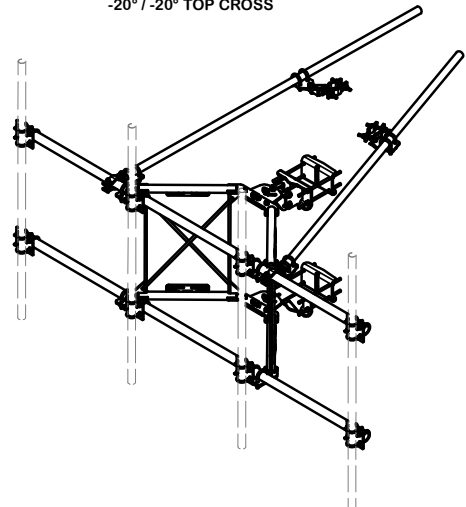
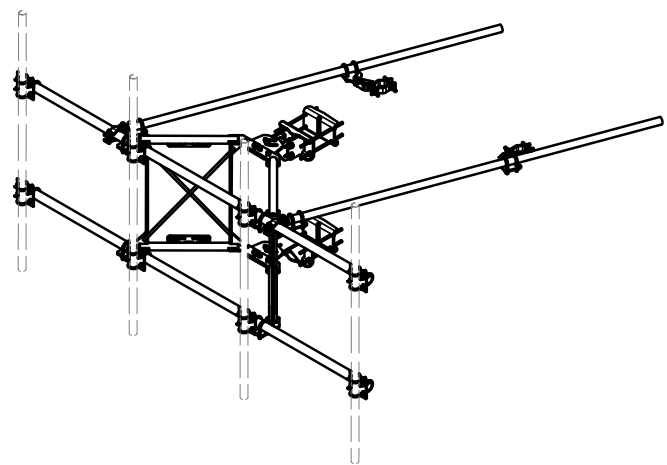
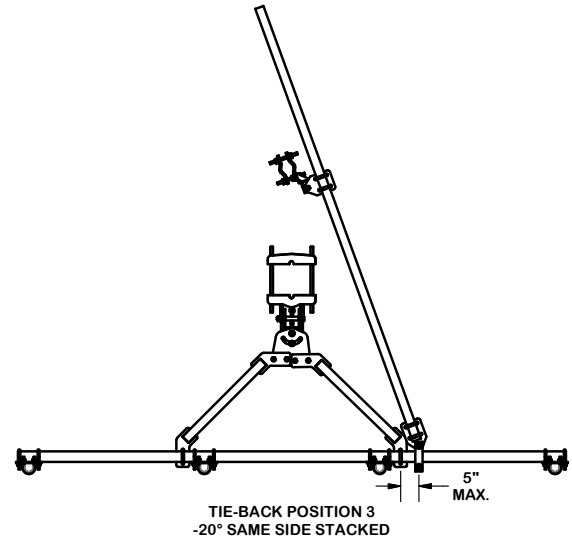
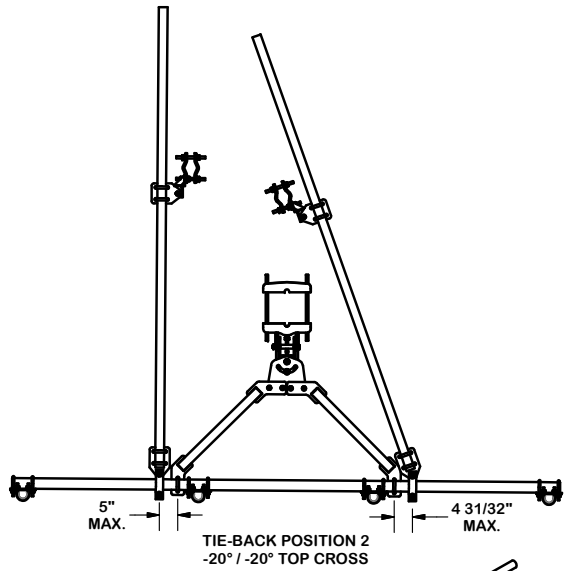
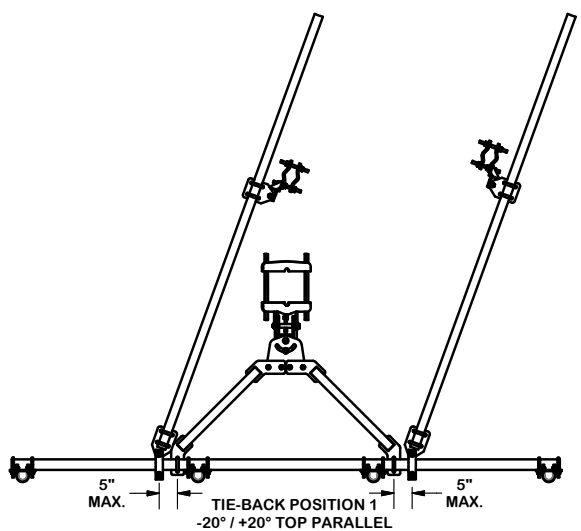
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES ($\pm 0.030"$)
DRILLED AND GAS CUT HOLES ($\pm 0.030"$) - NO CONING OF HOLES
LASER CUT EDGES AND HOLES ($\pm 0.010"$) - NO CONING OF HOLES
BENDS ARE $\pm 1/2$ DEGREE
ALL OTHER MACHINING ($\pm 0.030"$)
ALL OTHER ASSEMBLY ($\pm 0.060"$)

