



CONSTRUCTION LEADERS

LETTER OF TRANSMITTAL	
DATE: August 25, 2015	PCL JOB NO: 5515002
ATTN: Chris Barker	TRANSMITTAL NO: 091

To: **State of Vermont Agency of Transportation**
 One National Life Drive
 Montpelier, VT 05633-5001
 (802) 828-0053

Re: Hartford Lateral Slide
 Project No.: IM 091-2(79)
 Contract ID.: 12A132

County: Windsor PCL FILE NO: 5515002-051.2

WE ARE SENDING Attached Under separate cover via **Email & SP** the following:
 Shop drawings Prints Plans Samples Specifications
 Copy of Letter Change Order Other

COPIES	SPEC.	REVISION	DESCRIPTION
1	529	2	Removal of Existing Structures – NB Bridge

TRANSMITTED for as checked below:

For approval Approved as submitted Resubmit Copies for approval
 For your use Approved as noted Submit Copies for distribution
 As requested Returned for corrections Return Corrected prints
 For review and comment

Remarks:

The included demolition plans have been revised as a result of the conditions encountered during the demolition of the initial 1/3 of the Northbound Bridge. This revised submittal is for the Northbound Bridge only.

Please return an email of this approved submittal to Erich Heymann (ewheymann@pcl.com) and Jeremy Mackling (jmackling@pcl.com).

We request the review and return of this submittal within **2 days**. Please advise if this request cannot be met so we can plan accordingly.

By: **Erich Heymann**, Project Engineer

COPY TO: Project Files



CONSTRUCTION LEADERS

SUBMITTAL NO. : 51.2
Removal of Existing Structures – NB Bridge

Item No.	Specification	Description
1	529	Removal of Existing Structures – NB Bridge

PROJECT:
HARTFORD LATERAL SLIDE
PROJECT NO.: IM 091-2(79)
CONTRACT ID.: 12A132

OWNER:
STATE OF VERMONT AGENCY OF TRANSPORTATION

ENGINEER OF RECORD:
STATE OF VERMONT AGENCY OF TRANSPORTATION

CONTRACTOR:
PCL CIVIL CONSTRUCTORS, INC.

AUGUST 25, 2015



Vermont Agency of Transportation
I-91
Windsor County
Project Number: IM 091-2(79)

Hartford Lateral Slide

Calculations for Temporary Structures including:

Existing NB Bridge Demolition

Submitted By,

Tim Davis, P.E.
VT P.E. 97183

André Tousignant, P.E.
VT P.E. # 100162



Tim Davis, P.E.
Aug 25 2015 12:33 PM

August 25th, 2015

PCL Civil Constructors Inc.

3810 Northdale Blvd. Suite 200
Tampa, Florida 33624
813-264-9500



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Introduction

The purpose of this calculation is the demolition of the existing I-91 NB bridge above US-5.

Design Criteria

Loads:

- Dead Load
 - o Asphalt / Concrete Weight = 150 lb/ft³
 - o Steel Weight = 490 lb/ft³
 - o Wood Weight = 50 lb/ft³
- Live Load
 - o 25 psf

Materials:

- Steel
 - o W Shapes / HP's / Channels, $F_y = 50$ ksi or better
 - o Misc plates / shims, $F_y = 36$ ksi or better
 - o Existing Steel, $F_y = 36$ ksi

Design Aids:

- AASHTO Guide Design Specification for Bridge Temporary Works
- AISC ASD 9th Edition

Main Span Removal Sequence:

1. Remove pinned barrier wall
2. Mill asphalt
3. Sawcut midspan longitudinal sawcut lines
 - a. Install safety angles with pins
4. Hook panel to crane
5. Perform transverse sawcut
6. Fly out panel onto truck in I-91 lane closure
7. Repeat 4-6 for the 2nd and 3rd midspan panel
8. Hammer remaining concrete
9. Torch rebar
10. Rig crane to midspan girder
11. Unbolt diaphragms
12. Torch cut girder on center side of EJ's
13. Fly out girder onto truck in I-91 lane closure
14. Remove diaphragms
15. Repeat steps 10-14 for remaining girders

Back Span Removal Sequence:

1. Remove pinned barrier wall
2. Mill asphalt - remove curb sections
3. Sawcut transverse / Longitudinal lines
4. Crane mat Deck
5. Hammer section behind EJ (After MS 9)
6. Torch Rebar
7. Slab crab removal of deck pieces
8. Rig to EJ (After MS 15)
9. Torch cut girder on backspan side, fly out EJ.
10. Rig crane to girder
11. Unbolt diaphragms
12. Torch Backspan Anchor Bolts.
13. Fly out girder onto truck in I-91 lane closure
14. Remove diaphragms
15. Repeat steps 10-14 for remaining girders

Engineering Per Sequence Steps

Main Span Removal Sequence:

1. Remove pinned barrier wall ---> No Engineering Required
2. Mill asphalt ---> No Engineering Required
3. Sawcut longitudinal sawcut lines
 - a. Install safety angles with pins

Max Positive Bending Moment = 17.6k-ft

Max Negative Bending Moment = 48.8k-ft

Max Shear = 7.8 kips

8 - #5 bars provided on bottom mat - 8 required - OK

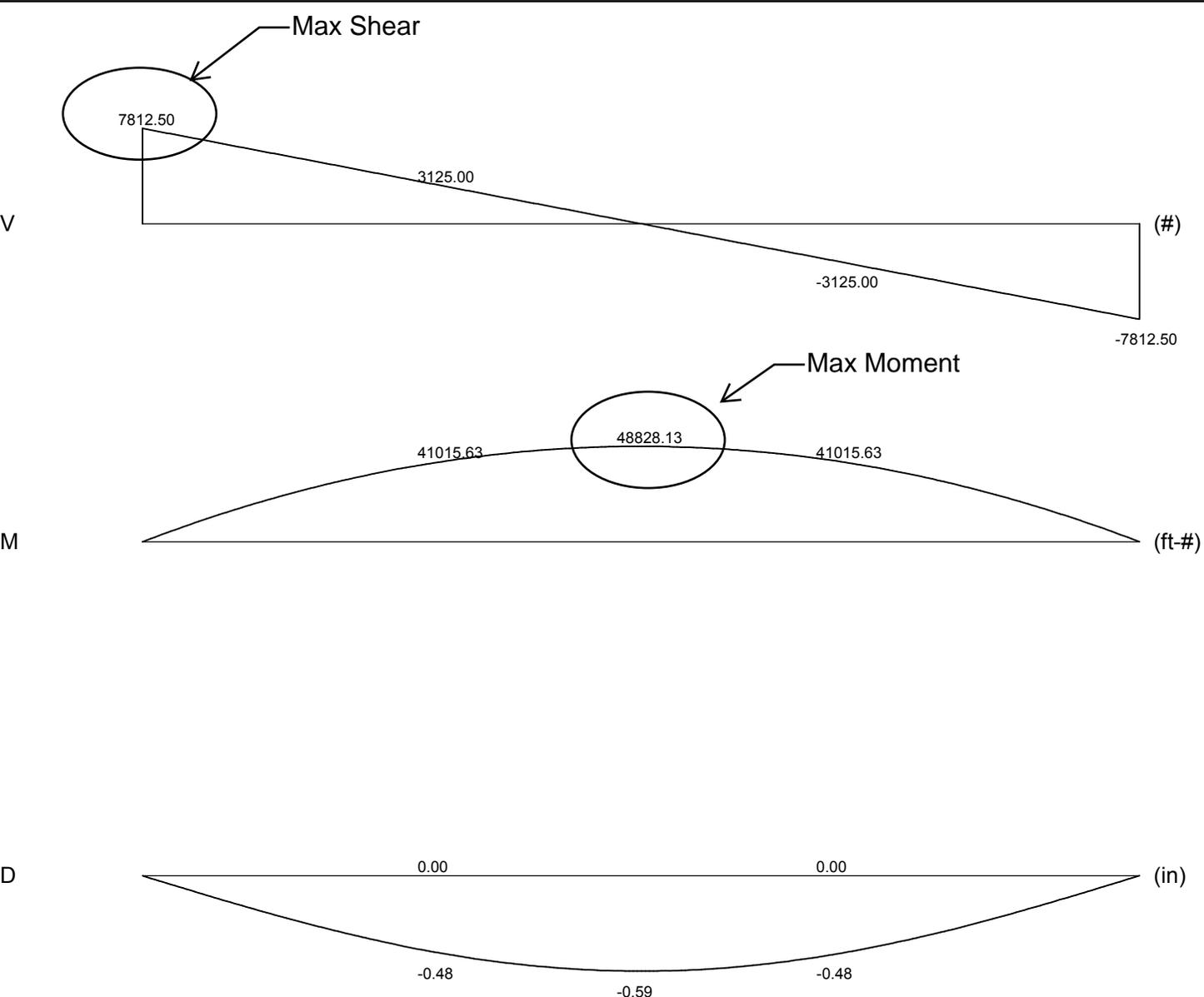
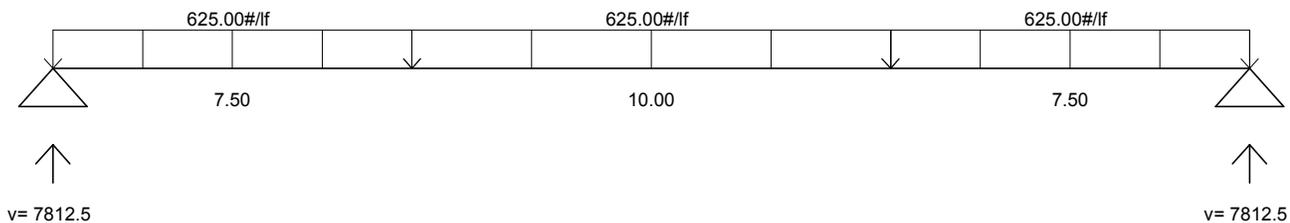
6 - #5 bars provided on top mat - 4 required - OK

no - shear reinforcing required

Safety Angles OK

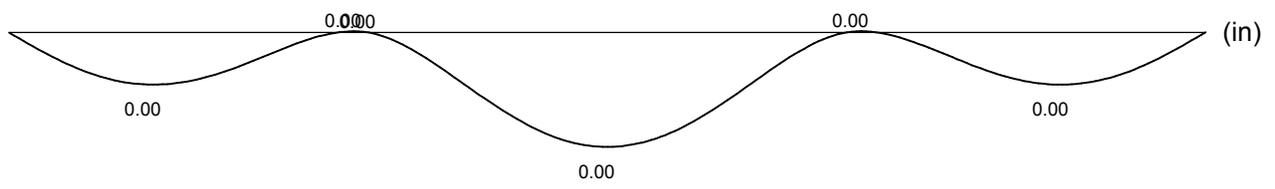
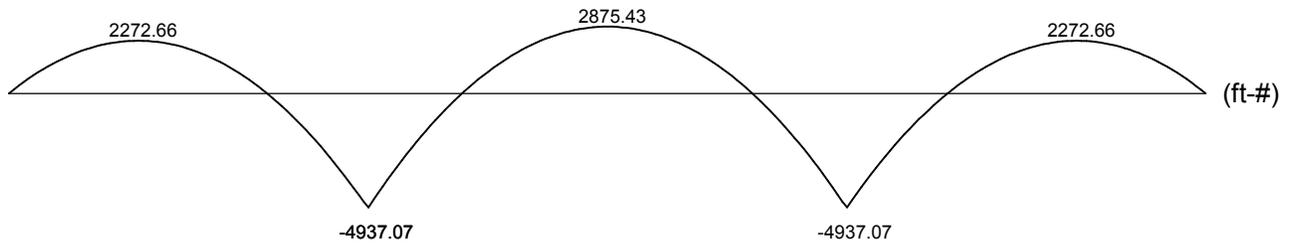
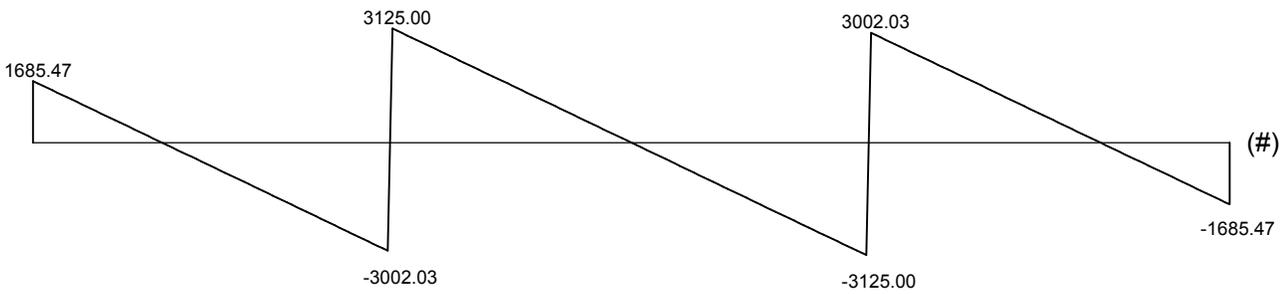
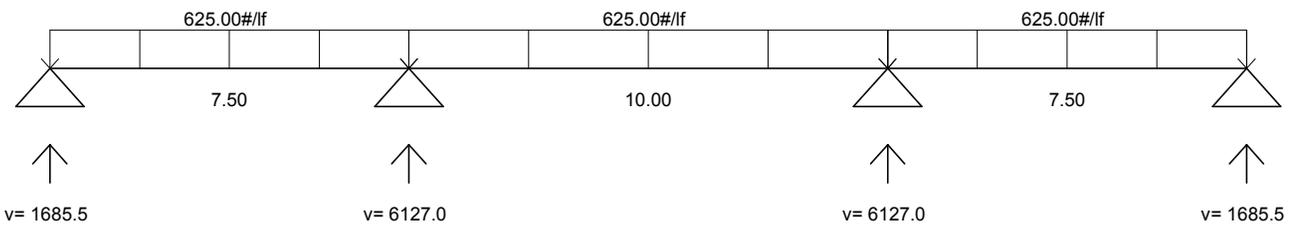
Backup documentation provided on following pages

Worst case Slab - assumes forgetting to put in support angles during Longitudinal Sawcut



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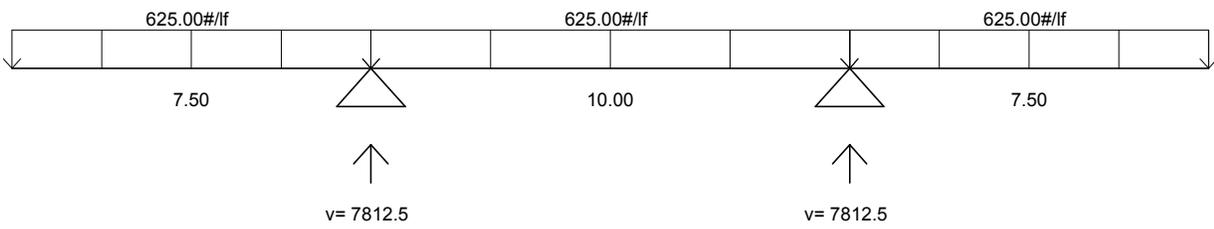
Design Slab with Angle Supports



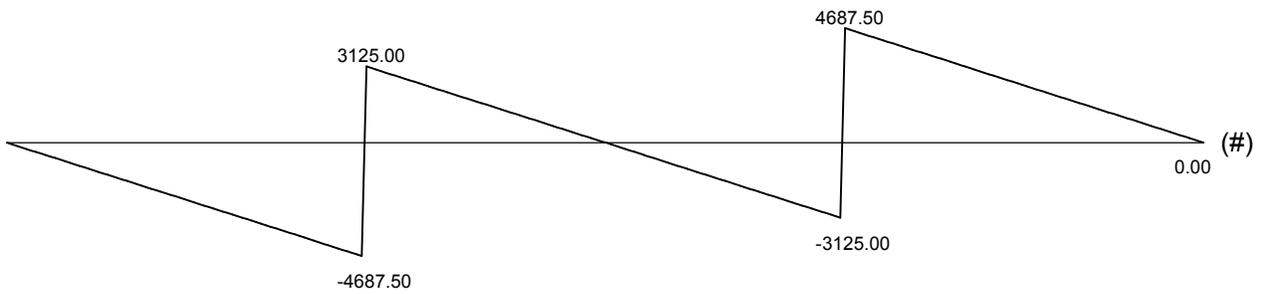
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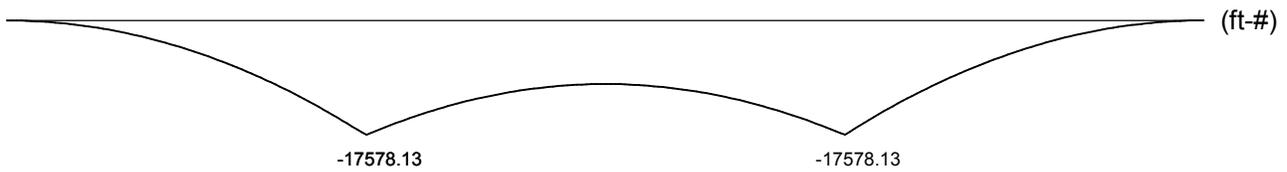
Design Slab during lifting



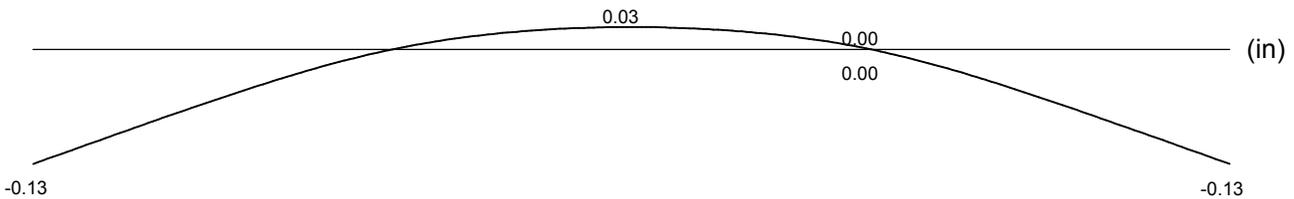
V



M



D



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Moment Design Worst case saw cutting



Project No: _____

By: TMD

Date: 8/23/2015

Project: _____

Checked By: _____

Date: _____

Calculation Of Required Reinforcing Rebars

Subject: _____

Calculation For: _____

Input

M (DL)=	48.8 FT.KIPS	Factor DL=	1.25
M (LL)=	0 FT.KIPS	Factor LL=	0
Mu=	FT.KIPS	f'c=	4 KSI
d=	6 IN	fy=	60 KSI
b=	75 IN	As(prov)=	0 IN ²

Output

Moment (Mu)=	61.0 FT.KIPS	X=	48.63067
A=	6.35	Y=	2.369333
B=	-324.0		
C=	732.0		
Δ=	86375		
β ₁ =	0.85 ACI (10.2.7.3)	(A) As ² + (B) As + (C) = 0	
ρ Min=	0.0033 ACI (10.5.1)	As=	2.369333 IN ²
ρ Max=	0.0214 ACI (10.3.3)	a=	0.56 IN
ρ Actual=	0.0053	Cc=	142 KIPS
Required As=	2.37 IN ²	T=	142 KIPS
Min As=	1.50 IN ²		
Max As=	9.62 IN ²	φMn=	0.0 FT.KIPS

OK

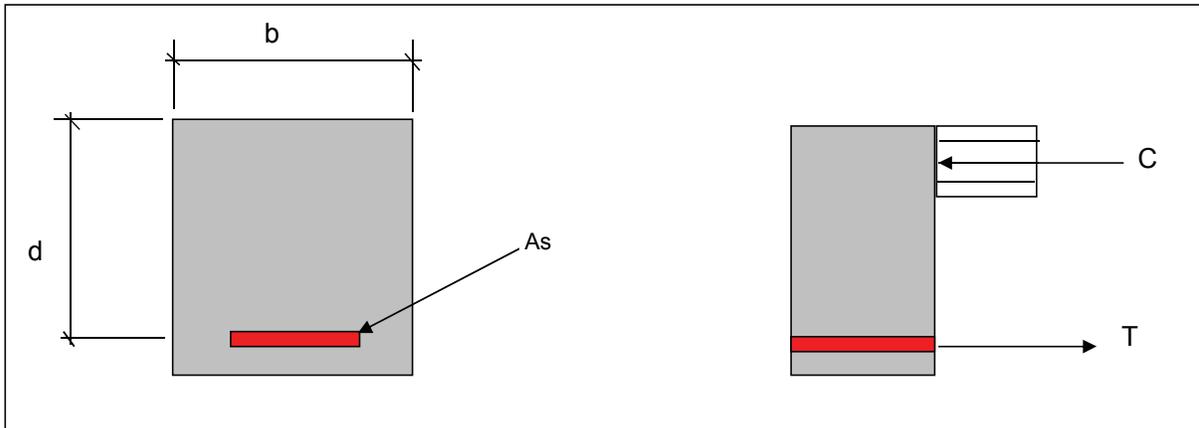
Final As (IN²)= 2.37

% of ρ Max= 24.6266 %

Bar Selection:

22	#3	2.42
12	#4	2.40
8	#5	2.48
6	#6	2.64
4	#7	2.40
3	#8	2.37
3	#9	3.00
2	#10	2.54
2	#11	3.12

or	#3 @	3.48 o.c.
or	#4 @	6.33 o.c.
or	#5 @	9.81 o.c.
or	#6 @	13.93 o.c.
or	#7 @	18.99 o.c.
or	#8 @	25.01 o.c.
or	#9 @	31.65 o.c.
or	#10 @	40.20 o.c.
or	#11 @	49.38 o.c.



Moment Design Worst Case Picking



Project No: _____ By: TMD Date: 8/23/2015
 Project: _____ Checked By: _____ Date: _____

Calculation Of Required Reinforcing Rebars

Subject: _____

Calculation For: _____

Input

M (DL)=	17.6 FT.KIPS	Factor DL=	1.25
M (LL)=	0 FT.KIPS	Factor LL=	0
Mu=	FT.KIPS	f'c=	4 KSI
d=	6 IN	fy=	60 KSI
b=	75 IN	As(prov)=	0 IN ²

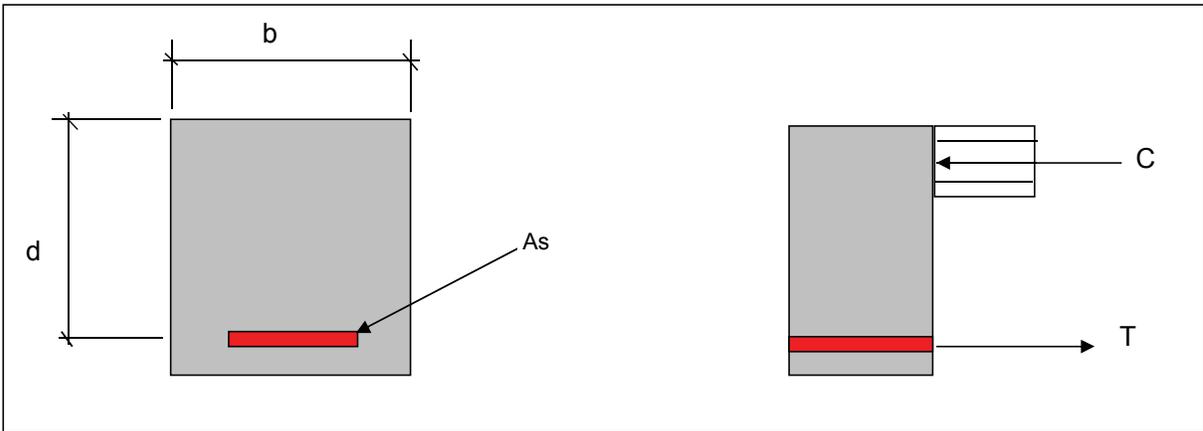
Output

Moment (Mu)=	22.0 FT.KIPS	X=	50.17173
A=	6.35	Y=	0.828266
B=	-324.0		
C=	264.0		
Δ=	98267		
β ₁ =	0.85 ACI (10.2.7.3)	(A) As ² + (B) As + (C) = 0	
ρ Min=	0.0033 ACI (10.5.1)	As=	0.828266 IN ²
ρ Max=	0.0214 ACI (10.3.3)	a=	0.19 IN
ρ Actual=	0.0018	Cc=	50 KIPS
Required As=	0.83 IN ²	T=	50 KIPS
Min As=	1.50 IN ²	Use the minimum of 1.33 Req'd As or As min	
Max As=	9.62 IN ²	φMn=	0.0 FT.KIPS

Final As (IN²)= **1.10**
 % of ρ Max= **11.4498 %**

Bar Selection:

11	#3	1.21	or	#3 @	7.49 o.c.
6	#4	1.20	or	#4 @	13.62 o.c.
4	#5	1.24	or	#5 @	21.11 o.c.
3	#6	1.32	or	#6 @	29.96 o.c.
2	#7	1.20	or	#7 @	40.85 o.c.
2	#8	1.58	or	#8 @	53.79 o.c.
2	#9	2.00	or	#9 @	68.08 o.c.
1	#10	1.27	or	#10 @	86.47 o.c.
1	#11	1.56	or	#11 @	106.21 o.c.





Project No: _____

By: _____ TMD

Date: 8/23/2015

Project: _____

Checked By: _____

Date: _____

CONSTRUCTION LEADERS

Calculation Of Required Shear Reinforcement

Subject: _____

Calculation For: _____

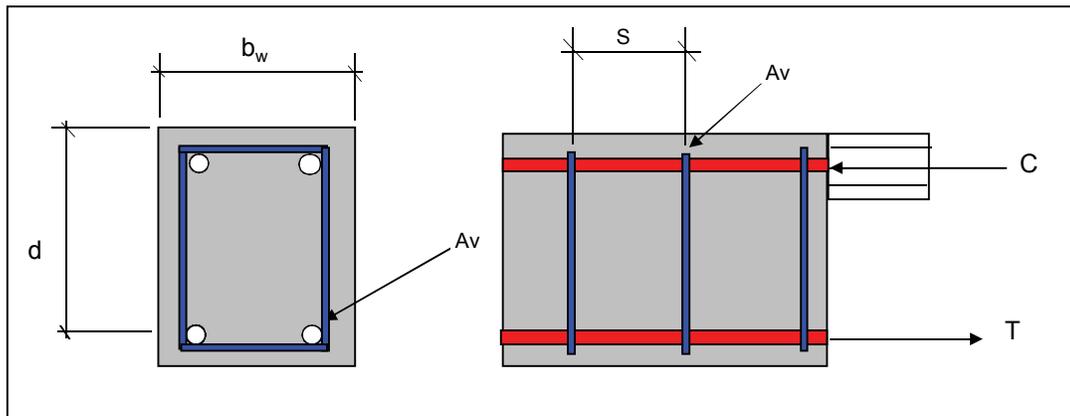
Input

V(DL)=	7.8 KIPS	Factor DL=	1.25
V(LL)=	KIPS	Factor LL=	1.6
Vu=	KIPS	f _c =	4 KSI
d=	7.5 IN	f _y =	60 KSI
b _w =	75 IN	A _v (prov)=	1.32 IN ²

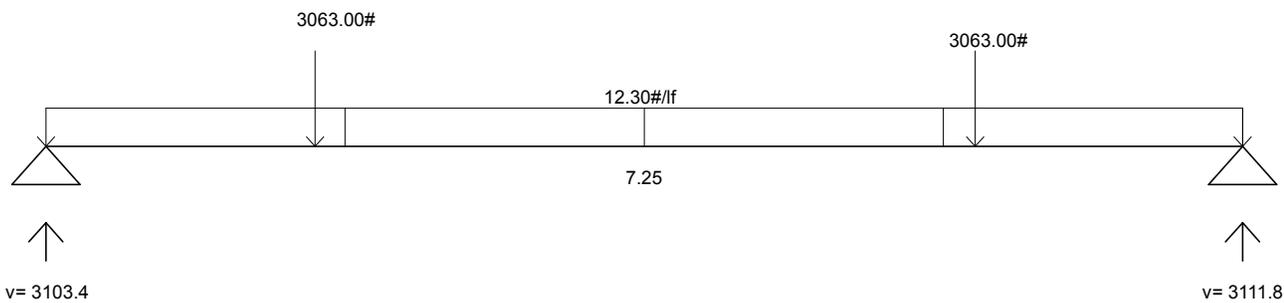
Output

Shear (Vu)=	9.75 KIPS	φVs _{max} =	241.91 KIPS	(ACI 11.5.6.8)
φVc _{min} =	60.48 KIPS	S _{max} =	3.75 IN	(ACI 11.5.4.1)
φVs =	KIPS	S =	3.75 IN	(ACI 11-15)
Comments:	No shear reinf. req'd			(ACI 11.5.4.3)

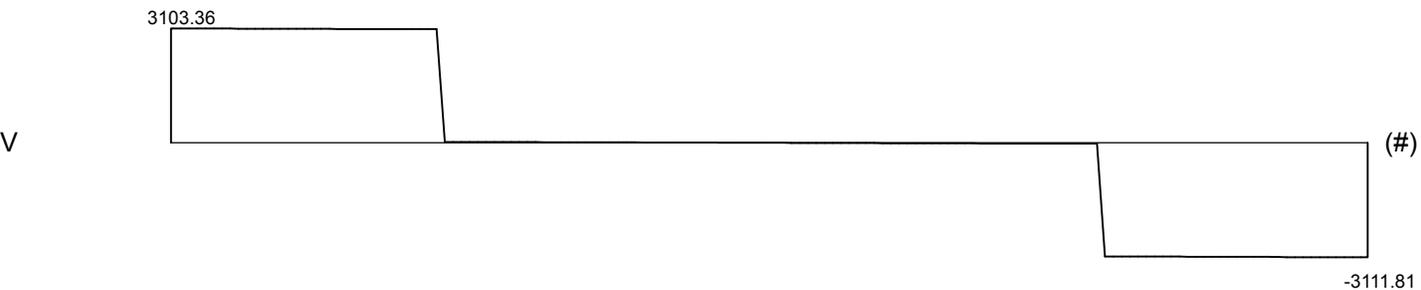
Area of Shear Reinforcement=	IN ²
Spacing of Shear Reinforcement=	N/A IN



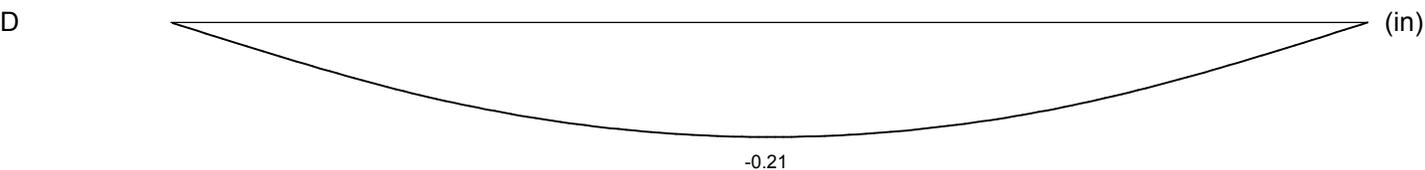
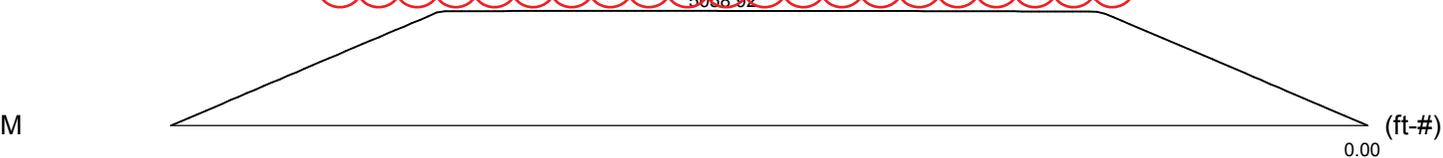
L 5x5x3/8" Angle Support



$$V/A_x = 3.1k / 3.61in^2 = < 1ksi \rightarrow OK$$



$$M/S_x = 5.1k\text{-ft} \times 12\text{"/ft} / 2.41in^3 = 25 ksi < .6F_y \rightarrow OK$$



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Engineering Per Sequence Step

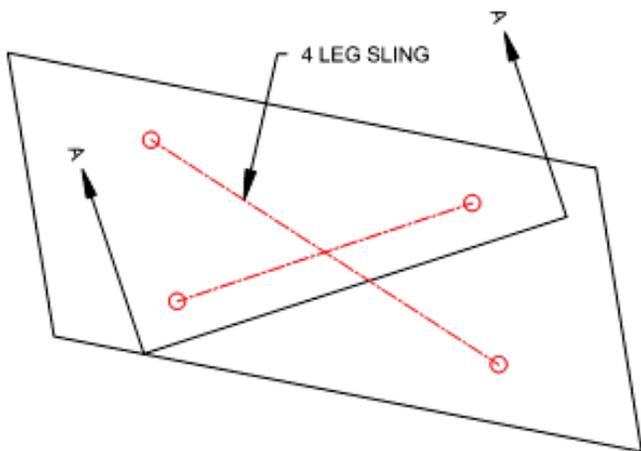
Main Span Removal Sequence:

4. Hook panel to crane
5. Perform transverse sawcut
6. Fly out panel onto truck in I-91 lane closure
7. Repeat 4-6 for the 2nd and 3rd midspan panel

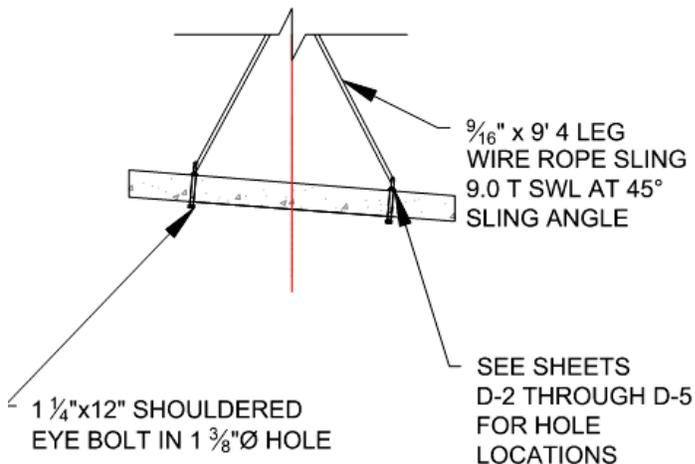
Supporting documentation provided on following pages for rigging

Note - rigging has been field tested to a 2.0 FOS

Demo Calcs - Lifting Slabs



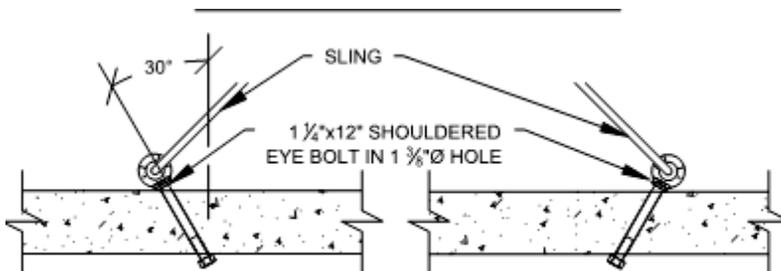
CONCRETE SLAB RIGGING - PLAN



CONCRETE SLAB RIGGING - ELEVATION

Max Slab is on NB, suspended span. 25' x 6'-3" x 7.5".

