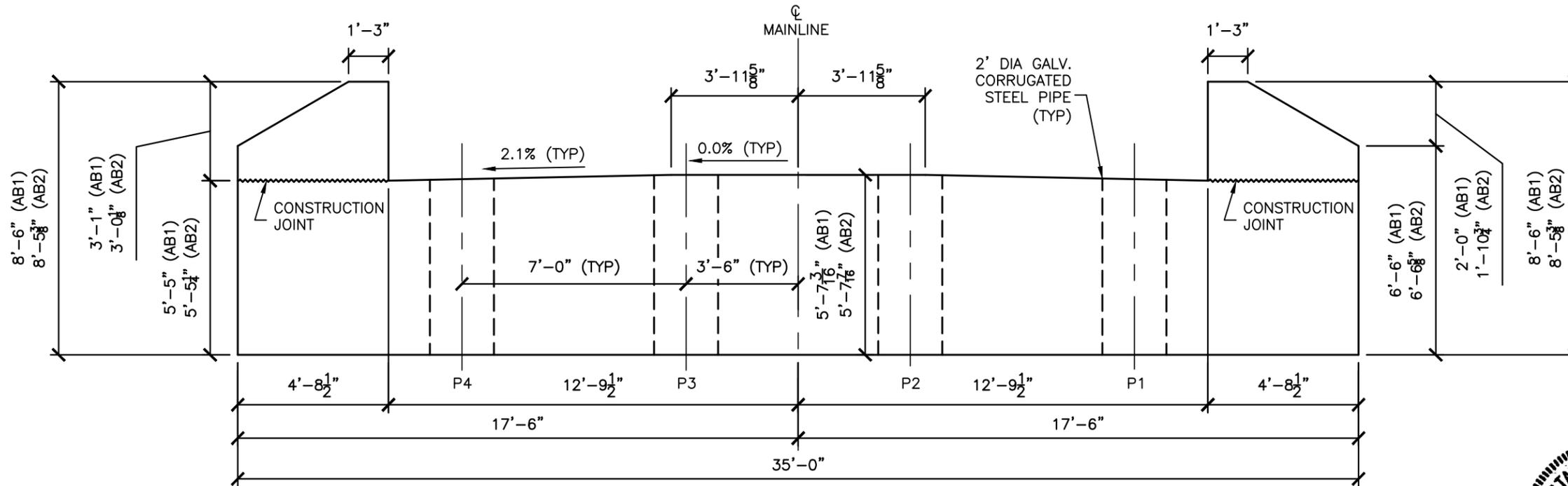


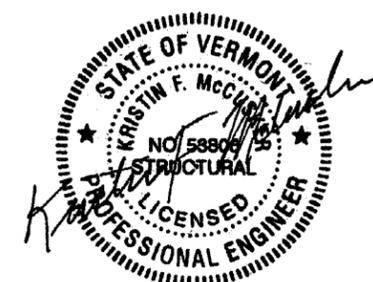
### TYPICAL ABUTMENT PLAN

SCALE: 1/4"=1'-0"



### TYPICAL ABUTMENT ELEVATION

SCALE: 1/4"=1'-0"



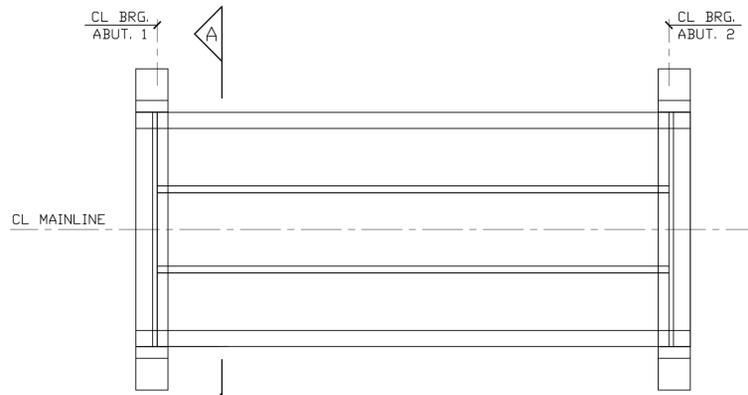
1

PREPARED BY: KFM  
 CHECKED BY: TRF  
 DATE: 05/20/15

CAMBRIDGE BRO 1448(39)  
 Abutments #1 and #2  
 Cambridge, VT

**T.R. FELLOWS**  
 NH  
 ENGINEERING  
 CIVIL - STRUCTURAL  
 134 COUNTY ROAD  
 P.O. BOX 428 03608  
 WALPOLE, NH  
 TEL/FAX: 603.756.4811  
 trf@myairpoint.net

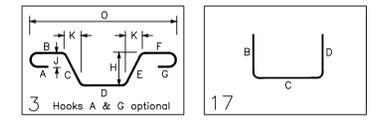
PO BOX 56  
 ROCHESTER, VT 05767  
 TEL: 802.316.7853  
 FAX: 802.316.5151  
 kricket@mapleridgevt.com



**DECK PLAN**  
CONTRACT DWG. REF. 16

- LIST 1 (F.F.) (2 THUS)**
- 3 #6 X 8'-0" (Z) F.F.
  - 1 #6 X 7'-10" (Z) F.F.
  - 1 #6 X 7'-7" (Z) F.F.
  - 1 #6 X 7'-3" (Z) F.F.
  - 1 #6 X 7'-0" (Z) F.F.
  - 1 #6 X 6'-8" (Z) F.F.
  - 1 #6 X 6'-5" (Z) F.F.
  - 1 #6 X 6'-1" (Z) F.F.
- LIST 2 (N.F.) (2 THUS)**
- 2 #5 X 8'-0" (Z) N.F.
  - 1 #5 X 7'-10" (Z) N.F.
  - 1 #5 X 7'-3" (Z) N.F.
  - 1 #5 X 6'-8" (Z) N.F.
  - 1 #5 X 6'-1" (Z) N.F.
- LIST 3 (F.F.) (2 THUS)**
- 3x1 #5 X 4'-2" (Z) F.F.
  - 1 #5 X 3'-8" (Z) F.F.
  - 1 #5 X 2'-9" (Z) F.F.
  - 1 #5 X 1'-11" (Z) F.F.
- LIST 4 (N.F.) (2 THUS)**
- 1 #5 X 4'-2" (Z) N.F.
  - 1 #5 X 3'-8" (Z) N.F.
  - 1 #5 X 1'-11" (Z) N.F.

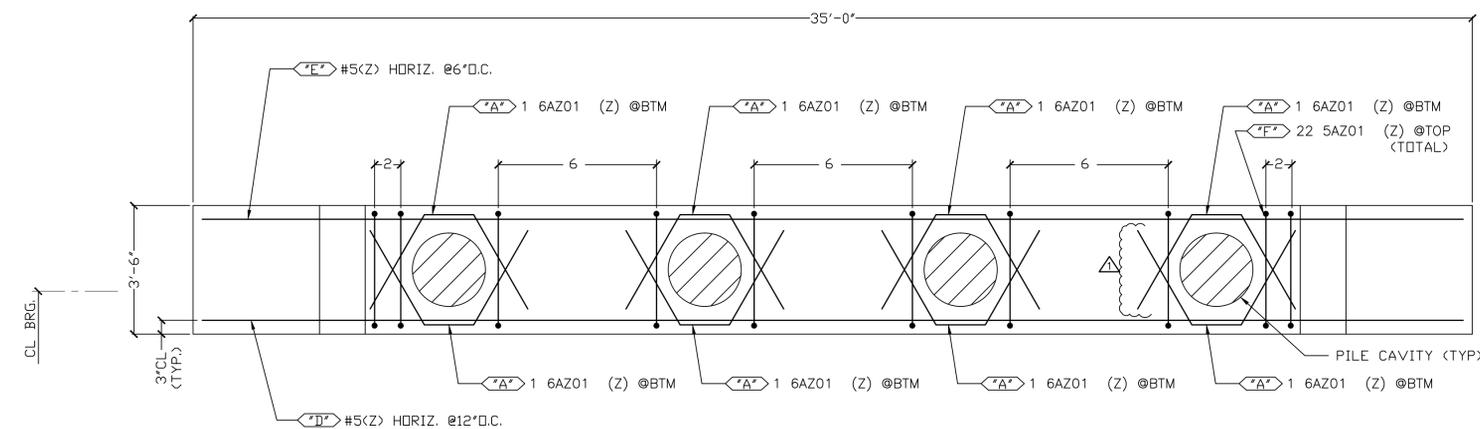
Release Number:					BAR LIST											
Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'R'
5AZ01	46	#5	8'-8"	17		2'-10"	3'-0"	2'-10"								
5AZ02	4	#5	4'-9"	3		0'-11"	3'-10"					1'-11"		3'-4"	4'-3"	
6AZ01	8	#6	7'-5 1/2"	3			2'-11 1/4"	1'-6"	2'-11 1/4"			2'-7"		1'-6"	4'-6"	