PROPRIETARY NOTE:
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DESCRIPTION		
12' 6" HEAVY DUTY V-FRAME ASSEMBLY WITH TWO STIFF ARMS		
CPD NO.	DRAWN BY	ENG. APPROVAL
	CEK 1/25/2017	
CLASS	DRAWING USAGE	CHECKED BY
81	CUSTOMER	BMC 12/13/2017
SUB		
02		

SITE PRO 1		Locations: New York, NY Atlanta, GA Los Angeles, CA Plymouth, IN Salem, OR Dallas, TX
Engineering Support Team: 1-888-753-7446		
A valmont COMPANY		
PART NO.	VFA12-HD	
DWG. NO.	VFA12-HD	

TIE-BACK POSITIONS



REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
D	UPDATED BCAM VERSION 1 TO BCAM VERSION 2		CEK	6/29/2018
C	UPDATED PIN LEG CONNECTION TO B-CAM CONNECTION		CEK	12/7/2017
B	CHANGED TIE-BACK BACK CONNECTION		CEK	7/31/2017
A	CHANGED TIE-BACK FRONT CONNECTION		CEK	2/2/2017
REVISION HISTORY				

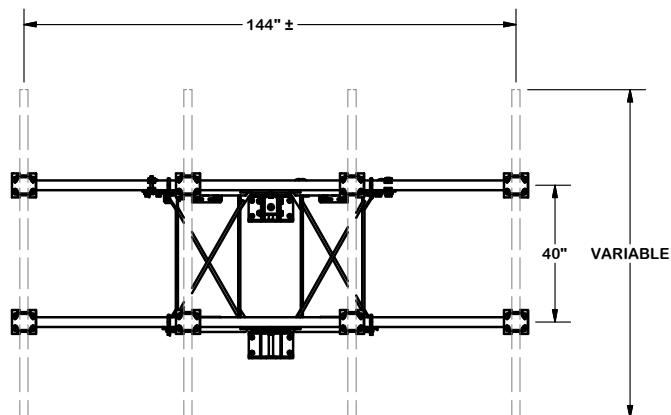
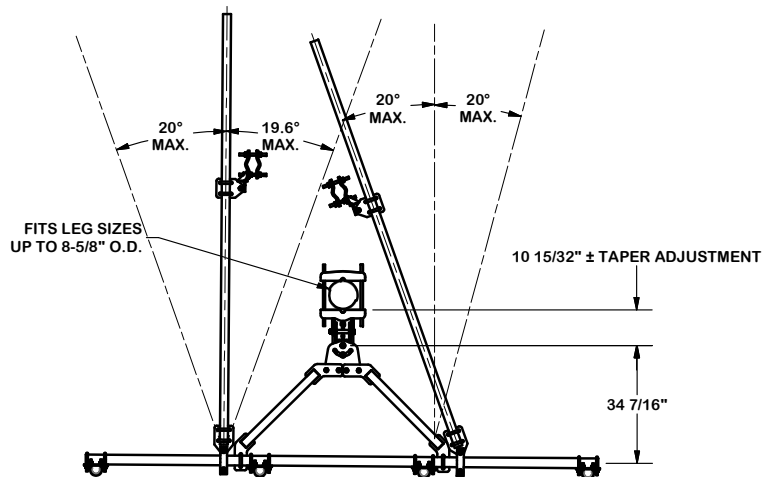
TOLERANCE NOTES

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DRILLED AND GAS CUT HOLES ($\pm 0.030"$) - NO CONING OF HOLES
LASER CUT EDGES AND HOLES ($\pm 0.010"$) - NO CONING OF HOLES
BENDS ARE $\pm 1/2$ DEGREE
ALL OTHER MACHINING ($\pm 0.030"$)
ALL OTHER ASSEMBLY ($\pm 0.060"$)