Max calculated piece weight = 25' x 6.25' x .625' x 150pcf = 14.6 kips



SECTION A-A

G-277 Shoulder Nut Eye Bolts

Shank Dia. & Length (in.)	G-277 Stock No.	Working Load Limit (lbs.)*	Weight Each Per 100 (lbs.)	Dimensions (in.)										
				A	B	C	D	E	F	G	H	J		
1/4 x 2	1045014	650	6.60	.25	.50	.88	.19	1.50	2.00	2.94	.50	.47		
1/4 x 4	1045032	650	9.10	.25	.50	.88	.19	2.50	4.00	4.94	.50	.47		
5/16 x 2-1/4	1045050	1200	12.50	.31	.62	1.12	.25	1.50	2.25	3.50	.69	.56		
5/16 x 4-1/4	1045078	1200	18.80	.31	.62	1.12	.25	2.50	4.25	5.50	.69	.56		
3/8 x 2-1/2	1045096	1550	21.40	.38	.75	1.38	.31	1.50	2.50	3.97	.78	.66		
3/8 x 4-1/2	1045112	1550	25.30	.38	.75	1.38	.31	2.50	4.50	5.97	.78	.66		
1/2 x 3-1/4	1045130	2600	42.60	.50	1.00	1.75	.38	1.50	3.25	5.12	1.00	.91		
1/2 x 6	1045158	2600	56.80	.50	1.00	1.75	.38	3.00	6.00	7.88	1.00	.91		
5/8 x 4	1045176	5200	68.60	.62	1.25	2.25	.50	2.00	4.00	6.44	1.31	1.12		
5/8 x 6	1045194	5200	102.40	.62	1.25	2.25	.50	3.00	6.00	8.44	1.31	1.12		
3/4 x 4-1/2	1045210	7200	144.50	.75	1.50	2.75	.62	2.00	4.50	7.44	1.56	1.38		
3/4 x 6	1045238	7200	167.50	.75	1.50	2.75	.62	3.00	6.00	8.94	1.56	1.38		
7/8 x 5	1045256	10600	225.00	.88	1.75	3.25	.75	2.50	5.00	8.46	1.84	1.56		
1 x 6	1045292	13300	366.30	1.00	2.00	3.75	.88	3.00	6.00	9.97	2.09	1.81		
1 x 9	1045318	13300	422.50	1.00	2.00	3.75	.88	4.00	9.00	12.97	2.09	1.81		
1-1/4 x 8	1045336	21000	650.00	1.25	2.50	4.50	1.00	4.00	8.00	12.72	2.47	2.28		
1-1/4 x 12	1045354	21000	795.00	1.25	2.50	4.50	1.00	4.00	12.00	16.72	2.47	2.28		
1-1/2 x 15	1045372	24000	1425.00	1.50	3.00	5.50	1.25	6.00	15.00	20.75	3.00	2.75		

*Ultimate Load is 5 times the Working Load Limit. Maximum Proof Load is 2 times the Working Load Limit.

Check Eyebolts:

21k > 14.6k ---> OK

Oversize chosen so that nuts could be installed if necessary

Demo Calcs - Lifting Slabs - Cont.

Check Curb Section:

Concrete is deeper with same reinforcement as Deck, OK by inspection.

Piece weight =

2'-2" x 19.5" x 16' x 150pcf = 8.4 kip.
(thickened)

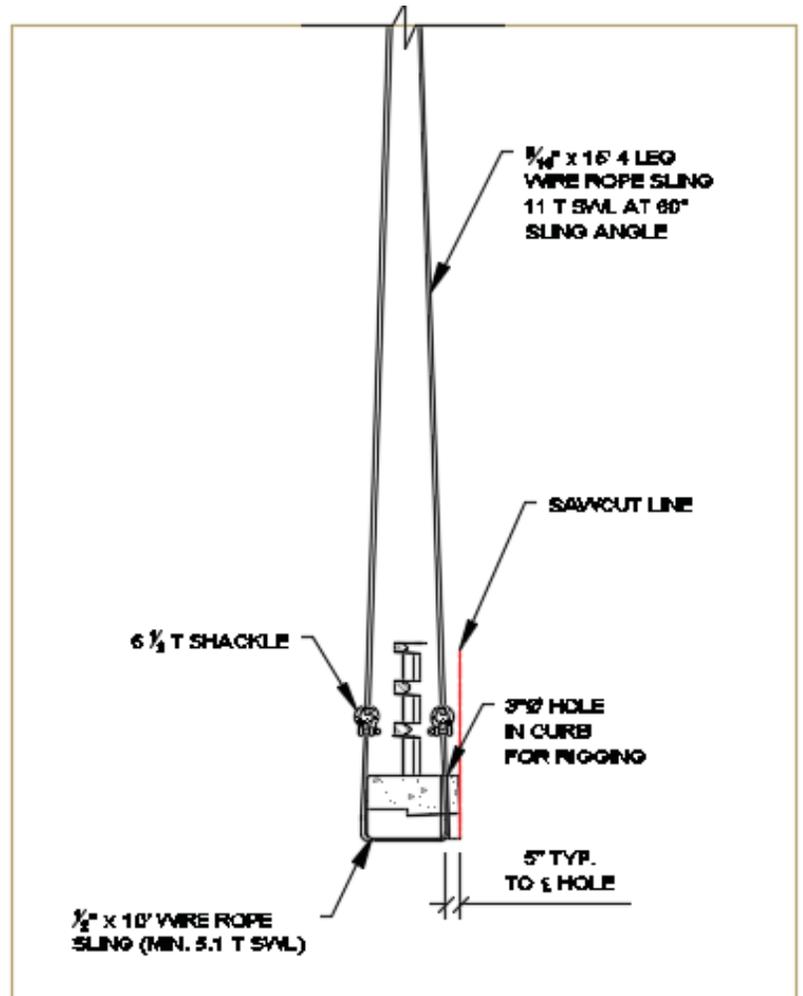
1'-8" x 7.5" x 16' x 150pcf = 2.5 kips
(deck)

8.4 k + 2.5 k = 10.9 k. 14 kips usec
conservatively, to include railing

Rigging Check:

14k total / 2 sides in a basket.

Rigging shall be 4.7k/leg min,
rigging shown OK.



OVERHANG CURB RIGGING

Demo Calcs - Cap Removal

Piece weight =

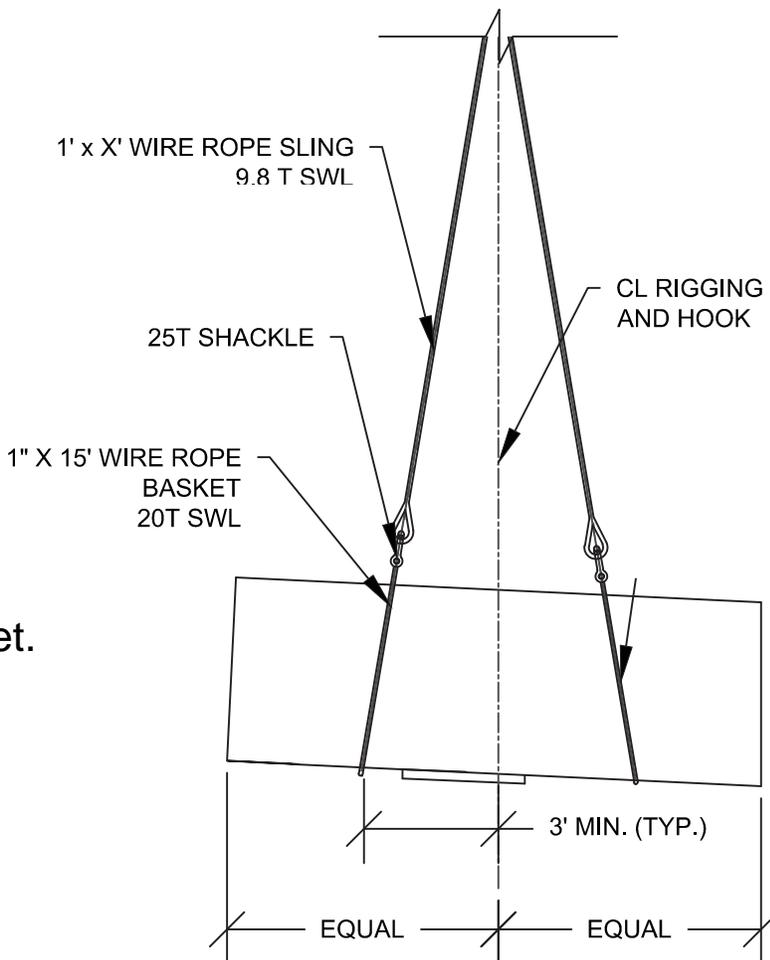
3'-0" x 4'-0" x 12'-0" x 150pcf
 = 21.6 kips

23 kips used conservatively

Rigging Check:

23k total / 2 sides in a basket.

Rigging shall be 6k/leg min,
 rigging shown OK.



PIER CAP RIGGING

Demo Calcs - Column Removal

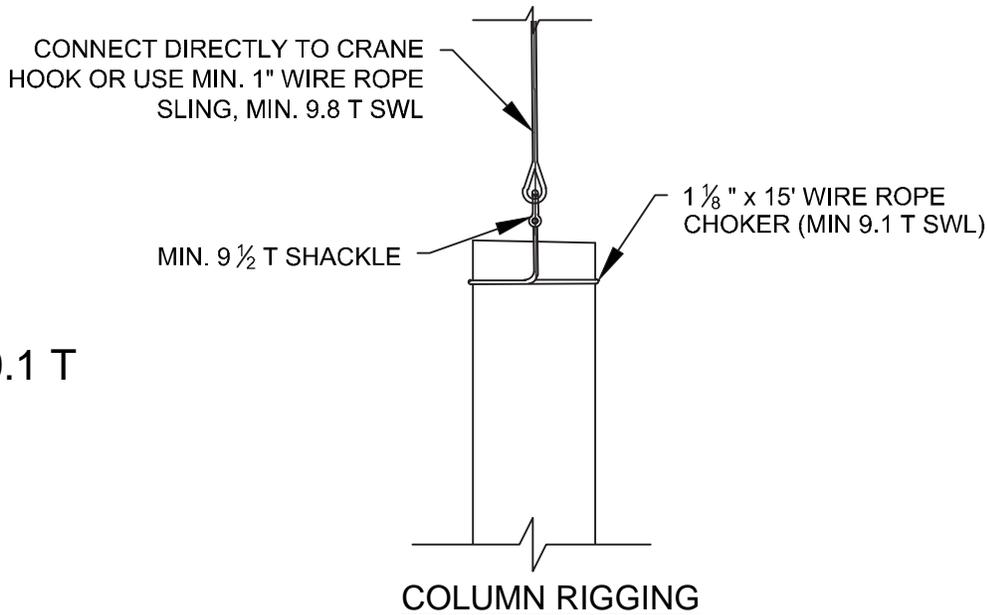
Piece weight =

$$(3.14 * 1'-4" ^2) * 17'-0" * 150 \text{pcf} = 14.2 \text{ kips}$$

16 kips used conservatively

Rigging Check:

Rigging shall be minimum 9.1 T
rigging shown OK.



Single Crane Rigging Check

End Spans:

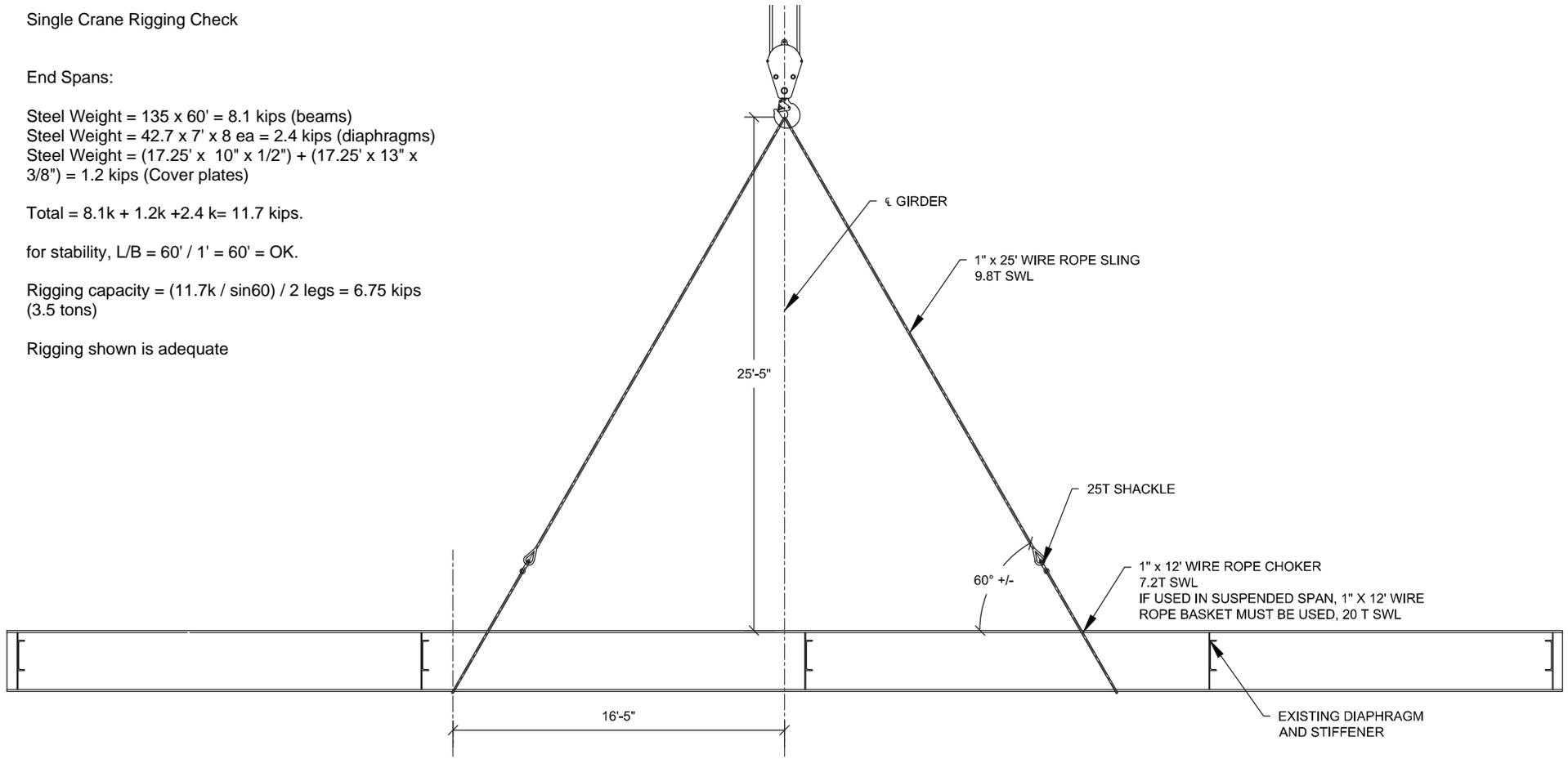
Steel Weight = 135 x 60' = 8.1 kips (beams)
 Steel Weight = 42.7 x 7' x 8 ea = 2.4 kips (diaphragms)
 Steel Weight = (17.25' x 10" x 1/2") + (17.25' x 13" x 3/8") = 1.2 kips (Cover plates)

Total = 8.1k + 1.2k + 2.4 k = 11.7 kips.

for stability, L/B = 60' / 1' = 60' = OK.

Rigging capacity = (11.7k / sin60) / 2 legs = 6.75 kips
 (3.5 tons)

Rigging shown is adequate



GIRDER DEMOLITION RIGGING - SINGLE CRANE LIFT

Revision No. & Date	Vermont Agency of Transportation			Engineer's Seal	Drawing Status	Name	Date	PCL Civil Constructors, Inc. 3810 Northdale Blvd. Suite 200, Tampa Florida 33624 (813)-264-9500 ; Fax: (813)-264-6689		
						Drawn By	AJT			06/03/15
	Road No.	County / City	Financial Project ID No.		PRELIMINARY	Design By	TMD/ AJT	06/03/15	Submittal DEMOLITION PLAN	PCL Project / Job No. I-91 Windsor / Hartford / 5514001
	I-91	Windsor / Hartford	IM 091-2(79)			Check By	TMD	06/30/15	Drawing Title RIGGING DETAILS (1)	Sheet No. 06

CRANE INFO:		TADANO GR-800XL	TADANO GR-750XL	LINK BELT LS-248H II	LINK BELT 298 HSL
BOOM LENGTH:	ft	91, TELE MODE 1	88.6, TELE MODE I	120	120
PIECE TYPE		DECK OVERHANG	DECK OVERHANG	DECK OVERHANG	DECK OVERHANG
MAX. PIECE WEIGHT	lbs	14,000	14,000	14,000	14,000
PICK WEIGHT + RIGGING:	lbs	16,330	16,330	22,913	22,913
MAX. CRANE RADIUS:	ft	45	45	100	110
CRANE CAPACITY:	ft	23,600	22,200	31,400	31,700
% OF CHART:		69%	74%	73%	72%

CRANE INFO:		TADANO GR-800XL	TADANO GR-750XL	LINK BELT LS-248H II	LINK BELT 298 HSL
BOOM LENGTH:	ft	91, TELE MODE 1	88.6, TELE MODE I	120	120
PIECE TYPE		DECK SECTION	DECK SECTION	DECK SECTION	DECK SECTION
MAX. PIECE WEIGHT	lbs	12,000	12,000	12,000	12,000
PICK WEIGHT + RIGGING:	lbs	14,330	14,330	20,913	20,913
MAX. CRANE RADIUS:	ft	50	50	110	117
CRANE CAPACITY:	ft	19,300	18,100	27,500	28,900
% OF CHART:		74%	79%	76%	72%

CRANE INFO:		TADANO GR-800XL	TADANO GR-750XL
BOOM LENGTH:	ft	91, TELE MODE 1	88.6, TELE MODE I
PIECE TYPE		CENTER DECK SECTION	CENTER DECK SECTION
MAX. PIECE WEIGHT	lbs	15,000	15,000
PICK WEIGHT + RIGGING:	lbs	17,330	17,330
MAX. CRANE RADIUS:	ft	50	45
CRANE CAPACITY:	ft	19,300	22,200
% OF CHART:		90%	78%

CRANE INFO:		TADANO GR-800XL	TADANO GR-750XL
BOOM LENGTH:	ft	91, TELE MODE 1	88.6, TELE MODE I
PIECE TYPE		SUSPENDED GIRDER	SUSPENDED GIRDER
MAX. PIECE WEIGHT	lbs	27,000	27,000
PICK WEIGHT + RIGGING:	lbs	15,830	15,830
MAX. CRANE RADIUS:	ft	45	45
CRANE CAPACITY:	ft	23,600	22,200
% OF CHART:		67%	71%

CRANE INFO:		TADANO GR-800XL	TADANO GR-750XL
BOOM LENGTH:	ft	91, TELE MODE 1	88.6, TELE MODE I
PIECE TYPE		SUSP. GIRDER NB G6	SUSP. GIRDER NB G6
MAX. PIECE WEIGHT	lbs	27,000	27,000
PICK WEIGHT + RIGGING:	lbs	15,830	15,830
MAX. CRANE RADIUS:	ft	50	50
CRANE CAPACITY:	ft	19,300	18,100
% OF CHART:		82%	87%

CRANE INFO:		LINK BELT LS-248H II	LINK BELT 298 HSL
BOOM LENGTH:	ft	120	120
PIECE TYPE		END SPAN GIRDER	END SPAN GIRDER
MAX. PIECE WEIGHT	lbs	11,700	11,700
PICK WEIGHT + RIGGING:	lbs	20,613	20,613
MAX. CRANE RADIUS:	ft	110	117
CRANE CAPACITY:	ft	27,500	28,900
% OF CHART:		75%	71%

CRANE INFO:		TADANO GR-800XL	TADANO GR-750XL	LINK BELT 298 HSL
BOOM LENGTH:	ft	91, TELE MODE 1	88.6, TELE MODE I	120
PIECE TYPE		EXPANSION JOINT	EXPANSION JOINT	EXPANSION JOINT
MAX. PIECE WEIGHT	lbs	18,100	18,100	18,100
PICK WEIGHT + RIGGING:	lbs	20,430	20,430	27,013
MAX. CRANE RADIUS:	ft	40	40	100
CRANE CAPACITY:	ft	28,700	27,700	36,300
% OF CHART:		71%	74%	74%

CRANE INFO:		TADANO GR-800XL	TADANO GR-750XL	LINK BELT 298 HSL
BOOM LENGTH:	ft	91, TELE MODE 1	88.6, TELE MODE I	120
PIECE TYPE		CAP SECTION	CAP SECTION	CAP SECTION
MAX. PIECE WEIGHT	lbs	23,000	23,000	23,000
PICK WEIGHT + RIGGING:	lbs	25,330	25,330	31,913
MAX. CRANE RADIUS:	ft	35	35	90
CRANE CAPACITY:	ft	34,000	34,700	42,000
% OF CHART:		75%	73%	76%

CRANE INFO:		TADANO GR-800XL	TADANO GR-750XL	LINK BELT 298 HSL
BOOM LENGTH:	ft	91, TELE MODE 1	88.6, TELE MODE I	120
PIECE TYPE		COLUMN	COLUMN	COLUMN
MAX. PIECE WEIGHT	lbs	16,000	16,000	16,000
PICK WEIGHT + RIGGING:	lbs	18,330	18,330	24,913
MAX. CRANE RADIUS:	ft	45	45	110
CRANE CAPACITY:	ft	23,600	22,200	31,700
% OF CHART:		78%	83%	79%



CONSTRUCTION LEADERS

CRANE LIFT STUDY ANALYSIS - LONG FORM

(All weights in lbs. unless noted otherwise)

I-91 NB/SB Bridges - 5515002

Date: _____

LOAD INFORMATION:

What is to be lifted: Existing Beam/Girder More than one crane Yes No

Initial location: Attach Lift Diagram (plan view) if required

Final set location: Attach Lift Diagram (plan view) if required

Verified Weight (weight of load, lbs.) 15,000 How was weight verified: Shop Drawings

Lift Points: Per Manufacturer
 Other, attach details and calculations

Maximum radius of lift: 55 Quadrants All

Maximum elevation of lift: Attach lift diagram (elevation view) if required

Maximum allowable wind speed for lift Per Manitowoc, 30 mph (Attach calculations)

GROUND CONDITIONS: Nature of soil Compacted Fill Safe Bearing Capacity 2 (tpsf)

Is the use of crane mats or compacted fill required: Yes No

CRANE CONFIGURATION: Model/SN Grove RT 880E Boom Length/Type 100 ft., LATTICE

Maximum Capacity 160,000 Jib Length/Type N/A

Boom Point Elevation at Maximum Working Radius 71.1

Cable Diameter 3/4" Block Capacity RT 80 Ton No. of Parts 4

Anti-two block device Yes No Barge/Crane List N/A

CALCULATIONS

Weight of Load	<u>15,000</u>	
+ Crane Capacity Deduction	<u>1,656</u>	
+ Plus Rigging Weight	<u>674</u>	
= Gross Weight	<u>17,330</u>	Maximum Lift Capacity for Radius <u>22,450</u>
% of Crane Chart	<u>77%</u>	(Gross weight/Crane capacity) See District Policy

RESPONSIBLE PERSONNEL (Print Name & Sign)

Project Manager _____
 Level 1 Lift Specialist _____
 Level 2 Lift Specialist (If Critical Lift) _____
 Level 3 Lift Specialist (If Engineered Lift) _____
 Superintendent _____
 Lift Supervisor _____
 Operator _____

WORKSHEET

RIGGING

Sling Length _____ Vertical Length _____ Max. Sling
 Sling Angle _____ Sling Load Angle Factor N/A Load _____ Tons

	Type	Size	Capacity	Qty	Weight
Slings	5/8" 6-Part Wire 38 ft.- Vertical	38 ft.	17 Ton	4	556.0
Slings	None	0	0	0	0.0
Slings	None	0	0	0	0.0
Shackles	Forged Screw Pin	25	25 Ton	4	117.8
Shackles	None	None	0	0	0.0
Eye Bolts					
Picking Device	None	N/A	N/A	0	0.0
Additional Items	None	0	0	0	0.0

Capacity >
Load?

OK

CONSERVATIVE RIGGING
WEIGHTS USED FOR
EXISTING GIRDER AND
COLUMN

TOTAL WEIGHT OF RIGGING 673.8

CRANE CAPACITY DEDUCTIONS

	Type	Gross Weight
Block	RT 80 Ton	1,319
Effective Jib Weight		
Boom Extension		
Hook and Overhaul Ball	None	0
Whip Line below boom tip		42
Main Load Cable below tip		296
Stowed Jib or Boom Extension		
TOTAL DEDUCTIONS		<u>1,656</u>

Final checks prior to lift

<input type="checkbox"/>	Verify gross weight and load chart capacities (de-rated if crane on barge)
<input type="checkbox"/>	Inspected crane and verified components (Daily logs & annual certification checked)
<input type="checkbox"/>	Inspected rigging for condition and size
<input type="checkbox"/>	Inspect load line and drum wrap configuration
<input type="checkbox"/>	Ground stability. Outrigger pads/blocking sized correctly? Barge/crane list (de-rated chart)
<input type="checkbox"/>	Distance to nearest utility _____ (above and below ground)
<input type="checkbox"/>	Weather and wind load consideration, checked & verified at time of lift
<input type="checkbox"/>	Pre-lift meeting with rigging crew, operator, and signal person (attached sign in sheet)
<input type="checkbox"/>	Rigging drawings attached
<input type="checkbox"/>	Method of communication (radios, hand signals, etc.) checked & verified
<input type="checkbox"/>	Lift abort procedures checked and verified. JHA/PSI conducted



CONSTRUCTION LEADERS

CRANE LIFT STUDY ANALYSIS - LONG FORM

(All weights in lbs. unless noted otherwise)

I-91 NB/SB Bridges - 5515002

Date: _____

LOAD INFORMATION:

What is to be lifted: Existing Beam/Girder More than one crane Yes No

Initial location: Attach Lift Diagram (plan view) if required

Final set location: Attach Lift Diagram (plan view) if required

Verified Weight (weight of load, lbs.) 14,000 How was weight verified: Shop Drawings

Lift Points: Per Manufacturer
 Other, attach details and calculations

Maximum radius of lift: 110 Quadrants All

Maximum elevation of lift: Attach lift diagram (elevation view) if required

Maximum allowable wind speed for lift Per Manitowoc, 30 mph (Attach calculations)

GROUND CONDITIONS: Nature of soil Compacted Fill Safe Bearing Capacity 2 (tpsf)

Is the use of crane mats or compacted fill required: Yes No

CRANE CONFIGURATION:	Model/SN	<u>Link-Belt 298 HSL</u>	Boom Length/Type	<u>150 ft., LATTICE</u>
	Maximum Capacity	<u>171,400</u>	Jib Length/Type	<u>N/A</u>
		Boom Point Elevation at Maximum Working Radius		<u>47.8</u>
	Cable Diameter	<u>1 1/8"</u>	Block Capacity	<u>250</u>
			No. of Parts	<u>8</u>
	Anti-two block device	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Barge/Crane List	<u>N/A</u>

CALCULATIONS

Weight of Load	<u>14,000</u>	
+ Crane Capacity Deduction	<u>7,965</u>	
+ Plus Rigging Weight	<u>948</u>	
= Gross Weight	<u>22,913</u>	Maximum Lift Capacity for Radius <u>31,700</u>
% of Crane Chart	<u>72%</u>	(Gross weight/Crane capacity) See District Policy

RESPONSIBLE PERSONNEL (Print Name & Sign)

Project Manager _____
 Level 1 Lift Specialist _____
 Level 2 Lift Specialist (If Critical Lift) _____
 Level 3 Lift Specialist (If Engineered Lift) _____
 Superintendent _____
 Lift Supervisor _____
 Operator _____

WORKSHEET

RIGGING

Sling Length _____ Vertical Length _____ Max. Sling
 Sling Angle _____ Sling Load Angle Factor N/A Load _____ Tons

	Type	Size	Capacity	Qty	Weight
Slings	5/8" 6-Part Wire 38 ft.- Vertical	38 ft.	17 Ton	4	556.0
Slings	7/8" 6-Part Wire Rope Choker	16 ft.	29 Ton	2	274.0
Slings	None	0	0	0	0.0
Shackles	None	None	0	0	0.0
Shackles	Forged Screw Pin	25	25 Ton	4	117.8
Eye Bolts					
Picking Device	None	N/A	N/A	0	0.0
Additional Items	None	0	0	0	0.0

Capacity >
Load?

OK
CONSERVATIVE RIGGING WEIGHTS USED

TOTAL WEIGHT OF RIGGING 947.8

CRANE CAPACITY DEDUCTIONS

	Type	Gross Weight
Block	250 Ton	5,721
Effective Jib Weight		
Boom Extension		
Hook and Overhaul Ball	20 Ton	1,255
Whip Line below boom tip		94
Main Load Cable below tip		896
Stowed Jib or Boom Extension		
TOTAL DEDUCTIONS		<u>7,965</u>

Final checks prior to lift

<input type="checkbox"/>	Verify gross weight and load chart capacities (de-rated if crane on barge)
<input type="checkbox"/>	Inspected crane and verified components (Daily logs & annual certification checked)
<input type="checkbox"/>	Inspected rigging for condition and size
<input type="checkbox"/>	Inspect load line and drum wrap configuration
<input type="checkbox"/>	Ground stability. Outrigger pads/blocking sized correctly? Barge/crane list (de-rated chart)
<input type="checkbox"/>	Distance to nearest utility _____ (above and below ground)
<input type="checkbox"/>	Weather and wind load consideration, checked & verified at time of lift
<input type="checkbox"/>	Pre-lift meeting with rigging crew, operator, and signal person (attached sign in sheet)
<input type="checkbox"/>	Rigging drawings attached
<input type="checkbox"/>	Method of communication (radios, hand signals, etc.) checked & verified
<input type="checkbox"/>	Lift abort procedures checked and verified. JHA/PSI conducted



CONSTRUCTION LEADERS

CRANE LIFT STUDY ANALYSIS - LONG FORM

(All weights in lbs. unless noted otherwise)

I-91 NB/SB Bridges - 5515002

Date: _____

LOAD INFORMATION:

What is to be lifted: Existing Beam/Girder More than one crane Yes No

Initial location: Attach Lift Diagram (plan view) if required

Final set location: Attach Lift Diagram (plan view) if required

Verified Weight (weight of load, lbs.) 14,000 How was weight verified: Shop Drawings

Lift Points: Per Manufacturer
 Other, attach details and calculations

Maximum radius of lift: 100 Quadrants All

Maximum elevation of lift: Attach lift diagram (elevation view) if required

Maximum allowable wind speed for lift Per Manitowoc, 30 mph (Attach calculations)

GROUND CONDITIONS: Nature of soil Compacted Fill Safe Bearing Capacity 2 (tpsf)

Is the use of crane mats or compacted fill required: Yes No

CRANE CONFIGURATION:	Model/SN	<u>Link-Belt LS-248H II</u>	Boom Length/Type	<u>150 ft., LATTICE</u>
	Maximum Capacity	<u>171,400</u>	Jib Length/Type	<u>N/A</u>
		Boom Point Elevation at Maximum Working Radius		<u>66.2</u>
	Cable Diameter	<u>1 1/8"</u>	Block Capacity	<u>200</u>
			No. of Parts	<u>8</u>
	Anti-two block device	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Barge/Crane List	<u>N/A</u>

CALCULATIONS

Weight of Load	<u>14,000</u>	
+ Crane Capacity Deduction	<u>8,309</u>	
+ Plus Rigging Weight	<u>948</u>	
= Gross Weight	<u>23,256</u>	Maximum Lift Capacity for Radius <u>31,400</u>
% of Crane Chart	<u>74%</u>	(Gross weight/Crane capacity) See District Policy

RESPONSIBLE PERSONNEL (Print Name & Sign)

Project Manager _____
 Level 1 Lift Specialist _____
 Level 2 Lift Specialist (If Critical Lift) _____
 Level 3 Lift Specialist (If Engineered Lift) _____
 Superintendent _____
 Lift Supervisor _____
 Operator _____

WORKSHEET

RIGGING

Sling Length _____ Vertical Length _____ Max. Sling
 Sling Angle _____ Sling Load Angle Factor N/A Load _____ Tons

	Type	Size	Capacity	Qty	Weight
Slings	5/8" 6-Part Wire 38 ft.- Vertical	38 ft.	17 Ton	4	556.0
Slings	7/8" 6-Part Wire Rope Choker	16 ft.	29 Ton	2	274.0
Slings	None	0	0	0	0.0
Shackles	None	None	0	0	0.0
Shackles	Forged Screw Pin	25	25 Ton	4	117.8
Eye Bolts					
Picking Device	None	N/A	N/A	0	0.0
Additional Items	None	0	0	0	0.0

Capacity >
Load?

OK

CONSERVATIVE RIGGING WEIGHTS USED

TOTAL WEIGHT OF RIGGING 947.8

CRANE CAPACITY DEDUCTIONS

	Type	Gross Weight
Block	250 Ton	5,721
Effective Jib Weight		
Boom Extension		
Hook and Overhaul Ball	20 Ton	1,255
Whip Line below boom tip		94
Main Load Cable below tip		1,239
Stowed Jib or Boom Extension		
TOTAL DEDUCTIONS		8,309

Final checks prior to lift

<input type="checkbox"/>	Verify gross weight and load chart capacities (de-rated if crane on barge)
<input type="checkbox"/>	Inspected crane and verified components (Daily logs & annual certification checked)
<input type="checkbox"/>	Inspected rigging for condition and size
<input type="checkbox"/>	Inspect load line and drum wrap configuration
<input type="checkbox"/>	Ground stability. Outrigger pads/blocking sized correctly? Barge/crane list (de-rated chart)
<input type="checkbox"/>	Distance to nearest utility _____ (above and below ground)
<input type="checkbox"/>	Weather and wind load consideration, checked & verified at time of lift
<input type="checkbox"/>	Pre-lift meeting with rigging crew, operator, and signal person (attached sign in sheet)
<input type="checkbox"/>	Rigging drawings attached
<input type="checkbox"/>	Method of communication (radios, hand signals, etc.) checked & verified
<input type="checkbox"/>	Lift abort procedures checked and verified. JHA/PSI conducted

Engineering Per Sequence Step

Main Span Removal Sequence:

8. Hammer remaining concrete
9. Torch rebar

See STAAD output for structural bridge checks

10. Rig crane girder
11. Unbolt diaphragms
12. Torch cut girder on center side of EJ's
13. Fly out girder onto truck in I-91 lane closure
14. Remove diaphragms
15. Repeat steps 10-14 for remaining girders

See Crane Rigging Checks for girder picks

Back Span Removal Sequence:

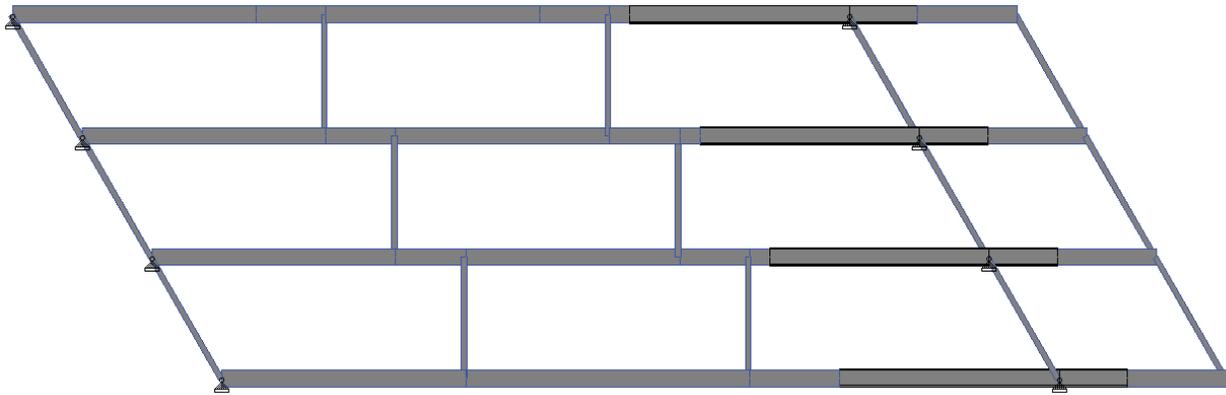
1. Remove pinned barrier wall ---> no engineering req'd
2. Mill asphalt - remove curb sections ---> no engineering req'd
3. Sawcut transverse / Longitudinal lines
4. Crane mat Deck
5. Hammer section behind EJ (After MS 9)
6. Torch Rebar
7. Slab crab removal of deck pieces

See STAAD output for structural bridge checks

8. Rig to EJ (After MS 15)
9. Torch cut girder on backspan side, fly out EJ.
10. Rig crane to girder
11. Unbolt diaphragms
12. Torch Backspan Anchor Bolts.
13. Fly out girder onto truck in I-91 lane closure
14. Remove diaphragms
15. Repeat steps 10-14 for remaining girders

See Crane Rigging Checks for girder picks

Staad Output





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Job No	Sheet No 1	Rev
Part		
Ref		
By	Date 23-Aug-15	Chd
Client	File HLS Backspan Girder.std	Date/Time 23-Aug-2015 18:37

Job Information

	Engineer	Checked	Approved
Name:			
Date:	23-Aug-15		

Structure Type	SPACE FRAME
----------------	-------------

Number of Nodes	34	Highest Node	50
Number of Elements	45	Highest Beam	69

Number of Basic Load Cases	6
Number of Combination Load Cases	4

Included in this printout are data for:

All	The Whole Structure
-----	---------------------

Included in this printout are results for load cases:

Type	L/C	Name
Primary	1	SELF WEIGHT
Primary	2	GIRDERS AT END
Primary	3	EXCAVATOR AT ENDS
Primary	4	EXCAVATOR IN MIDDLE
Primary	5	RIGHT SIDE EXCAVATOR AT TIP
Primary	6	LEFT SIDE EXCAVATOR AT TIP
Combination	7	TIP LOAD
Combination	8	MID LOAD
Combination	9	TIP RIGHT
Combination	10	TIP LEFT

Nodes

Node	X (ft)	Y (ft)	Z (ft)
15	8.360	0.000	14.500
16	45.250	0.000	14.500
17	58.360	0.000	14.500
18	62.440	0.000	14.500
19	68.360	0.000	14.500
20	27.079	0.000	14.500
21	44.040	0.000	14.500
22	12.540	0.000	21.750
23	49.430	0.000	21.750
24	62.540	0.000	21.750
25	66.620	0.000	21.750
26	72.540	0.000	21.750
27	27.079	0.000	21.750



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Job No	Sheet No 2	Rev
Part		
Ref		
By	Date 23-Aug-15	Chd
Client	File HLS Backspan Girder.std	Date/Time 23-Aug-2015 18:37

Nodes Cont...