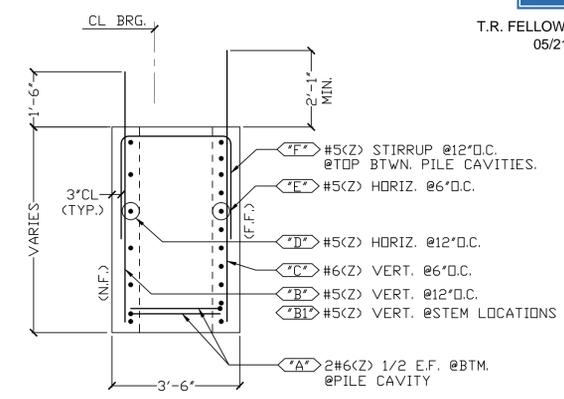
LIFTING POINT LOCATIONS & ANCHORS  
- BY OTHERS/G.C.

4 #7 SHEAR BAR FOR WIRE ANCHORS  
4 #7 X 4'-0" (Z) TOTAL

BAR MARKS MAY CHANGE, DUE TO REVISIONS



**ABUTMENT #1 PLAN**  
(VERTICALS NOT SHOWN FOR CLARITY)  
CONTRACT DWG. REF. 20



**SECTION 1**  
(REINF. @ BRIDGE SEAT)  
CONTRACT DWG. REF. 20

APPROVED  
T.R. FELLOWS ENGINEERING  
05/21/2015

**LEGEND:**  
CONT.-CONTINUOUS  
TRANS.-TRANSVERSE  
DWLS.-DOWELS  
VERTS.-VERTICAL  
HORIZ.-HORIZONTAL  
T&B -TOP & BOTTOM  
I.F.-INNER FACE  
O.F.-OUTER FACE  
E.E.-EACH END  
E.F.-EACH FACE  
N.F.-NEAR FACE  
F.F.-FAR FACE  
E.W.-EACH WAY  
D.C.-DN CENTER  
L.W.-LONG WAY  
S.W.-SHORT WAY

FOR APPROVAL

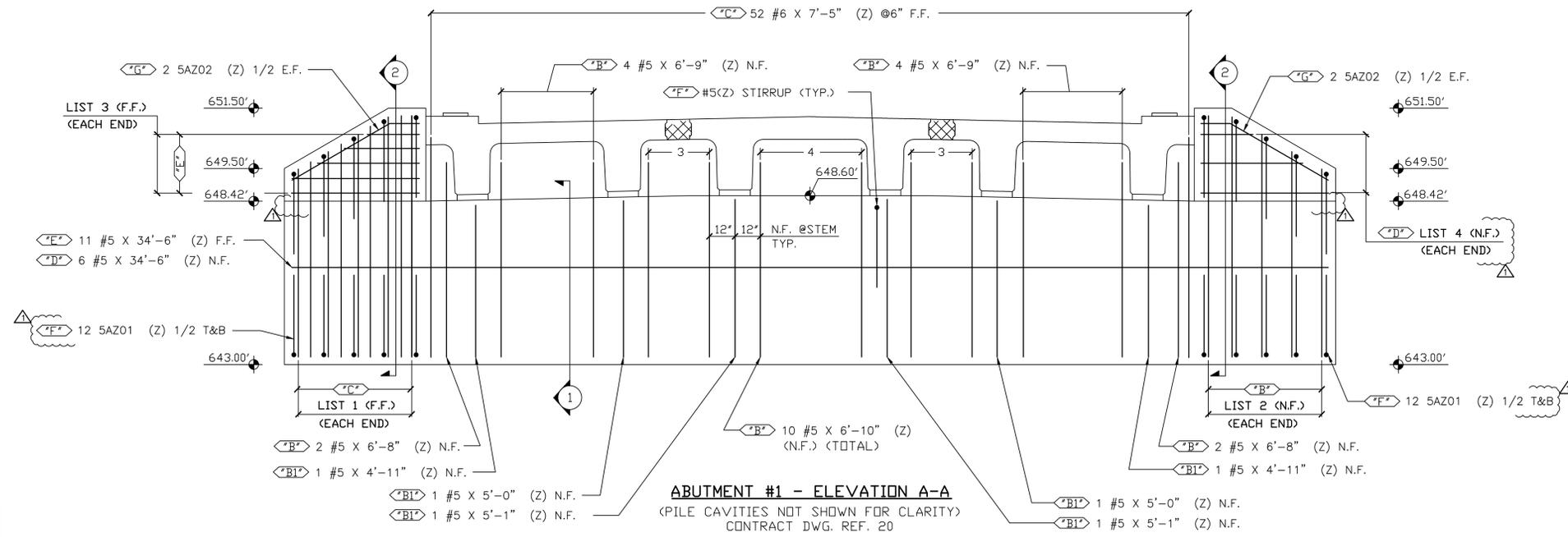
LAP CHART	
#5, #6	2'-7" (U.N.)

**ALL REINF. BARS  
LEVEL II - DUAL COATED**

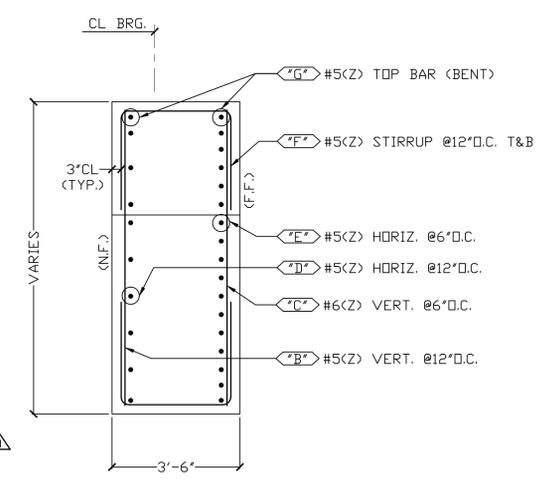
ELEVATIONS & DIMENSIONS SHOWN ON THIS DWG. ARE FOR REINF. DETAILING PURPOSES ONLY AND ARE NOT INTENDED FOR DIMENSIONAL CONSTRUCTION.

DUAL COATED REINF. BARS ASTM A615 GRADE 60, MARKED (Z)

VERIFICATION OF UNCLEAR INFORMATION MAY BE REQUESTED ON THIS DRAWING. SHOULD VERIFICATION BE LEFT UN-ADDRESSED IT WILL REMAIN AS SHOWN AND ASSUME TO BE CORRECT.