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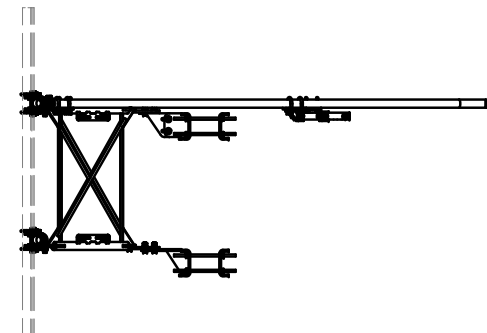
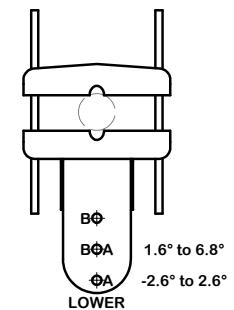
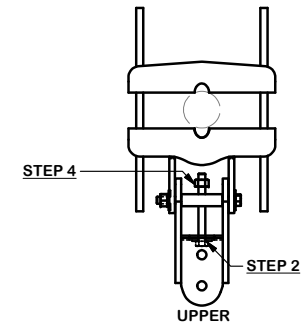
DESCRIPTION			
12' 6" HEAVY DUTY V-FRAME ASSEMBLY WITH TWO STIFF ARMS			
CPD NO.	DRAWN BY	ENG. APPROVAL	
	CEK 1/25/2017		
CLASS	SUB	DRAWING USAGE	CHECKED BY
81	02	CUSTOMER	BMC 12/13/2017

SITE PRO 1		Locations: New York, NY Atlanta, GA Los Angeles, CA Plymouth, IN Salem, OR Dallas, TX
Engineering Support Team: 1-888-753-7446		
A valmont COMPANY		
PART NO.	VFA12-HD	
DWG. NO.	VFA12-HD	



ANGLE CALIBRATING PROCEDURE:

1. MEASURE TOWER TAPER AND PICK LOWER BRACKET HOLE:
 - HOLE A = -2.6° TO 2.6°
 - HOLE B = 1.6° TO 6.8°
2. USE CALIBRATING BOLT TO ADJUST FRAME TO DESIRED TAPER
3. TORQUE LOCKING BOLTS TO 100 ft.-lbs.
4. ADVANCE LOCKING NUT TO POSITIONING PLATE, THEN TIGHTEN.



REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
D	UPDATED BCAM VERSION 1 TO BCAM VERSION 2		CEK	6/29/2018
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TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
 SAWED, SHEARED AND GAS CUT EDGES (± 0.030)
 DRILLED AND GAS CUT HOLES (± 0.030) - NO CONING OF HOLES
 LASER CUT EDGES AND HOLES (± 0.010) - NO CONING OF HOLES
 BENDS ARE $\pm 1/2$ DEGREE
 ALL OTHER MACHINING (± 0.030)
 ALL OTHER ASSEMBLY (± 0.060)