Node	X (ft)	Y (ft)	Z (ft)
28	44.040	0.000	21.750
29	16.720	0.000	29.000
30	53.610	0.000	29.000
31	66.720	0.000	29.000
32	70.800	0.000	29.000
33	76.720	0.000	29.000
34	35.439	0.000	29.000
35	52.400	0.000	29.000
36	20.900	0.000	36.250
37	57.790	0.000	36.250
38	70.900	0.000	36.250
39	74.980	0.000	36.250
40	80.900	0.000	36.250
41	35.439	0.000	36.250
42	52.400	0.000	36.250
44	22.899	0.000	14.500
46	39.860	0.000	14.500
47	31.259	0.000	21.750
48	31.259	0.000	29.000
49	48.220	0.000	21.750
50	48.220	0.000	29.000

Beams

Beam	Node A	Node B	Length (ft)	Property	β (degrees)
13	15	44	14.539	1	0
14	20	46	12.781	1	0
15	21	16	1.210	1	0
16	16	17	13.110	2	0
17	17	18	4.080	2	0
18	18	19	5.920	1	0
19	22	27	14.539	1	0
20	27	47	4.180	1	0
21	28	49	4.180	1	0
22	23	24	13.110	2	0
23	24	25	4.080	2	0
24	25	26	5.920	1	0
25	29	48	14.539	1	0
26	34	50	12.781	1	0
27	35	30	1.210	1	0
28	30	31	13.110	2	0
29	31	32	4.080	2	0
30	32	33	5.920	1	0



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Job No	Sheet No 3	Rev
Part		
Ref		
By	Date 23-Aug-15	Chd
Client	File HLS Backspan Girder.std	Date/Time 23-Aug-2015 18:37

Beams Cont...

Beam	Node A	Node B	Length (ft)	Property	β (degrees)
31	36	41	14.539	1	0
32	41	42	16.961	1	0
33	42	37	5.390	1	0
34	37	38	13.110	2	0
35	38	39	4.080	2	0
36	39	40	5.920	1	0
41	20	27	7.250	3	0
42	21	28	7.250	3	0
43	17	24	8.369	3	0
44	19	26	8.369	3	0
45	34	41	7.250	3	0
46	35	42	7.250	3	0
47	31	38	8.369	3	0
48	33	40	8.369	3	0
51	26	33	8.369	3	0
53	24	31	8.369	3	0
55	15	22	8.369	3	0
56	22	29	8.369	3	0
57	29	36	8.369	3	0
59	44	20	4.180	1	0
62	46	21	4.180	1	0
64	47	28	12.781	1	0
65	48	34	4.180	1	0
66	47	48	7.250	3	0
67	49	23	1.210	1	0
68	50	35	4.180	1	0
69	49	50	7.250	3	0

Section Properties

Prop	Section	Area (in ²)	I _{yy} (in ⁴)	I _{zz} (in ⁴)	J (in ⁴)	Material
1	W36X135	39.700	225.000	7.8E+3	6.431	STEEL
2	W36X135 TB	49.553	334.755	11E+3	7.074	STEEL
3	MC18X42	12.600	14.400	554.000	1.171	STEEL

 Software licensed to PCL Constructors Inc.	Job No	Sheet No 4	Rev
	Part		
Job Title	Ref		
	By	Date 23-Aug-15	Chd
Client	File HLS Backspan Girder.std	Date/Time	23-Aug-2015 18:37

Supports

Node	X (kip/in)	Y (kip/in)	Z (kip/in)	rX (kip*ft/deg)	rY (kip*ft/deg)	rZ (kip*ft/deg)
15	Fixed	Fixed	Fixed	-	-	-
17	Fixed	Fixed	Fixed	-	-	-
22	Fixed	Fixed	Fixed	-	-	-
24	Fixed	Fixed	Fixed	-	-	-
29	Fixed	Fixed	Fixed	-	-	-
31	Fixed	Fixed	Fixed	-	-	-
36	Fixed	Fixed	Fixed	-	-	-
38	Fixed	Fixed	Fixed	-	-	-

Primary Load Cases

Number	Name	Type
1	SELF WEIGHT	None
2	GIRDERS AT END	None
3	EXCAVATOR AT ENDS	None
4	EXCAVATOR IN MIDDLE	None
5	RIGHT SIDE EXCAVATOR AT TIP	None
6	LEFT SIDE EXCAVATOR AT TIP	None

Combination Load Cases

Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
7	TIP LOAD	1	SELF WEIGHT	1.00
		2	GIRDERS AT END	1.00
		3	EXCAVATOR AT ENDS	1.00
8	MID LOAD	1	SELF WEIGHT	1.00
		4	EXCAVATOR IN MIDDLE	1.00
9	TIP RIGHT	1	SELF WEIGHT	1.00
		2	GIRDERS AT END	1.00
		5	RIGHT SIDE EXCAVATOR AT TIP	1.00
10	TIP LEFT	1	SELF WEIGHT	1.00
		2	GIRDERS AT END	1.00
		6	LEFT SIDE EXCAVATOR AT TIP	1.00



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Job No	Sheet No 5	Rev
Part		
Ref		
By	Date 23-Aug-15	Chd
Client	File HLS Backspan Girder.std	Date/Time 23-Aug-2015 18:37

1 SELF WEIGHT : Beam Loads

Beam	Type	Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
13	UNI	lbf/ft	GY	-1E+3	-	-	-
14	UNI	lbf/ft	GY	-1E+3	-	-	-
15	UNI	lbf/ft	GY	-1E+3	-	-	-
16	UNI	lbf/ft	GY	-1E+3	-	-	-
17	UNI	lbf/ft	GY	-1E+3	-	-	-
18	UNI	lbf/ft	GY	-1E+3	-	-	-
19	UNI	lbf/ft	GY	-1E+3	-	-	-
20	UNI	lbf/ft	GY	-1E+3	-	-	-
21	UNI	lbf/ft	GY	-1E+3	-	-	-
22	UNI	lbf/ft	GY	-1E+3	-	-	-
23	UNI	lbf/ft	GY	-1E+3	-	-	-
24	UNI	lbf/ft	GY	-1E+3	-	-	-
25	UNI	lbf/ft	GY	-1E+3	-	-	-
26	UNI	lbf/ft	GY	-1E+3	-	-	-
27	UNI	lbf/ft	GY	-1E+3	-	-	-
28	UNI	lbf/ft	GY	-1E+3	-	-	-
29	UNI	lbf/ft	GY	-1E+3	-	-	-
30	UNI	lbf/ft	GY	-1E+3	-	-	-
31	UNI	lbf/ft	GY	-1E+3	-	-	-
32	UNI	lbf/ft	GY	-1E+3	-	-	-
33	UNI	lbf/ft	GY	-1E+3	-	-	-
34	UNI	lbf/ft	GY	-1E+3	-	-	-
35	UNI	lbf/ft	GY	-1E+3	-	-	-
36	UNI	lbf/ft	GY	-1E+3	-	-	-
59	UNI	lbf/ft	GY	-1E+3	-	-	-
62	UNI	lbf/ft	GY	-1E+3	-	-	-
64	UNI	lbf/ft	GY	-1E+3	-	-	-
65	UNI	lbf/ft	GY	-1E+3	-	-	-
67	UNI	lbf/ft	GY	-1E+3	-	-	-
68	UNI	lbf/ft	GY	-1E+3	-	-	-

2 GIRDERS AT END : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip'in)	MY (kip'in)	MZ (kip'in)
19	-	-30.000	-	-	-	-
26	-	-30.000	-	-	-	-
33	-	-30.000	-	-	-	-
40	-	-30.000	-	-	-	-

 Software licensed to PCL Constructors Inc.	Job No	Sheet No 6	Rev
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3 EXCAVATOR AT ENDS : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip'in)	MY (kip'in)	MZ (kip'in)
19	-	-22.500	-	-	-	-
26	-	-22.500	-	-	-	-
33	-	-22.500	-	-	-	-
40	-	-22.500	-	-	-	-

4 EXCAVATOR IN MIDDLE : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip'in)	MY (kip'in)	MZ (kip'in)
28	-	-22.500	-	-	-	-
42	-	-22.500	-	-	-	-
46	-	-22.500	-	-	-	-
50	-	-22.500	-	-	-	-

5 RIGHT SIDE EXCAVATOR AT TIP : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip'in)	MY (kip'in)	MZ (kip'in)
33	-	-45.000	-	-	-	-
40	-	-45.000	-	-	-	-

6 LEFT SIDE EXCAVATOR AT TIP : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip'in)	MY (kip'in)	MZ (kip'in)
19	-	-45.000	-	-	-	-
26	-	-45.000	-	-	-	-

Node Displacement Summary

	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)	rX (rad)	rY (rad)	rZ (rad)
Max X	15	1:SELF WEIG†	0.000	0.000	0.000	0.000	-0.002	0.000	-0.003
Min X	15	1:SELF WEIG†	0.000	0.000	0.000	0.000	-0.002	0.000	-0.003
Max Y	19	8:MID LOAD	0.000	0.553	0.000	0.553	0.003	0.000	0.005
Min Y	46	8:MID LOAD	0.000	-0.897	0.000	0.897	0.001	0.000	0.002
Max Z	15	1:SELF WEIG†	0.000	0.000	0.000	0.000	-0.002	0.000	-0.003
Min Z	15	1:SELF WEIG†	0.000	0.000	0.000	0.000	-0.002	0.000	-0.003
Max rX	50	10:TIP LEFT	0.000	-0.057	0.000	0.057	0.003	0.000	0.001
Min rX	26	10:TIP LEFT	0.000	-0.538	0.000	0.538	-0.006	0.000	-0.005
Max rY	15	1:SELF WEIG†	0.000	0.000	0.000	0.000	-0.002	0.000	-0.003
Min rY	15	1:SELF WEIG†	0.000	0.000	0.000	0.000	-0.002	0.000	-0.003
Max rZ	17	8:MID LOAD	0.000	0.000	0.000	0.000	0.003	0.000	0.005

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Node Displacement Summary Cont...

	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)	rX (rad)	rY (rad)	rZ (rad)
Min rZ	40	9:TIP RIGHT	0.000	-0.724	0.000	0.724	-0.002	0.000	-0.006
Max Rst	46	8:MID LOAD	0.000	-0.897	0.000	0.897	0.001	0.000	0.002

Beam Maximum Forces by Section Property

Section		Axial			Shear		Torsion	Bending	
		Max Fx (kip)	Max Fy (kip)	Max Fz (kip)	Max Mx (kip'in)	Max My (kip'in)	Max Mz (kip'in)		
W36X135	Max +ve	0.000	84.433	0.000	2.713	0.000	5.79E+3		
	Max -ve	0.000	-28.584	0.000	-2.075	0.000	-6.27E+3		
W36X135	Max +ve	0.000	88.513	0.000	2.713	0.000	10E+3		
	Max -ve	0.000	-41.694	0.000	-1.932	0.000	-4.69E+3		
MC18X42	Max +ve	0.000	7.076	0.000	0.418	0.000	355.848		
	Max -ve	0.000	-7.093	0.000	-0.418	0.000	-356.412		

Utilization Ratio

Beam	Analysis Property	Design Property	Actual Allowable Ratio		Ratio (Act./Allow.)	Clause	L/C	Ax (in ²)	Iz (in ⁴)	Iy (in ⁴)	Ix (in ⁴)
13	W36X135	W36X135	0.474	1.000	0.474	AISC- H1-3	8	39.700	7.8E+3	225.000	6.990
14	W36X135	W36X135	0.661	1.000	0.661	AISC- H1-3	8	39.700	7.8E+3	225.000	6.990
15	W36X135	W36X135	0.487	1.000	0.487	AISC- H1-3	8	39.700	7.8E+3	225.000	6.990
16	W36X135	W36X135TB	0.769	1.000	0.769	AISC- H1-3	10	49.553	11E+3	334.755	7.633
17	W36X135	W36X135TB	0.699	1.000	0.699	AISC- H1-3	10	49.553	11E+3	334.755	7.633
18	W36X135	W36X135	0.555	1.000	0.555	AISC- H1-3	10	39.700	7.8E+3	225.000	6.990
19	W36X135	W36X135	0.474	1.000	0.474	AISC- H1-3	8	39.700	7.8E+3	225.000	6.990
20	W36X135	W36X135	0.494	1.000	0.494	AISC- H1-3	8	39.700	7.8E+3	225.000	6.990
21	W36X135	W36X135	0.601	1.000	0.601	AISC- H1-3	8	39.700	7.8E+3	225.000	6.990
22	W36X135	W36X135TB	0.639	1.000	0.639	AISC- H1-3	10	49.553	11E+3	334.755	7.633
23	W36X135	W36X135TB	0.581	1.000	0.581	AISC- H1-3	10	49.553	11E+3	334.755	7.633
24	W36X135	W36X135	0.459	1.000	0.459	AISC- H1-3	10	39.700	7.8E+3	225.000	6.990
25	W36X135	W36X135	0.474	1.000	0.474	AISC- H1-3	8	39.700	7.8E+3	225.000	6.990
26	W36X135	W36X135	0.661	1.000	0.661	AISC- H1-3	8	39.700	7.8E+3	225.000	6.990
27	W36X135	W36X135	0.486	1.000	0.486	AISC- H1-3	8	39.700	7.8E+3	225.000	6.990
28	W36X135	W36X135TB	0.639	1.000	0.639	AISC- H1-3	9	49.553	11E+3	334.755	7.633
29	W36X135	W36X135TB	0.581	1.000	0.581	AISC- H1-3	9	49.553	11E+3	334.755	7.633
30	W36X135	W36X135	0.459	1.000	0.459	AISC- H1-3	9	39.700	7.8E+3	225.000	6.990
31	W36X135	W36X135	0.475	1.000	0.475	AISC- H1-3	8	39.700	7.8E+3	225.000	6.990
32	W36X135	W36X135	0.717	1.000	0.717	AISC- H1-3	8	39.700	7.8E+3	225.000	6.990
33	W36X135	W36X135	0.601	1.000	0.601	AISC- H1-3	8	39.700	7.8E+3	225.000	6.990
34	W36X135	W36X135TB	0.769	1.000	0.769	AISC- H1-3	9	49.553	11E+3	334.755	7.633
35	W36X135	W36X135TB	0.699	1.000	0.699	AISC- H1-3	9	49.553	11E+3	334.755	7.633
36	W36X135	W36X135	0.555	1.000	0.555	AISC- H1-3	9	39.700	7.8E+3	225.000	6.990
41	MC18X42	MC18X42	0.001	1.000	0.001	AISC- H1-3	8	12.600	554.000	14.400	1.208

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Utilization Ratio Cont...

Beam	Analysis Property	Design Property	Actual Allowable		Ratio (Act./Allow.)	Clause	L/C	Ax (in ²)	Iz (in ⁴)	Iy (in ⁴)	Ix (in ⁴)
			Ratio	Ratio							
42	MC18X42	MC18X42	0.002	1.000	0.002	AISC- H1-3	6	12.600	554.000	14.400	1.208
43	MC18X42	MC18X42	0.001	1.000	0.001	AISC- H1-3	8	12.600	554.000	14.400	1.208
44	MC18X42	MC18X42	0.350	1.000	0.350	AISC- H1-3	5	12.600	554.000	14.400	1.208
45	MC18X42	MC18X42	0.003	1.000	0.003	AISC- H1-3	5	12.600	554.000	14.400	1.208
46	MC18X42	MC18X42	0.001	1.000	0.001	AISC- H1-3	9	12.600	554.000	14.400	1.208
47	MC18X42	MC18X42	0.001	1.000	0.001	AISC- H1-3	5	12.600	554.000	14.400	1.208
48	MC18X42	MC18X42	0.350	1.000	0.350	AISC- H1-3	6	12.600	554.000	14.400	1.208
51	MC18X42	MC18X42	0.353	1.000	0.353	AISC- H1-3	10	12.600	554.000	14.400	1.208
53	MC18X42	MC18X42	0.001	1.000	0.001	AISC- H1-3	5	12.600	554.000	14.400	1.208
55	MC18X42	MC18X42	0.001	1.000	0.001	AISC- H1-3	8	12.600	554.000	14.400	1.208
56	MC18X42	MC18X42	0.001	1.000	0.001	AISC- H1-3	10	12.600	554.000	14.400	1.208
57	MC18X42	MC18X42	0.001	1.000	0.001	AISC- H1-3	10	12.600	554.000	14.400	1.208
59	W36X135	W36X135	0.495	1.000	0.495	AISC- H1-3	8	39.700	7.8E+3	225.000	6.990
62	W36X135	W36X135	0.601	1.000	0.601	AISC- H1-3	8	39.700	7.8E+3	225.000	6.990
64	W36X135	W36X135	0.661	1.000	0.661	AISC- H1-3	8	39.700	7.8E+3	225.000	6.990
65	W36X135	W36X135	0.494	1.000	0.494	AISC- H1-3	8	39.700	7.8E+3	225.000	6.990
66	MC18X42	MC18X42	0.003	1.000	0.003	AISC- H1-3	10	12.600	554.000	14.400	1.208
67	W36X135	W36X135	0.486	1.000	0.486	AISC- H1-3	8	39.700	7.8E+3	225.000	6.990
68	W36X135	W36X135	0.601	1.000	0.601	AISC- H1-3	8	39.700	7.8E+3	225.000	6.990
69	MC18X42	MC18X42	0.004	1.000	0.004	AISC- H1-3	10	12.600	554.000	14.400	1.208

Failed Members

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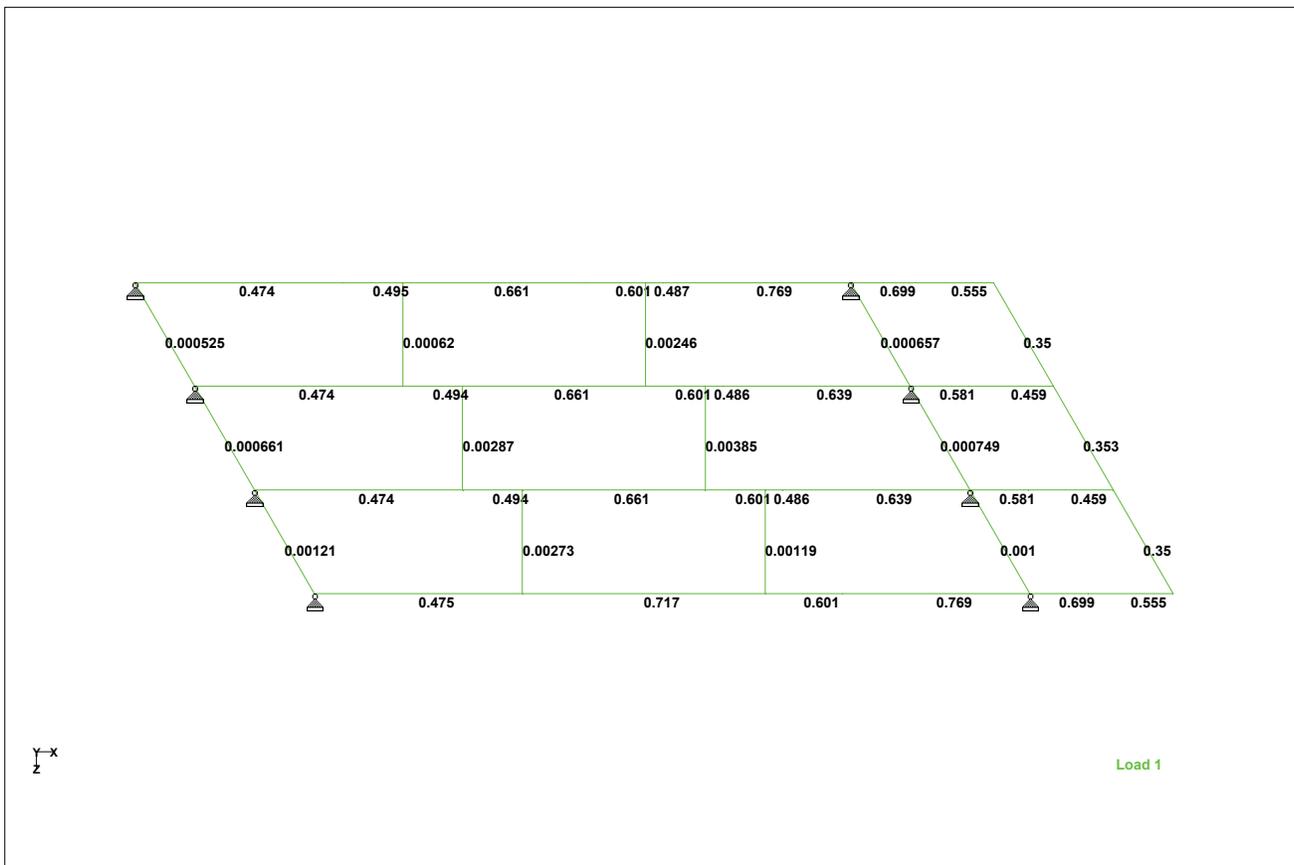
Reaction Summary

	Node	L/C	Horizontal	Vertical	Horizontal	Moment		
			FX (kip)	FY (kip)	FZ (kip)	MX (kip'in)	MY (kip'in)	MZ (kip'in)
Max FX	15	1:SELF WEIG†	0.000	23.997	0.000	0.000	0.000	0.000
Min FX	15	1:SELF WEIG†	0.000	23.997	0.000	0.000	0.000	0.000
Max FY	38	9:TIP RIGHT	0.000	130.215	0.000	0.000	0.000	0.000
Min FY	36	5:RIGHT SIDE	0.000	-9.748	0.000	0.000	0.000	0.000
Max FZ	15	1:SELF WEIG†	0.000	23.997	0.000	0.000	0.000	0.000
Min FZ	15	1:SELF WEIG†	0.000	23.997	0.000	0.000	0.000	0.000
Max MX	15	1:SELF WEIG†	0.000	23.997	0.000	0.000	0.000	0.000
Min MX	15	1:SELF WEIG†	0.000	23.997	0.000	0.000	0.000	0.000
Max MY	15	1:SELF WEIG†	0.000	23.997	0.000	0.000	0.000	0.000
Min MY	15	1:SELF WEIG†	0.000	23.997	0.000	0.000	0.000	0.000
Max MZ	15	1:SELF WEIG†	0.000	23.997	0.000	0.000	0.000	0.000
Min MZ	15	1:SELF WEIG†	0.000	23.997	0.000	0.000	0.000	0.000



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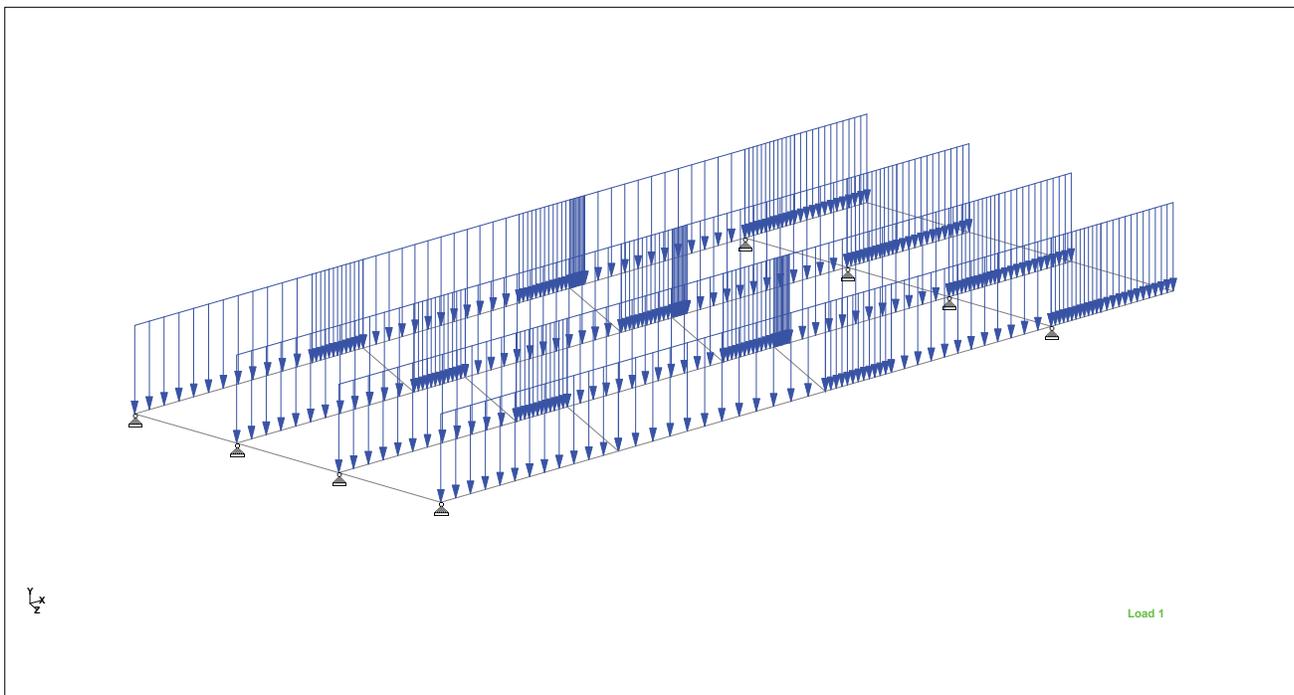


Unity Check

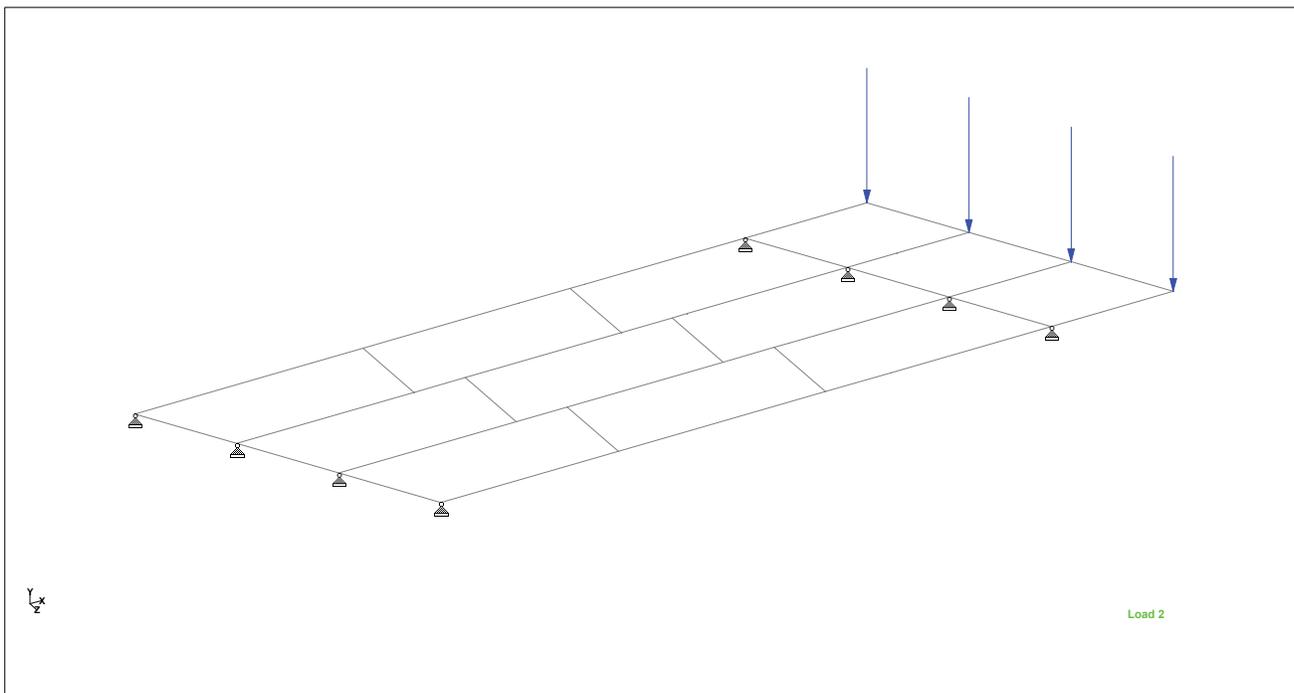


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Job No	Sheet No 10	Rev
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1 KLF for deck weight + timber mats

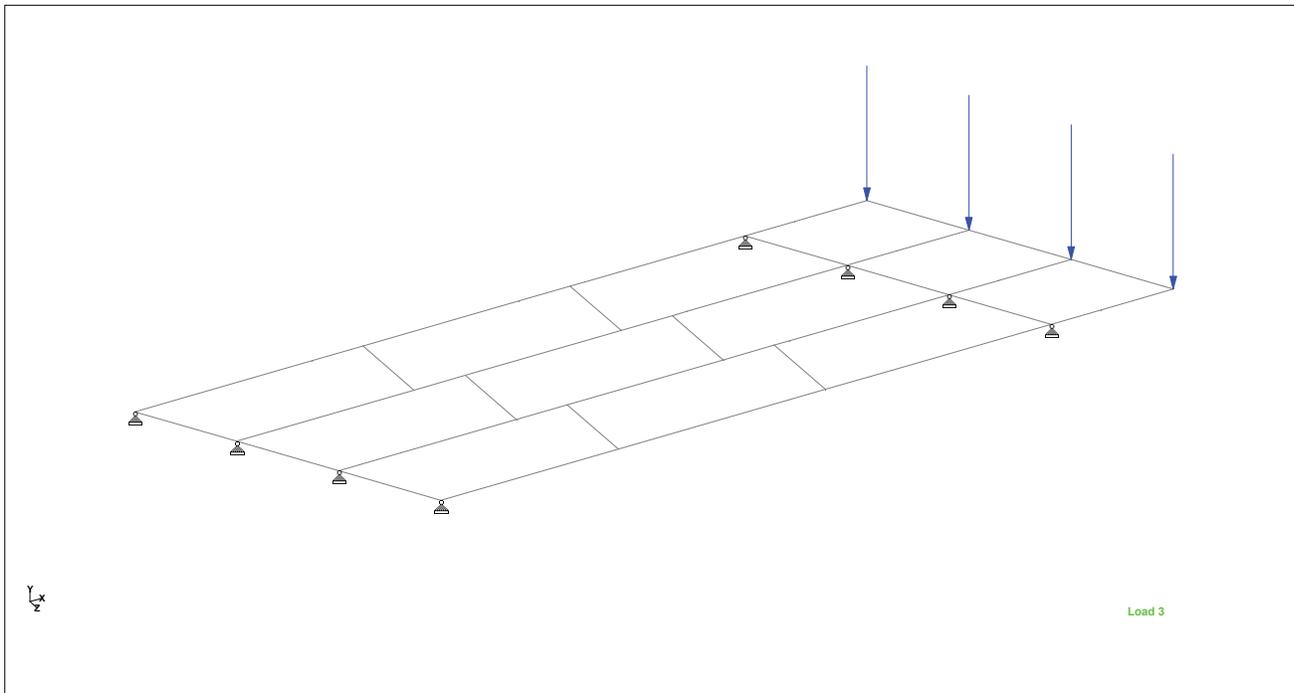


30k at end for suspended span load

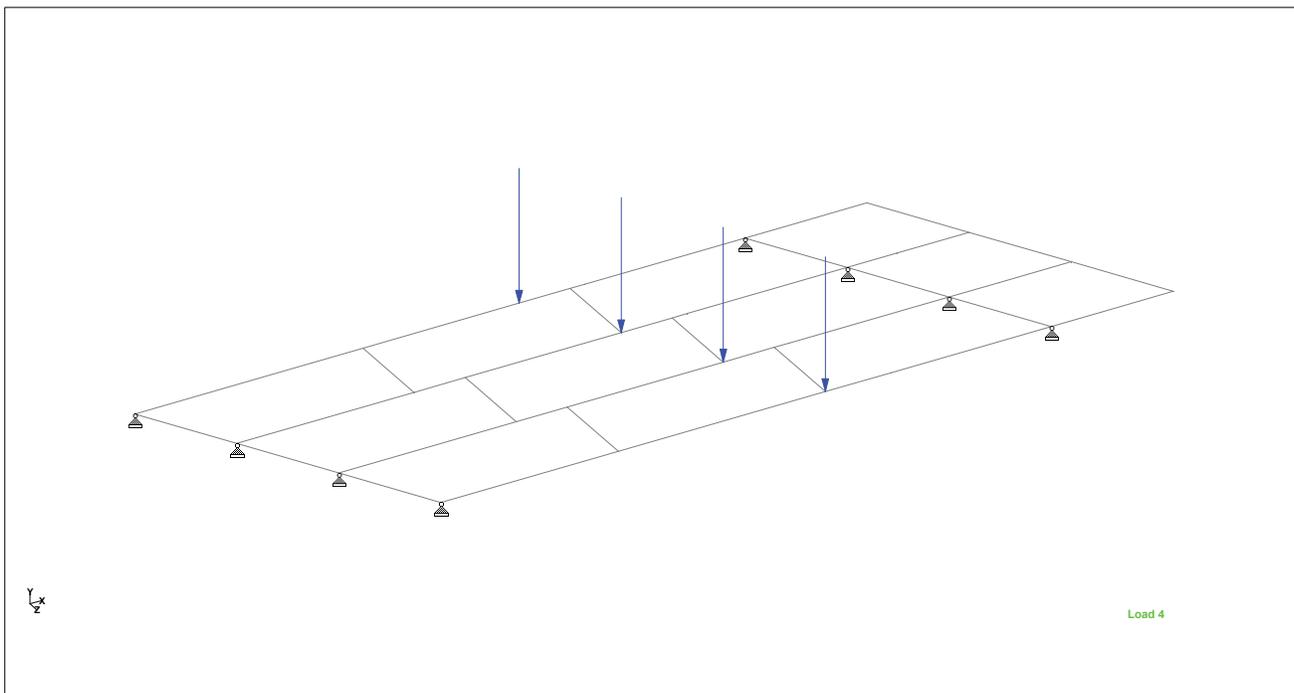


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Excavator evenly dist. over exp jt