**ABUTMENT #1 - ELEVATION A-A**  
(PILE CAVITIES NOT SHOWN FOR CLARITY)  
CONTRACT DWG. REF. 20



**SECTION 2**  
(REINF. @ CHEEK WALL)  
CONTRACT DWG. REF. 20

6			
5			
4			
3			
2	5/21/15	REVISED PER APPROVAL	
1	1/29/15	FOR APPROVAL	
DATE	REV.#	SENT FOR	
STRUCTURE	VTAOT CAMBRIDGE BRO 1448(39)		
LOCATION	CAMBRIDGE, VERMONT		
ARCHITECT			
ENGINEER			
CUSTOMER	BLOW & COTE, INC.		
DRAWN BY	DATE	OFF #	
KRIS J	1/23/15	9127	
DRAWING COVERS		DRAWING #	
WEST ABUTMENT #1		A	





**Vermont Agency of Transportation  
1 National Life Drive  
Montpelier, VT 05633  
Sample Report**

Requested By:  
Greg Wilcox

Sample ID: dnelson1375105929	Sampled By: Nelson, Douglas	Sample Type: Acceptance
Lab/Ref : C130266	Station:	Sample Date: 06/26/2013
Lot #:	Sampled From: Truck chute	Sample Time: 111:00
Material: Concrete Concrete (501 and 541)		Quantity: 44.00 CM
Supplier: HARRISON REDI-MIX, GEORGIA, VT		Mix Design: HP13-A-280
Manufacturer: HARRISON REDI-MIX, GEORGIA, VT		
Comment: Pier #1 Hammer Head		Truck #:
Contract: 12072701 CAMBRIDGE BRF 027-1(4) & CAMBRIDGE STP 030-2(27)		
Project: 78F163 CAMBRIDGE BRF 027-1(4)		Quantity
Pay Item: 0485 501.33 CONCRETE, HIGH PERFORMANCE CLASS A		44.00 CM

**Concrete Field Test:**

In Compliance	Results	Min	Max	Out of Tol.
T121 Unit Weight pcf:	0			
T152 Air Content %:	5.7	5.5	8.5	
T119 Slump in:	5.50	0	7.0	
Total Water gal/cy:	29.90			
W/c Ratio:	0.410		0.44	
ASTM C1064 Conc Temp °F:	77.0	50	85	
Ambient Temperature °F:	75.0	10	90	

**AASHTO T22 Concrete Cylinder Break**

							Design Break lbf:	4000	
Cylinder No.:	Unit Density:	Age:	Design Age:	Cure Type:	Area in <sup>2</sup> :	Cylinder Dia in:	Break Type:	Load LBF:	Break PSI:
HH-3	149.00	7	7	Field	12.57	4		57300	4560
HH-4	149.00	7	7	Field	12.57	4		57200	4550
							<b>Average Break lbf:</b>	<b>4555</b>	

**AASHTO T22 Concrete Cylinder Break**

							Design Break lbf:	4000		
Cylinder No.:	Unit Density:	Age:	Design Age:	Cure Type:	Area in <sup>2</sup> :	Cylinder Dia in:	Break Type:	Load LBF:	Break PSI:	Out of Tol:
HH-1	150.00	28	28	Standard	12.57	4		91900	7310	
HH-2	150.00	28	28	Standard	12.57	4		93700	7460	
							<b>Average Break lbf:</b>	<b>7385</b>		

	Template	Tested By	Tested Date	Authorized By	Authorized Date
1	SC-CYL-28	Wyluda, Eric	07/24/2013	Wild, Jim	07/25/2013
1	SC-CYL-7	Nelson, Douglas	07/05/2013	Wild, Jim	
1	SC-FIELD	Nelson, Douglas	07/05/2013	Wild, Jim	

**Vermont Agency of Transportation  
1 National Life Drive  
Montpelier, VT 05633  
Sample Report**

Requested By:  
Greg Wilcox

Sample ID: ewyluda137V091745	Sampled By: Wilcox, Greg	Sample Type: Acceptance
Lab/Ref : C130354	Station:	Sample Date: 07/20/2013
Lot #:	Sampled From: Truck Chute	Sample Time: 8:30
Material: Concrete Concrete (501 and 541)		Quantity: 44.00 CM
Supplier: HARRISON REDI-MIX, GEORGIA, VT		Mix Design: HP13-A-280
Manufacturer: HARRISON REDI-MIX, GEORGIA, VT		
Comment: Pier #2		Truck #:
Contract: 12072701 CAMBRIDGE BRF 027-1(4) & CAMBRIDGE STP 030-2(27)		
Project: 78F163 CAMBRIDGE BRF 027-1(4)		Quantity
Pay Item: 0485 501.33 CONCRETE, HIGH PERFORMANCE CLASS A		44.00 CM

**Concrete Field Test:**

In Compliance	Results	Min	Max	Out of Tol.
<b>T121 Unit Weight pcf:</b>	0			
<b>T152 Air Content %:</b>	7.0	5.5	8.5	
<b>T119 Slump in:</b>	5.00	0	7.0	
<b>Total Water gal/cy:</b>	31.34			
<b>W/c Ratio:</b>	0.430		0.44	
<b>ASTM C1064 Conc Temp °F:</b>	79.0	50	85	
<b>Ambient Temperature °F:</b>	72.0	10	90	

**AASHTO T22 Concrete Cylinder Break**

							Design Break lbf:	4000
Cylinder No.:	Unit Density;	Age	Design	Cure	Area in <sup>2</sup> :	Cylinder	Break	
	Broke:	Age:	Age:	Type		Dia in:	Type:	Load LBF: Break PSI:
P2H-3	146.00	6	6	Field	12.57	4		43000 3420
P2H-4	144.00	6	6	Standard	12.57	4		43200 3440
							<b>Average Break lbf:</b>	<b>3430</b>

**AASHTO T22 Concrete Cylinder Break**

							Design Break lbf:	4000
Cylinder No.:	Unit Density;	Age	Design	Cure	Area in <sup>2</sup> :	Cylinder	Break	
	Broke:	Age:	Age:	Type		Dia in:	Type:	Load LBF: Break PSI:
P2H-5	145.00	9	9	Field	12.57	4		55870 4450
P2H-6	146.00	9	9	Field	12.57	4		58260 4640
							<b>Average Break lbf:</b>	<b>4545</b>

**AASHTO T22 Concrete Cylinder Break**

							Design Break lbf:	4000	
In Compliance		Age	Design	Cure	Area in <sup>2</sup> :	Cylinder	Break		Out of Tol:
Cylinder No.:	Unit Density;	Age:	Age:	Type		Dia in:	Type:	Load LBF: Break PSI:	
P2H-1	144.00	28	28	Standard	12.57	4		73500 5850	
P2H-2	146.00	28	28	Standard	12.57	4		73500 5850	
							<b>Average Break lbf:</b>	<b>5850</b>	

**Vermont Agency of Transportation  
1 National Life Drive  
Montpelier, VT 05633  
Sample Report**

Requested By:  
Greg Wilcox

Sample ID: ewyluda137V091745	Sampled By: Wilcox, Greg	Sample Type: Acceptance
Lab/Ref : C130354	Station:	Sample Date: 07/20/2013
Lot #:	Sampled From: Truck Chute	Sample Time: 8:30
Material: Concrete Concrete (501 and 541)		Quantity: 44.00 CM
Supplier: HARRISON REDI-MIX, GEORGIA, VT		Mix Design: HP13-A-280
Manufacturer: HARRISON REDI-MIX, GEORGIA, VT		
Comment: Pier #2		Truck #:
Contract: 12072701 CAMBRIDGE BRF 027-1(4) & CAMBRIDGE STP 030-2(27)		
Project: 78F163 CAMBRIDGE BRF 027-1(4)		Quantity
Pay Item: 0485 501.33 CONCRETE, HIGH PERFORMANCE CLASS A		44.00 CM

	Template	Tested By	Tested Date	Authorized By	Authorized Date
1	SC-CYL-28	Lackey, Larry	08/19/2013	Ljungvall, Mark	08/19/2013
1	SC-CYL-G	Lackey, Larry	07/31/2013	Ljungvall, Mark	
2	SC-CYL-G	Lackey, Larry	07/31/2013	Ljungvall, Mark	
1	SC-FIELD	Lessard, Dan	07/31/2013	Ljungvall, Mark	
1	SC-FIELD	Lackey, Larry	07/31/2013	Ljungvall, Mark	

**Vermont Agency of Transportation  
1 National Life Drive  
Montpelier, VT 05633  
Sample Report**

Requested By:  
Greg Wilcox

Sample ID: cmoulton138L110708	Sampled By: Connolly, Darren	Sample Type: Acceptance
Lab/Ref : C130435	Station:	Sample Date: 08/12/2013
Lot #:	Sampled From: Truck	Sample Time: 1:50
Material: Concrete Concrete (501 and 541)		Quantity: 40.00 CM
Supplier: HARRISON REDI-MIX, GEORGIA, VT		Mix Design: HP13-A-280
Manufacturer: HARRISON REDI-MIX, GEORGIA, VT		
Comment: Abut #2		Truck #: Trk #61
Contract: 12072701 CAMBRIDGE BRG 027-1(4) & CAMBRIDGE STP 030-2(27)		
Project: 78F163 CAMBRIDGE BRG 027-1(4)		Quantity
Pay Item: 0485 501.33 CONCRETE, HIGH PERFORMANCE CLASS A		40.00 CM