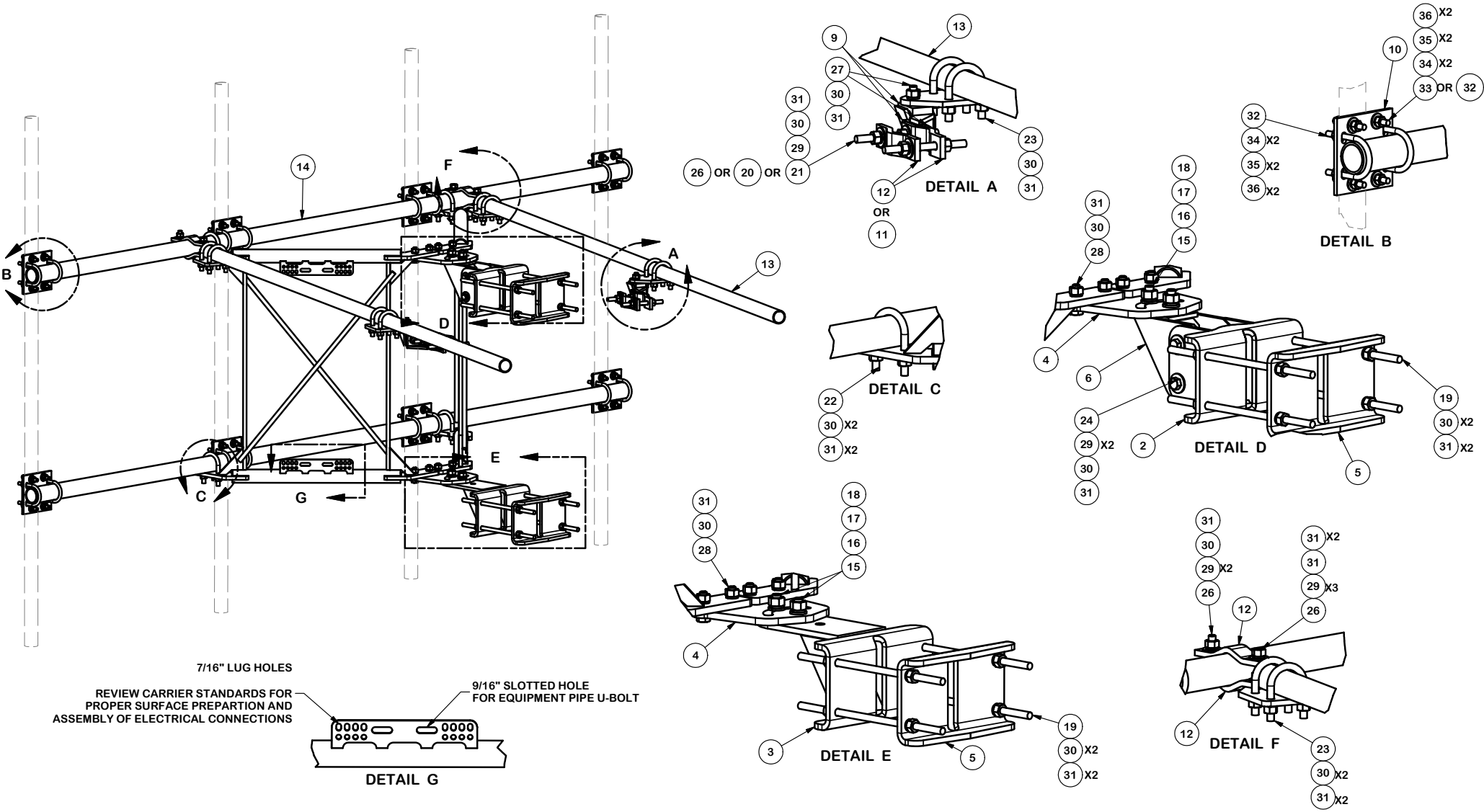
PROPRIETARY NOTE:
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DESCRIPTION				SITE PRO 1 Engineering Support Team: 1-888-753-7446 Locations: New York, NY Atlanta, GA Los Angeles, CA Plymouth, IN Salem, OR Dallas, TX A valmont  COMMUNITY		COL 1				
CPD NO.		DRAWN BY CEK 1/25/2017		ENG. APPROVAL			PART NO. VFA12-HD			
CLASS 81		SUB 02		DRAWING USAGE CUSTOMER			CHECKED BY BMC 12/13/2017		DWG. NO. VFA12-HD	



Engineering
 Support Team:
 1-888-753-7446

Locations:
 New York, NY
 Atlanta, GA
 Los Angeles, CA
 Plymouth, IN
 Salem, OR
 Dallas, TX



D	UPDATED BCAM VERSION 1 TO BCAM VERSION 2		CEK	6/29/2018
C	UPDATED PIN LEG CONNECTION TO B-CAM CONNECTION		CEK	12/7/2017
B	CHANGED TIE-BACK BACK CONNECTION		CEK	7/31/2017
A	CHANGED TIE-BACK FRONT CONNECTION		CEK	2/2/2017
REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
REVISION HISTORY				

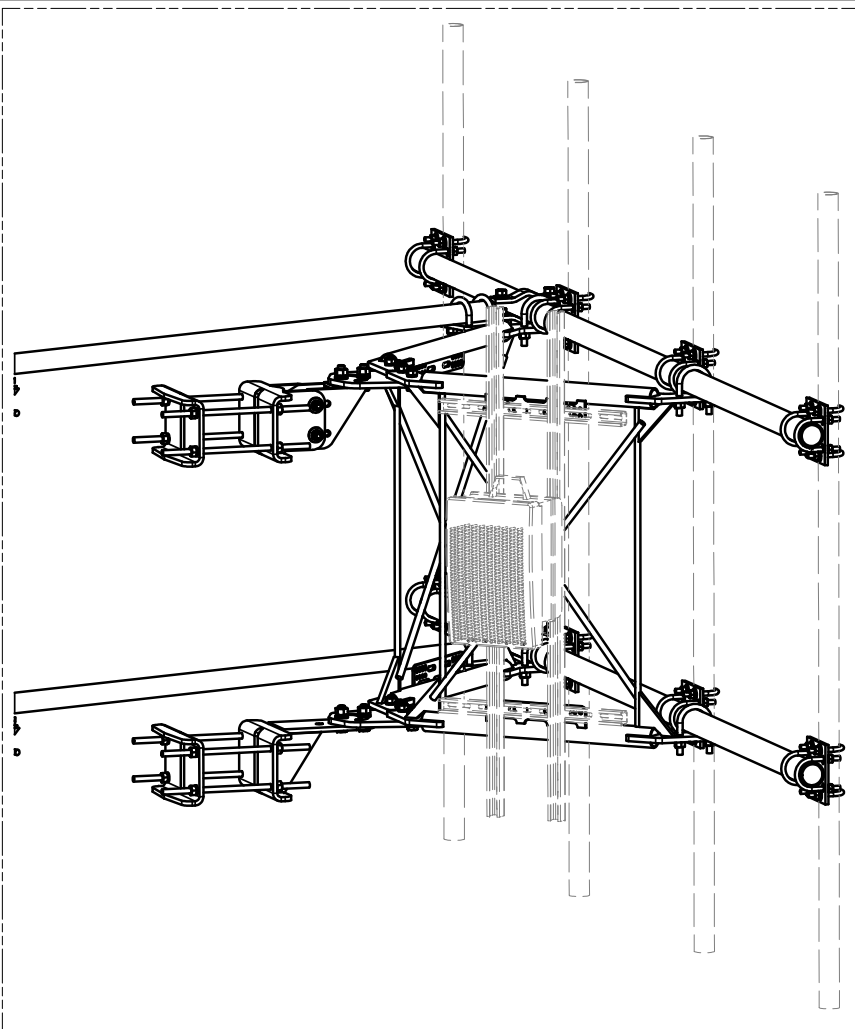
TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES ($\pm 0.030"$)
DRILLED AND GAS CUT HOLES ($\pm 0.030"$) - NO CONING OF HOLES
LASER CUT EDGES AND HOLES ($\pm 0.010"$) - NO CONING OF HOLES
BENDS ARE $\pm 1/2$ DEGREE
ALL OTHER MACHINING ($\pm 0.030"$)
ALL OTHER ASSEMBLY ($\pm 0.060"$)