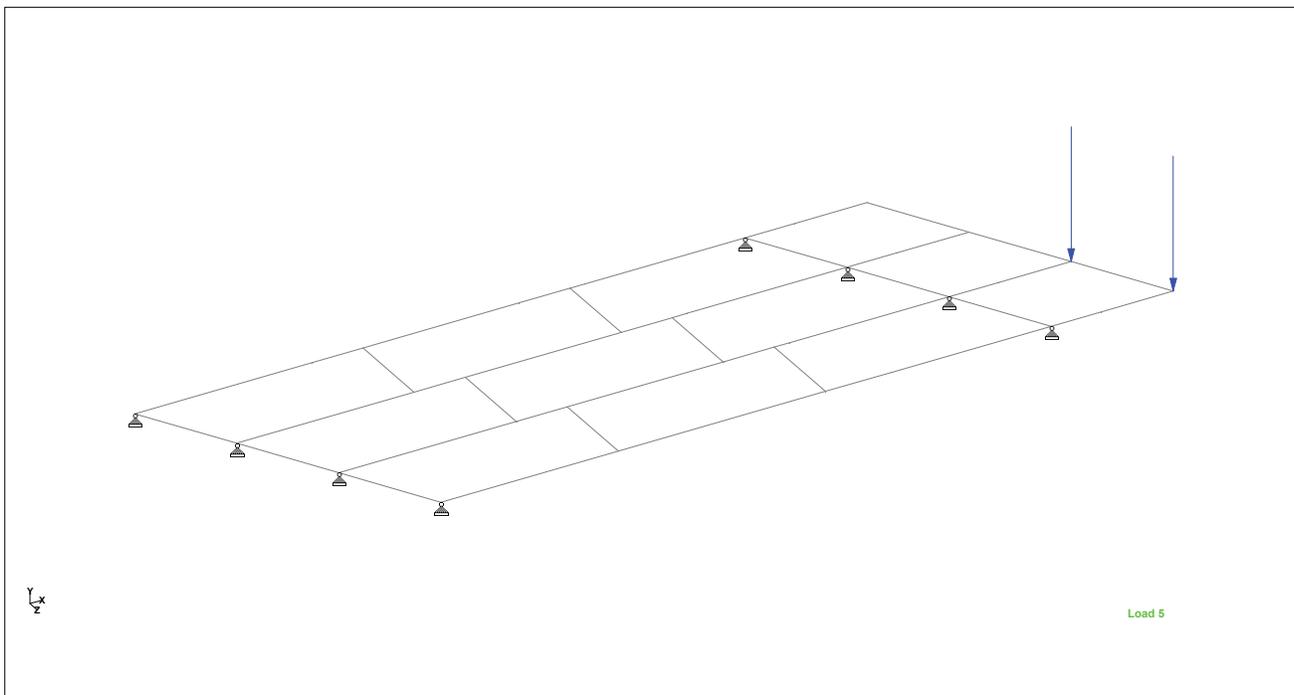


excavator evenly dist over midspan

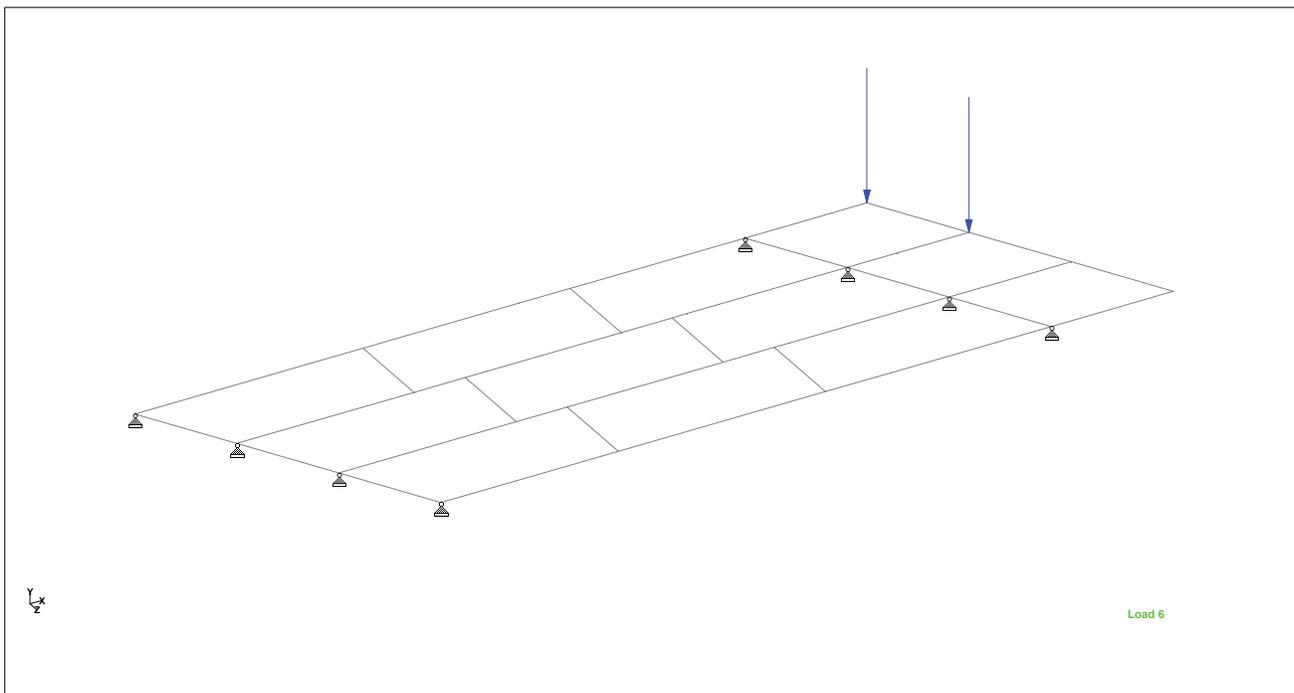


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excavator point loaded on exterior right



excavator at tip on left side

SERIAL NUMBER: **XXXX-XXXX**

CRANE RATING MANUAL

298 HSL

250 TON LATTICE BOOM CRAWLER CRANE

- 68" x 80" TUBE BOOM
WITH 30' PEAK SECTION
- 1.25" DIAMETER DUAL PENDANTS
- WITH 25' LIVE MAST
- 30" X 36" TUBULAR JIB
- LBCE CRAWLER LOWER 19' 3" GAUGE
AND 27' 9" OVERALL LENGTH

For Replacement, Order Part Number: P3P0029
(061812)

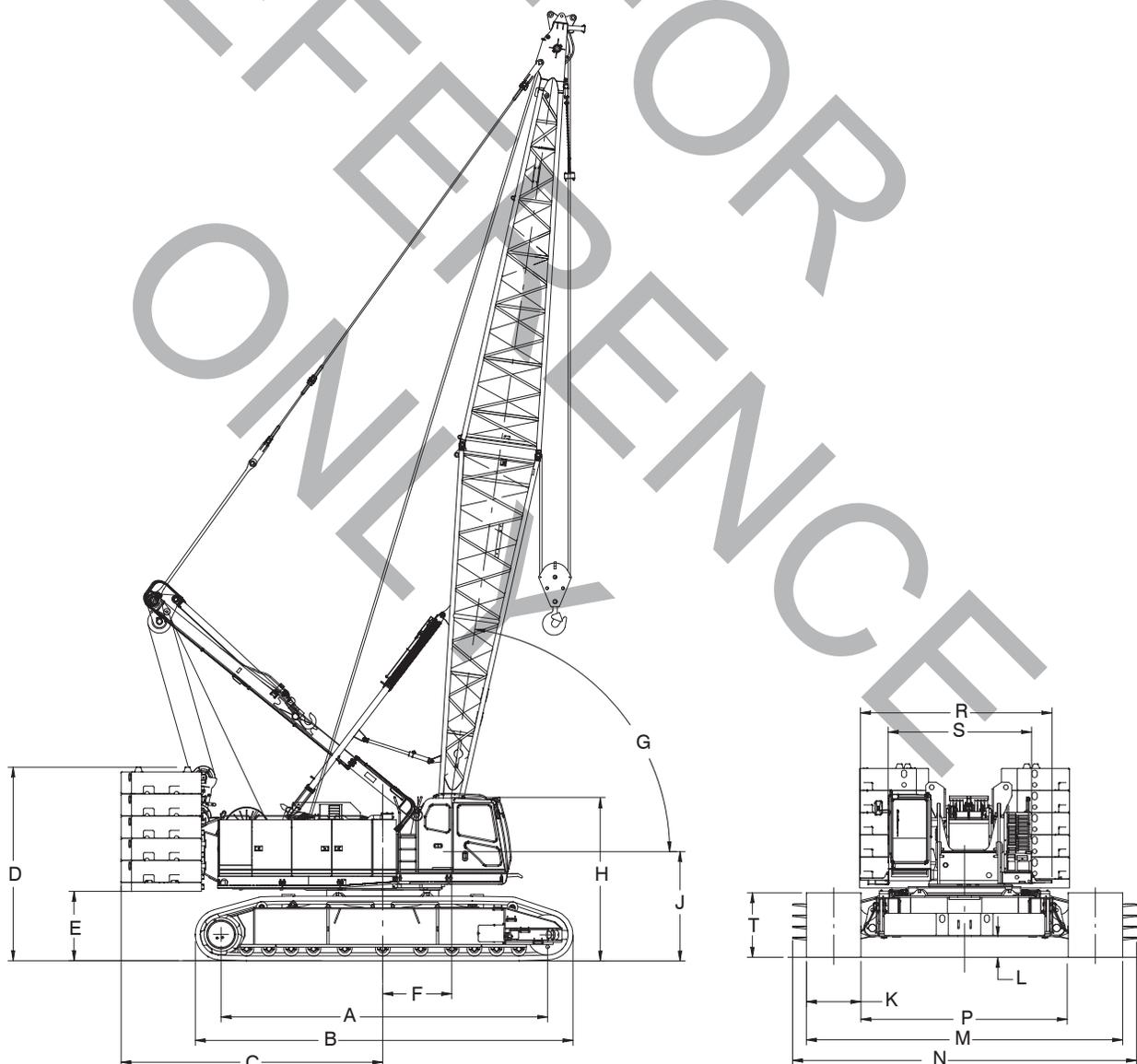
Link-Belt[®]
CONSTRUCTION EQUIPMENT

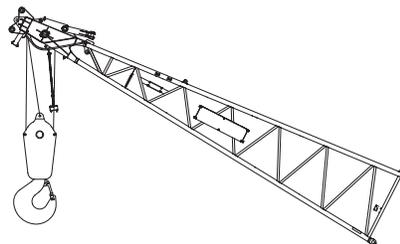
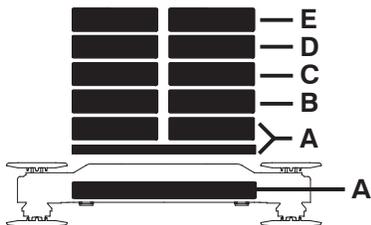
© Link-Belt is a registered trademark.

General Dimensions

A	Centerline Sprocket To Centerline Idler (Nominal)	24' (7.32m)
B	Overall Length (Lower)	27'-9" (8.46m)
C	Tailswing (Upper Counterweight)	19'-5.0" (5.92m)
D	Working Height	14'-4" (4.37m)
E	Ground Clearance (Upper Counterweight)	61.6" (1.56m)
F	Centerline Of Rotation To Centerline Of Boom Foot	53.5" (1.36m)
G	Boom Angle (Maximum)	82°
H	Operator's Cab Height	12'-10.5" (3.92m)
J	Boom Foot Pin Height	97" (2.46m)

K	Track Shoe Width	48" (1.22m) Std. 60" (1.52m) Opt.
L	Ground Clearance (Frame)	17.8" (0.45m)
M	Overall Width – Lower [48" (1.22m) Shoes]	23'-3" (7.08m)
	Overall Width – Lower [60" (1.52m) Shoes]	24'-3" (7.39m)
N	Overall Width – Lower With Steps [48" (1.22m) Shoes]	25'-3.5" (7.71m)
	Overall Width – Lower With Steps [60" (1.52m) Shoes]	26'-3.5" (8.01m)
P	Distance Between Tracks [48" (1.22m) Shoes]	15'-3" (4.64m)
	Distance Between Tracks [60" (1.52m) Shoes]	14'-3" (4.27m)
R	Upper Width (Over Catwalks)	14'-1" (4.29m)
S	Upper Width (Catwalks Removed)	10'-6" (3.20m)
T	Track Height	57.3" (1.46m)





Main Boom Capacities – 120'

Load Radius (ft)	Boom Angle (deg)	Over End Blocked	360° Rotation					Load Radius (ft)
		ABCDE+A CTWT (lb)	ABCDE+A CTWT (lb)	ABCD+A CTWT (lb)	ABC+A CTWT (lb)	AB+A CTWT (lb)		
		Curve 1	Curve 2	Curve 3	Curve 4	Curve 5		
21.16	82.0	326,800	326,800	317,700	305,000	292,200	21.16	
25	80.1	282,000	282,000	271,000	257,600	225,600	25	
30	77.7	231,300	231,300	215,800	191,800	167,700	30	
35	75.3	190,400	190,400	171,400	152,100	132,700	35	
40	72.8	162,900	157,700	141,600	125,500	109,400	40	
50	67.7	125,300	116,400	104,300	92,200	80,100	50	
60	62.4	100,100	91,600	81,900	72,200	62,500	60	
70	56.9	84,100	74,900	66,900	58,800	50,700	70	
80	51.0	70,900	63,000	56,100	49,200	42,300	80	
90	44.5	60,800	54,100	48,000	42,000	35,900	90	
100	37.2	52,700	47,100	41,700	36,300	30,900	100	
110	28.4	47,000	41,400	36,600	31,700	26,900	110	
117.22	20.0	42,200	38,000	33,500	28,900	24,400	117.22	

Note: Refer To Page 21 For “Capacity Deductions”.

Link-Belt®

CONSTRUCTION EQUIPMENT

LS - 248H II

CRANE RATING MANUAL

- 68" x 80" TUBULAR BOOM
- 30' OPEN THROAT PEAK SECTION
- 15' HAMMERHEAD PEAK SECTION
- 1.0" DIAMETER PENDANTS
- WITH LIVE MAST
- LBCE CRAWLER LOWER, 18'10" GAGE AND 28'6" OVERALL LENGTH

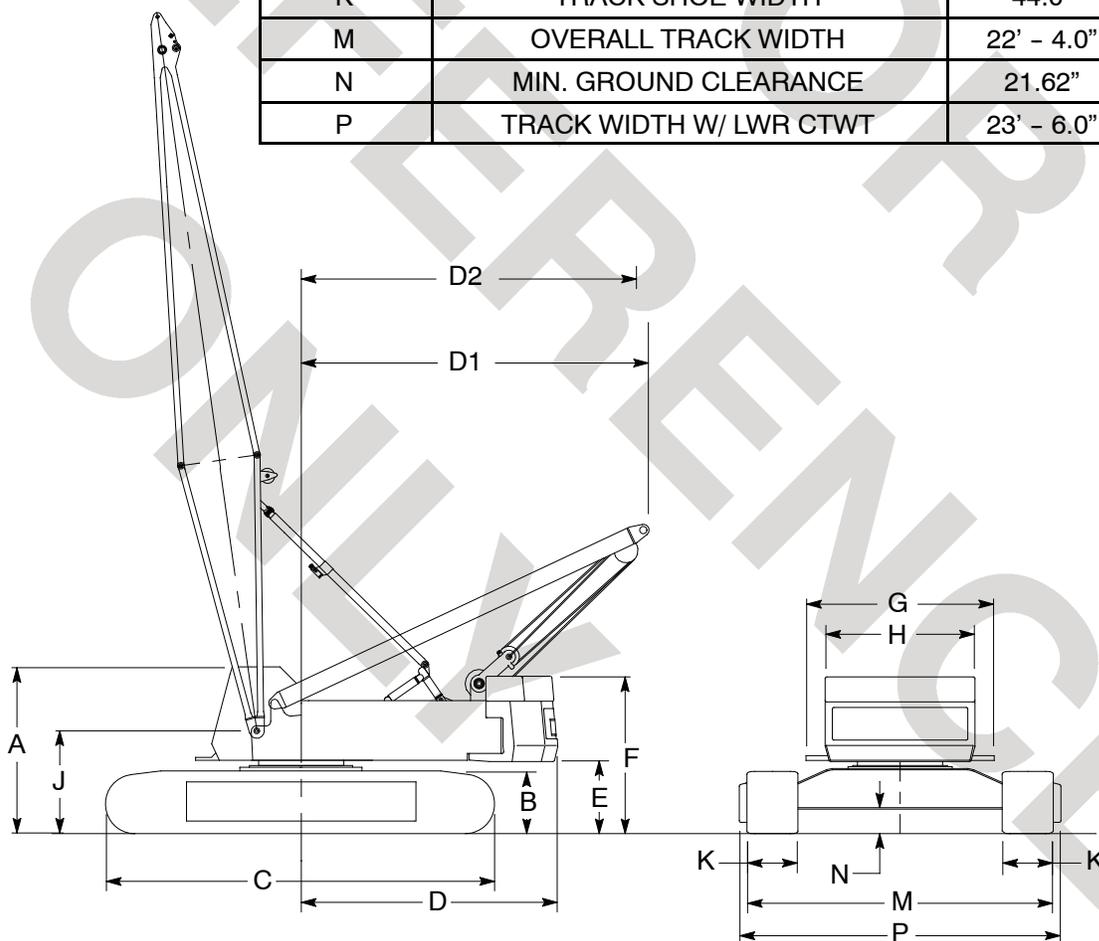
SERIAL NUMBER XXXX-XXXX

For Replacement, Order Part Number H3P0038.
(010802)

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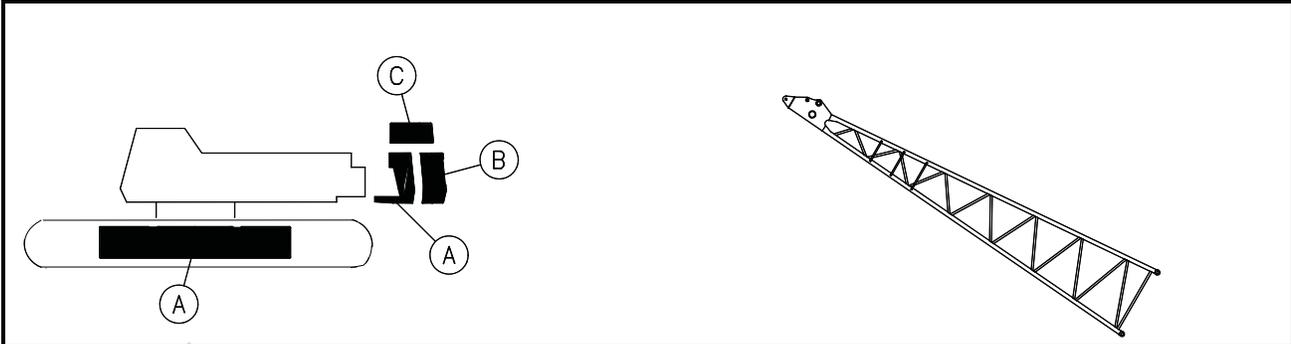
GENERAL DIMENSIONS

GENERAL DESCRIPTION	DIMENSION	
A	OPERATOR'S CAB HEIGHT	12' - 0.00"
B	TREADMEMBER HEIGHT	53.50"
C	TREADMEMBER LENGTH	28' - 6.0"
D	TAIL SWING - CTWT	18' - 10.62"
D1	MAX. LIVE MAST SWING	25' - 0.0"
D2	MAX. BALANCE ARM SWING	24' - 6.0"
E	GROUND CLEARANCE - CTWT	63.81"
F	OVERALL HEIGHT - CTWT	11' - 5.55"
G	WIDTH OVER CATWALKS	13' - 7.78"
H	UPPER WIDTH	10' - 11.50"
J	HEIGHT OF BOOM FOOT PIN	90.5"
K	TRACK SHOE WIDTH	44.0"
M	OVERALL TRACK WIDTH	22' - 4.0"
N	MIN. GROUND CLEARANCE	21.62"
P	TRACK WIDTH W/ LWR CTWT	23' - 6.0"



NOTES:

1. Dimensions D1 and D2 are approximate and should be considered as reference only. Dimension D2 is applicable to luffing attachment applications only.
2. Individual job site obstacles must be considered and ample clearance given for all hazards near the crane working range.



MAIN BOOM CAPACITIES - 120 FT OPEN THROAT TUBE BOOM

Load Radius (ft)	Boom Angle (deg)	360° Rotation					Over End Blocked	Load Radius (ft)
		ABC + A CTWT (lb)	ABC CTWT (lb)	AB CTWT (lb)	A CTWT (lb)	0 CTWT (lb)	ABC + A CTWT (lb)	
20.0	82.0	186,200	186,200	186,200	148,900	106,900	186,200	20.0
25	79.6	173,900	173,900	157,300	97,900	69,800	173,900	25
30	77.1	156,900	144,900	117,000	72,200	51,000	156,900	30
35	74.7	128,900	115,000	92,600	56,700	39,700	131,100	35
40	72.2	106,500	94,900	76,300	46,300	32,100	112,600	40
50	67.1	78,500	69,800	55,800	33,200	22,600	86,900	50
60	61.8	61,600	54,600	43,400	25,400	16,800	69,300	60
70	56.2	50,300	44,500	35,100	20,100	13,000	58,300	70
80	50.3	42,200	37,200	29,200	16,300	10,200	49,000	80
90	43.7	36,100	31,800	24,700	13,400	8,100	41,800	90
100	36.3	31,400	27,500	21,200	11,200	6,400	36,100	100
110	27.2	27,500	24,000	18,400	9,400	5,100	31,400	110
120	13.4	24,300	21,100	16,000	7,800	3,900	27,500	120

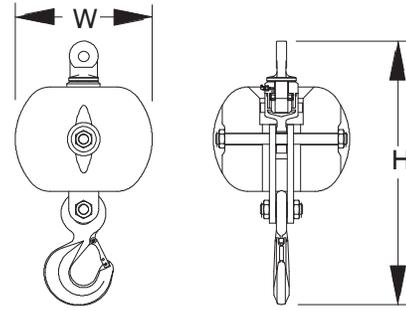
Note: Refer To Page 13 For "Capacity Deductions" Caused By Any Jib Attachment Or Tip Extension.

Hook Balls

20 Ton (18.1mt) Swivel

Hook Ball* 1

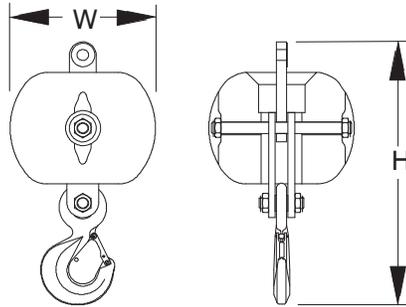
Width	21.75 in	(0.55m)
Height	41.75 in	(1.06m)
Weight	1,255 lb	(569kg)



20 Ton (18.1mt) Non-Swivel

Hook Ball* 1

Width	21.75 in	(0.55m)
Height	39 in	(0.99m)
Weight	1,211 lb	(549kg)

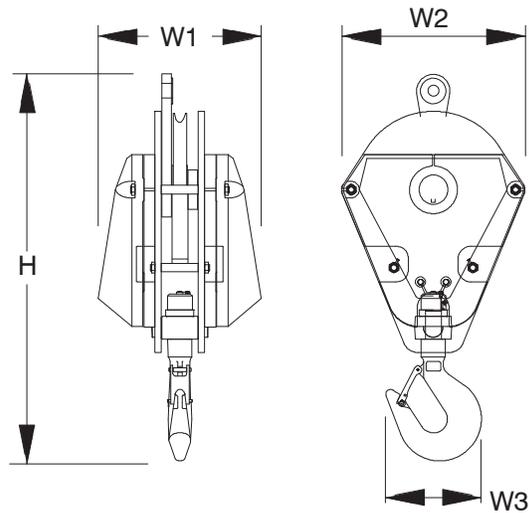


Hook Blocks

40 Ton (36.3mt)

1 – Sheave Hook Block* 1

Width1	25.50 in	(0.65m)
Width2	28.75 in	(0.73m)
Width3	15 in	(0.38m)
Height	60.75 in	(1.54m)
Weight	2,293 lb	(1 040kg)



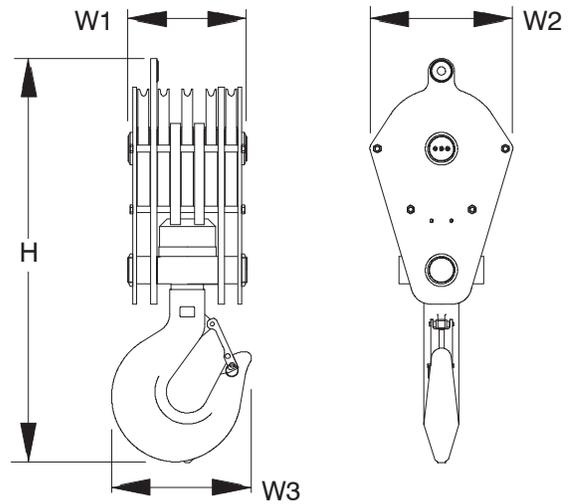
Number inside black circle “1” = # of components

* – Optional equipment

165 Ton (150mt)

5-Sheave Hook Block* ①

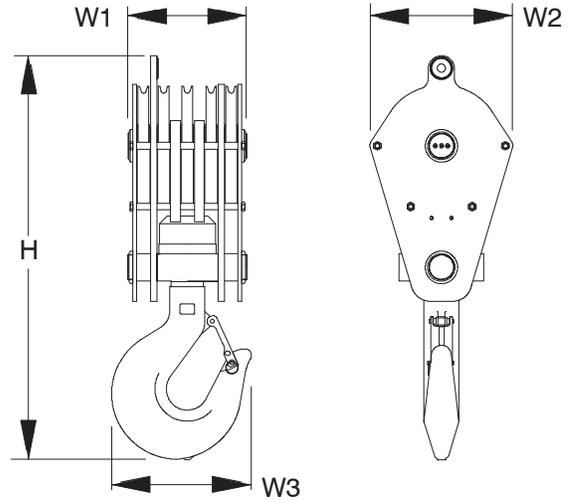
Width1	22 in	(0.56m)
Width2	28.75 in	(0.73m)
Width3	28.25 in	(0.72m)
Height	81.50 in	(2.07m)
Weight	3,392 lb	(1 539kg)



200 Ton (181.4mt)

5-Sheave Hook Block* ①

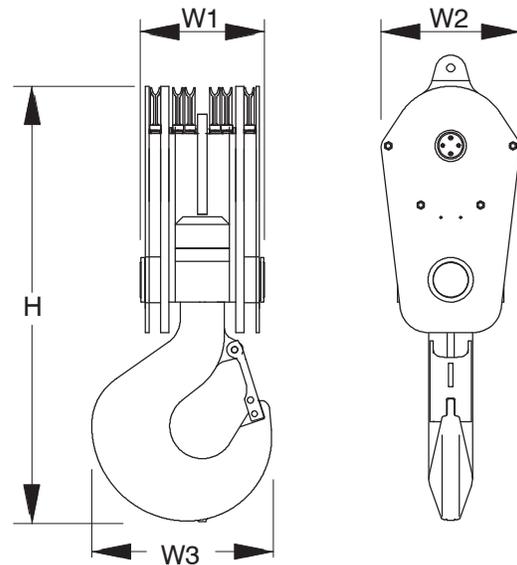
Width1	25 in	(0.63m)
Width2	28.75 in	(0.73m)
Width3	35 in	(0.89m)
Height	58 in	(1.47m)
Weight	4,300 lb	(1 950kg)



250 Ton (226.8mt)

6-Sheave Hook Block* ①

Width1	27 in	(0.69m)
Width2	35.25 in	(0.90m)
Width3	34.75 in	(0.88m)
Height	95.50 in	(2.43m)
Weight	5,721 lb	(2 595kg)



Number inside black circle "①" = # of components
 * - Optional equipment

Load Hoist Performance

Front & Rear Drums – 28mm Wire Rope

Rope Layer	Maximum Line Pull		No Load Line Speed		Full Load Line Speed		Pitch Diameter		Layer		Total	
	lb	kg	ft/min	m/min	ft/min	m/min	in	mm	ft	m	ft	m
1	59,234	26 869	383.7	116.9	191.8	58.5	24.6	624.0	192.9	58.8	192.9	58.8
2	54,356	24 656	413.0	125.9	206.5	62.9	26.4	671.7	278.5	84.9	400.6	122.1
3	50,220	22 780	442.3	134.8	221.1	67.4	28.3	719.3	222.5	67.8	623.1	189.9
4	46,669	21 169	471.6	143.7	235.8	71.9	30.2	767.0	237.1	72.3	860.2	262.2
5	43,587	19 771	500.9	152.7	250.4	76.3	32.1	814.6	251.9	76.8	1,112.1	339.0
6	40,887	18 546	530.2	161.6	265.1	80.8	33.9	862.3	266.7	81.3	1,378.8	420.2
7	38,502	17 465	559.5	170.5	279.7	85.3	35.8	910.0	281.3	85.7	1,660.1	506.0

Boom Hoist Drums – 22mm Wire Rope

Rope Layer	Maximum Line Pull		No Load Line Speed		Full Load Line Speed		Pitch Diameter		Layer		Total	
	lb	kg	ft/min	m/min	ft/min	m/min	in	mm	ft	m	ft	m
1	103,657	47 019	99.9	30.4	54.8	16.7	26.1	663.0	150.3	45.8	150.3	45.8
2	97,096	44 043	105.6	32.2	57.9	17.7	27.6	701.1	159.0	48.5	309.3	94.3
3	91,316	41 421	111.3	33.9	61.1	18.6	29.1	739.3	167.7	51.1	477.0	145.4
4	86,186	39 094	117.1	35.7	64.2	19.6	30.6	777.4	176.2	53.7	653.2	199.1
5	81,601	37 014	122.8	37.4	67.4	20.5	32.1	815.6	185.0	56.4	838.2	255.5
6	77,480	35 145	128.6	39.2	70.5	21.5	33.6	853.7	193.6	59.0	1,031.8	314.5
7	73,755	33 455	134.3	40.9	73.7	22.5	35.1	891.9	202.2	61.6	1,234.0	376.1

Third Hoist Drum – 1.0 in (25.4mm) Wire Rope

Rope Layer	Maximum Line Pull		No Load Line Speed		Full Load Line Speed		Pitch Diameter		Layer		Total	
	lb	kg	ft/min	m/min	ft/min	m/min	in	mm	ft	m	ft	m
1	29,090	13 195	271	82.6	230	70.1	21	533.4	131	39.9	131	39.9
2	26,560	12 048	297	90.5	251	76.5	23	584.2	143	43.6	274	83.5
3	24,440	11 086	322	98.1	273	83.2	25	635.0	156	47.5	430	131.1
4	22,630	10 265	348	106.1	295	89.9	27	685.8	168	51.2	598	182.3
5	21,070	9 557	374	114.0	317	96.6	29	736.6	181	55.2	779	237.4
6	---	---	---	---	---	---	---	---	193	58.8	972	296.3

Wire Rope Application	Diameter		Type	Max. Permissible Load		Wire Rope Descriptions
	in	mm		lb	kg	
Front Hoist	--	28	ZB	33,900	15 377	4 strand, low torque, right regular lay
Rear Hoist	--	28	ZB	33,900	15 377	4 strand, low torque, right regular lay
Boom Hoist	--	22	LB	25,000	11 340	6 x 25 (6 x19 Class) – Filler Wire – Preformed – I.W.R.C – Right Lay – Regular Lay Compacted Strands
Third Drum	1.0	25.4	RB	22,760	10 324	18 x 19 Rotation Resistant Compacted Strand – High Strength – Preformed, Right Regular Lay

SUPERSTRUCTURE SPECIFICATIONS

BOOM

Five section full power synchronized telescoping boom, 37.7'~144.4'(11.5m~44.0m), of round hexagonal box construction with 7 sheaves, 15" (0.38m) root diameter, at boom head. The synchronization system consists of two telescope cylinders, an extension cable and retraction cable. Hydraulic cylinder fitted with holding valve. Two easily removable wire rope guards, rope dead end provided on both sides of boom head. Boom telescope sections are supported by wear pads both vertically and horizontally.

Extension speed 106' 7-1/2" in 145 seconds.

BOOM ELEVATION - By a double acting hydraulic cylinder with holding valve. Elevation -2.0°~80.7°, combination controls for hand or foot operation. Boom angle indicator. Automatic speed reduction and soft stop function. Elevation speed -2.0°~80.7° in 77 seconds.

JIB - Two stage bi-fold lattice type with 3.5°, 25° or 45° offset (tilt type). Single sheave, 15-5/8"(0.396m) root diameter, at the head of both jib sections. Stored alongside base boom section. Jib length is 32.5' (9.9m) or 58.1' (17.7m). Assist cylinders for mounting and stowing are controlled at right side of superstructure. Self stowing jib mounting pins.

AUXILIARY LIFTING SHEAVE (SINGLE TOP)- Single sheave, 15-5/8" (0.396m) root diameter. Mounted to main boom head for single line work (stowable).

ANTI-TWO BLOCK - Pendant type over-winding cut out device with audio-visual (FAILURE lamp/BUZZER) warning system.

SWING

Hydraulic axial piston motor driven through planetary swing speed reducer. Continuous 360° full circle swing on ball bearing turntable at 2.3rpm. Equipped with manually locked/released swing brake. A 360° positive swing lock for pick and carry and travel modes, manually engaged in cab. Twin swing System: Free swing or lock swing controlled by selector switch on front console.

HOIST

MAIN HOIST - Variable speed type with grooved drum driven by hydraulic axial piston motor through winch speed reducer. Power load lowering and raising. Equipped with automatic brake (neutral brake) and counterbalance valve. Controlled independently of main hoist. Equipped with cable follower and drum rotation indicator.

DRUM - Grooved 15-3/4"(0.40m) root diameter x 22-3/4" (0.578m) wide. Wire rope: 797' of 3/4"diameter rope (243m of 19mm). Drum capacity: 1,096' (334m) 7 layers. Maximum line pull (available): 18,200lbs. (8,260kg). Maximum line speed: 585FPM (178m/min).

AUXILIARY HOIST - Variable speed type with grooved drum driven by hydraulic axial piston motor through winch speed reducer. Power load lowering and raising. Equipped with automatic brake (neutral brake) and counterbalance valve. Controlled independently of main hoist. Equipped with cable follower and drum rotation indicator.

DRUM - Grooved 15-3/4"(0.40m) root diameter x 22-3/4" (0.578m) wide. Wire rope: 436' of 3/4"diameter rope (133m of 19mm). Drum capacity: 1,096' (334m) 7 layers. Maximum line pull (available): 18,200lbs. (8,260kg). Maximum line speed: 585FPM (178m/min).