**Concrete Field Test:**

In Compliance	Results	Min	Max	Out of Tol.
<b>T121 Unit Weight pcf:</b>	0			
<b>T152 Air Content %:</b>	7.0	5.5	8.5	
<b>T119 Slump in:</b>	5.00	0	7.0	
<b>Total Water gal/cy:</b>	32.00			
<b>W/c Ratio:</b>	0.437		0.44	
<b>ASTM C1064 Conc Temp °F:</b>	80.0	50	85	
<b>Ambient Temperature °F:</b>	78.0	10	90	

**AASHTO T22 Concrete Cylinder Break**

							Design Break lbf:	4000
Cylinder No.:	Unit Density;	Age	Design	Cure	Area in <sup>2</sup> :	Cylinder	Break	
	Broke:	Age:	Age:	Type		Dia in:	Type:	Load LBF: Break PSI:
ABT2-3	146.00	10	10	Field	12.57	4		50200 3990
ABT2-4	146.00	10	10	Field	12.57	4		51700 4110
							<b>Average Break lbf:</b>	<b>4050</b>

**AASHTO T22 Concrete Cylinder Break**

							Design Break lbf:	4000
Cylinder No.:	Unit Density;	Age	Design	Cure	Area in <sup>2</sup> :	Cylinder	Break	
	Broke:	Age:	Age:	Type		Dia in:	Type:	Load LBF: Break PSI:
ABT2-5	146.00	14	14	Field	12.57	4		59300 4720
ABT2-6	147.00	14	14	Field	12.57	4		61600 4900
							<b>Average Break lbf:</b>	<b>4810</b>

**AASHTO T22 Concrete Cylinder Break**

							Design Break lbf:	4000	
In Compliance		Age	Design	Cure	Area in <sup>2</sup> :	Cylinder	Break		Out of Tol:
Cylinder No.:	Unit Density;	Age:	Age:	Type		Dia in:	Type:	Load LBF: Break PSI:	
ABT2-1	146.00	28	28	Standard	12.57	4		73300 5830	
ABT2-2	145.00	28	28	Standard	12.57	4		75100 5980	
							<b>Average Break lbf:</b>	<b>5905</b>	

**Vermont Agency of Transportation  
1 National Life Drive  
Montpelier, VT 05633  
Sample Report**

Requested By:  
Greg Wilcox

Sample ID: cmoulton138L110708	Sampled By: Connolly, Darren	Sample Type: Acceptance
Lab/Ref : C130435	Station:	Sample Date: 08/12/2013
Lot #:	Sampled From: Truck	Sample Time: 1:50
Material: Concrete Concrete (501 and 541)		Quantity: 40.00 CM
Supplier: HARRISON REDI-MIX, GEORGIA, VT		Mix Design: HP13-A-280
Manufacturer: HARRISON REDI-MIX, GEORGIA, VT		
Comment: Abut #2		Truck #: Trk #61
Contract: 12072701 CAMBRIDGE BRF 027-1(4) & CAMBRIDGE STP 030-2(27)		
Project: 78F163 CAMBRIDGE BRF 027-1(4)		Quantity
Pay Item: 0485 501.33 CONCRETE, HIGH PERFORMANCE CLASS A		40.00 CM

	Template	Tested By	Tested Date	Authorized By	Authorized Date
1	SC-CYL-14	Allen, Allyson	08/26/2013	Wild, Jim	10/04/2013
1	SC-CYL-28	Allen, Allyson	09/18/2013	Wild, Jim	
1	SC-CYL-28	Lackey, Larry	09/09/2013	Wild, Jim	
1	SC-CYL-G	Allen, Allyson	08/22/2013	Wild, Jim	
1	SC-FIELD	Allen, Allyson	08/21/2013	Wild, Jim	

**Vermont Agency of Transportation  
1 National Life Drive  
Montpelier, VT 05633  
Sample Report**

Requested By:  
G. Wilcox

Sample ID: cstevens139P091158	Sampled By: Wilcox, Greg	Sample Type: Acceptance
Lab/Ref : C130569	Station:	Sample Date: 09/14/2013
Lot #:	Sampled From: Pump Hose	Sample Time: 10:30
Material: Concrete Concrete (501 and 541)		Quantity: 30.00 CM
Supplier: HARRISON REDI-MIX, GEORGIA, VT		Mix Design: HP13-A-280
Manufacturer: HARRISON REDI-MIX, GEORGIA, VT		
Comment: Deck pour		Truck #:
Contract: 12072701 CAMBRIDGE BRG 027-1(4) & CAMBRIDGE STP 030-2(27)		
Project: 78F163 CAMBRIDGE BRG 027-1(4)		Quantity
Pay Item: 0485 501.33 CONCRETE, HIGH PERFORMANCE CLASS A		30.00 CM

**Concrete Field Test:**

In Compliance	Results	Min	Max	Out of Tol.
<b>T121 Unit Weight pcf:</b>	0			
<b>T152 Air Content %:</b>	5.5	5.5	8.5	
<b>T119 Slump in:</b>	4.00	0	7.0	
<b>Total Water gal/cy:</b>	31.80			
<b>W/c Ratio:</b>	0.437		0.44	
<b>ASTM C1064 Conc Temp °F:</b>	72.0	50	85	
<b>Ambient Temperature °F:</b>	52.0	10	90	

**AASHTO T22 Concrete Cylinder Break**

							<b>Design Break lbf:</b>	<b>4000</b>	
Cylinder No.:	Unit Density;	Age	Design	Cure	Area in <sup>2</sup> :	Cylinder	Break	Load LBF:	Break PSI:
		Broke:	Age:	Type		Dia in:	Type:		
DECK-7	148.00	13	14	Field	12.57	4	Shear	74000	5890
DECK-8	148.00	13	14	Field	12.57	4	Shear	72800	5790
							<b>Average Break lbf:</b>	<b>5840</b>	

**AASHTO T22 Concrete Cylinder Break**

							<b>Design Break lbf:</b>	<b>4000</b>		
Cylinder No.:	Unit Density;	Age	Design	Cure	Area in <sup>2</sup> :	Cylinder	Break	Load LBF:	Break PSI:	Out of Tol:
		Broke:	Age:	Type		Dia in:	Type:			
DECK - 5	149.00	27	28	Standard	12.57	4	Shear	97000	7720	
DECK - 6	149.00	27	28	Standard	12.57	4	Shear	95000	7560	
							<b>Average Break lbf:</b>	<b>7640</b>		

	Template	Tested By	Tested Date	Authorized By	Authorized Date
1	SC-CYL-28	Davison, Timothy	10/11/2013	Ljungvall, Mark	10/21/2013
1	SC-CYL-G	Coletta, Trent	09/30/2013	Ljungvall, Mark	
1	SC-CYL-G	Ljungvall, Mark	10/18/2013	Ljungvall, Mark	
1	SC-CYL-G	Allen, Allyson	10/18/2013	Ljungvall, Mark	
1	SC-FIELD	Allen, Allyson	09/25/2013	Ljungvall, Mark	

**Vermont Agency of Transportation  
1 National Life Drive  
Montpelier, VT 05633  
Sample Report**

Requested By:  
Greg Wilcox

Sample ID: cstevens139P113946	Sampled By: Wilcox, Greg	Sample Type: Acceptance
Lab/Ref : C130571	Station:	Sample Date: 09/14/2013
Lot #:	Sampled From: Pump Hose	Sample Time: 1:00
Material: Concrete Concrete (501 and 541)		Quantity: 30.00 CM
Supplier: HARRISON REDI-MIX, GEORGIA, VT		Mix Design: HP13-A-280
Manufacturer: HARRISON REDI-MIX, GEORGIA, VT		Truck #:
Comment: Deck pour		
Contract: 12072701 CAMBRIDGE BRG 027-1(4) & CAMBRIDGE STP 030-2(27)		
Project: 78F163 CAMBRIDGE BRG 027-1(4)		Quantity
Pay Item: 0485 501.33 CONCRETE, HIGH PERFORMANCE CLASS A		30.00 CM