PROPRIETARY NOTE:
THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

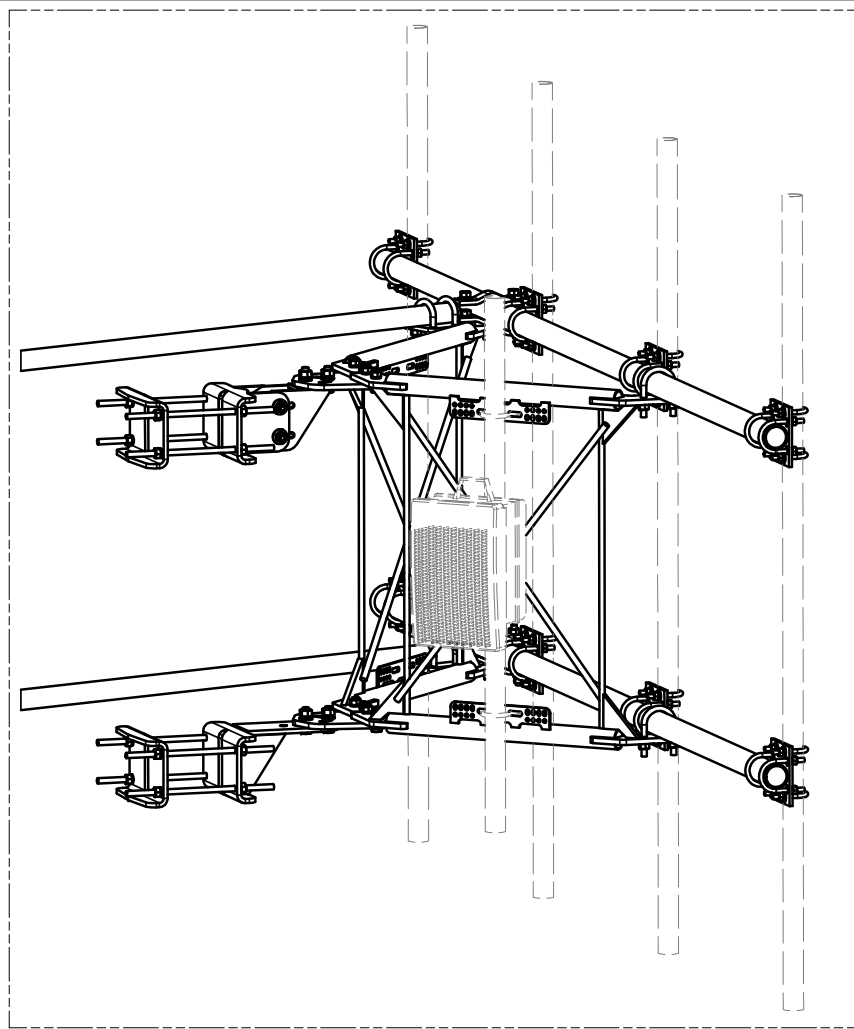
DESCRIPTION		12' 6" HEAVY DUTY V-FRAME ASSEMBLY WITH TWO STIFF ARMS	
CPD NO.	DRAWN BY	ENG. APPROVAL	
	CEK 1/25/2017		
CLASS	SUB	DRAWING USAGE	CHECKED BY
81	02	CUSTOMER	BMC 12/13/2017

SITE PRO 1 A valmont COMPANY		Locations: New York, NY Atlanta, GA Los Angeles, CA Plymouth, IN Salem, OR Dallas, TX
Engineering Support Team: 1-888-753-7446		
PART NO.	VFA12-HD	
DWG. NO.	VFA12-HD	



UNISTRUT AND HARDWARE
SOLD SEPARATELY.