WIRE ROPE - Warrington seal wire, extra improved plow steel, preformed, independent wire rope core, right regular lay. 3/4"(19 mm) 6X37 class

HOOK BLOCKS

- **80 ton (72.6 metric ton) - 7 Sheave with swivel hook and safety latch for 3/4" (19mm) wire rope.**
- 6.2 ton (5.6 metric ton) - Weighted hook with swivel and safety latch, for 3/4"(19mm) wire rope.

HYDRAULIC SYSTEM

PUMPS - Two variable piston pumps for crane functions. Tandem gear pump for steering, swing and optional equipment. Powered by carrier engine. Pump disconnect for crane is engaged/ disengaged by rotary switch from operator's cab.

CONTROL VALVES - Multiple valves actuated by pilot pressure with integral pressure relief valves.

RESERVOIR - 195 gallon (740 lit.) capacity. External sight level gauge.

FILTRATION - 26 micron return filter, full flow with bypass protection, located inside of hydraulic reservoir. Accessible for easy replacement.

OIL COOLER - Air cooled fan type.

CAB AND CONTROLS

Both crane and drive operations can be performed from one cab mounted on rotating superstructure.

Left side, 1 man type, steel construction with sliding door access and tinted safety glass windows opening at side. Door window is powered control. Windshield glass and roof window glass are shatter-resistant. Tilt-telescoping steering wheel. Adjustable control lever stands for swing, boom hoist, boom telescoping, auxiliary hoist and main hoist. Control lever stands can change neutral positions and tilt for easy access into cab. 3 way adjustable operator's seat with high back, headrest and armrest. Engine throttle knob. Foot operated controls: boom hoist, boom telescoping, service brake and engine throttle. Hot water cab heater and air conditioning.

Dash-mounted engine start/stop, monitor lamps, cigarette lighter ashtray, drive selector switch, parking brake switch, steering mode select switch, power window switch, pump engaged/ disengaged switch, swing brake switch, telescoping/auxiliary winch select switch, outrigger controls, main winch/auxiliary winch selector switch, swing stop cancel switch, slow elevation stop cancel switch and free swing / lock swing selector switch.

Instruments - Torque converter oil temperature, engine water temperature, air pressure, fuel, speedometer, tachometer and hour meter. Hydraulic oil pressure is monitored and displayed on the AML-L display panel.

WARNING AND OPERATING INSTRUCTIONS FOR USING THE LOAD MOMENT INDICATOR (AML-L)

1. When operating crane on outriggers:

Set P.T.O. switch to "ON".

Press the outrigger mode select key to register for the outrigger operation. Press the set key, then the outrigger mode indicative symbol changes from flickering to lighting. Press the boom mode select key to register the boom mode, then the boom mode indicative symbol changes from lighting to flickering. Each time the boom mode select key is pressed, the mode changes. Press the set key to select the status that corresponds to the actual state of the boom, then the boom mode indicative symbol changes from flickering to lighting.

When erecting and stowing jib, select the status of jib set (jib state indicative symbol flicker).

2. When operating crane on rubber:

Set P.T.O. switch to "ON".

Press the outrigger mode select key. The on-tire mode indicative symbol comes on. Each time the outrigger mode select key is pressed the mode changes. Select the creep operation, the on-tire mode indicative symbol flicker. Press the boom mode select key to register the boom mode.

However, pay attention to the following.

(1) For stationary operation.

The front capacities are attainable only when the over front position symbol comes on. When the boom is more than 2 degrees from centered over front of chassis, 360° capacities are in effect.

When a load is lifted in the front position and then swung to the side area, make sure the value of the LOAD MOMENT INDICATOR(AML-L) is below the 360° lifting capacity.

(2) For creep operation.

The creep capacities are attainable only when boom is in the straight forward position of chassis and the over front position symbol is on. If boom is not in the straight forward position of chassis, never lift load.

3. A swing does not automatically stop even if the crane becomes overloaded.

4. During crane operation, make sure that the displays on front panel are in accordance with actual operating conditions.

5. The displayed values of LOAD MOMENT INDICATOR (AML-L) are based on freely suspended loads and make no allowance for such factors as the effect of wind, sudden stopping of loads, supporting surface conditions, inflation of tire, operating speed, side loads, etc.

For safe operation, it is recommended when extending and lowering boom or swinging, lifting loads shall be appropriately reduced.

6. LOAD MOMENT INDICATOR (AML-L) is intended as an aid to the operator. Under no condition should it be relied upon to replace use of capacity charts and operating instruction. Sole reliance upon LOAD MOMENT INDICATOR (AML-L) aids in place of good operating practice can cause an accident. The operator must exercise caution to assure safety.

TFGR-800XL-1 Axle weight distribution chart

	Pounds			Kilograms		
	GVW	Front	Rear	GVW	Front	Rear
Base machine	107,965	57,781	50,185	48,972	26,209	22,763
Remove:						
1. 80 ton (72.6 metric ton) hook block	-1,817	-3,276	1,459	-824	-1,486	662
2. 6.2 ton (5.6 metric ton) hook ball	-289	-401	112	-131	-182	51
3. Hot water cab heater and air conditioner	-214	-68	-146	-97	-31	-66
4. Top jib (25.6')	-677	-880	203	-307	-399	92
5. Base jib (32.5')	-1,832	-3,543	1,711	-831	-1,607	776
6. Auxiliary lifting sheave	-110	-324	214	-50	-147	97
7. Removable Counterweight	-17,355	7,474	-24,828	-7,872	3,390	-11,262

GR-800XL-1 RATED LIFTING CAPACITIES (IN POUNDS)

ON OUTRIGGERS FULLY EXTENDED 23' 7-1/2" (7.2m) SPREAD														
360° ROTATION														
A	37.7'		51'		64.4' (19.62m)		91' (27.75m)		117.7' (35.87m)		131'		144.4'	
	B	C (11.5m)	C (15.56m)	C (19.62m)	C (19.62m)	C (27.75m)	C (27.75m)	C (35.87m)	C (35.87m)	C (39.93m)	C (44.0m)			
10	68	160,000	75	103,600	78	88,100	78	44,000						
12	65	125,000	72	103,600	76	88,100	76	44,000						
15	60	108,000	69	103,600	73	88,100	73	44,000	79	44,000	79	30,800		
20	50	78,400	63	77,800	69	71,900	69	44,000	76	44,000	76	30,800	79	30,800
25	38	59,400	56	59,000	64	56,100	64	44,000	73	44,000	73	30,800	77	30,800
30	21	45,900	48	44,600	59	42,600	59	44,000	70	39,000	70	26,700	75	30,800
35			39	33,800	53	33,000	53	39,900	66	34,000	66	23,200	72	28,200
40			28	26,300	47	25,500	47	32,300	63	28,700	63	20,400	70	24,700
45			5	20,900	40	20,000	40	26,400	59	23,600	59	18,200	67	21,800
50					32	15,900	32	21,900	55	19,300	56	16,400	65	19,500
60									46	13,200	47	14,500	59	14,800
70									36	9,000	37	11,400	53	10,700
80									22	6,100	24	9,500	46	7,600
90													38	5,300
100													27	3,500
110													13	2,100
120														
D	0°										18°		32°	
Telescoping conditions (%)														
Telescoping mode	I, II	I	I	II	I	II	I	II	I	II	II	I, II		
2nd boom	0	50	100	0	100	0	100	0	100	0	50	100		
3rd boom	0	0	0	33	33	66	66	100	100	100	100	100		
4th boom	0	0	0	33	33	66	66	100	100	100	100	100		
Top boom	0	0	0	33	33	66	66	100	100	100	100	100		

LIFTING CAPACITIES AT ZERO DEGREE BOOM ANGLE ON OUTRIGGERS FULLY EXTENDED														
23' 7-1/2" (7.2m) SPREAD 360° ROTATION														
A	37.7'		51'		64.4'		64.4'		91'		91'		117.7'	
	B	C (11.5m)	B (15.56m)	C (19.62m)	C (19.62m)	B (27.75m)	C (27.75m)	B (35.87m)	C (35.87m)					
0°	31.7	41,600	45.0	20,900	58.3	11,500	58.3	14,900	85.0	5,200	85.0	7,900	111.6	2,000
Telescoping mode	I, II	I	I	II	I	II	I	II	I	II				

- A : Boom length in feet
- B : Load radius in feet
- C : Loaded boom angle (deg.)
- D : Minimum boom angle (deg.) for indicated length (no load)

NOTE: -The lifting capacity data stored in the LOAD MOMENT INDICATOR (AML-L) is based on the standard number of parts of line listed in the chart.

-Standard number of parts of line for outrigger operation should be according to the following table.

Boom Length in Feet (meters)	37.7' (11.5m)	37.7' to 51' (11.5m to 15.56m)	51' to 64.4' (15.56m to 19.62m)	64.4' to 91' (19.62m to 27.75m)	91' to 144.4' (27.75m to 44.0m)	Single top Jib
Number of parts of line	15	10	8	4	4	1

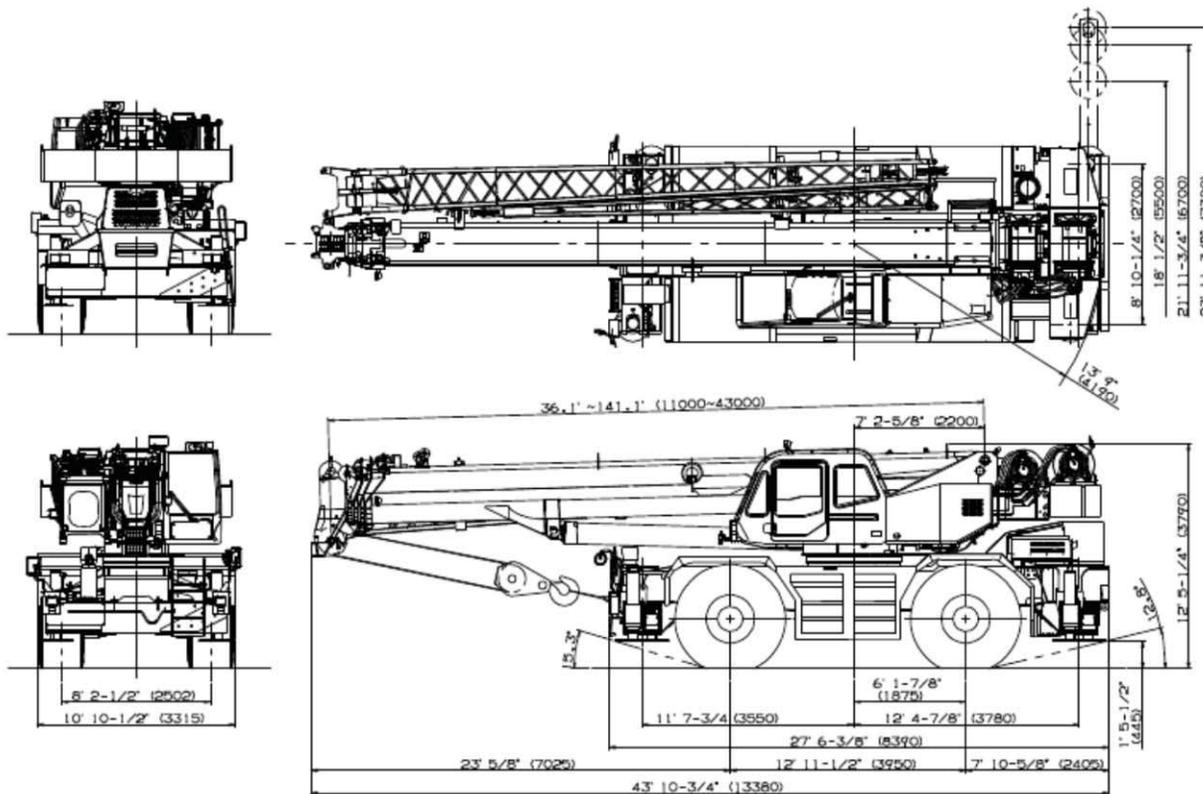


GR-750XL

75 Ton Capacity (68 Metric Tons)

HYDRAULIC ROUGH TERRAIN CRANE

DIMENSIONS



Note : Dimension is with boom angle at -1.6 degree.

GENERAL DIMENSIONS (29.5 - 25 Tires)

	Feet	Meters
Turning radius		
4 wheel steer	22' 4"	6.8
2 wheel steer	39' 1"	11.9
Tail swing of counterweight	13' 9"	4.19

Specifications are subject to change without notice.
Specification effective with serial number 548831 and up.

STANDARD EQUIPMENT

- Five section full power partially synchronized boom
36.1'~141.1' (11.0 m~43.0 m)
- 33.2' or 58.1' (10.1 m or 17.7 m) bi-fold lattice jib (tilt type)
with 3.5°, 25° or 45° pinned offsets and self storing pins.
- Auxiliary lifting sheave (single top) stowable
- Variable speed main hoist with grooved drum, cable follower
and 771' of 3/4" cable.
- Variable speed auxiliary hoist with grooved drum, cable follower
and 436' of 3/4" cable.
- Drum rotation indicator (audible, visible and thumper type) main
and auxiliary hoist
- Anti-Two block device (overwind cutout)
- Boom angle indicator
- Tadano electronic load moment indicator system (AML-C)
- Outrigger extension length detector
- Electronic crane monitoring system
- Tadano twin slewing system and 360° positive slewing lock
- Self centering finger control levers with pilot control
- Control pedals for boom elevating and boom telescoping
- 3 way adjustable cloth seat with armrests, high back
and seat belt
- Tilt-telescoping steering wheel
- Tinted safety glass and sun visor
- Front windshield wiper and washer
- Roof window wiper and washer
- Power window (cab door)
- Rear view mirrors (right and left side)
- Mirror for main and auxiliary hoists
- Cigarette lighter and ashtray
- Cab floor mat
- Pump disconnect in operator's cab
- Hydraulic oil cooler
- Hot water cab heater and air conditioner
- Positive control
- Quick reeving type bi-fold jib
- Work lights
- Independently controlled outriggers
- Four outrigger extension positions
- Self-storing outrigger pads
- Cummins QSB6.7 turbo charged
after cooled engine (270HP) with exhaust brake
- Electronic controlled automatic transmission driven
by torque converter
- 4 X 4 X 4 drive/steer
- Non-spin rear differential
- Automatic rear axle oscillation lockout system
- 29.5-25 22PR(OR) tires or 29.5-25 28PR(OR) tires
- Disc brakes
- Fenders
- Air dryer
- Water separator with filter (high filtration)
- Engine over-run alarm
- Back-up alarm
- Low oil pressure/high water temp. warning device (visual)
- Rear steer centering light
- Air cleaner dust indicator
- Full instrumentation package
- Complete highway light package
- Tool storage compartment
- Tire inflation kit
- 24 volt electric system
- 6.2 ton (5.6 metric ton) hook ball with swivel
- 75 ton (68 metric ton) - 7 sheaves with swivel hook block
and safety latch for 3/4"(19mm) wire rope
- Towing hooks-Front and rear
- Lifting eyes
- Hook block tie down (front bumper)
- Weighted hook storage compartment
- Halogen head lamp
- Telematics (machine data logging and monitoring system)
with HELLO-NET via internet
- Fuel consumption monitor
- Eco mode system

HOISTING PERFORMANCE

LINE SPEEDS AND PULLS

Layer	Main or auxiliary hoist - 14-1/4" (0.362m) drum			
	Line speeds ¹		Line pulls Available ²	
	F.P.M.	m/min	Lbs.	kgf
1st	331	101	16,500	7,480
2nd	361	110	15,200	6,900
3rd	390	119	13,800	6,260
4th	420	128	12,700	5,760
5th	450	137	11,900	5,400
6th	479	146	11,000	4,990
7th ³	509	155	10,300	4,670

* Maximum permissible line pull may be affected by wire rope strength.
Maximum lifting capacity per line (Main & Aux.): 12,300 lbs (5,600 kg)

- ¹ Line speeds based only on hook block, not loaded.
- ² Developed by machinery with each layer of wire rope, but not based on rope strength or other limitation in machinery or equipment.
- ³ Seventh layer of wire rope are not recommended for hoisting operations.

DRUM WIRE ROPE CAPACITIES

Wire rope layer	Main and auxiliary drum grooved lagging			
	3/4" (19mm) wire rope			
	Rope per layer		Total wire rope	
	Feet	Meters	Feet	Meters
1	112.2	34.2	112.2	34.2
2	122.3	37.3	234.5	71.5
3	132.2	40.3	366.8	111.8
4	142.3	43.4	509.1	155.2
5	152.2	46.4	661.4	201.6
6	162.4	49.5	823.8	251.1
7	172.5	52.6	996.4	303.7

DRUM DIMENSIONS

	Inch	mm
Root diameter	14-1/4"	362
Length	23-5/8"	600
Flange diameter	25-7/8"	657

WARNING AND OPERATING INSTRUCTIONS FOR USING THE LOAD MOMENT INDICATOR (AML-C)

1. When operating crane on outriggers:
 - Set P.T.O. switch to "ON".
 - Press the outrigger mode select key to register for the outrigger operation. Press the register key, then the outrigger mode indicative symbol changes from flashing to a solid light.
 - Press the lift mode select key to select the lift status that corresponds to the actual boom configuration. Each time the lift mode select key is pressed, the status changes. Press the register key to register the lift status, then the lift indicative symbol changes from flashing to a solid light.
 - when mounting and stowing jib, select the jib set status. (the jib state indicative symbol will be flashing.)
 2. When operating crane on rubber:
 - Set P.T.O. switch to "ON".
 - Press the outrigger mode select key. The on-tire mode indicative symbol comes on. Each time the outrigger mode select key is pressed the status changes. Select the creep operation, the on-tire mode indicative symbol flicker.
 - Press the lift mode select key to register the boom or single top lift.
- However, pay attention to the following.
- (1) For stationary operation.
 - The front capacities are attainable only when the over front position symbol comes on. When the boom is more than 2 degrees from centered over front of chassis, 360° capacities are in effect.
 - (2) For creep operation.
 - The creep capacities are attainable only when boom is in the straight forward position of chassis and the over front position symbol is on. If boom is not in the straight forward position of chassis, never lift load.
3. A slewing does not automatically stop even if the crane becomes overloaded.
 4. During crane operation, make sure that the displays on front panel are in accordance with actual operating conditions.
 5. The displayed values of LOAD MOMENT INDICATOR (AML-C) are based on freely suspended loads and make no allowance for such factors as the effect of wind, sudden stopping of loads, supporting surface conditions, inflation of tire, operating speed, side loads, etc. For safe operation, it is recommended when extending and lowering boom or slewing, lifting loads shall be appropriately reduced.
 6. LOAD MOMENT INDICATOR (AML-C) is intended as an aid to the operator. Under no condition should it be relied upon to replace use of capacity charts and operating instruction. Sole reliance upon LOAD MOMENT INDICATOR (AML-C) aids in place of good operating practice can cause an accident. The operator must exercise caution to assure safety.

GR-750XL Axle weight distribution chart

	Pounds			Kilograms		
	GVW	Front	Rear	GVW	Front	Rear
Base machine	97,920	50,180	47,740	44,416	22,762	21,654
1. 6.2ton (5.6metric ton) hook ball	-330	-470	140	-150	-214	64
2. 75ton (68metric ton) hook block (1,600lbs)	-1,600	-2,840	1,240	-726	-1,290	564
3. Top jib	-740	-805	65	-336	-365	29
Remove: 4. Base jib	-1,910	-3,270	1,360	-867	-1,483	616
5. Auxiliary lifting sheave	-110	-300	190	-50	-137	87
6. Counterweight (with Auxiliary hoist & wire rope)	-12,500	5,510	-18,010	-5,670	2,498	-8,168

TADANO AMERICA CORPORATION

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 Houston, Texas, 77066 U.S.A.
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Form No. TAC-GR-750-3-00311-09022014

GR-750XL RATED LIFTING CAPACITIES (IN POUNDS)

ON OUTRIGGERS FULLY EXTENDED 23' 11-3/8"(7.3m) SPREAD																													
360° ROTATION																													
B	A	36.1'		49.2'		62.3' (19m)		75.5' (23m)		88.6' (27m)		101.7' (31m)		114.8' (35m)		128.0'	141.1'												
	C	(11m)	C	(15m)	C	C	C	C	C	C	C	C	C	C	C	C	(39m)	C	(43m)										
8'	72	150,000	77	90,000																									
10'	68	132,300	75	90,000	79	70,500	78	44,100																					
12'	64	117,100	72	90,000	77	70,500	76	44,100	79	44,100	79	44,100																	
15'	59	98,000	68	90,000	73	70,500	73	44,100	77	44,100	77	44,100	79	44,100	79	37,500													
20'	48	75,600	62	75,100	69	69,600	69	44,100	73	44,100	73	44,100	76	42,400	76	37,100	78	36,600	78	31,700									
25'	33	60,000	54	59,400	64	59,100	63	44,100	69	44,100	69	43,300	73	39,100	73	32,600	76	32,400	76	28,100	78	28,500	78	24,600	79	22,000			
30'			46	45,900	59	45,000	58	44,100	65	44,100	65	37,200	70	38,800	69	29,500	73	31,500	73	25,200	75	26,300	75	22,200	77	22,000	79	19,800	
35'			36	33,900	52	32,900	52	38,300	60	34,600	60	32,400	66	34,700	66	25,900	70	30,600	70	23,500	73	25,600	73	20,100	75	20,300	77	18,500	
40'			21	26,100	45	25,300	45	30,200	55	26,800	55	28,500	62	27,700	62	23,100	67	27,700	67	20,900	70	24,900	70	18,700	73	18,700	75	17,200	
45'					38	19,900	38	24,600	50	21,300	50	24,800	58	22,200	58	20,900	63	22,800	63	18,800	68	22,700	67	17,400	70	17,700	74	16,900	
50'					29	15,900	28	20,500	45	17,300	45	20,700	54	18,100	54	19,000	60	18,700	60	17,100	65	19,100	64	15,600	68	17,100	71	16,500	
55'					13	11,100	11	14,000	38	14,200	38	17,500	49	15,000	49	17,400	56	15,500	56	15,500	62	16,000	62	14,000	66	15,600	69	16,100	
60'									31	11,700	31	15,000	45	12,500	45	15,200	53	13,100	53	14,000	58	13,400	58	12,700	63	14,200	67	13,900	
65'									22	9,700	22	13,000	40	10,500	40	13,200	49	11,000	49	12,800	55	11,400	55	11,600	60	12,500	65	11,900	
70'													34	8,900	34	11,500	45	9,400	45	11,600	52	9,800	52	10,600	57	10,900	62	10,300	
75'													26	7,500	26	10,100	40	8,000	40	10,300	48	8,400	48	9,700	54	9,500	59	8,800	
80'													15	6,300	18	9,000	35	6,800	35	9,100	44	7,200	45	9,000	51	8,300	57	7,700	
85'																	29	5,800	29	8,000	40	6,200	41	8,100	48	7,200	54	6,600	
90'																	21	5,000	21	7,200	36	5,300	36	7,200	45	6,300	51	5,700	
95'																				31	4,500	31	6,400	41	5,600	48	4,900		
100'																				25	3,900	25	5,800	37	4,900	45	4,300		
105'																				16	3,300	16	5,200	33	4,300	42	3,700		
110'																									27	3,800	38	3,100	
115'																									21	3,300	34	2,600	
120'																									8	2,900	30	2,200	
125'																												24	1,800
130'																												17	1,500
D	0																												
Telescoping conditions (%)																													
Tele. mode	I, II	I	I	II	I	II	I	II	I	II	I	II	I	II	II	I, II													
2nd boom	0	50	100	0	100	0	100	0	100	0	100	0	100	0	50	100													
3rd boom	0	0	0	33	16	50	33	66	50	83	66	100	100	100	100	100													
4th boom	0	0	0	33	16	50	33	66	50	83	66	100	100	100	100	100													
Top boom	0	0	0	33	16	50	33	66	50	83	66	100	100	100	100	100													

LIFTING CAPACITIES AT ZERO DEGREE BOOM ANGLE ON OUTRIGGERS FULLY EXTENDED																												
23' 11-3/8"(7.3m) SPREAD 360° ROTATION																												
C	A	36.1'		49.2'		62.3' (19m)		75.5' (23m)		88.6' (27m)		101.7' (31m)		114.8' (35m)		128.0'	141.1'											
	B	(11m)	B	(15m)	B	B	B	B	B	B	B	B	B	B	B	B	(39m)	B	(43m)									
0	28.9'	26,000	42.0'	16,800	55.4'	10,800	55.4'	13,700	68.6'	7,900	68.6'	10,100	81.7'	6,000	81.7'	8,400	94.2'	4,400	94.5'	6,600	107.2'	3,100	107.2'	4,600	119.8'	2,900	132.3'	1,100
Tele. mode	I, II	I	I	II	I	II	I	II	I	II	I	II	I	II	II	I, II												

- A** : Boom length in feet
- B** : Load radius in feet
- C** : Loaded boom angle (°)
- D** : Minimum boom angle (°) for indicated length (no load)

NOTE: The lifting capacity data stored in the LOAD MOMENT INDICATOR (AML-C) is based on the standard number of parts of line listed in the chart. Standard number of parts of line for each boom length should be according to the following table.

Boom length in feet (meters)	36.1' (11m)	36.1' to 49.2' (11m to 15m)	49.2' to 62.3' (15m to 19m)	62.3' to 141.1' (19m to 43m)	Single top Jib
Telescoping mode	I, II	I	I	II	I, II
Number of parts of line	14	8	6	4	1

The Crosby Group, Inc.

Forged Shackles

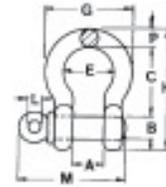
SCREW PIN



ROUND PIN



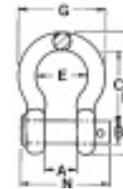
209



G-209 S-209

G-213 S-213

213



Screw pin anchor shackles meet the performance requirements of Federal Specification RR-C-271D Type IVA, Grade A, Class 2, except for those provisions required of the contractor.

Round pin anchor shackles meet the performance requirements of Federal Specification RR-C-271D Type IVA, Grade A, Class 1, except for those provisions required of the contractor.

- Working Load Limit permanently shown on every shackle
- Forged — Quenched and Tempered, with alloy pins.
- Shackles can be furnished proof tested with certificates to designated standards, such as ABS, DNV, Lloyds, or other certification. Charges for proof testing and certification available when requested at the time of order.
- Hot Dip galvanized or Self Colored.

Nominal Size (in.)	Working Load Limit* (tons)	G-209 Galv.		S-209 S.C.		G-213 Galv.		S-213 S.C.		Weight Each (lbs.)	
		CERTEX Cat. Ref. No.	Crosby Stock No.	CERTEX Cat. Ref. No.	Crosby Stock No.	CERTEX Cat. Ref. No.	Crosby Stock No.	CERTEX Cat. Ref. No.	Crosby Stock No.	G-209 S-209	G-213 S-213
3/16	† 1/3	CX10-0001	1018357	—	—	—	—	—	—	.06	—
1/4	1/2	CX10-0002	1018375	CX10-0018	1018384	CX10-0034	1018017	CX10-0049	1018026	.10	.13
5/16	3/4	CX10-0003	1018393	CX10-0019	1018400	CX10-0035	1018035	CX10-0050	1018044	.19	.18
3/8	1	CX10-0004	1018419	CX10-0020	1018428	CX10-0036	1018053	CX10-0051	1018062	.31	.29
7/16	1 1/2	CX10-0005	1018437	CX10-0021	1018446	CX10-0037	1018071	CX10-0052	1018080	.38	.38
1/2	2	CX10-0006	1018455	CX10-0022	1018464	CX10-0038	1018099	CX10-0053	1018106	.72	.71
5/8	3 1/4	CX10-0007	1018473	CX10-0023	1018482	CX10-0039	1018115	CX10-0054	1018124	1.37	1.50
3/4	4 3/4	CX10-0008	1018491	CX10-0024	1018507	CX10-0040	1018133	CX10-0055	1018142	2.35	2.32
7/8	6 1/2	CX10-0009	1018516	CX10-0025	1018525	CX10-0041	1018151	CX10-0056	1018160	3.62	3.49
1	8 1/2	CX10-0010	1018534	CX10-0026	1018543	CX10-0042	1018179	CX10-0057	1018188	5.03	5.00
1 1/8	9 1/2	CX10-0011	1018552	CX10-0027	1018561	CX10-0043	1018197	CX10-0058	1018204	7.41	6.97
1 1/4	12	CX10-0012	1018570	CX10-0028	1018589	CX10-0044	1018213	CX10-0059	1018222	9.50	9.75
1 3/8	13 1/2	CX10-0013	1018598	CX10-0029	1018605	CX10-0045	1018231	CX10-0060	1018240	13.53	13.25
1 1/2	17	CX10-0014	1018614	CX10-0030	1018623	CX10-0046	1018259	CX10-0061	1018268	17.20	17.25
1 3/4	25	CX10-0015	1018632	CX10-0031	1018641	CX10-0047	1018277	CX10-0062	1018286	27.78	29.46
2	35	CX10-0016	1018650	CX10-0032	1018669	CX10-0048	1018295	CX10-0063	1018302	45.00	45.75
2 1/2	†55	CX10-0017	1018678	CX10-0033	1018687	—	—	—	—	85.75	—

† Furnished in screw pin only.

* NOTE: Maximum Proof Load is 2.2 times the Working Load Limit. Minimum Ultimate Strength is 6 times the Working Load Limit. For Working Load Limit reduction due to side loading applications, see beginning of chapter.

10

Nominal Size (in.)	Working Load Limit* (tons)	Dimensions (in.)												Tolerance	
		A	B	C	D	E	F	G	H	L	M	N	P	C	A
3/16	† 1/3	.38	.25	.88	.19	.60	.56	.98	1.47	.16	1.12	—	.19	.06	.06
1/4	1/2	.47	.31	1.13	.25	.78	.61	1.28	1.84	.19	1.38	1.34	.25	.06	.06
5/16	3/4	.53	.38	1.22	.31	.84	.75	1.47	2.09	.22	1.66	1.59	.31	.06	.06
3/8	1	.66	.44	1.44	.38	1.03	.91	1.78	2.49	.25	2.03	1.86	.38	.13	.06
7/16	1 1/2	.75	.50	1.69	.44	1.16	1.06	2.03	2.91	.31	2.38	2.13	.44	.13	.06
1/2	2	.81	.63	1.88	.50	1.31	1.19	2.31	3.28	.38	2.69	2.38	.50	.13	.06
5/8	3 1/4	1.06	.75	2.38	.63	1.69	1.50	2.94	4.19	.44	3.34	2.91	.69	.13	.06
3/4	4 3/4	1.25	.88	2.81	.75	2.00	1.81	3.50	4.97	.50	3.97	3.44	.81	.25	.06
7/8	6 1/2	1.44	1.00	3.31	.88	2.28	2.09	4.03	5.83	.50	4.50	3.81	.97	.25	.06
1	8 1/2	1.69	1.13	3.75	1.00	2.69	2.38	4.69	6.56	.56	5.07	4.53	1.06	.25	.06
1 1/8	9 1/2	1.81	1.25	4.25	1.16	2.91	2.69	5.16	7.47	.63	5.59	5.13	1.25	.25	.06
1 1/4	12	2.03	1.38	4.69	1.29	3.25	3.00	5.75	8.25	.69	6.16	5.50	1.38	.25	.06
1 3/8	13 1/2	2.25	1.50	5.25	1.42	3.63	3.31	6.38	9.16	.75	6.84	6.13	1.50	.25	.13
1 1/2	17	2.38	1.63	5.75	1.54	3.88	3.63	6.88	10.00	.81	7.35	6.50	1.62	.25	.13
1 3/4	25	2.88	2.00	7.00	1.84	5.00	4.19	8.86	12.34	1.00	9.08	7.75	2.25	.25	.13
2	35	3.25	2.25	7.75	2.08	5.75	4.81	9.97	13.68	1.22	10.34	8.75	2.40	.25	.13
2 1/2	†55	4.13	2.75	10.50	2.71	7.25	5.69	12.87	17.84	1.38	13.00	—	3.13	.25	.25

† Furnished in screw pin only.

* NOTE: Maximum Proof Load is 2.2 times the Working Load Limit. Minimum Ultimate Strength is 6 times the Working Load Limit. For Working Load Limit reduction due to side loading applications, see beginning of chapter.

The Crosby Group, Inc.

Warnings and Application Instructions



Regular Nut
Eye Bolt
G-291



Shoulder Nut
Eye Bolt
G-277



Machinery Nut
Eye Bolt
S-279

Size (in.)	Working Load Limit (lbs.)
1/4	650
5/16	1200
3/8	1550
1/2	2600
5/8	5200
3/4	7200
7/8	10600
1	13300
1 1/4	21000
1 1/2	24000

IMPORTANT SAFETY INFORMATION — READ & FOLLOW

Inspection/Maintenance Safety:

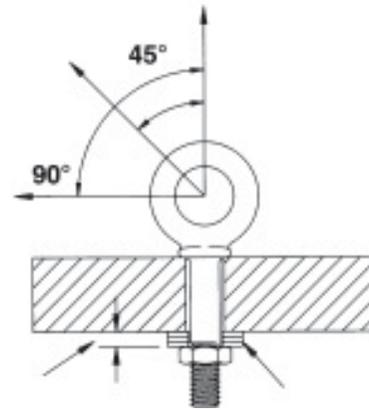
- Always inspect eye bolt before use.
- Never use eye bolt that shows signs of wear or damage.
- Never use eye bolt if eye or shank is bent or elongated.
- Always be sure threads on shank and receiving holes are clean.
- Never machine, grind, or cut eye bolt.

Assembly Safety:

- Never exceed load limits specified in Table I.
- Never use regular nut eye bolts for angular lifts.
- Always use shoulder nut eye bolts (or machinery eye bolts) for angular lifts.
- For angular lifts, adjust working load as follows:

Direction of Pull	Adjusted Working Load
45 degrees	30% of rated working load
90 degrees	25% of rated working load

- Never undercut eye bolt to seat shoulder against the load.
- Always countersink receiving hole or use washers to seat shoulder.
- Always screw eye bolt down completely for proper seating.
- Always tighten nuts securely against the load.



IN - LINE

Shoulder Nut Eye Bolt — Installation for Angular Loading

- The threaded shank must protrude through the load sufficiently to allow full engagement of the nut.
- If the eye bolt protrudes so far through the load that the nut cannot be tightened securely against the load, use properly sized washer to take up the excess space BETWEEN THE NUT AND THE LOAD.
- Place washers or spacers between nut and load so that when the nut is tightened securely, the shoulder is secured flush against the load surface.
- Thickness of spacers must exceed this distance between the bottom of the load and the last thread of the eye bolt.



WARNING

- Loads may slip or fall if proper eye bolt assembly and lifting procedures are not used.
- A falling load can serious injury or kill.
- Read and understand both sides of these instructions, and follow all eye bolt safety information presented here.
- Read, understand and follow all information in diagrams and charts below before using eye bolt assemblies.