**Concrete Field Test:**

Not In Compliance	Results	Min	Max	Out of Tol.
T121 Unit Weight pcf:	0			
T152 Air Content %:	5.0	5.5	8.5	-0.5
T119 Slump in:	5.25	0	7.0	
Total Water gal/cy:	31.90			
W/c Ratio:	0.436		0.44	
ASTM C1064 Conc Temp °F:	72.0	50	85	
Ambient Temperature °F:	55.0	10	90	

**AASHTO T22 Concrete Cylinder Break**

							Design Break lbf:	4000
Cylinder No.:	Unit Density;	Age	Design	Cure	Area in <sup>2</sup> :	Cylinder	Break	
Deck-15	147.00	11	11	Field	12.57	4	Type:	Load LBF: Break PSI:
Deck-15	147.00	11	11	Field	12.57	4		63000 5010
Deck-16	147.00	11	11	Field	12.57	4		61000 4850
							<b>Average Break lbf:</b>	<b>4930</b>

**AASHTO T22 Concrete Cylinder Break**

							Design Break lbf:	4000	
Cylinder No.:	Unit Density;	Age	Design	Cure	Area in <sup>2</sup> :	Cylinder	Break		Out of Tol:
DECK - 13	147.00	27	28	Standard	12.57	4	Type:	Load LBF: Break PSI:	
DECK - 13	147.00	27	28	Standard	12.57	4	Shear	96100 7650	
DECK - 14	147.00	27	28	Standard	12.57	4	Shear	97000 7720	
							<b>Average Break lbf:</b>	<b>7685</b>	

	Template	Tested By	Tested Date	Authorized By	Authorized Date
1	SC-CYL-28	Davison, Timothy	10/11/2013	Wild, Jim	10/16/2013
1	SC-CYL-G	Allen, Allyson	09/26/2013	Wild, Jim	
1	SC-FIELD	Allen, Allyson	09/26/2013	Wild, Jim	

**Vermont Agency of Transportation  
1 National Life Drive  
Montpelier, VT 05633  
Sample Report**

Requested By:  
G. Wilcox

Sample ID: cstevens139P094353	Sampled By: Wilcox, Greg	Sample Type: Acceptance
Lab/Ref : C130572	Station:	Sample Date: 09/19/2013
Lot #:	Sampled From: Truck	Sample Time: 12:15
Material: Concrete Concrete (501 and 541)		Quantity: 30.00 CM
Supplier: HARRISON REDI-MIX, GEORGIA, VT		Mix Design: HP13-A-291
Manufacturer: HARRISON REDI-MIX, GEORGIA, VT		
Comment: Deck pour		Truck #:
Contract: 12072701 CAMBRIDGE BRG 027-1(4) & CAMBRIDGE STP 030-2(27)		
Project: 78F163 CAMBRIDGE BRG 027-1(4)		Quantity
Pay Item: 0485 501.33 CONCRETE, HIGH PERFORMANCE CLASS A		30.00 CM

**Concrete Field Test:**

In Compliance	Results	Min	Max	Out of Tol.
T121 Unit Weight pcf:	0			
T152 Air Content %:	5.8	5.5	8.5	
T119 Slump in:	6.50	0	7.0	
Total Water gal/cy:	28.50			
W/c Ratio:	0.389		0.44	
ASTM C1064 Conc Temp °F:	70.0	50	85	
Ambient Temperature °F:	58.0	10	90	

**AASHTO T22 Concrete Cylinder Break**

							Design Break lbf:	4000	
Cylinder No.:	Unit Density:	Age:	Design Age:	Cure Type:	Area in <sup>2</sup> :	Cylinder Dia in:	Break Type:	Load LBF:	Break PSI:
Deck-25	147.00	7	7	Field	12.57	4	Shear	65700	5230
Deck-26	147.00	7	7	Field	12.57	4	Shear	63900	5090
							<b>Average Break lbf:</b>	<b>5160</b>	

**AASHTO T22 Concrete Cylinder Break**

							Design Break lbf:	4000		
Cylinder No.:	Unit Density:	Age:	Design Age:	Cure Type:	Area in <sup>2</sup> :	Cylinder Dia in:	Break Type:	Load LBF:	Break PSI:	Out of Tol:
Deck-23	147.00	28	28	Standard	12.57	4	Shear	93400	7430	
Deck-24	147.00	28	28	Standard	12.57	4	Shear	90800	7230	
							<b>Average Break lbf:</b>	<b>7330</b>		

	Template	Tested By	Tested Date	Authorized By	Authorized Date
1	SC-CYL-28	Lackey, Larry	10/17/2013	Wild, Jim	10/31/2013
1	SC-CYL-7	Lessard, Dan	09/30/2013	Wild, Jim	
1	SC-FIELD	Allen, Allyson	09/25/2013	Wild, Jim	

## Guidelines for Use

**Dosage:** There is no standard dosage for Micro Air admixture. The exact quantity of air-entraining admixture needed for a given air content of concrete varies because of differences in concrete making materials and ambient conditions. Typical factors that might influence the amount of air entrained include: temperature, cementitious materials, sand gradation, sand-aggregate ratio, mixture proportions, slump, means of conveying and placement, consolidation and finishing technique.

The amount of Micro Air admixture used will depend upon the amount of entrained air required under actual job conditions. In a trial mixture, use 1/8 to 1-1/2 fl oz/cwt (8-98 mL/100 kg) of cement. In mixtures containing water-reducing or set-control admixtures, the amount of Micro Air admixture needed is somewhat less than the amount required in plain concrete. Due to possible changes in the factors that can affect the dosage of Micro Air admixture, frequent air content checks should be made during the course of the work. Adjustments to the dosage should be based on the amount of entrained air required in the mixture at the point of placement. If an unusually high or low dosage of Micro Air admixture is required to obtain the desired air content, consult your BASF Construction Chemicals representative. In such cases, it may be necessary to determine that, in addition to a proper air content in the fresh concrete, a suitable air-void system is achieved in the hardened concrete.

**Dispensing and Mixing:** Add Micro Air admixture to the concrete mixture using a dispenser designed for air-entraining admixtures; or add manually using a suitable measuring device that ensures accuracy within plus or minus 3% of the required amount. For optimum, consistent performance, the air-entraining admixture should be dispensed on damp, fine aggregate or with the initial batch water. If the concrete mixture contains lightweight aggregate, field evaluations should be conducted to determine the best method to dispense the air-entraining admixture.

## Precaution

In a 2005 publication from the Portland Cement Association (PCA R&D Serial No. 2789), it was reported that problematic air-void clustering that can potentially lead to above normal decreases in strength was found to coincide with late additions of water to air-entrained concretes. Late additions of water include the conventional practice of holding back water during batching for addition at the jobsite. Therefore, caution should be exercised with delayed additions to air-entrained concrete. Furthermore, an air content check should be performed after any post-batching addition to an air-entrained concrete mixture.

BASF Construction Chemicals, LLC  
Admixture Systems

[www.masterbuilders.com](http://www.masterbuilders.com)

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## Product Notes

**Corrosivity – Non-Chloride, Non-Corrosive:** Micro Air admixture will neither initiate nor promote corrosion of reinforcing and prestressing steel embedded in concrete, or of galvanized steel floor and roof systems. No calcium chloride or other chloride-based ingredients are used in the manufacture of this admixture.

**Compatibility:** Micro Air admixture may be used in combination with any BASF Construction Chemicals admixture, unless stated otherwise on the data sheet for the other product. When used in conjunction with other admixtures, each admixture must be dispensed separately into the mixture.

## Storage and Handling

**Storage Temperature:** Micro Air admixture should be stored and dispensed at 35 °F (2 °C) or higher. Although freezing does not harm this product, precautions should be taken to protect it from freezing. If it freezes, thaw and reconstitute by mild mechanical agitation. **Do not use pressurized air for agitation.**

**Shelf Life:** Micro Air admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your BASF Construction Chemicals representative regarding suitability for use and dosage recommendations if the shelf life of Micro Air admixture has been exceeded.

**Safety:** Micro Air admixture is a caustic solution. Chemical goggles and gloves are recommended when transferring or handling this material. (See MSDS and/or product label for complete information.)

## Packaging

Micro Air admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

## Related Documents

Material Safety Data Sheets: Micro Air admixture.

## Additional Information

For suggested specification information or for additional product data on Micro Air admixture, contact your BASF Construction Chemicals representative.