REQUIRES 3/8" HARDWARE



EQUIPMENT PIPE AND HARDWARE
SOLD SEPARATELY.

REQUIRES 1/2" HARDWARE
AND 2-3/8" TO 4-1/2" O.D. PIPE

					TOLERANCE NOTES TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE: SAWED, SHEARED AND GAS CUT EDGES ($\pm 0.030"$) DRILLED AND GAS CUT HOLES ($\pm 0.030"$) - NO CONING OF HOLES LASER CUT EDGES AND HOLES ($\pm 0.010"$) - NO CONING OF HOLES BENDS ARE $\pm 1/2$ DEGREE ALL OTHER MACHINING ($\pm 0.030"$) ALL OTHER ASSEMBLY ($\pm 0.060"$) PROPRIETARY NOTE: THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.					DESCRIPTION 12' 6" HEAVY DUTY V-FRAME ASSEMBLY WITH TWO STIFF ARMS					SITE PRO 1 A valmont COMPANY Locations: New York, NY Atlanta, GA Los Angeles, CA Plymouth, IN Salem, OR Dallas, TX Engineering Support Team: 1-888-753-7446				
D	UPDATED BCAM VERSION 1 TO BCAM VERSION 2			CEK	6/29/2018	CPD NO.		DRAWN BY CEK 1/25/2017		ENG. APPROVAL		PART NO. VFA12-HD		5 OF 5					
C	UPDATED PIN LEG CONNECTION TO B-CAM CONNECTION			CEK	12/7/2017	CLASS 81		SUB 02		DRAWING USAGE CUSTOMER		CHECKED BY BMC 12/13/2017			DWG. NO. VFA12-HD				
B	CHANGED TIE-BACK BACK CONNECTION			CEK	7/31/2017														
A	CHANGED TIE-BACK FRONT CONNECTION			CEK	2/2/2017														
REV	DESCRIPTION OF REVISIONS			CPD	BY	DATE													
REVISION HISTORY																			

Exhibit F

Power Density/RF Emissions Report

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL
TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CT11236A

Stamford / Dtown
555 E. Main Street
Stamford, CT 06901

May 11, 2016

EBI Project Number: 6216002216

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	2.65 %

May 11, 2016

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CT11236A – Stamford / Dtown**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **555 E. Main Street, Stamford, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limit for the 700 MHz Band is approximately $467 \mu\text{W}/\text{cm}^2$, and the general population exposure limit for the PCS and AWS bands is $1000 \mu\text{W}/\text{cm}^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **555 E. Main Street, Stamford, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

- 1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel
- 2) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 3) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 4) 2 LTE channels (PCS Band – 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 5) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.



- 6) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 7) For the following calculations the sample point was the top of a six-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 8) The antennas used in this modeling are the **Ericsson AIR32 B4A/B2P & Ericsson AIR21 B2A/B4P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR32 B4A/B2P & Ericsson AIR21 B2A/B4P** have a maximum gain of **15.9 dBd** at their main lobe at 1900 MHz and 2100 MHz. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 9) The antenna mounting height centerlines of the proposed antennas are **203 feet & 210 feet** above ground level (AGL) (**96.5 feet & 103.5 feet** above the existing **106.5-foot** rooftop walking surface)
- 10) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculations were done with respect to uncontrolled / general public threshold limits.



T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR32 B4A/B2P	Make / Model:	Ericsson AIR32 B4A/B2P	Make / Model:	Ericsson AIR32 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	210	Height (AGL):	210	Height (AGL):	210
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	9,337.08	ERP (W):	9,337.08	ERP (W):	9,337.08
Antenna A1 MPE%	0.81	Antenna B1 MPE%	0.81	Antenna C1 MPE%	0.81
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	210	Height (AGL):	210	Height (AGL):	210
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A2 MPE%	0.40	Antenna B2 MPE%	0.40	Antenna C2 MPE%	0.40
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	210	Height (AGL):	210	Height (AGL):	210
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power(W):	30	Total TX Power(W):	30	Total TX Power(W):	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A3 MPE%	0.17	Antenna B3 MPE%	0.17	Antenna C3 MPE%	0.17