1-PART SLINGS/MECHANICAL SPLICE

Single Leg Slings



EXTRA IMPROVED PLOW STEEL IWRC RATED CAPACITY IN TONS

CERTEX Cat. Ref. No.	ROPE DIAMETER (INCHES)	BASKET AT DEGREES					
		VERTICAL	CHOKER	BASKET AT DEGREES			
				VERTICAL BASKET	30 DEGREE	45 DEGREE	60 DEGREE
CX02-0001	1/4	0.65	0.48	1.3	0.65	0.91	1.1
CX02-0002	5/16	1.0	0.74	2.0	1.0	1.4	1.7
CX02-0003	3/8	1.4	1.1	2.9	1.4	2.0	2.5
CX02-0004	7/16	1.9	1.4	3.9	1.9	2.7	3.4
CX02-0005	1/2	2.5	1.9	5.1	2.5	3.6	4.4
CX02-0006	9/16	3.2	2.4	6.4	3.2	4.5	5.5
CX02-0007	5/8	3.9	2.9	7.8	3.9	5.5	6.8
CX02-0008	3/4	5.6	4.1	11	5.6	7.9	9.7
CX02-0009	7/8	7.6	5.6	15	7.6	11	13
CX02-0010	1	9.8	7.2	20	9.8	14	17
CX02-0011	1 1/8	12	9.1	24	12	17	21
CX02-0012	1 1/4	15	11	30	15	21	26
CX02-0013	1 3/8	18	13	36	18	25	31
CX02-0014	1 1/2	21	16	42	21	30	37
CX02-0015	1 5/8	24	18	49	24	35	42
CX02-0016	1 3/4	28	21	57	28	40	49
CX02-0017	1 7/8	32	24	64	32	46	56
CX02-0018	2	37	28	73	37	52	63
CX02-0019	2 1/8	40	31	80	40	56	69
CX02-0020	2 1/4	44	35	89	44	63	77
CX02-0021	2 3/8	49	38	99	49	70	85
CX02-0022	2 1/2	54	42	109	54	77	94
CX02-0023	2 5/8	60	46	119	60	84	103
CX02-0024	2 3/4	65	51	130	65	92	113
CX02-0025	2 7/8	71	55	141	71	100	122
CX02-0026	3	77	60	153	77	108	132
CX02-0027	3 1/8	82	64	165	82	117	143
CX02-0028	3 1/4	89	69	177	89	125	153
CX02-0029	3 3/8	95	74	190	95	135	165
CX02-0030	3 1/2	102	79	203	102	144	176
CX02-0031	4	130	101	260	130	183	224
CX02-0032	4 1/2	160	124	320	160	225	276

RATED CAPACITIES BASKET HITCH BASED ON D/d RATIO OF 25

RATED CAPACITIES BASED ON PIN DIAMETER NO LARGER THAN NATURAL EYE WIDTH OR LESS THAN THE NOMINAL SLING DIAMETER

RATED CAPACITIES BASED ON DESIGN FACTOR OF 5

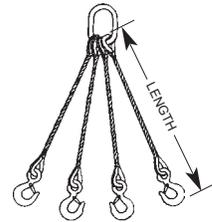
HORIZONTAL SLING ANGLES LESS THAN 30 DEGREES SHALL NOT BE USED

Rated Capacities shown apply only to 6x19 and 6x37 classification wire rope.

1-PART SLINGS/MECHANICAL SPLICE

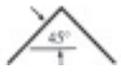
4-Leg Bridle Slings

EXTRA IMPROVED PLOW STEEL IWRC
RATED CAPACITY IN TONS



Standard Style

2

CERTEX Cat. Ref. No.	ROPE DIAMETER (INCHES)	4 LEG BRIDLE			
		VERTICAL	30°	45°	60°
					
CX02-0069	1/4	2.6	1.3	1.8	2.2
CX02-0070	5/16	4.0	2.0	2.8	3.5
CX02-0071	3/8	5.7	2.9	4.1	5.0
CX02-0072	7/16	7.8	3.9	5.5	6.7
CX02-0073	1/2	10	5.1	7.1	8.8
CX02-0074	9/16	13	6.4	9.0	11
CX02-0075	5/8	16	7.8	11	14
CX02-0076	3/4	22	11	16	19
CX02-0077	7/8	30	15	21	26
CX02-0078	1	39	20	28	34
CX02-0079	1 1/8	48	24	34	42
CX02-0080	1 1/4	59	30	42	51
CX02-0081	1 3/8	71	36	50	62
CX02-0082	1 1/2	84	42	60	73
CX02-0083	1 5/8	98	49	69	85
CX02-0084	1 3/4	113	57	80	98
CX02-0085	1 7/8	129	64	91	112
CX02-0086	2	147	73	104	127
CX02-0850	2 1/8	159	80	112	138
CX02-0851	2 1/4	178	89	126	154
CX02-0852	2 3/8	197	99	139	171
CX02-0853	2 1/2	217	109	154	188
CX02-0854	2 5/8	238	119	168	206
CX02-0855	2 3/4	260	130	184	225
CX02-0856	2 7/8	282	141	200	244
CX02-0857	3	306	153	216	265
CX02-0858	3 1/8	330	165	233	286
CX02-0859	3 1/4	354	177	250	307
CX02-0860	3 3/8	381	190	269	330
CX02-0861	3 1/2	406	203	287	352

RATED CAPACITIES BASKET HITCH BASED ON D/d RATIO OF 25

RATED CAPACITIES BASED ON PIN DIAMETER NO LARGER THAN NATURAL EYE WIDTH OR LESS THAN THE NOMINAL SLING DIAMETER

RATED CAPACITIES BASED ON DESIGN FACTOR OF 5

HORIZONTAL SLING ANGLES LESS THAN 30 DEGREES SHALL NOT BE USED

Rated Capacities shown apply only to 6x19 and 6x37 classification wire rope.

Engine

Engine Model	CAT C9	
Flywheel Power	184 kW	247 hp
ISO 9249	184 kW	247 hp
SAE J1349	182 kW	244 hp
EEC 80/1269	184 kW	247 hp
Bore	112 mm	4.41 in
Stroke	149 mm	5.87 in
Displacement	8.8 L	537 in ³

Weights

Operating Weight – Long Undercarriage	35 100 kg	77,400 lb
---------------------------------------	-----------	-----------

- 6.5 m (21 ft 4 in) boom, 3.9 m (12 ft 10 in) stick, 1.4 m³ (1.88 yd³), 1246 mm (48 in) HDP bucket, and 850 mm (34 in) track shoe.

Service Refill Capacities

Fuel Tank Capacity	618 L	163 gal
Cooling System	38 L	10 gal
Engine Oil	36 L	9.4 gal
Swing Drive	19 L	5 gal
Final Drive (each)	15 L	4 gal
Hydraulic System (including tank)	410 L	108 gal
Hydraulic Tank	175 L	46 gal

Sound Performance

Performance	ANSI/SAE J1166
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- Sound level of 74 dBA

Standards

Brakes	SAE J1026 APR90
Cab/FOGS	SAE J1356 FEB88 ISO 10262

Hydraulic System

Main Implement System – Maximum Flow (2x)	280 L/min	74 gal/min
Max. pressure – Implements (Full Time)	34 300 kPa	4,974 psi
Max. pressure – Travel	34 300 kPa	4,974 psi
Max. pressure – Swing	27 900 kPa	4,046 psi
Pilot System – Maximum flow	37 L/min	10 gal/min
Pilot System – Maximum pressure	4120 kPa	597 psi
Boom Cylinder – Bore	150 mm	5.91 in
Boom Cylinder – Stroke	1440 mm	57 in
Stick Cylinder – Bore	170 mm	6.69 in
Stick Cylinder – Stroke	1738 mm	68 in
D Family Bucket Cylinder – Bore	150 mm	5.91 in
D Family Bucket Cylinder – Stroke	1156 mm	46 in
E Family Bucket Cylinder – Bore	160 mm	6.3 in
E Family Bucket Cylinder – Stroke	1356 mm	53 in

Drive

Maximum Drawbar Pull	294 kN	66,094 lb
Maximum Travel Speed	5 kph	3.1 mph

Swing Mechanism

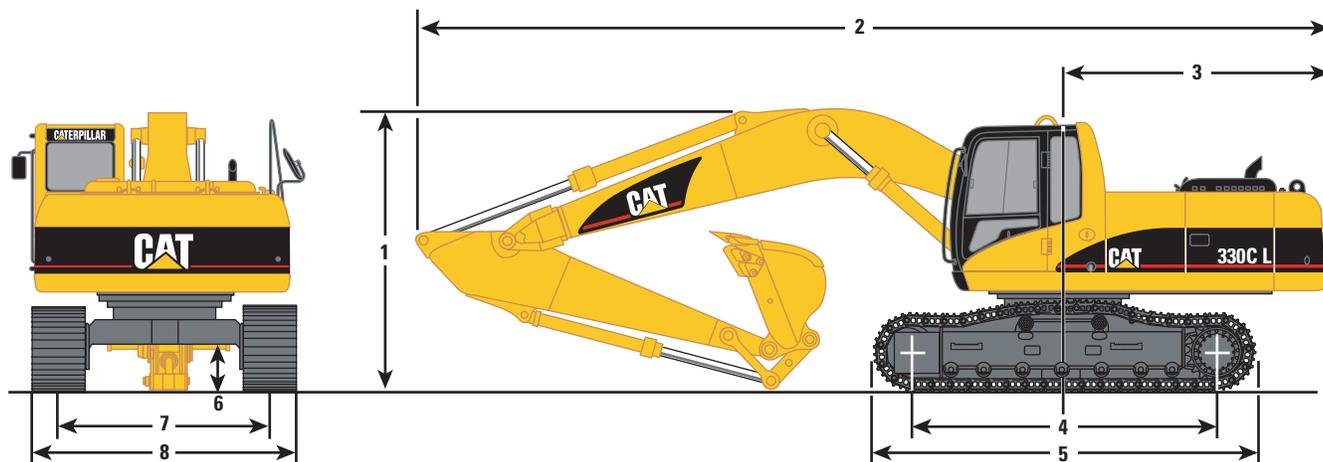
Swing Speed	10 rpm	
Swing Torque	108 kN·m	79,657 lb ft

Track

Standard w/Long Undercarriage – Triple Grouser	850 mm	34 in
Optional – Heavy Duty – Triple Grouser	850 mm	34 in
Optional – Triple Grouser	750 mm	30 in

Dimensions

All dimensions are approximate.

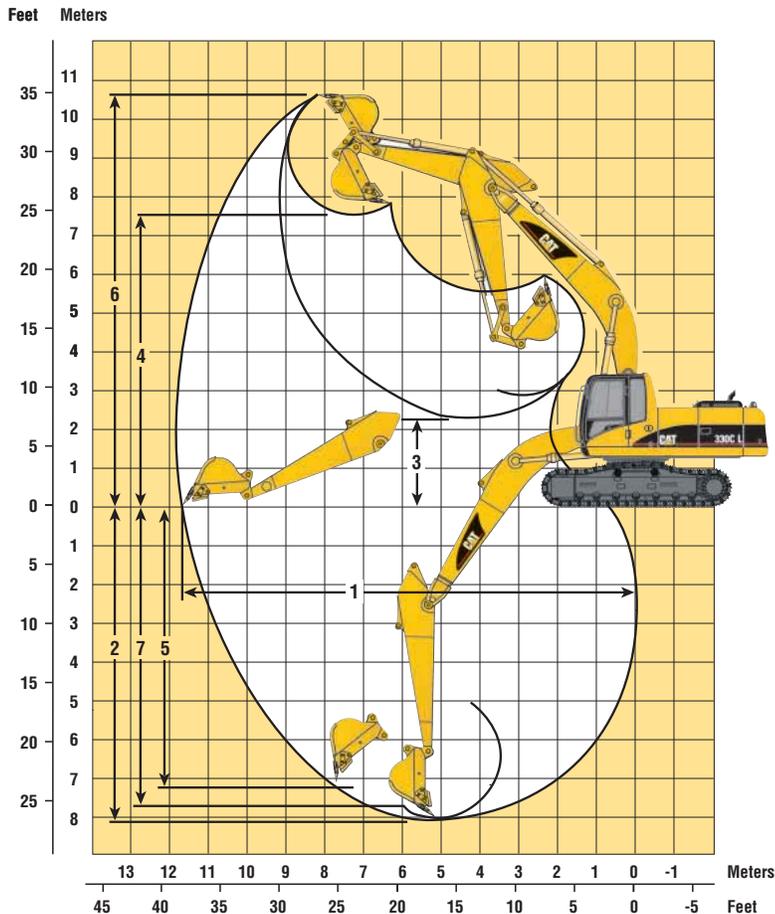


Boom Options	Reach — 6.5 m (21'4")	Reach — 6.5 m (21'4")	Mass — 6.18 m (20'3")
Stick Options	R3.9D m (12'10")	R3.2D m (10'6")	M2.55E (8'4")
1 Shipping height	3630 mm (11'11")	3350 mm (11'0")	3490 mm (11'5")
2 Shipping length	11 190 mm (36'9")	11 140 mm (36'7")	10 840 mm (35'7")
3 Tail swing radius	3500 mm (11'6")	3500 mm (11'6")	3500 mm (11'6")
4 Length to centers of rollers	4040 mm (13'3")	4040 mm (13'3")	4040 mm (13'3")
5 Track length	5020 mm (16'6")	5020 mm (16'6")	5020 mm (16'6")
6 Ground clearance	510 mm (1'8")	510 mm (1'8")	510 mm (1'8")
7 Track gauge	2590 mm (8'6")	2590 mm (8'6")	2590 mm (8'6")
8 Shipping width with 850 mm (34") Shoes	3440 mm (11'3")	3440 mm (11'3")	3440 mm (11'3")
Operating Weight			
750 mm (30") Shoes	34 382 kg (75,800 lb)	34 252 kg (75,513 lb)	34 462 kg (75,976 lb)
850 mm (34") Shoes	35 108 kg (77,400 lb)	34 978 kg (77,113 lb)	35 188 kg (77,576 lb)

* R3.9 shipping height increases to 3700 mm (12'2") with medium pressure and/or drain auxiliary lines.

Working Ranges

Major Component Weights



Booms: including lines, boom cylinders, stick cylinders and left side light

	kg	lb
Reach	3880	8550
Mass	3950	8700

Sticks: including bucket cylinder and bucket linkage

	kg	lb
R3.9 m	1950	4300
R3.2 m	1815	4000
M2.55 m	1960	4320

Counterweight 6020 13,300

	Reach Boom 6.5 m (21'4")	Reach Boom 6.5 m (21'4")	Mass Boom 6.18 m (20'3")
Stick Length	R3.9 (12'10")	R3.2 (10'6")	M2.55E (8'4")
Bucket	1.4 m³ (1.8 yd³)	1.4 m³ (1.8 yd³)	2.2 m³ (3.0 yd³)
1 Maximum Reach at Ground Level	11.64 m (38'2")	10.92 m (35'10")	10.21 m (33'6")
2 Maximum Digging Depth	8.09 m (26'7")	7.39 m (24'3")	6.60 m (21'8")
3 Minimum Loading Height	2.01 m (6'7")	2.71 m (8'11")	2.97 m (9'9")
4 Maximum Loading Height	7.64 m (25'1")	7.20 m (23'7")	6.67 m (21'11")
5 Maximum Vertical Wall Digging Depth	7.35 m (24'1")	6.49 m (21'4")	5.85 m (19'2")
6 Maximum Cutting Height	10.81 m (35'6")	10.34 m (33'11")	10.17 m (33'4")
7 Maximum Depth Cut for 2440 mm (8') Level Bottom	7.74 m (25'5")	7.04 m (23'1")	6.19 m (20'4")

Reach Boom Lift Capacities



Load Point Height



Load Radius Over Front



Load Radius Over Side



Load at Maximum Reach

R3.9D STICK – 3900 mm (12'10")
BUCKET – D 36" HD

SHOES – 850 mm (34") triple grouser

BOOM – 6500 mm (21'4")

	1.5 m (5.0 ft)		3.0 m (10.0 ft)		4.5 m (15.0 ft)		6.0 m (20.0 ft)		7.5 m (25.0 ft)		9.0 m (30.0 ft)				m ft			
																		
9.0 m 30.0 ft	kg lb															*3100 *6900	*3100 *6900	9.21 29.79
7.5 m 25.0 ft	kg lb															*2950 *6450	*2950 *6450	10.27 33.47
6.0 m 20.0 ft	kg lb									*6050 *13,250	*6050 *13,250	*5900 4750	4600 10,150	*2900 *6300	*2900 *6300	10.97 35.88		
4.5 m 15.0 ft	kg lb									*6800 *14,700	6450 13,850	*6300 *13,700	4600 9800	*2900 *6400	*2900 *6400	11.38 37.30		
3.0 m 10.0 ft	kg lb					*12 350 *26,550	*12 350 *26,550	*9300 *20,000	8850 19,050	*7700 *16,650	6150 13,150	*6800 *14,750	4450 9450	*3050 *6650	2800 6200	11.54 37.87		
1.5 m 5.0 ft	kg lb					*15 300 *32,950	12 750 27,450	*10 850 *23,450	8250 17,700	*8600 *18,650	5800 12,450	7200 15,400	4250 9100	*3250 *7100	2800 6100	11.47 37.63		
Ground Line	kg lb			*6850 *15,600	*6850 *15,600	*17 000 *36,700	12 000 25,800	*12 050 *26,000	7800 16,700	*9350 20,200	5500 11,850	7000 15,050	4100 8750	*3550 *7850	2900 6350	11.15 36.59		
-1.5 m -5.0 ft	kg lb	*6700 *14,900	*6700 *14,900	*10 550 *23,900	*10 550 *23,900	*17 450 *37,700	11 700 25,100	*12 550 *27,200	7500 16,150	9200 19,800	5350 11,500	6900 14,850	4000 8600	*4100 *9000	3150 6950	10.57 34.64		
-3.0 m -10.0 ft	kg lb	*10 900 *24,400	*10 900 *24,400	*15 450 *35,000	*15 450 *35,000	*16 850 *36,450	11 650 25,050	*12 400 *26,800	7450 16,000	9150 19,650	5300 11,400	6950 15,250	4000 8850	*4900 *10,900	3700 8200	9.67 31.62		
-4.5 m -15.0 ft	kg lb	*15 900 *35,800	*15 900 *35,800	*21 650 *46,700	*21 650 *46,700	*15 200 *32,750	11 900 25,550	*11 300 *24,300	7550 16,250	*8450 *17,900	5400 11,650			*6100 *13,400	4800 10,800	8.34 27.10		
-6.0 m -20.0 ft	kg lb			*16 600 *35,150	*16 600 *35,150	*11 950 *25,250	*11 950 *25,250	*8550 *17,600	7900 17,100					*7350 *16,100	7050 16,050	6.50 20.92		

* Limited by hydraulic capacity rather than tipping load. The above loads are in compliance with SAE hydraulic excavator lift capacity rating standard J1097. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping capacity. Weight of all lifting accessories must be deducted from the above lifting capacities.

R3.2D STICK – 3200 mm (10'6")
BUCKET – D 36" HD

SHOES – 850 mm (34") triple grouser

BOOM – 6500 mm (21'4")

	1.5 m (5.0 ft)		3.0 m (10.0 ft)		4.5 m (15.0 ft)		6.0 m (20.0 ft)		7.5 m (25.0 ft)		9.0 m (30.0 ft)				m ft			
																		
9.0 m	kg															*4000	*4000	8.26
7.5 m 25.0 ft	kg lb									*6400 *14,000	*6400 *14,000					*3750 *8250	*3750 *8250	9.46 30.77
6.0 m 20.0 ft	kg lb									*6850 *14,950	6550 14,000					*3700 *8150	*3700 *8150	10.22 33.41
4.5 m 15.0 ft	kg lb									*8600 *18,650	*8600 *18,650	*7500 *16,300	6350 13,550	*6900 *15,050	4500 9650	*3750 *8250	3400 7500	10.67 34.95
3.0 m 10.0 ft	kg lb					*13 950 *29,950	13 450 29,000	*10 200 *21,950	8650 18,550	*8350 *18,050	6050 12,950	*7300 15,700	4400 9350	*3950 *8650	3200 7050	10.84 35.55		
1.5 m 5.0 ft	kg lb					*16 450 *35,450	12 350 26,650	*11 600 *25,050	8100 17,400	*9150 *19,750	5750 12,300	7150 15,350	4250 9050	*4250 *9300	3150 6950	10.75 35.29		
Ground Line	kg lb			*14,100	*14,100	*17 450 *37,750	11 850 25,500	*12 450 *26,950	7700 16,600	9400 20,150	5500 11,850	7050 15,100	4150 8850	*4700 *10,300	3300 7250	10.41 34.15		
-1.5 m -5.0 ft	kg lb	*8050 *17,900	*8050 *17,900	*11 800 *26,650	*11 800 *26,650	*17 300 *37,500	11 700 25,150	*12 700 *27,450	7550 16,200	9250 19,900	5400 11,600	7000 15,400	4100 9000	*5400 *11,950	3650 8050	9.78 32.03		
-3.0 m -10.0 ft	kg lb	*13 500 *30,200	*13 500 *30,200	*18 400 *41,650	*18 400 *41,650	*16 250 *35,100	11 850 25,400	*12 150 *26,150	7550 16,250	9300 *19,900	5400 11,650			*6650 *14,750	4400 9800	8.78 28.67		
-4.5 m -15.0 ft	kg lb			*19 100 *41,100	*19 100 *41,100	*13 950 *30,000	12 150 26,100	*10 450 *22,250	7750 16,700					*4600 *9750	*4600 *9750	7.25 23.47		

* Limited by hydraulic capacity rather than tipping load. The above loads are in compliance with SAE hydraulic excavator lift capacity rating standard J1097. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping capacity. Weight of all lifting accessories must be deducted from the above lifting capacities.

Mass Boom Lift Capacities



Load Point
Height



Load Radius
Over Front



Load Radius
Over Side



Load at
Maximum Reach

M2.55E STICK – 2550 mm (8'4")
BUCKET – E 42" GP

SHOES – 850 mm (34") triple grouser

BOOM – 6180 mm (20'3")

	3.0 m (10.0 ft)		4.5 m (15.0 ft)		6.0 m (20.0 ft)		7.5 m (25.0 ft)				m ft	
												
7.5 m 25.0 ft	kg lb									*3700 *8150	*3700 *8150	8.67 28.15
6.0 m 20.0 ft	kg lb					*7850 *17,000	*7850 *17,000	*7150 *15,500	6050 12,950	*3600 *7900	*3600 *7900	9.51 31.08
4.5 m 15.0 ft	kg lb			*11 450 *24,500	*11 450 *24,500	*9000 *19,400	8700 18,700	*7700 *16,750	5800 12,350	*3650 *8000	3400 7500	9.99 32.72
3.0 m 10.0 ft	kg lb			*14 400 *30,850	12 900 27,750	*10 350 *22,400	8150 17,500	*8400 *18,200	5500 11,850	*3850 *8400	3150 6950	10.16 33.32
1.5 m 5.0 ft	kg lb			*16 450 *35,400	11 850 25,450	*11 550 *24,950	7650 16,400	*9050 *19,550	5300 11,300	*4150 *9100	3150 6900	10.04 32.96
Ground Line	kg lb			*17 000 *36,750	11 400 24,450	*12 200 *26,350	7300 15,650	9000 19,300	5100 10,950	*4650 *10,250	3350 7400	9.63 31.60
-1.5 m -5.0 ft	kg lb	*14 300 *32,450	*14 300 *32,450	*16 400 *35,550	11 350 24,350	*12 050 *26,050	7200 15,400	8950 19,150	5050 10,800	*5500 *12,150	3900 8650	8.88 29.09
-3.0 m -10.0 ft	kg lb	*20 050 *43,450	*20 050 *43,450	*14 750 *31,850	11 550 24,850	*10 950 *23,500	7300 15,650			*6100 *13,350	5200 11,550	7.67 25.01
-4.5 m -15.0 ft	kg lb	*15 200 *32,450	*15 200 *32,450	*11 400 *24,150	*11 400 *24,150					*7750 *16,950	*7750 *16,950	5.97 19.31

* Limited by hydraulic capacity rather than tipping load. The above loads are in compliance with SAE hydraulic excavator lift capacity rating standard J1097. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping capacity. Weight of all lifting accessories must be deducted from the above lifting capacities.

Engine

Engine Model	Cat® C9.3 (ATAAC)	
Net Power – SAE J1349	224 kW	300 hp
Gross Power – SAE J1995	241 kW	323 hp
Bore	115 mm	4.53 in
Stroke	149 mm	5.87 in
Displacement	9.3 L	568 in ³

Weights

Minimum Weight*	36 100 kg	79,600 lb
Maximum Weight**	39 100 kg	86,200 lb

*HD Reach boom, R3.2DB (10'6") stick, 2.28 m³ (2.98 yd³)
GP bucket, 700 mm (28") TG shoes.

**ES Reach boom, R3.9DB ES (12'10") stick, 2.28 m³ (2.98 yd³)
GP bucket, 850 mm (34") TG shoes.

Hydraulic System

Main System – Maximum Flow (Total)	578 L/min	153 gal/min
Swing System – Maximum Flow	275 L/min	73 gal/min
Maximum Pressure – Equipment		
Heavy Lift	38 000 kPa	5,511 psi
Normal	35 000 kPa	5,076 psi
Maximum Pressure – Travel	35 000 kPa	5,076 psi
Maximum Pressure – Swing	28 000 kPa	4,061 psi
Pilot System – Maximum Flow	26 L/min	6.9 gal/min
Pilot System – Maximum Pressure	4100 kPa	595 psi
Boom Cylinder – Bore	150 mm	5.9 in
Boom Cylinder – Stroke	1440 mm	56.7 in
Stick Cylinder – Bore	170 mm	6.7 in
Stick Cylinder – Stroke	1738 mm	68.4 in
DB Family Bucket Cylinder – Bore	150 mm	5.9 in
DB Family Bucket Cylinder – Stroke	1151 mm	45.3 in
TB Family Bucket Cylinder – Bore	160 mm	6.3 in
TB Family Bucket Cylinder – Stroke	1356 mm	53.4 in

Drive

Maximum Travel Speed	4.9 km/h	3 mph
Maximum Drawbar Pull	295 kN	66,300 lbf

Swing Mechanism

Swing Speed	9.2 rpm	
Swing Torque	109 kN·m	80,400 lb ft

Service Refill Capacities

Fuel Tank Capacity	620 L	163.8 gal
Cooling System	56 L	14.8 gal
Engine Oil (with filter)	30.5 L	8.1 gal
Swing Drive (each)	19 L	5 gal
Final Drive (each)	8 L	2.1 gal
Hydraulic System (including tank)	380 L	100.4 gal
Hydraulic Tank	175 L	46.2 gal

Track

Number of Shoes (each side)	
Long Undercarriage	49
Number of Track Rollers (each side)	
Long Undercarriage	9
Number of Carrier Rollers (each side)	
Long Undercarriage	2

Sound Performance

Operator Noise SAE J1166	71 dB(A)
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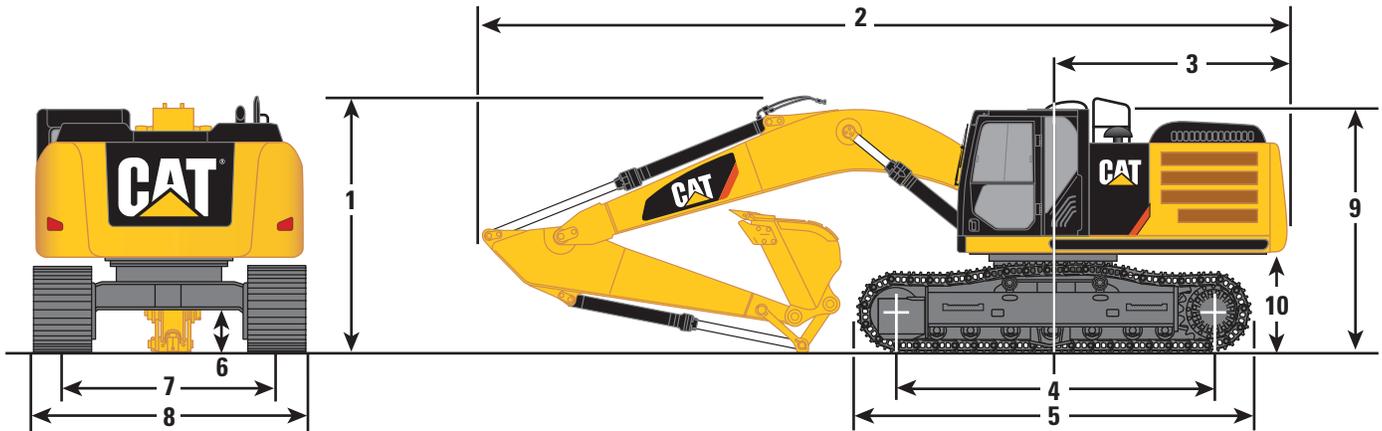
- When properly installed and maintained, the cab offered by Caterpillar, when tested with doors and windows closed according to ANSI/SAE J1166, meets OSHA and MSHA requirements for operator sound exposure limits in effect at time of manufacture.
- Hearing protection may be needed when operating with an open operator station and cab (when not properly maintained or doors/windows open) for extended periods or in noisy environment.

Standards

Brakes	ISO 10265 2008
Cab/FOGS	ISO 10262 1998

Dimensions

All dimensions are approximate.



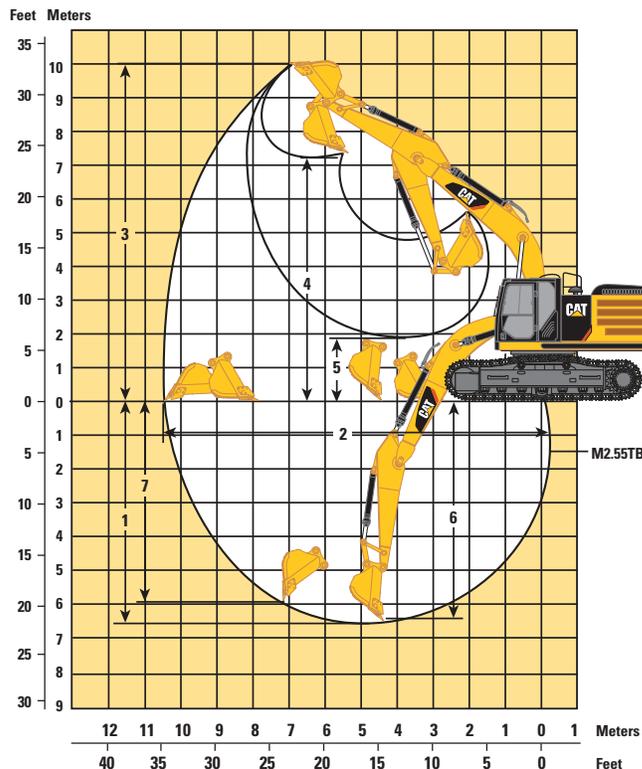
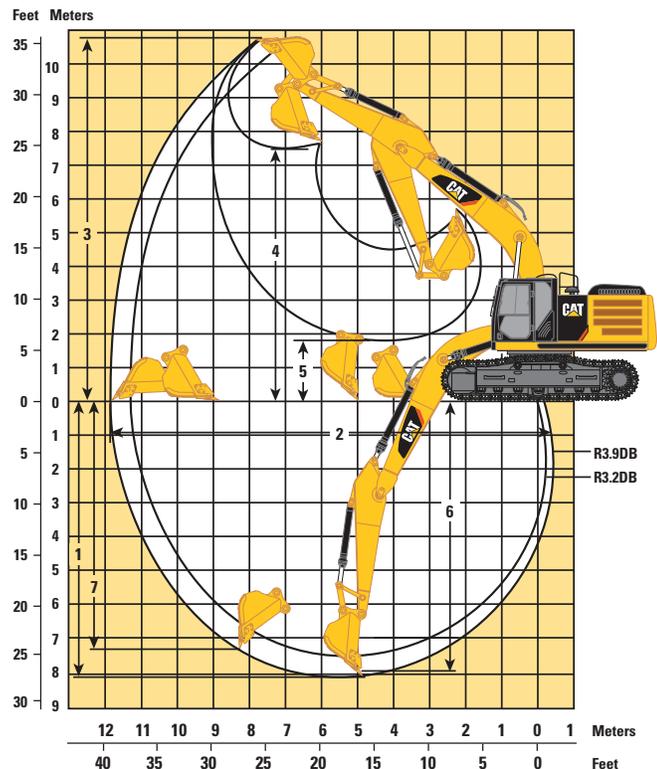
Extreme Service and Heavy Duty Reach Booms 6.50 m (21'4")

Mass Boom 6.18 m (20'3")

Stick	R3.9DB (12'10")	R3.2DB (10'6")	M2.55TB (8'4")
	mm (ft)	mm (ft)	mm (ft)
1 Shipping Height (with Shoe Lug Height)	3660 (12'0")	3510 (11'6")	3600 (11'10")
Shipping Height with Top Guard	3660 (12'0")	3510 (11'6")	3510 (11'6")
2 Shipping Length	11 170 (36'8")	11 160 (36'7")	10 890 (35'9")
3 Tail Swing Radius	3500 (11'6")	3500 (11'6")	3500 (11'6")
4 Length to Center of Rollers			
Long Undercarriage	4040 (13'3")	4040 (13'3")	4040 (13'3")
5 Track Length			
Long Undercarriage	5020 (16'6")	5020 (16'6")	5020 (16'6")
6 Ground Clearance			
With Shoe Lug Height	510 (1'8")	510 (1'8")	510 (1'8")
Without Shoe Lug Height	480 (1'7")	480 (1'7")	480 (1'7")
7 Track Gauge			
Long Undercarriage	2590 (8'6")	2590 (8'6")	2590 (8'6")
8 Transport Width			
Long/Std U/C – 700 mm (28") Shoes	3290 (10'10")	3290 (10'10")	3290 (10'10")
Long/Std U/C – 800 mm (32") Shoes	3390 (11'1")	3390 (11'1")	3390 (11'1")
Long/Std U/C – 850 mm (34") Shoes	3440 (11'3")	3440 (11'3")	3440 (11'3")
9 Cab Height	3150 (10'4")	3150 (10'4")	3150 (10'4")
Cab Height with Top Guard	3360 (11'0")	3360 (11'0")	3360 (11'0")
10 Counterweight Clearance (without Shoe Lug Height)	1220 (4'0")	1220 (4'0")	1220 (4'0")

Working Ranges

All dimensions are approximate.