*The Admixture Systems business of BASF Construction Chemicals is a leading provider of innovative additives for specialty concrete used in the ready mix, precast, manufactured concrete products, underground construction and paving markets throughout the NAFTA region. The Company's respected Master Builders brand products are used to improve the placing, pumping, finishing, appearance and performance characteristics of concrete.*

**Master  
Builders**

### Description

GLENIUM® 7500 high-range water-reducing admixture is based on the next generation of polycarboxylate technology found in all of the Glenium 7000 series products. This technology combines state-of-the-art molecular engineering with a precise understanding of regional cements to provide specific and exceptional value to all phases of the concrete construction process.

GLENIUM 7500 admixture is very effective in producing concrete mixtures with different levels of workability including applications that require self-consolidating concrete (SCC). The use of GLENIUM 7500 admixture results in faster setting characteristics as well as improved early age compressive strength. GLENIUM 7500 admixture will meet ASTM C 494/C 494M requirements for Type A, water-reducing, and Type F, high-range water-reducing, admixtures.

### Applications

Recommended for use in:

- Concrete with varying water reduction requirements (5-40%)
- Concrete where control of workability and setting time is critical
- Concrete where high flowability, increased stability, high early and ultimate strengths, and improved durability are needed
- Production of Rheodynamic® Self-Consolidating Concrete (SCC) mixtures
- 4x4™ Concrete for fast-track construction
- Pervious Concrete mixtures

# GLENIUM® 7500

## High-Range Water-Reducing Admixture

### Features

- Excellent early strength development
- Controls setting characteristics
- Optimizes slump retention/setting relationship
- Consistent air entrainment
- Dosage flexibility

### Benefits

- Faster turnover of forms due to accelerated early strength development
- Reduces finishing labor costs due to optimized set times
- Use in fast track construction
- Minimizes the need for slump adjustments at the jobsite
- Less jobsite QC support required
- Fewer rejected loads
- Optimizes concrete mixture costs

### Performance Characteristics

Concrete produced with GLENIUM 7500 admixture achieves significantly higher early age strength than first generation polycarboxylate high-range water-reducing admixtures. GLENIUM 7500 admixture also strikes the perfect balance between workability retention and setting characteristics in order to provide efficiency in placing and finishing concrete.

### Guidelines for Use

**Dosage:** GLENIUM 7500 admixture has a recommended dosage range of 2-15 fl oz/cwt (130-975 mL/100 kg) of cementitious materials. For most applications, dosages in the range of 5-8 fl oz/cwt (325-520 mL/100 kg) will provide excellent performance. For high performance and Rheodynamic Self-Consolidating Concrete mixtures, dosages of up to 12 fl oz/cwt (780 mL/100 kg) of cementitious materials can be utilized. Because of variations in concrete materials, jobsite conditions and/or applications, dosages outside of the recommended range may be required. In such cases, contact your local BASF Admixtures representative.

**Mixing:** GLENIUM 7500 admixture can be added with the initial batch water or as a delayed addition. However, optimum water reduction is generally obtained with a delayed addition.

# Product Data: GLENIUM® 7500

## Product Notes

**Corrosivity – Non-Chloride, Non-Corrosive:** GLENIUM 7500 admixture will neither initiate nor promote corrosion of reinforcing steel embedded in concrete, prestressing steel or of galvanized steel floor and roof systems. Neither calcium chloride nor other chloride-based ingredients are used in the manufacture of GLENIUM 7500 admixture.

**Compatibility:** GLENIUM 7500 admixture is compatible with most admixtures used in the production of quality concrete, including normal, mid-range and high-range water-reducing admixtures, air-entrainers, accelerators, retarders, extended set control admixtures, corrosion inhibitors, and shrinkage reducers.

**Do not use GLENIUM 7500 admixture with admixtures containing beta-naphthalene sulfonate. Erratic behaviors in slump, workability retention and pumpability may be experienced.**

## Storage and Handling

**Storage Temperature:** GLENIUM 7500 admixture must be stored at temperatures above 40 °F (5 °C). If GLENIUM 7500 admixture freezes, thaw and reconstitute by mechanical agitation.

**Shelf Life:** GLENIUM 7500 admixture has a minimum shelf life of 6 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your BASF Admixtures representative regarding suitability for use and dosage recommendations if the shelf life of GLENIUM 7500 admixture has been exceeded.

## Packaging

GLENIUM 7500 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

## Related Documents

Material Safety Data Sheets: GLENIUM 7500 admixture.

## Additional Information

For additional information on GLENIUM 7500 admixture or on its use in developing concrete mixtures with special performance characteristics, contact your BASF Admixtures representative.

*BASF Admixtures is a leading provider of innovative chemical admixtures and silica fume for specialty concrete used in the ready mix, precast, manufactured concrete products, underground construction and paving markets in the United States and Canada. The Company's respected Master Builders brand products are used to improve the placing, pumping, finishing, appearance and performance characteristics of concrete.*

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## Description

Pozzolith 100 XR ready-to-use liquid admixture is used for producing more uniform and predictable quality concrete. Placing and finishing requirements are facilitated because this admixture retards setting time. Pozzolith 100 XR admixture meets ASTM C 494/C 494M requirements for Type B, retarding, and Type D, water-reducing and retarding, admixtures.

## Applications

Recommended for use in:

- Prestressed concrete
- Precast concrete
- Reinforced concrete
- Shotcrete
- Lightweight or normal weight concrete
- Pumped concrete
- 4x4™ Concrete
- Pervious Concrete
- Rheodynamic®Self-Consolidating Concrete

# POZZOLITH® 100 XR

## Set Retarding Admixture

### Features

- Reduced water content required for a given workability
- Retarded setting characteristics
- Controlled retardation – depending on the addition rate
- Dead-load deflection can take place (before concrete sets) in extended pours for bridge decks, cantilevers, nonshored structural elements, etc.

### Benefits

- Improved workability
- Reduced segregation
- Superior finishing characteristics for flatwork and cast surfaces
- Flexibility in scheduling of placing and finishing operations
- Offsets effects of early stiffening during extended delays between mixing and placing
- Helps eliminate cold joints
- Peak temperature and/or rate of temperature rise in mass concrete lowered thereby reducing thermal cracking
- Increased compressive and flexural strength

### Performance Characteristics

**Rate of Hardening:** The temperature of the concrete mixture and the ambient temperature (forms, earth, reinforcement, air, etc.) affect the hardening rate of concrete. At higher temperatures, concrete stiffens more rapidly which may cause problems with placing and finishing. Pozzolith 100 XR admixture retards the set of concrete. Within the normal dosage range, it will generally extend the setting time of concrete containing normal portland cement approximately 1-1/2 to 8 hours compared to that of a plain concrete mixture, depending on job materials and temperatures. Trial mixtures should be made with materials approximating job conditions to determine the dosage required.

**Compressive Strength:** Concrete produced with Pozzolith 100 XR admixture will have rapid strength development after initial set occurs. If retardation is within the normal ASTM C 494/C 494M Types B and D specifications, Pozzolith 100 XR admixture will develop higher early (24-hour) and ultimate strengths than plain concrete when used within the recommended dosage range and under normal, comparable curing conditions.

When Pozzolith 100 XR admixture is used in heat-cured concrete, the length of the preheating period should be increased until initial set of the concrete is achieved. The actual heat-curing period is then reduced accordingly to maintain existing production cycles without sacrificing early or ultimate strengths.

# Product Data: POZZOLITH® 100 XR

## Guidelines for Use

**Dosage:** Pozzolith 100 XR admixture is recommended for use at a dosage of  $3 \pm 1$  fl oz/cwt ( $195 \pm 65$  mL/100 kg) of cementitious materials for most concrete mixtures using typical concrete ingredients. Because of variations in job conditions and concrete materials, dosage rates other than the recommended amounts may be required. In such cases, contact your local sales representative.

Pozzolith 100 XR admixture may be used at less than the recommended dosage for the purpose of retardation only.

## Product Notes

**Corrosivity – Non-Chloride, Non-Corrosive:** Pozzolith 100 XR admixture will neither initiate nor promote corrosion of reinforcing steel in concrete. This admixture does not contain intentionally-added calcium chloride or other chloride-based ingredients.

**Compatibility:** Pozzolith 100 XR admixture may be used in combination with any BASF Construction Chemicals admixtures. When used in conjunction with other admixtures, each admixture must be dispensed separately into the mix.