Site Composite MPE %	
Carrier	MPE%
T-Mobile (Per Sector Max)	1.38 %
AT&T	0.63 %
WinStar Wireless	0.07 %
PageNet	0.14 %
Broadcast Video	0.43 %
Site Total MPE %:	2.65 %

T-Mobile Sector 1 Total:	1.38 %
T-Mobile Sector 2 Total:	1.38 %
T-Mobile Sector 3 Total:	1.38 %
Site Total:	2.65 %

T-Mobile _Max per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
T-Mobile 2100 MHz (AWS) LTE	2	2334.27	210	4.03	2100	1000	0.40 %
T-Mobile 2100 MHz (AWS) LTE	2	2334.27	210	4.03	2100	1000	0.40 %
T-Mobile 1900 MHz (PCS) GSM/UMTS	2	1167.14	210	2.02	1900	1000	0.20 %
T-Mobile 2100 MHz (AWS) UMTS	2	1167.14	210	2.02	2100	1000	0.20 %
T-Mobile 700 MHz LTE	1	865.21	203	0.80	700	467	0.17 %
						Total:	1.38%

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public exposure to RF Emissions.

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector 1:	1.38 %
Sector 2:	1.38 %
Sector 3:	1.38 %
T-Mobile Per Sector Maximum:	1.38 %
Site Total:	2.65 %
Site Compliance Status:	COMPLIANT

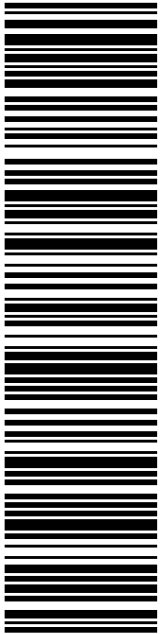
The anticipated composite MPE value for this site at ground level assuming all carriers present is **2.65%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

On the existing 106.6-foot rooftop walking surface the anticipated composite MPE value for this site assuming all carriers present is **7.38%** of the allowable FCC established general public limit with **6.11%** from the T-Mobile radio systems.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

Exhibit G

Recipient Mailings

 Click-N-Ship®	
P	usps.com US POSTAGE Flat Rate Env 07/12/2022 Mailed from 01566
PRIORITY MAIL®	
DEBORAH CHASE NORTHEAST SITE SOLUTIONS STE 1 420 MAIN ST STURBRIDGE MA 01566-1359	Expected Delivery Date: 07/14/22 Ref#: CT11410 0000
 CAROLINE SIMMONS MAYOR- STAMFORD 888 WASHINGTON BLVD # 10 STAMFORD CT 06901-2924	
USPS TRACKING #  9405 5036 9930 0294 3189 10	
Electronic Rate Approved #038555749 	

Cut on dotted line.

Instructions

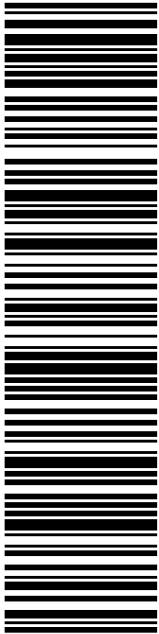
- Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. DO NOT PHOTO COPY OR ALTER LABEL.
- Place your label so it does not wrap around the edge of the package.
- Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.
- To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
- Mail your package on the "Ship Date" you selected when creating this label.

Click-N-Ship® Label Record

USPS TRACKING # : 9405 5036 9930 0294 3189 10	
Trans. #: 567406500 Print Date: 07/12/2022 Ship Date: 07/12/2022 Expected Delivery Date: 07/14/2022	Priority Mail® Postage: \$8.95 Total: \$8.95
From: DEBORAH CHASE NORTHEAST SITE SOLUTIONS STE 1 420 MAIN ST STURBRIDGE MA 01566-1359	
To: CAROLINE SIMMONS MAYOR- STAMFORD 888 WASHINGTON BLVD # 10 STAMFORD CT 06901-2924	
Ref#: CT11410	
* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.	



Thank you for shipping with the United States Postal Service!
 Check the status of your shipment on the USPS Tracking® page at usps.com

 UNITED STATES POSTAL SERVICE®		Click-N-Ship®	
		usps.com US POSTAGE Flat Rate Env	
07/12/2022		Mailed from 01566	
PRIORITY MAIL®		U.S. POSTAGE PAID Click-N-Ship®	
DEBORAH CHASE NORTHEAST SITE SOLUTIONS STE 1 420 MAIN ST STURBRIDGE MA 01566-1359		Expected Delivery Date: 07/14/22 Ref#: CT11410 0000	
		C024	
JAMES LUNNEY III CHIEF ZONING ENFORCEMENT OFFICER 888 WASHINGTON BLVD # 7 STAMFORD CT 06901-2924			
USPS TRACKING #			
			
9405 5036 9930 0294 3189 34			
Electronic Rate Approved #038555749			

✂ ————— Cut on dotted line.