Extreme Service and Heavy Duty Reach Booms 6.50 m (21'4")

Mass Boom 6.18 m (20'3")

Stick	R3.9DB (12'10")	R3.2DB (10'6")	M2.55TB (8'4")
	mm (ft)	mm (ft)	mm (ft)
1 Maximum Digging Depth	8190 (26'10")	7490 (24'7")	6650 (21'10")
2 Maximum Reach at Ground Level	11 720 (38'5")	11 020 (36'2")	10 260 (33'8")
3 Maximum Cutting Height	10 740 (35'3")	10 320 (33'10")	9970 (32'9")
4 Maximum Loading Height	7500 (24'7")	7110 (23'4")	6620 (21'9")
5 Minimum Loading Height	1910 (6'3")	2610 (8'7")	2920 (9'7")
6 Maximum Depth Cut for 2440 mm (8'0") Level Bottom	7610 (25'0")	6820 (22'5")	5810 (19'1")
7 Maximum Vertical Wall Digging Depth	6310 (20'8")	5500 (18'1")	4450 (14'7")

Operating Weight and Ground Pressure

	850 mm (34") Triple Grouser Shoes		800 mm (32") Triple Grouser Shoes		700 mm (28") Triple Grouser Shoes	
	kg (lb)	kPa (psi)	kg (lb)	kPa (psi)	kg (lb)	kPa (psi)
Long Undercarriage						
HD Reach Boom – 6.50 m (21'4")						
R3.9DB (12'10")	37 300 (82,200)	49.0 (7.1)	37 000 (81,600)	51.7 (7.5)	36 300 (80,000)	58.0 (8.4)
R3.2DB (10'6")	37 000 (81,600)	48.7 (7.1)	36 700 (80,900)	51.3 (7.4)	36 100 (79,600)	57.7 (8.4)
ES Reach Boom – 6.50 m (21'4") – including 7.0 mt (7.7 t) counterweight						
R3.9DB HD (12'10")	39 100 (86,200)	51.4 (7.5)	38 900 (85,800)	54.3 (7.9)	38 200 (84,200)	61.0 (8.8)
R3.2DB HD (10'6")	38 900 (85,800)	51.1 (7.4)	38 600 (85,100)	53.9 (7.8)	37 900 (83,600)	60.5 (8.8)
Mass Boom – 6.18 m (20'3")						
M2.55TB (8'4")	38 100 (84,000)	50.1 (7.3)	37 800 (83,300)	52.8 (7.7)	37 100 (81,800)	59.3 (8.6)

336E L Heavy Duty Reach Boom Lift Capacities – Americas



Load Point Height



Load at Maximum Reach



Load Radius Over Front



Load Radius Over Side

Boom – 6.50 m (21'4")
Stick – R3.9DB (12'10")

Counterweight – 6.0 mt (6.6 t)
Shoes – 800 mm (32") triple grouser

Bucket – None
Heavy Lift Mode – On

	1.5 m/5.0 ft		3.0 m/10.0 ft		4.5 m/15.0 ft		6.0 m/20.0 ft		7.5 m/25.0 ft		9.0 m/30.0 ft				m ft	
																
9.0 m 30.0 ft	kg lb													*6250 *13,950	*6250 *13,950	7.35 23.64
7.5 m 25.0 ft	kg lb								*7700 *17,050	7650 16,450				*5800 *12,850	*5800 *12,850	8.53 27.74
6.0 m 20.0 ft	kg lb								*8000 *17,550	7550 16,200	*7500 *14,550	5550 11,850		*5650 *12,450	5150 11,500	9.33 30.48
4.5 m 15.0 ft	kg lb						*9800 *21,200	*9800 *21,200	*8750 *19,100	7300 15,650	*8200 *17,950	5450 11,650		*5650 *12,450	4650 10,250	9.84 32.22
3.0 m 10.0 ft	kg lb				*15 300 *32,900	14 850 32,000	*11 600 *25,100	9700 20,850	*9750 *21,150	6950 14,950	8250 17,700	5250 11,300		*5850 *12,850	4350 9,600	10.10 33.11
1.5 m 5.0 ft	kg lb				*18 450 *39,800	13 700 29,450	*13 300 *28,800	9100 19,600	10 600 22,750	6650 14,250	8050 17,300	5100 10,900		*6200 *13,600	4250 9,350	10.12 33.22
Ground Line	kg lb			*8550 *19,400	*8550 *19,400	*20 100 *43,450	13 050 28,050	14 450 31,000	8700 18,700	10 300 22,150	6400 13,700	7900 16,950	4950 10,600	*6750 *14,850	4300 9,450	9.93 32.56
-1.5 m -5.0 ft	kg lb	*8900 *19,900	*8900 *19,900	*13 300 *30,050	*13 300 *30,050	*20 350 *44,100	12 800 27,500	14 150 30,450	8450 18,200	10 100 21,750	6200 13,400	7800 16,800	4850 10,450	7250 16,000	4550 10,000	9.48 31.09
-3.0 m -10.0 ft	kg lb	*14 100 *31,550	*14 100 *31,550	*19 400 *43,850	*19 400 *43,850	*19 500 *42,150	12 800 27,550	14 100 30,350	8400 18,100	10 100 21,700	6200 13,350			8150 18,000	5050 11,200	8.76 28.66
-4.5 m -15.0 ft	kg lb	*20 200 *45,400	*20 200 *45,400	*24 050 *51,900	*24 050 *51,900	*17 350 *37,450	13 000 28,000	*13 200 *28,300	8550 18,400	*9900 *20,850	6350 13,700			*9450 *20,850	6150 13,700	7.69 25.01
-6.0 m -20.0 ft	kg lb					*13 250 *27,950	*13 250 *27,950	*9400	8950					*9250 *20,250	8850 20,100	6.06 19.44

Boom – 6.50 m (21'4")
Stick – R3.2DB (10'6")

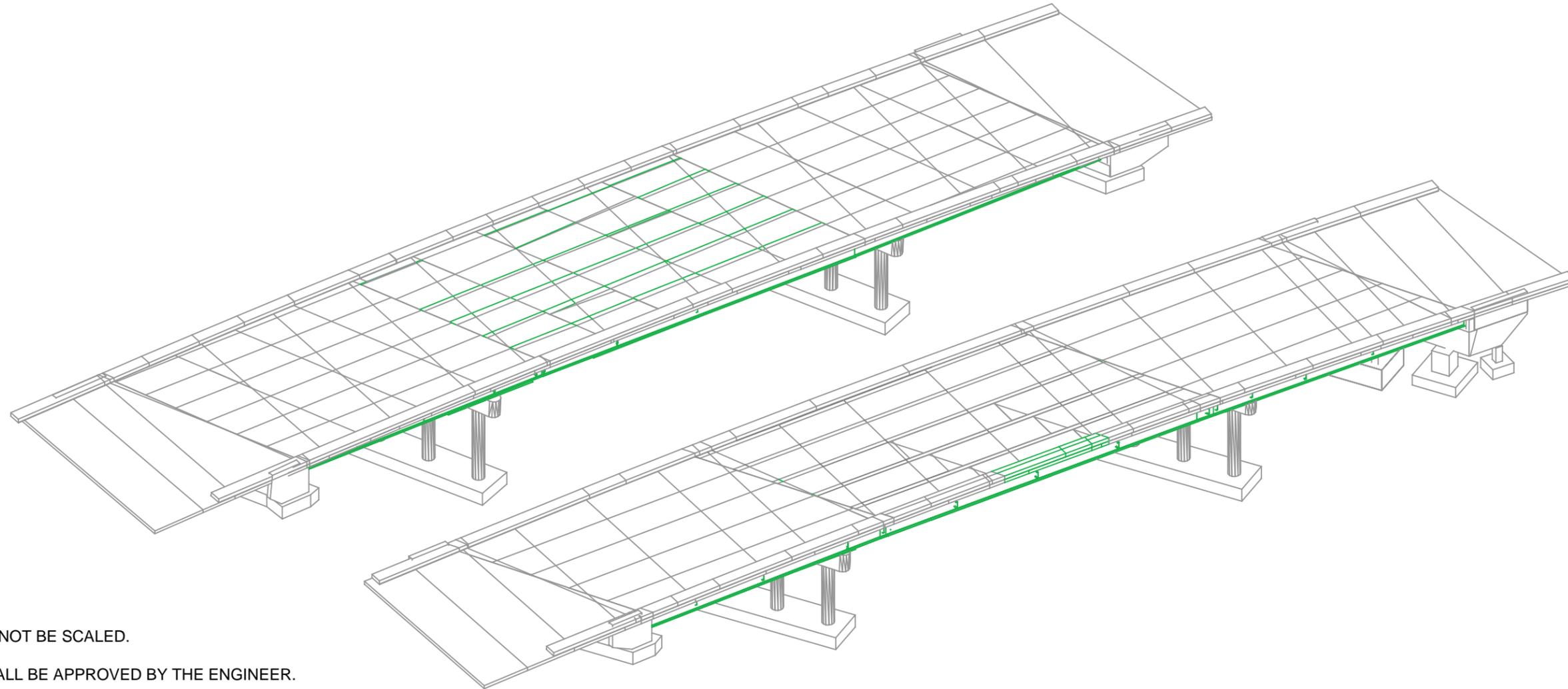
Counterweight – 6.0 mt (6.6 t)
Shoes – 800 mm (32") triple grouser

Bucket – None
Heavy Lift Mode – On

	1.5 m/5.0 ft		3.0 m/10.0 ft		4.5 m/15.0 ft		6.0 m/20.0 ft		7.5 m/25.0 ft		9.0 m/30.0 ft				m ft	
																
7.5 m 25.0 ft	kg lb								*8800 *19,500	7500 15,950				*9100 *20,150	8700 19,700	6.58 21.25
6.0 m 20.0 ft	kg lb								*8900 *19,500	7400 15,950				*8700 *19,150	6800 15,100	7.59 24.74
4.5 m 15.0 ft	kg lb					*13 500	*13 500	*10 900 *23,600	10 100 21,750	*9550 *20,800	7200 15,450	8350	5350	*8650 *19,100	5850 12,950	8.21 26.85
3.0 m 10.0 ft	kg lb					*17 150 *36,800	14 400 31,050	*12 600 *27,250	9500 20,500	*10 450 *22,700	6900 14,850	8200 17,650	5250 11,250	8500 18,800	5400 11,850	8.51 27.92
1.5 m 5.0 ft	kg lb					*19 700 *42,550	13 450 28,950	*14 100 *30,500	9000 19,450	10 550 22,700	6600 14,250	8050 17,300	5100 10,950	8350 18,350	5250 11,500	8.55 28.05
Ground Line	kg lb					*20 550 *44,550	13 050 28,050	14 450 31,000	8700 18,700	10 300 22,200	6400 13,800	7950 17,100	5000 10,750	8600 18,950	5350 11,800	8.31 27.27
-1.5 m -5.0 ft	kg lb			*14 500 *32,800	*14 500 *32,800	*20 150 *43,750	12 950 27,850	14 250 30,650	8550 18,400	10 200 22,000	6300 13,600			9450 20,850	5850 12,950	7.78 25.48
-3.0 m -10.0 ft	kg lb			*22 850 *51,700	*22 850 *51,700	*18 700 *40,550	13 050 28,100	*14 250 *30,750	8600 18,500	10 250 22,100	6350 13,750			*10 800 *23,750	7050 15,600	6.88 22.45
-4.5 m -15.0 ft	kg lb			*21 050 *45,350	*21 050 *45,350	*15 900 *34,100	13 350 28,800	*12 050 *25,650	8800 19,000					*10 050 *21,950	*10 050 *21,950	5.43 17.51
-6.0 m -20.0 ft	kg lb															

*Indicates that the load is limited by hydraulic lifting capacity rather than tipping load. The above loads are in compliance with hydraulic excavator lift capacity standard ISO 10567:2007. They do not exceed 87% of hydraulic lifting capacity or 75% of tipping load. Weight of all lifting accessories must be deducted from the above lifting capacities. Lifting capacities are based on the machine standing on a firm, uniform supporting surface.

Always refer to the appropriate Operation and Maintenance Manual for specific product information.



GENERAL NOTES

DRAWINGS SHALL NOT BE SCALED.

ANY CHANGES SHALL BE APPROVED BY THE ENGINEER.

MATERIALS SHALL BE NEW OR IN GOOD CONDITION AND APPROVED BY THE DESIGN ENGINEER.

ALL WELDS ARE TO FOLLOW CURRENT AWS STANDARDS.

ALL WORK OVER US-5 TO BE PERFORMED UNDER FLAGGING OPERATIONS PER THE TRAFFIC CONTROL PLAN.

DEMOLITION SEQUENCE BASED ON REMOVAL OF SUSPENDED SPAN AND END SPAN DECK PRIOR TO END SPAN STEEL REMOVAL.

CRANE CONFIGURATIONS ARE AS FOLLOWS:

- ALL RT CRANES ON 100% OUTRIGGER EXTENSION
- LINK-BELT LS-248H I ABC+A COUNTERWEIGHT
- LINK BELT 298 HSL ABC+A COUNTERWEIGHT

EXISTING NORTHBOUND BRIDGE DEMOLITION PLAN

DESIGN AIDS

- ASD NINTH ED. (STEEL)
- AASHTO GUIDE DESIGN SPECIFICATIONS FOR BRIDGE TEMPORARY WORKS

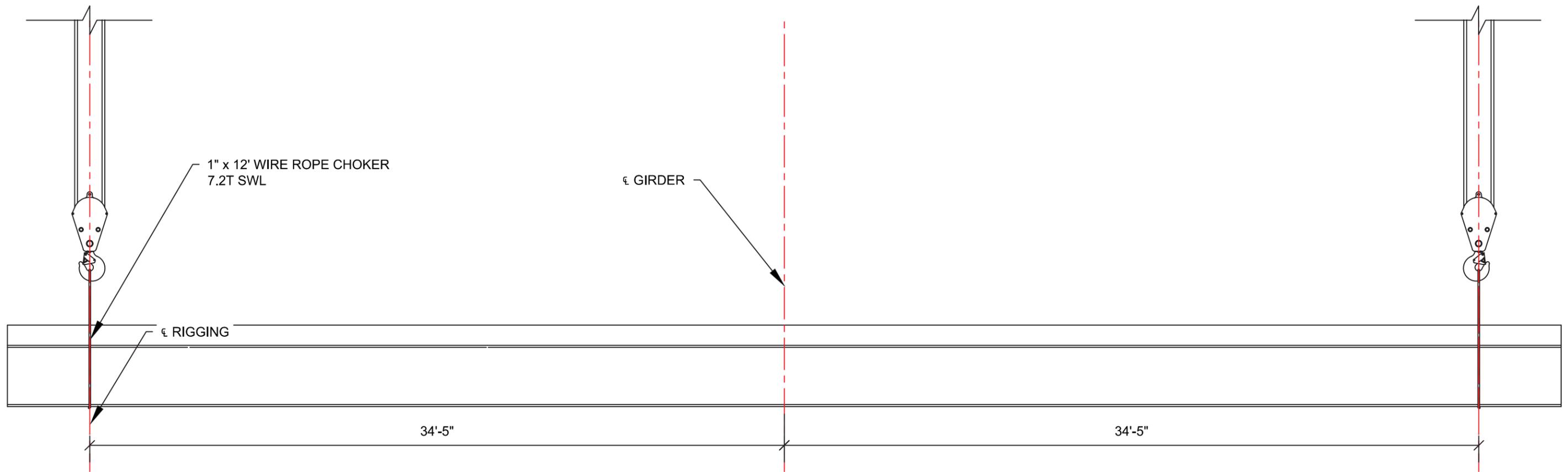
MATERIAL PROPERTIES

- STEEL
- PLATE, MISC.
 - ASTM A36 Fy = 36 ksi MIN

LIST OF DRAWINGS

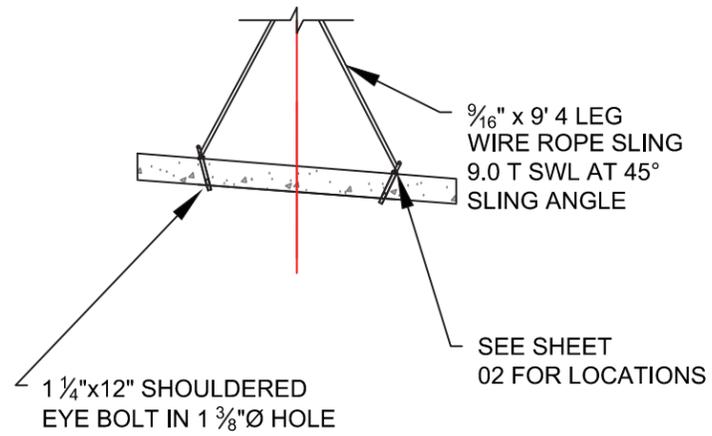
TITLE SHEET	01
SAWCUT LAYOUTS	02
RIGGING DETAILS	05
PIER CAP DEMO DETAIL	10
NB SEQUENCE	11

Revision No. & Date		Vermont Agency of Transportation			Drawing Status		Name		Date		PCL Civil Constructors, Inc.		
					Tim Davis, P.E. Aug 25 2015 12:26 PM FOR CONSTRUCTION		Drawn By AJT		08/24/15		3810 Northdale Blvd. Suite 200, Tampa Florida 33624 (813)-264-9500 ; Fax: (813)-264-6689		
Road No.	County / City	Financial Project ID No.				Design By		TMD/ AJT		08/24/15		Submittal NB DEMOLITION PLAN	PCL Project / Job No. I-91 Windsor / Hartford / 5514001
I-91	Windsor / Hartford	IM 091-2(79)				Check By		TMD / AMD		08/24/15		Drawing Title TITLE PAGE AND GENERAL NOTES	Sheet No. 01

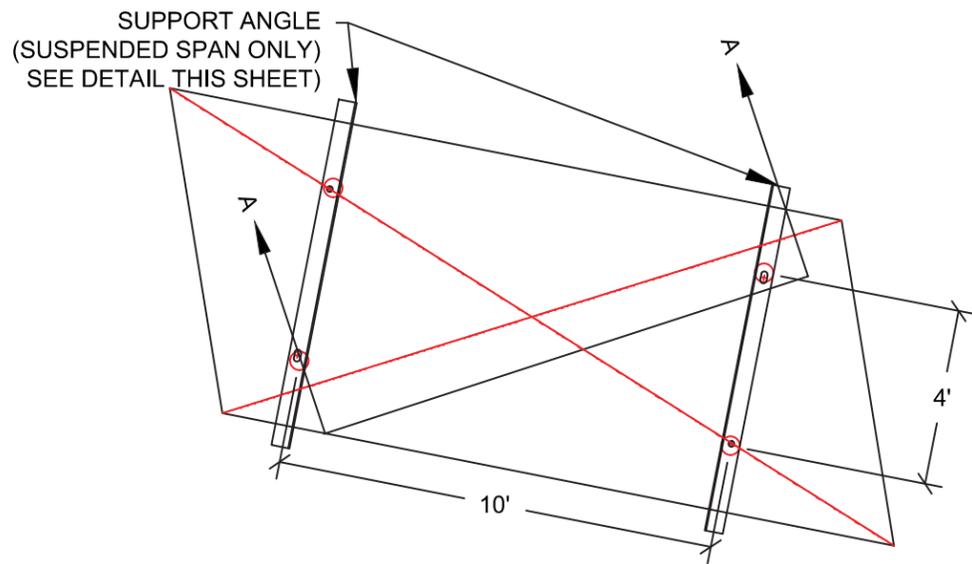


DEMOLITION RIGGING - TWO CRANE LIFT

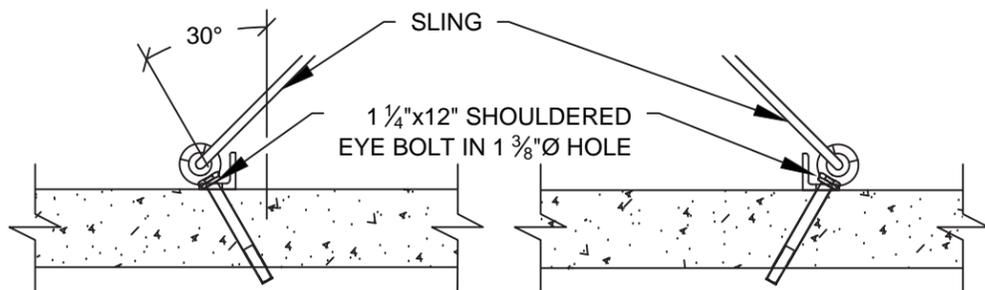
Revision No. & Date	Vermont Agency of Transportation				Drawing Status	Name	Date	PCL Civil Constructors, Inc. 3810 Northdale Blvd. Suite 200, Tampa Florida 33624 (813)-264-9500 ; Fax: (813)-264-6689	
	Road No.	County / City	Financial Project ID No.	Aug 25 2015 12:27 PM FOR CONSTRUCTION	Drawn By	AJT	08/24/15	Submittal	PCL Project / Job No.
	I-91	Windsor / Hartford	IM 091-2(79)		Design By	TMD/ AJT	08/24/15	NB DEMOLITION PLAN	I-91 Windsor / Hartford / 5514001
					Check By	TMD / AMD	08/24/15	Drawing Title	Sheet No.
								RIGGING DETAILS (2)	06



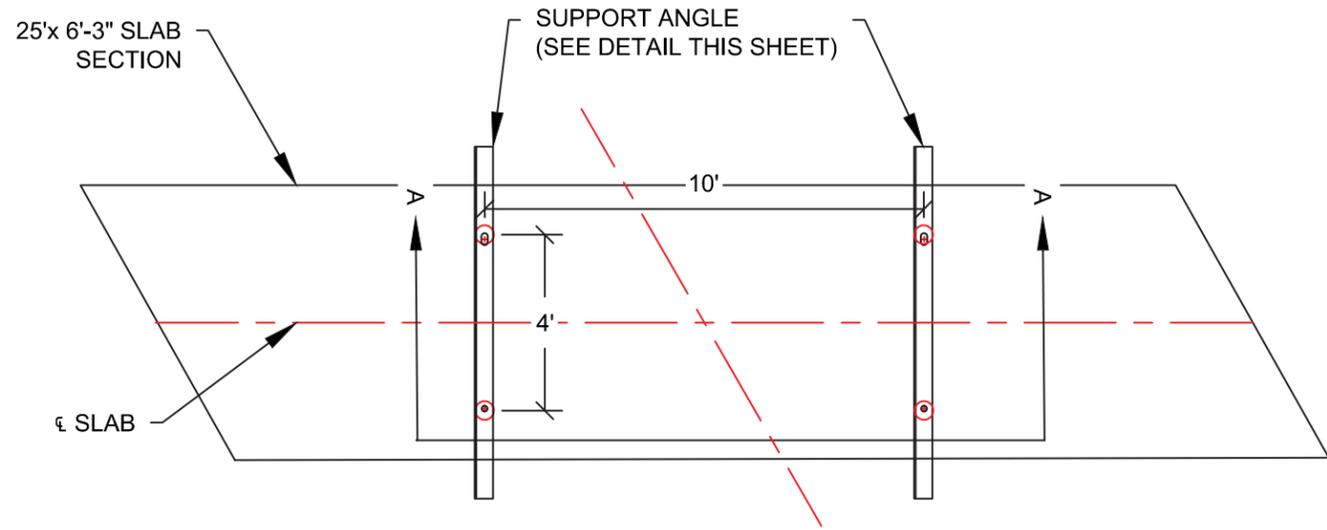
CONCRETE SLAB RIGGING - ELEVATION



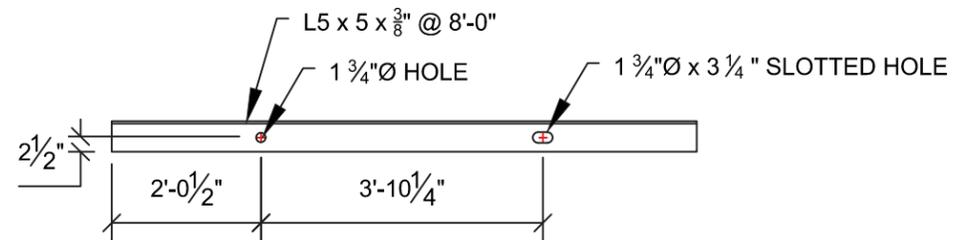
TYPICAL CONCRETE SLAB RIGGING - PLAN



SECTION A-A

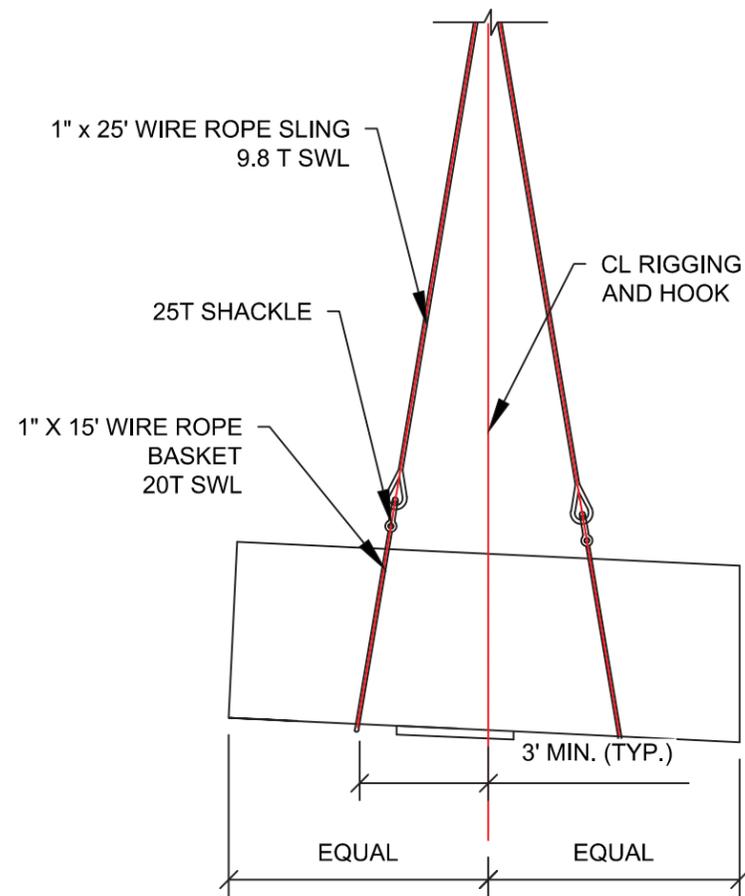


SUSPENDED SPAN CONCRETE SLAB RIGGING - PLAN

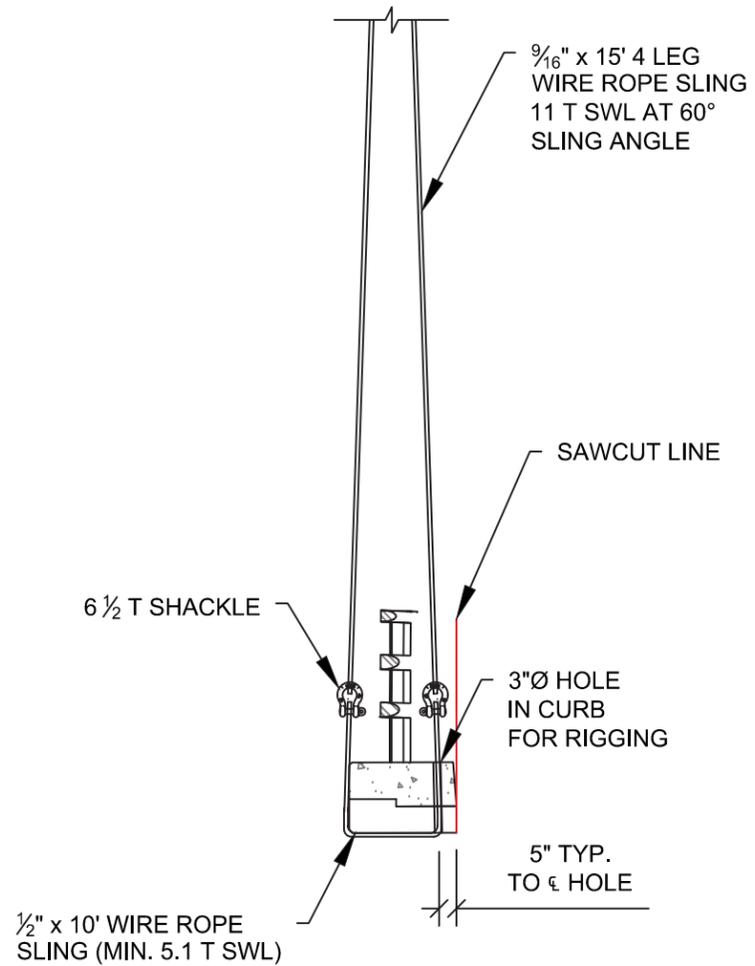


SUPPORT ANGLE DETAIL

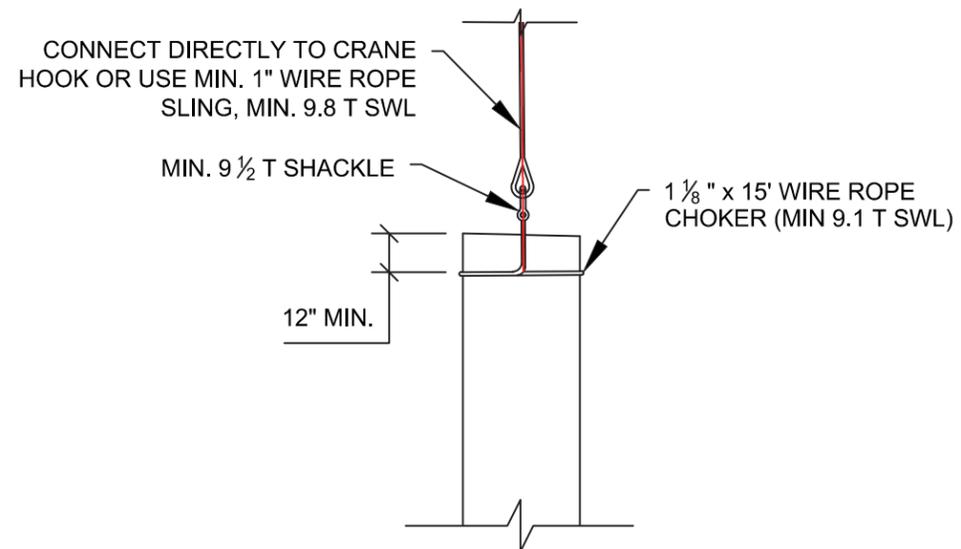
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		Road No.	County / City		Financial Project ID No.	Aug 25 2015 12:27 PM FOR CONSTRUCTION	Name	Date
		I-91	Windsor / Hartford	IM 091-2(79)		Drawn By	AJT	08/24/15
						Design By	TMD/ AJT	08/24/15
						Check By	TMD / AMD	08/24/15
								Submittal NB DEMOLITION PLAN
								Drawing Title RIGGING DETAILS (4)
								Sheet No. 08



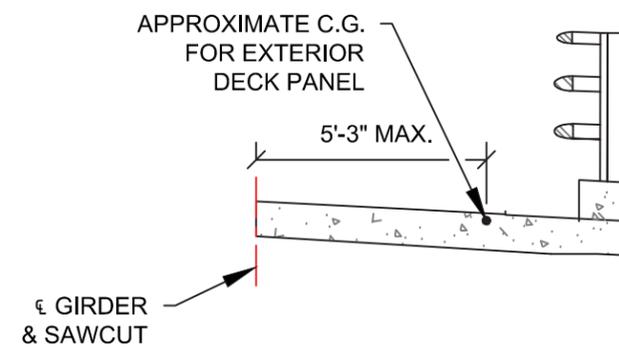
PIER CAP RIGGING



OVERHANG CURB RIGGING

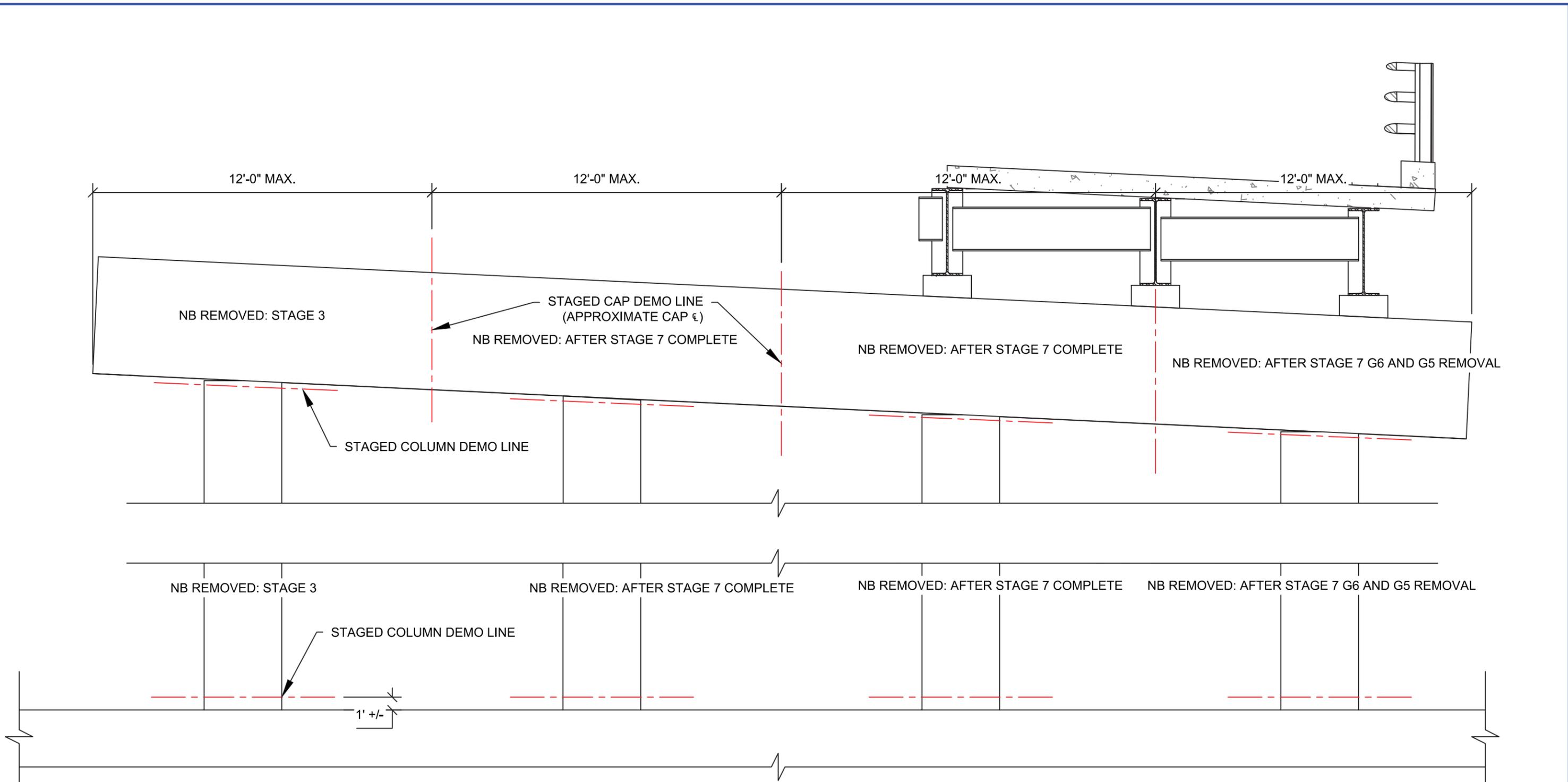


COLUMN RIGGING



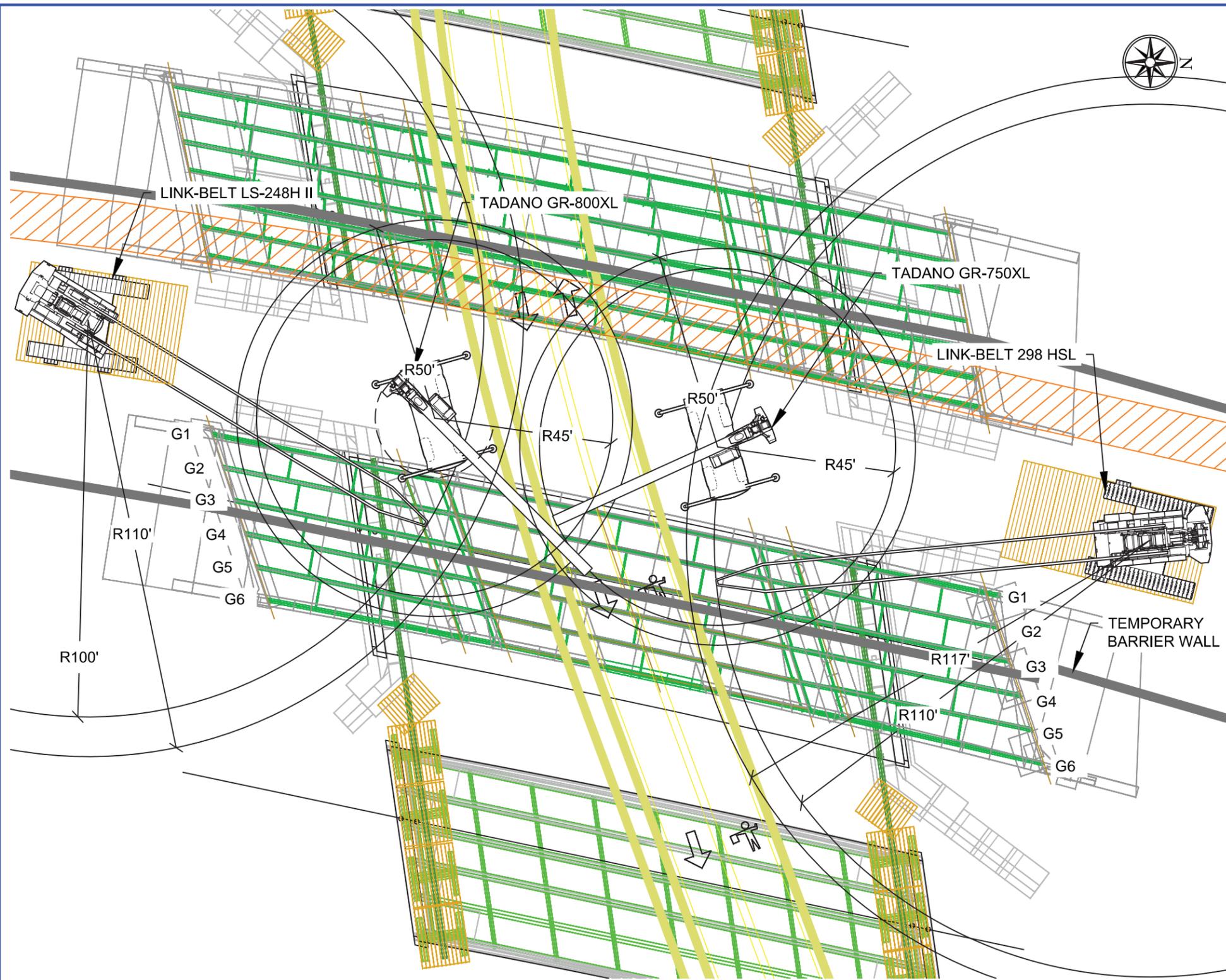
END SPAN EXTERIOR DECK C.G.