## Storage and Handling

**Storage Temperature:** If this product freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation. **Do not use pressurized air for agitation.**

**Shelf Life:** Pozzolith 100 XR admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of Pozzolith 100 XR admixture has been exceeded.

## Packaging

Pozzolith 100 XR admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

## Related Documents

Material Safety Data Sheets: Pozzolith 100 XR admixture.

## Additional Information

For additional information on Pozzolith 100 XR admixture or its use in developing a concrete mix with special performance characteristics, contact your local sales representative.

*The Admixture Systems business of BASF Construction Chemicals is a leading provider of innovative additives for specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets throughout the North American region. The Company's respected Master Builders brand products are used to improve the placing, pumping, finishing, appearance and performance characteristics of concrete.*

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STATE OF VERMONT  
AGENCY OF TRANSPORTATION  
CONSTRUCTION AND MATERIALS BUREAU

CONCRETE BATCH PLANT  
DAILY REPORT

Day & Date Friday, May 29, 2015

Plant Harrison Redi-Mix

Location Georgia, VT

1 1/2" Stone		3/4" Stone		3/8" Stone		Fine Aggregate	
Sieve	% passing	Sieve	% passing	Sieve	% passing	Sieve	% passing
						3/8"	100
1 3/4"	100	1"	100	1/2"	100	4	100
1 1/2"	93	3/4"	97	3/8"		8	88
1"	36	1/2"	69	1/4"		16	70
3/4"	5	3/8"	48	4		30	48
1/2"	4	4	8	8		50	23
3/8"	2	8	3	16		100	6
flats					FM	2.65	
fractured					Color		

1 1/2 Stone Rainville Quarry Georgia  
 3/4 Stone Rainville Quarry Georgia  
 3/8 Stone N/A  
 Fine Agg. Airport Sand and Fill - Highgate, VT  
 Cement Ciment Quebec Type II  
 Silica Fume BASF Rheomac SF100  
 Fly Ash Headwaters, Brayton Pt. MA  
 Slag \_\_\_\_\_  
 Air Entrainer Micro Air  
 Retarder Pozz 100XR  
 Water Reducer Glenium 7500  
 Choose \_\_\_\_\_

Class →	DRY BATCH WEIGHTS			MOISTURE TEST			CLASS →	WET BATCH WEIGHTS		
	HPC B			PERCENT	TIME	PERCENT		HPC B		
1 1/2" Stone	888			0.9		0.2		896		
3/4" Stone	888			1.1		0.2		898		
3/8" Stone						N/A				
Fine Aggregate	1242			4.1		1.3		1293		
Cement	412			Air Entrainment (oz/cy)				10.00		
Silica Fume	40			Retarding Admixture (oz/cwt)				105.00		
Fly Ash / Slag	113			High Range/ Water Red Admixture (oz/cwt)				210.00		

PROJECT			PROJECT			PROJECT		
Name	Jericho		Name			Name		
Number	STP FTBR (3)		Number			Number		
Class	Mix #	QUANTITY	Class	QUANTITY	Class	QUANTITY	Class	QUANTITY
HPC B	HP15-B-280	10 CY						
Cement Sample	No		Cement Sample		Cement Sample		Cement Sample	
Wear Sample	No		Wear Sample		Wear Sample		Wear Sample	

Time required at plant 9:25 AM 1:30 PM Visitors at plant \_\_\_\_\_

Remarks Line item number 0410

Plant Inspector D. Connolly

## Quality Control Procedures

Blow & Cote QC Control Manager: Marc Cote\*

1. A pre-production meeting shall be held a minimum of seven calendar days prior to the beginning of concrete placement. The pre-production meeting will be attended by the Project Superintendent, QC Control Manager, the Concrete Producer's QC, the Resident Engineer, the Project Manager and the Composite Materials Engineer.
2. VTrans will retain their responsibilities for Quality Acceptance testing.
3. Four extra cylinder sets per concrete placement shall be taken for early strength breaks or confirmation strength breaks.
4. All inside form dimensions, rebar spacing and clearances shall be reviewed and documented on the pre-pour inspection sheet (see page 10) by the Project Superintendent, the QC Control Manager and the resident engineer before casting is commenced.
5. Before forms are erected the contractor will inspect all form work for damage or residual concrete. Any deficiency in the form material shall be corrected prior to being incorporated into the form work. Forming shall conform to 2011 Standard Specification 541.09.
6. Forms shall be coated with form oil as needed prior to installing rebar. Caution will be taken not to over-oil the forms so no oil gets on the rebar. Oiled forms will be wet before concrete placement. Any wood forms or oil that may discolor the concrete will not be used.
7. Concrete tolerance to be  $\pm 1/4"$ ; Reinforcing steel placement tolerances to be  $\pm 1/4"$  for cover and clearance and 1" for spacing of bars; Horizontal clearances shall be 3" top and bottom with vertical clearance of 3" both faces. Support material to maintain clearance will be plastic.
8. All precast will be inspected by both the contractor and resident engineer and documented on the post-pour inspection sheet (see page 11). Any minor repairs (defined as holes, honeycombing, or spalls, which are 150 mm (6 inches) or less in diameter, that do not penetrate deeper than 25 mm (1 inch) into the concrete) will be repaired with a vertical or overhead patch from the approved products list. Any issues requiring repair for an area over 6" in diameter will be cause for rejection. Cracks less than 0.25 mm (0.01 inch) in width shall be sealed by a method approved by the Engineer. Cracks in excess of 0.25 mm (0.01 inch) may be cause for rejection.
9. The date of manufacture, the production lot number, and the piece mark shall be clearly marked on each individual piece of precast concrete. The mark shall be in a location that will not be visible in the finished product.
10. Todd Nelson of Harrison Redi-Mix will be responsible for the QC for supplying the concrete to the project. See page 4 of this submittal for the approved mix design by Harrison Redi-Mix. Harrison to run aggregate gradations prior to producing concrete. Harrison will test concrete on project before placing it into forms to verify compliance to specifications. Should modifications need to be made in the field to comply with specifications, it will be done at this point (i.e. air content is low, more air entraining agent will be added as needed). The precast concrete will then be retested to confirm compliance with specification.

\*Marc Cote's previous experience in this area:

1. Bristol BRO 1445(32): Cast-in-place abutments and deck
2. Fairground Road Bridge, Northfield, VT: Cast-in-place abutments, overlay.