Instructions

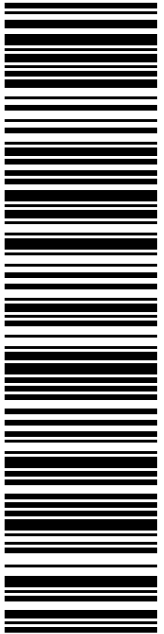
- Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. DO NOT PHOTO COPY OR ALTER LABEL.
- Place your label so it does not wrap around the edge of the package.
- Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.
- To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
- Mail your package on the "Ship Date" you selected when creating this label.

Click-N-Ship® Label Record

USPS TRACKING # : 9405 5036 9930 0294 3189 34	
Trans. #: 567406500 Print Date: 07/12/2022 Ship Date: 07/12/2022 Expected Delivery Date: 07/14/2022	Priority Mail® Postage: \$8.95 Total: \$8.95
From: DEBORAH CHASE NORTHEAST SITE SOLUTIONS STE 1 420 MAIN ST STURBRIDGE MA 01566-1359	
To: JAMES LUNNEY III CHIEF ZONING ENFORCEMENT OFFICER 888 WASHINGTON BLVD # 7 STAMFORD CT 06901-2924	
Ref#: CT11410	
* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.	



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Check the status of your shipment on the USPS Tracking® page at usps.com

 UNITED STATES POSTAL SERVICE®		Click-N-Ship®	
		usps.com US POSTAGE Flat Rate Env U.S. POSTAGE PAID Click-N-Ship®	
07/12/2022		Mailed from 01566	
PRIORITY MAIL®		Expected Delivery Date: 07/15/22 Ref#: CT11410 0000	
DEBORAH CHASE NORTHEAST SITE SOLUTIONS STE 1 420 MAIN ST STURBRIDGE MA 01566-1359			
			
SOUTHERN NE TELEPHONE C/O FRONTIER PO BOX 2629 ADDISON TX 75001-2629			
USPS TRACKING #			
			
9405 5036 9930 0294 3189 65			
Electronic Rate Approved #038555749			
			

✂ ————— Cut on dotted line.

Instructions

- Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. DO NOT PHOTO COPY OR ALTER LABEL.
- Place your label so it does not wrap around the edge of the package.
- Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.
- To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
- Mail your package on the "Ship Date" you selected when creating this label.

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0294 3189 65

Trans. #: 567406500
Print Date: 07/12/2022
Ship Date: 07/12/2022
Expected
Delivery Date: 07/15/2022

Priority Mail® Postage: **\$8.95**
Total: **\$8.95**

From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
STE 1
420 MAIN ST
STURBRIDGE MA 01566-1359

Ref#: CT11410

To: SOUTHERN NE TELEPHONE C/O FRONTIER
COMMUNICATIONS
PO BOX 2629
ADDISON TX 75001-2629

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.



Thank you for shipping with the United States Postal Service!
Check the status of your shipment on the USPS Tracking® page at usps.com

CT 11410A Anchor
L 600



FARMINGTON
210 MAIN ST
FARMINGTON, CT 06032-9998
(800)275-8777

07/13/2022

04:05 PM

Product	Qty	Unit Price	Price
Prepaid Mail	1		\$0.00
Addison, TX 75001			
Weight: 0 lb 15.20 oz			
Acceptance Date:			
Wed 07/13/2022			
Tracking #:			
9405 5036 9930 0294 3189 65			
Prepaid Mail	1		\$0.00
Stamford, CT 06901			
Weight: 0 lb 15.20 oz			
Acceptance Date:			
Wed 07/13/2022			
Tracking #:			
9405 5036 9930 0294 3189 10			
Prepaid Mail	1		\$0.00
Stamford, CT 06901			
Weight: 0 lb 15.20 oz			
Acceptance Date:			
Wed 07/13/2022			
Tracking #:			
9405 5036 9930 0294 3189 34			
Prepaid Mail	1		\$0.00
Norwalk, CT 06851			
Weight: 0 lb 15.20 oz			
Acceptance Date:			
Wed 07/13/2022			
Tracking #:			
9405 5036 9930 0294 3189 58			
Grand Total:			\$0.00

Every household in the U.S. is now
eligible to receive a third set
of 8 free test kits.
Go to www.covidtests.gov

Preview your Mail
Track your Packages
Sign up for FREE @
<https://informedelivery.usps.com>

All sales final on stamps and postage.
Refunds for guaranteed services only.
Thank you for your business.

Tell us about your experience.
Go to: <https://postalexperience.com/Pos>
or scan this code with your mobile device,



or call 1-800-410-7420.