Revision No. & Date		Vermont Agency of Transportation			Drawing Status		Name		Date		PCL Civil Constructors, Inc.			
					Aug 25 2015 12:27 PM FOR CONSTRUCTION		Drawn By		AJT		08/24/15		3810 Northdale Blvd. Suite 200, Tampa Florida 33624 (813)-264-9500 ; Fax: (813)-264-6689	
Road No.	County / City	Financial Project ID No.					Design By		TMD/ AJT		08/24/15		PCL Project / Job No. I-91 Windsor / Hartford / 5514001	
I-91	Windsor / Hartford	IM 091-2(79)				Check By		TMD / AMD		08/24/15		Drawing Title RIGGING DETAILS (5) Sheet No. 09		



CAP DEMOLITION
 COLUMN STUB AND FOOTING (AS REQ'D) TO BE REMOVED
 AFTER CLOSURE

Revision No. & Date	Vermont Agency of Transportation				Drawing Status	Name	Date	PCL Civil Constructors, Inc. 3810 Northdale Blvd. Suite 200, Tampa Florida 33624 (813)-264-9500 ; Fax: (813)-264-6689	
	Road No.	County / City	Financial Project ID No.		Aug 25 2015 12:27 PM FOR CONSTRUCTION	Drawn By	AJT	08/24/15	Submittal
	I-91	Windsor / Hartford	IM 091-2(79)		Design By	TMD/ AJT	08/24/15	NB DEMOLITION PLAN	I-91 Windsor / Hartford / 5514001
					Check By	TMD / AMD	08/24/15	Drawing Title	Sheet No.
								COLUMN AND CAP DEMO	10



NB DEMOLITION - STAGE 1
PRE-CLOSURE WORK

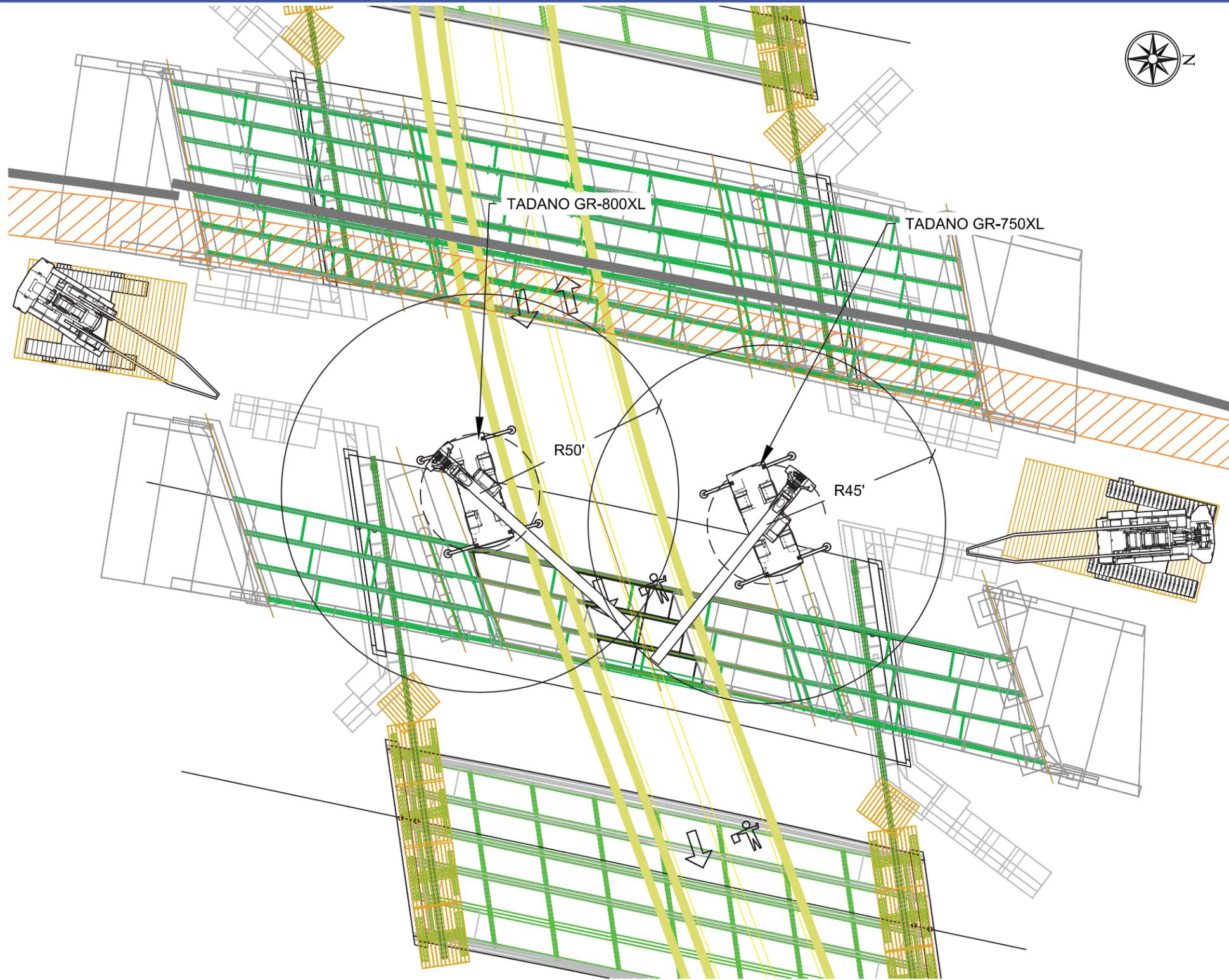
CRANE INFO:		TADANO GR-800XL	TADANO GR-750XL	LINK BELT LS-248H II	LINK BELT 298 HSL
BOOM LENGTH:	ft	91, TELE MODE 1	88.6, TELE MODE I	120	120
PIECE TYPE		DECK OVERHANG	DECK OVERHANG	DECK OVERHANG	DECK OVERHANG
MAX. PIECE WEIGHT	lbs	14,000	14,000	14,000	14,000
PICK WEIGHT + RIGGING:	lbs	16,330	16,330	22,913	22,913
MAX. CRANE RADIUS:	ft	45	45	100	110
CRANE CAPACITY:	ft	23,600	22,200	31,400	31,700
% OF CHART:		69%	74%	73%	72%

CRANE INFO:		TADANO GR-800XL	TADANO GR-750XL	LINK BELT LS-248H II	LINK BELT 298 HSL
BOOM LENGTH:	ft	91, TELE MODE 1	88.6, TELE MODE I	120	120
PIECE TYPE		DECK SECTION	DECK SECTION	DECK SECTION	DECK SECTION
MAX. PIECE WEIGHT	lbs	12,000	12,000	12,000	12,000
PICK WEIGHT + RIGGING:	lbs	14,330	14,330	20,913	20,913
MAX. CRANE RADIUS:	ft	50	50	110	117
CRANE CAPACITY:	ft	19,300	18,100	27,500	28,900
% OF CHART:		74%	79%	76%	72%

NB DEMOLITION - STAGE 1

1. LAYOUT CORE HOLES AS SHOWN ON SHEETS 02 AND 08 UNDER LANE CLOSURES.
2. CORE DRILL HOLES IN BRIDGE DECK UNDER LANE CLOSURES. FLAG TRAFFIC FOR HOLES IN SUSPENDED SPAN.
3. REMOVE ASPHALT FROM BRIDGE SURFACE UNDER LANE CLOSURES.
4. INSTALL TEMPORARY BARRIER WALL AND SECURE TO BRIDGE DECK PER THE TRAFFIC CONTROL PLAN.
5. LAYOUT SAWCUTS AS SHOWN ON SHEETS 02 AND 03.
6. COMPLETE PLUNGE CUTS IN OVERHANG. FLAG TRAFFIC FOR CUTS IN SUSPENDED SPAN.
7. SET UP SB LEFT LANE CLOSURE FOR STAGING OF DEBRIS REMOVAL TRUCKS.
8. REMOVE OVERHANG DECK SECTIONS. FLAG TRAFFIC FOR CUTS IN SUSPENDED SPAN.
 - 8.1. RIG TO SECTION PER RIGGING DETAILS ON SHEET 06.
 - 8.2. REMOVE SLACK FROM RIGGING.
 - 8.3. PERFORM FINAL LONGITUDINAL CUT TO RELEASE PIECE.
9. COMPLETE LONGITUDINAL AND TRANSVERSE CUTS BETWEEN G1 AND G3.
10. AS CUTS IN SECTIONS ARE COMPLETED, RIG TO SLAB SECTION PER DETAIL ON SHEET 08 AND REMOVE.

Revision No. & Date		Vermont Agency of Transportation			Drawing Status	Name	Date	PCL Civil Constructors, Inc.	
		Road No.	County / City		Financial Project ID No.	Aug 25 2015 12:28 PM FOR CONSTRUCTION	Drawn By	08/24/15	3810 Northdale Blvd. Suite 200, Tampa Florida 33624 (813)-264-9500 ; Fax: (813)-264-6689
		I-91	Windsor / Hartford	IM 091-2(79)		Design By	08/24/15	Submittal	PCL Project / Job No.
						Check By	08/24/15	NB DEMOLITION PLAN	I-91 Windsor / Hartford / 5514001
								Drawing Title	Sheet No.
								NB DEMO - STAGE 1	11



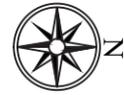
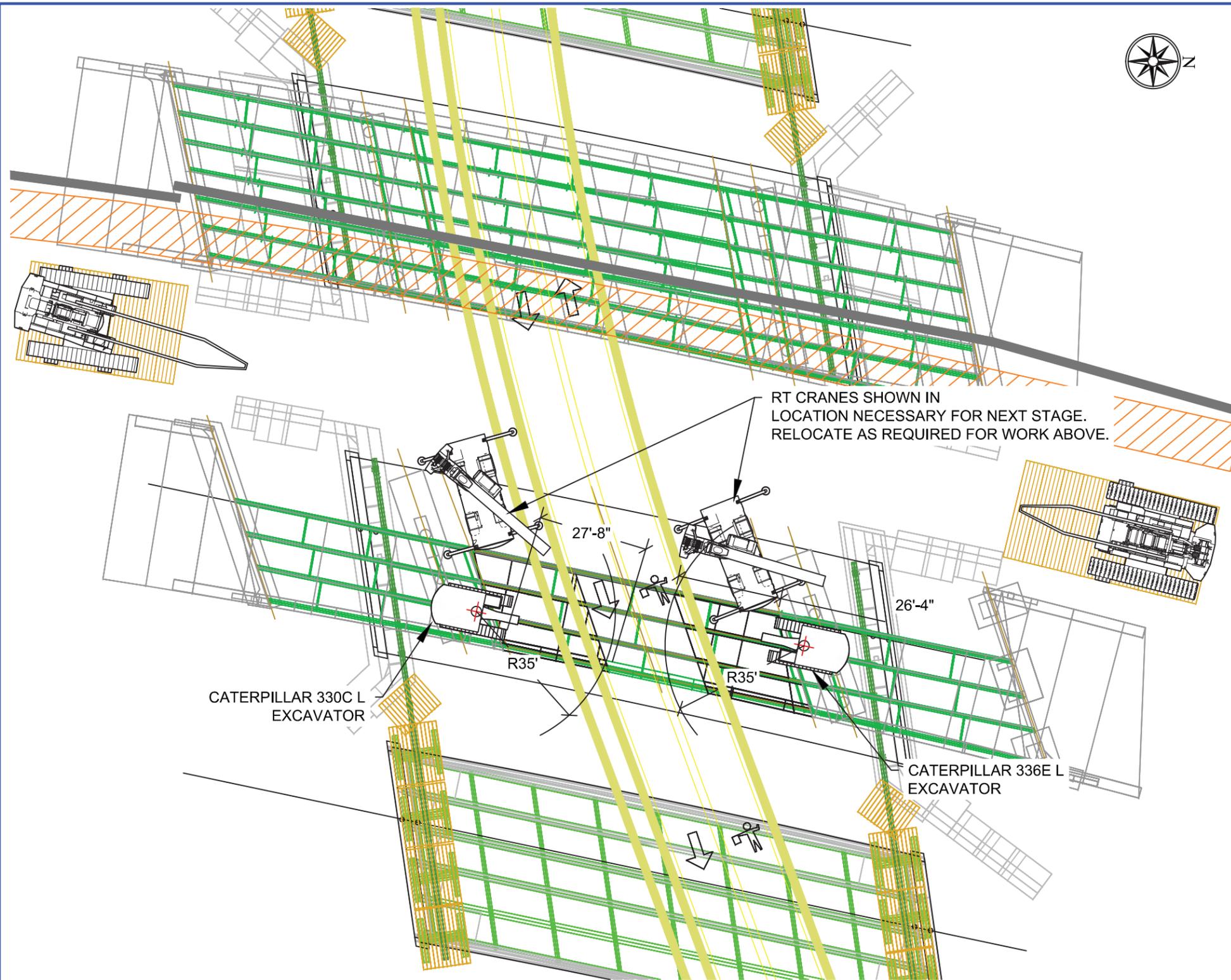
CRANE INFO:		TADANO GR-800XL	TADANO GR-750XL
BOOM LENGTH:	ft	91, TELE MODE 1	88.6, TELE MODE I
PIECE TYPE		CENTER DECK SECTION	CENTER DECK SECTION
MAX. PIECE WEIGHT	lbs	15,000	15,000
PICK WEIGHT + RIGGING:	lbs	17,330	17,330
MAX. CRANE RADIUS:	ft	50	45
CRANE CAPACITY:	ft	19,300	22,200
% OF CHART:		90%	78%

NB DEMOLITION - STAGE 4

1. FLAG US-5 TRAFFIC AS NECESSARY FOR SUSPENDED SPAN WORK.
2. REMOVE MIDSPAN DECK SECTIONS.
 - 2.1. COMPLETE LONGITUDINAL SAWCUT AND INSTALL SUPPORT ANGLE. SEE ANGLE DETAIL SHEET 08 .
 - 2.2. INSTALL PANEL RIGGING AND REMOVE SLACK FROM RIGGING. SEE RIGGING DETAIL SHEET 08.
 - 2.3. TRANSVERSELY SAWCUT PANELS.
 - 2.4. REMOVE PANEL.
3. REPEAT STEP 2 FOR REMAINING TWO PANELS.

NB DEMOLITION - STAGE 4
CLOSURE WORK

Revision No. & Date		Vermont Agency of Transportation			Drawing Status		PCL Civil Constructors, Inc. 3810 Northdale Blvd. Suite 200, Tampa Florida 33624 (813)-264-9500 ; Fax: (813)-264-6689			
		Road No.	County / City		Financial Project ID No.	Aug 25 2015 12:28 PM	Drawn By	Name	Date	
		I-91	Windsor / Hartford		IM 091-2(79)	FOR CONSTRUCTION	Design By	TMD/ AJT	08/24/15	
						Check By	TMD / AMD	08/24/15	Submittal NB DEMOLITION PLAN Drawing Title NB DEMO - STAGE 4	PCL Project / Job No. I-91 Windsor / Hartford / 5514001 Sheet No. 14



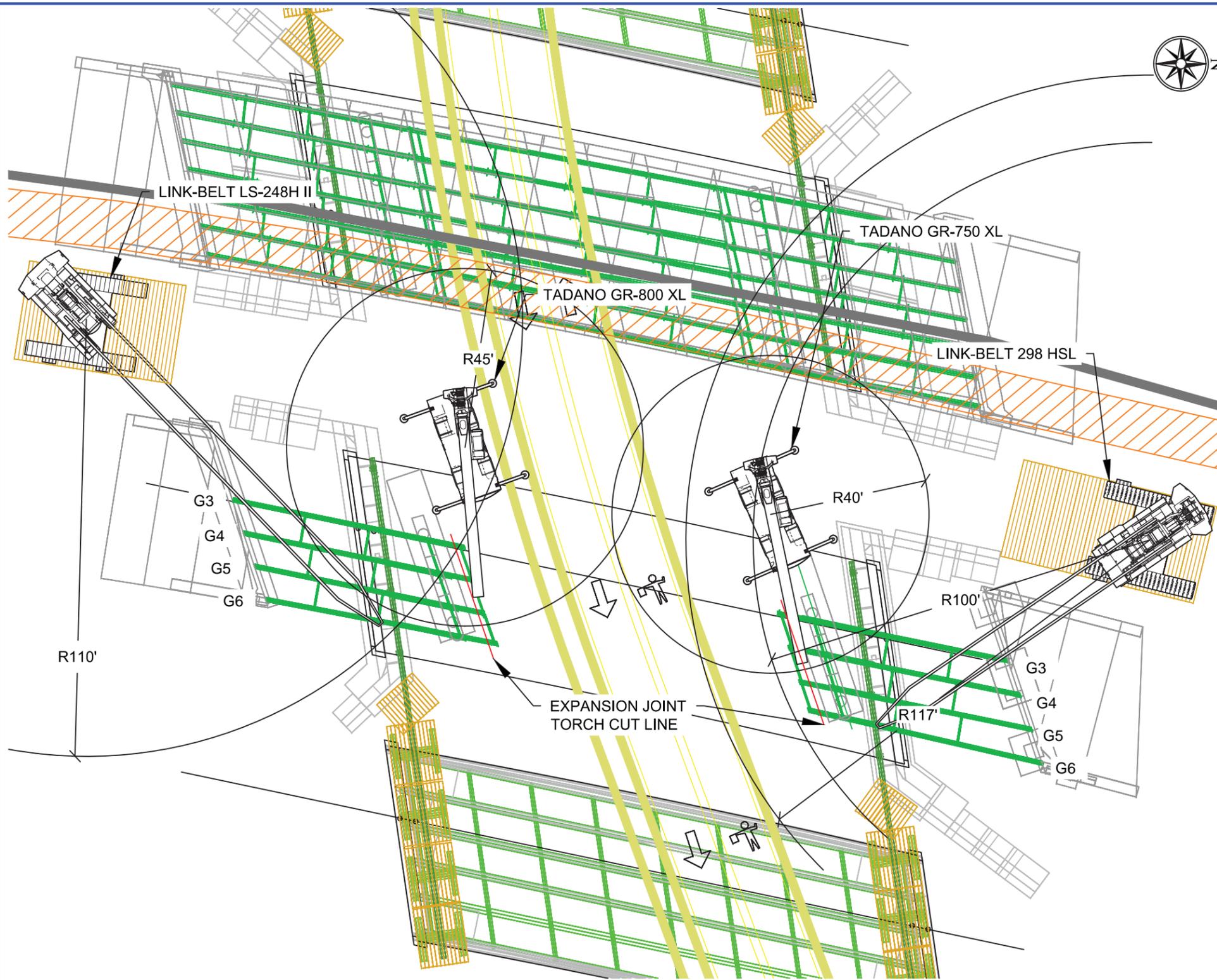
NB DEMOLITION - STAGE 5

1. SAWCUT END SPAN DECK LONGITUDINALLY, TRANSVERSELY AND WITH PLUNGE CUTS IN OVERHANG. SEE SHEET 02 FOR LAYOUT.
2. INSTALL CRANE MATS ON END SPANS AS SHOWN ON SHEET 04.
3. FLAG US-5 TRAFFIC AS NECESSARY FOR SUSPENDED SPAN WORK.
4. AFTER MIDSPAN PANELS ARE REMOVED, TRACK EXCAVATOR FORWARD.
5. WORKING FROM SUSPENDED SPAN OUT, HOE RAM REMAINING CONCRETE FROM SUSPENDED SPAN. SEE SHEET 20 FOR LIMITS OF HOE RAM DECK REMOVAL. AS NEEDED, TORCH CUT REBAR AS HOE RAM ADVANCES.
 - 5.1. CONCRETE ATOP SUSPENDED SPAN BEAMS MAY REMAIN.
 - 5.2. THE EXTERIOR 27.5 LF OF OVERHANG AND DECK ATOP G6 MUST BE REMOVED.
6. TORCH CUT REMAINING REBAR.

NB DEMOLITION - STAGE 5

CLOSURE WORK, CRANE MATS NOT SHOWN UNDER EXCAVATOR FOR CLARITY

Revision No. & Date		Vermont Agency of Transportation			Drawing Status	Name	Date	PCL Civil Constructors, Inc.	
					Aug 25 2015 12:28 PM FOR CONSTRUCTION	Drawn By	AJT	08/24/15	3810 Northdale Blvd. Suite 200, Tampa Florida 33624 (813)-264-9500 ; Fax: (813)-264-6689
Road No.	County / City	Financial Project ID No.			Design By	TMD/ AJT	08/24/15	Submittal	PCL Project / Job No.
I-91	Windsor / Hartford	IM 091-2(79)			Check By	TMD / AMD	08/24/15	NB DEMOLITION PLAN	I-91 Windsor / Hartford / 5514001
								Drawing Title	Sheet No.
								NB DEMO - STAGE 5	15



CRANE INFO:		TADANO GR-800XL	TADANO GR-750XL	LINK BELT 298 HSL
BOOM LENGTH:	ft	91, TELE MODE 1	88.6, TELE MODE I	120
PIECE TYPE		EXPANSION JOINT	EXPANSION JOINT	EXPANSION JOINT
MAX. PIECE WEIGHT	lbs	18,100	18,100	18,100
PICK WEIGHT + RIGGING:	lbs	20,430	20,430	27,013
MAX. CRANE RADIUS:	ft	45	40	100
CRANE CAPACITY:	ft	23,600	27,700	36,300
% OF CHART:		87%	74%	74%

CRANE INFO:		LINK BELT LS-248H II	LINK BELT 298 HSL
BOOM LENGTH:	ft	120	120
PIECE TYPE		END SPAN GIRDER	END SPAN GIRDER
MAX. PIECE WEIGHT	lbs	11,700	11,700
PICK WEIGHT + RIGGING:	lbs	20,613	20,613
MAX. CRANE RADIUS:	ft	110	117
CRANE CAPACITY:	ft	27,500	28,900
% OF CHART:		75%	71%

NB DEMOLITION - STAGE 7

- NOTE: EXPANSION JOINT REMOVAL MAY START AFTER DECK AND REBAR REMOVAL IN SUSPENDED SPAN IS COMPLETE. RIG TO EXPANSION JOINT AS SHOWN ON SHEET 07. REMOVE SLACK FROM RIGGING.
- TORCH CUT GIRDERS AT LOCATION SHOWN AND TORCH CUT OR UNBOLT DIAPHRAGMS.
- REMOVE EXPANSION JOINT SECTION AND RELEASE FROM CRANE.
- RIG TO END SPAN GIRDER G3 AS SHOWN ON SHEET 05. REMOVE SLACK FROM MAIN LINES AND RIGGING.
- TORCH CUT OR UNBOLT GIRDER DIAPHRAGMS AND TORCH CUT ANCHOR BOLTS.
- LIFT GIRDER AND SET ONTO HAUL TRUCK.
- RELEASE GIRDER FROM CRANE.
- TORCH CUT OR UNBOLT DIAPHRAGMS.
- REPEAT STEPS 4 THROUGH 8 FOR G6, G5 AND G4. NOTE - G6 MUST BE REMOVED BEFORE G5.

NB DEMOLITION - STAGE 7
CLOSURE WORK

Revision No. & Date		Vermont Agency of Transportation			Drawing Status		PCL Civil Constructors, Inc. 3810 Northdale Blvd. Suite 200, Tampa Florida 33624 (813)-264-9500 ; Fax: (813)-264-6689		
Road No.	County / City	Financial Project ID No.			Aug 25 2015 12:28 PM FOR CONSTRUCTION	Name	Date		
I-91	Windsor / Hartford	IM 091-2(79)			Drawn By	AJT	08/24/15		
					Design By	TMD/ AJT	08/24/15	Submittal NB DEMOLITION PLAN	
					Check By	TMD / AMD	08/24/15	Drawing Title NB DEMO - STAGE 7	
								PCL Project / Job No. I-91 Windsor / Hartford / 5514001	
								Sheet No. 17	



CRANE INFO:		TADANO GR-800XL	TADANO GR-750XL	LINK BELT 298 HSL
BOOM LENGTH:	ft	91, TELE MODE 1	88.6, TELE MODE I	120
PIECE TYPE		CAP SECTION	CAP SECTION	CAP SECTION
MAX. PIECE WEIGHT	lbs	23,000	23,000	23,000
PICK WEIGHT + RIGGING:	lbs	25,330	25,330	31,913
MAX. CRANE RADIUS:	ft	35	35	90
CRANE CAPACITY:	ft	34,000	34,700	42,000
% OF CHART:		75%	73%	76%

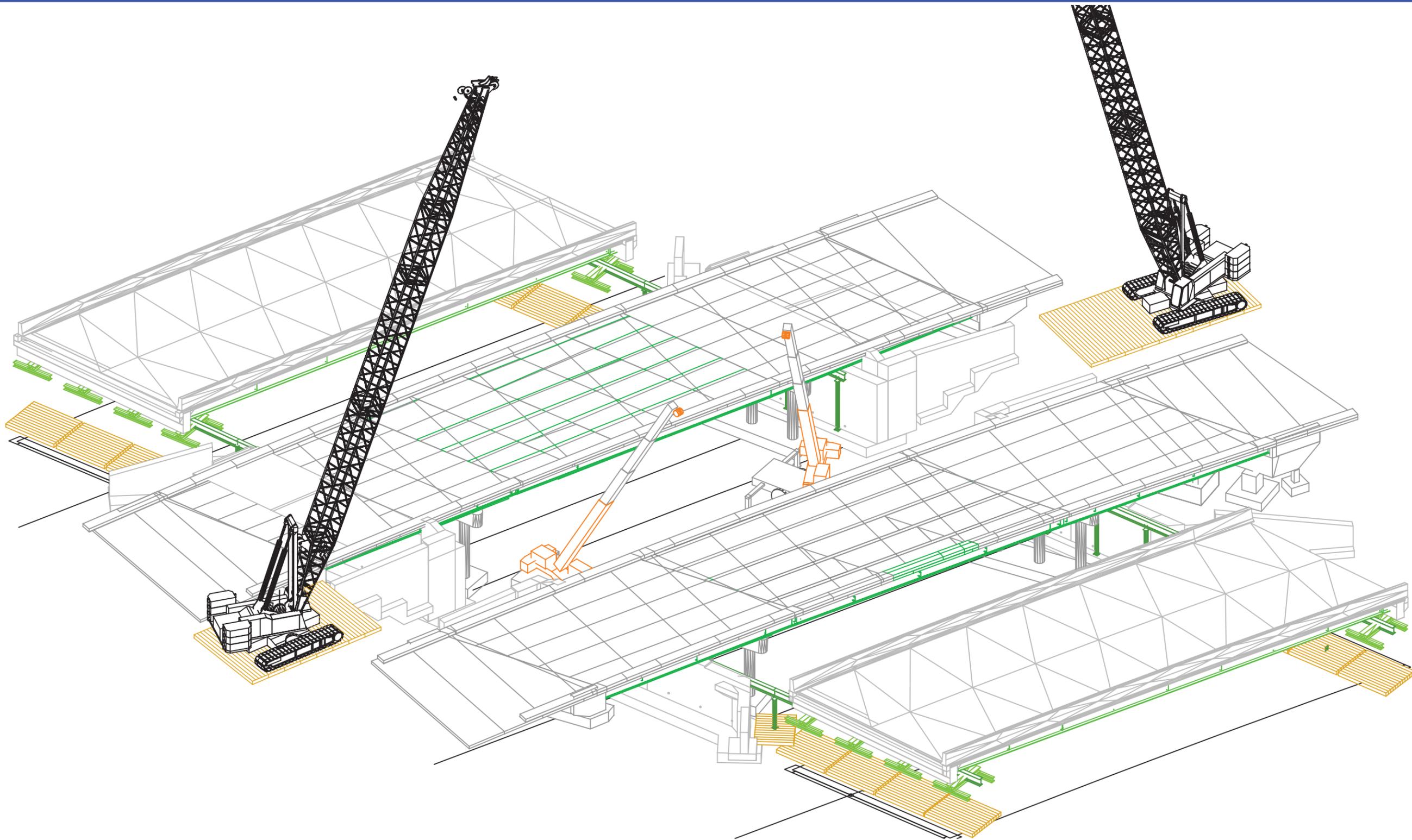
CRANE INFO:		TADANO GR-800XL	TADANO GR-750XL	LINK BELT 298 HSL
BOOM LENGTH:	ft	91, TELE MODE 1	88.6, TELE MODE I	120
PIECE TYPE		COLUMN	COLUMN	COLUMN
MAX. PIECE WEIGHT	lbs	16,000	16,000	16,000
PICK WEIGHT + RIGGING:	lbs	18,330	18,330	24,913
MAX. CRANE RADIUS:	ft	45	45	110
CRANE CAPACITY:	ft	23,600	22,200	31,700
% OF CHART:		78%	83%	79%

NB DEMOLITION - STAGE 8

- CAP / COLUMN SECTIONS MAY BE REMOVED AS GIRDERS ABOVE ARE REMOVED. SEE SHEET 10 FOR DETAILS.
- VERTICALLY CUT PIER CAP AT LOCATIONS SHOWN ON SHEET 10.
- RIG TO EXTERIOR SECTION OF PIER CAP. (SEE DETAIL SHEET 09) REMOVE SLACK FROM RIGGING.
- HORIZONTALLY CUT PIER CAP AT TOP OF EXTERIOR COLUMN AS SHOWN ON SHEET 10.
- REMOVE CAP SECTION, FLAGGING TRAFFIC AS NECESSARY.
- CHOKE TOP OF COLUMN AS SHOWN ON SHEET 09.
- SAWCUT OR CHIP BOTTOM OF COLUMN. USE CRANE TO STABILIZE TOP OF COLUMN AS CUT IS MADE.
- USE CRANE TO LAYOVER COLUMN ONTO FOOTING. CUT OR CHIP COLUMN ON GROUND FOR REMOVAL FROM SITE.

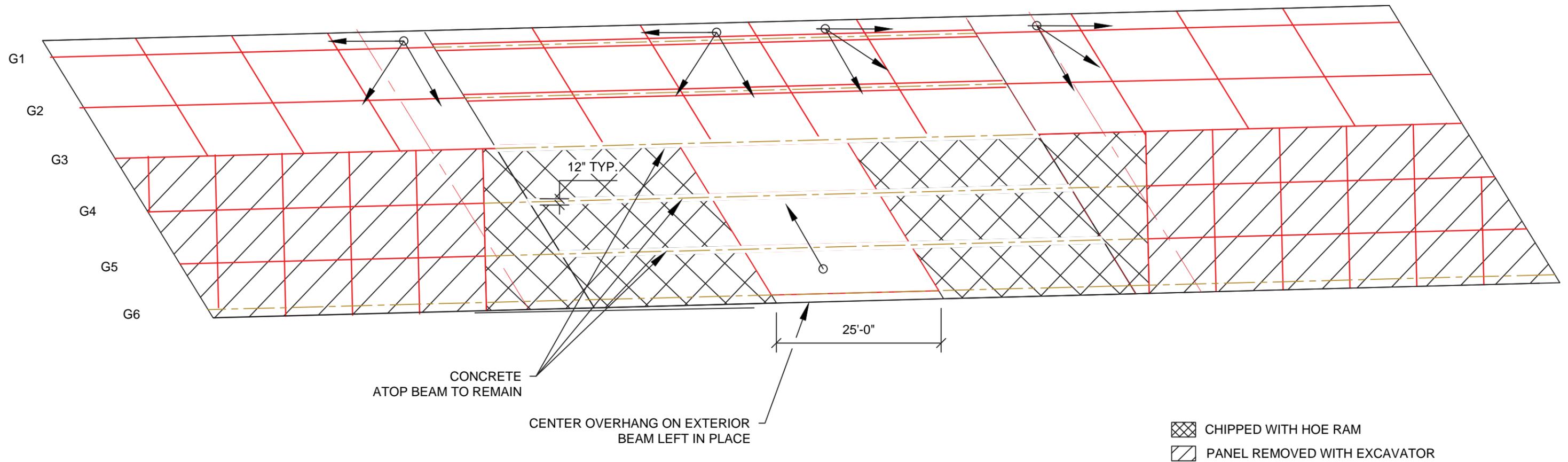
NB DEMOLITION - STAGE 8
CLOSURE WORK

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		Road No.	County / City		Financial Project ID No.	Aug 25 2015 12:28 PM FOR CONSTRUCTION		Drawn By: AJT 08/24/15 Design By: TMD/ AJT 08/24/15 Check By: TMD / AMD 08/24/15
	I-91	Windsor / Hartford	IM 091-2(79)					



NB DEMOLITION - ISOMETRIC

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					Aug 25 2015 12:28 PM FOR CONSTRUCTION		3810 Northdale Blvd. Suite 200, Tampa Florida 33624 (813)-264-9500 ; Fax: (813)-264-6689	
Road No.	County / City	Financial Project ID No.			Drawn By	Name	Date	Submittal
I-91	Windsor / Hartford	IM 091-2(79)		Design By	TMD/ AJT	08/24/15	NB DEMOLITION PLAN	
				Check By	TMD / AMD	08/24/15	Drawing Title	
							NB DEMO - 3D VIEW	PCL Project / Job No. I-91 Windsor / Hartford / 5514001
								Sheet No. 19



NB DECK PANEL - DECK REMOVAL SEQUENCE
 SEQUENCE SUBJECT TO FIELD MODIFICATION UNDER THE
 DIRECTION OF THE CONSTRUCTION ENGINEER

Revision No. & Date	Vermont Agency of Transportation				Drawing Status	Name	Date	PCL Civil Constructors, Inc. 3810 Northdale Blvd. Suite 200, Tampa Florida 33624 (813)-264-9500 ; Fax: (813)-264-6689	
	Road No.	County / City	Financial Project ID No.		Aug 25 2015 12:28 PM FOR CONSTRUCTION	Drawn By	AJT	08/24/15	Submittal
	I-91	Windsor / Hartford	IM 091-2(79)		Design By	TMD/ AJT	08/24/15	NB DEMOLITION PLAN	I-91 Windsor / Hartford / 5514001
					Check By	TMD / AMD	08/24/15	Drawing Title	Sheet No.
								NB SLAB REMOVAL	20