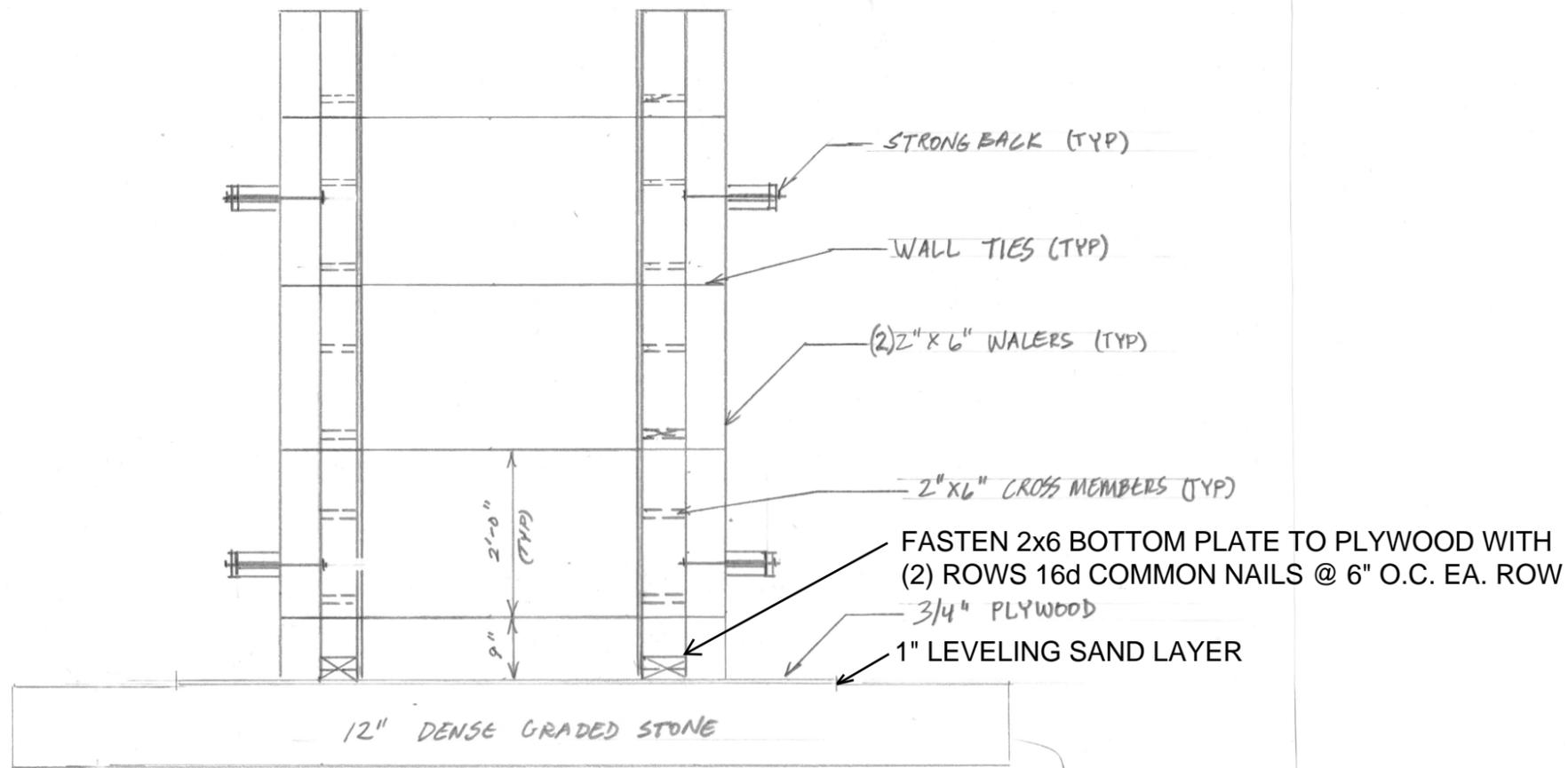
### Contractor Fabricated Precast Concrete Notes

1. Concrete abutment minimum compressive strength: 5,000 psi at 28 days
2. Only construction joints in abutments are between cheek walls and bridge seat, therefore no post-tensioning is required. All reinforcing will be tied and in place prior to placement of concrete below bridge seat. Construction joints will be constructed in accordance with VAOT Standard Spec 501.13.
3. All concrete to be supplied by Harrison Redi-Mix.
4. See page 4 of this submittal for the 5000 psi mix design by Harrison Redi-Mix
5. Concrete abutment bridge seats will have textured surface raked finish roughened to  $\frac{1}{4}$ " amplitude except area under bearing pads shall be troweled smooth to the proposed slope.
6. Tops of wingwalls to have smooth float finish.
7. All exposed concrete edges shall be chamfered 1"x1".
8. All lifting devices embedded in concrete shall be galvanized.
9. Abutments to be wet cured with forms in place per Table 501.17A "curing concrete components". The forms will be removed after 7 day cylinder breaks show a minimum design strength of 4,000 psi. The precast structure will not be handled and lifted until the cure period and the required 28 day design strength has been attained as demonstrated by field cured cylinder breaks.

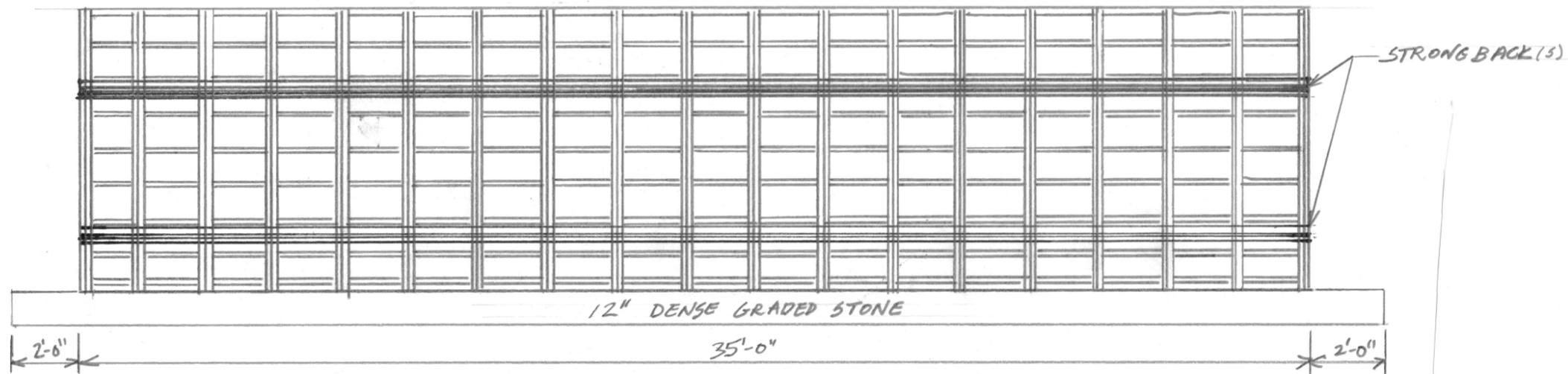
### Form Construction Notes

*(Refer to page 8, Precast Form Details, for additional information)*

- Level 8' x 40' area and compact native soil to construct abutments. Add 12" of compacted, dense graded stone with a  $\pm 1$ " shim layer of sand above and compact to a finished level surface.
- Lay down  $\frac{3}{4}$ " x 8' x 40' area of exterior plywood as a base to build abutments on. Attach 2"x6" plate to the  $\frac{3}{4}$ " plywood floor to maintain the correct exterior dimensions at the base of the abutment vertical forms. 2"x6" plate shall be fastened to plywood floor with (2) rows 16d common nails @ 6" o.c. each row, or equivalent.
- The exterior forms are  $\frac{3}{4}$ " exterior plywood with 2"x6" backers at 12" on center as shown on Page 8, Precast Form Details.
- (2)-2x6 walers @ 24" on center will be installed outboard of the 2"x6" backers on the form and be bolted thru to the wall ties inside the form to hold the assembly together.
- Strong backs will be installed approximately 18" and 6'-0" above the base. Strong backs to be made of (2)-2"x6" bolted to the walers to keep forms in alignment.
- 2x4 and 2x6 diagonal braces and kicker supports will be installed as required to hold the forms plumb.
- All rebar, pipes, lifting devices will be installed prior to building the second side of the form which will mirror the first side. The ends will be closed in last with  $\frac{3}{4}$ " plywood and similar backer, waler, and strong back construction as the long sides. Chamfer strips will be installed as needed to grade.
- Placement and curing of concrete in abutment forms as described above will be in accordance with State of Vermont Standard Specifications for Construction 2011 Edition, Subsection 501.10. All concrete will be placed in daylight and not in any adverse weather conditions.
- 1" form tie breakback per 501.09(f) will be achieved using Dayton/Richmond B-3 Screw-On Coil Ties with Dayton/Richmond B-30 Screw-On Plastic Cones (see pages 9-10).
- Vertical and horizontal spacing of forms ties shall be 24" o.c. maximum. First (lowest) row of form ties shall be 9" above the plywood floor as shown on page 8.



TYPICAL FORM SECTION  
 $\frac{1}{2}'' = 1'-0''$



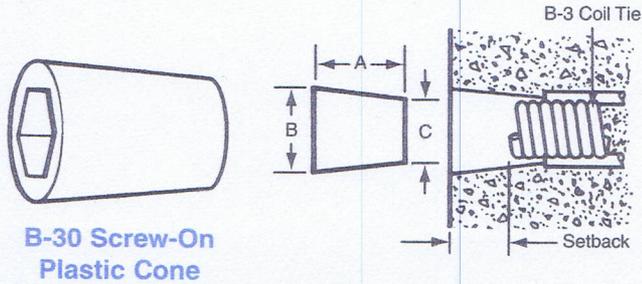
TYPICAL FORM ELEVATION  
 $\frac{1}{4}'' = 1'-0''$



BLOW & COTE, INC.	
CAMBRIDGE BRO 1448(39)	
PRECAST FORM DETAILS	
SCALE: AS SHOWN	Page 8 of 38
	2 FEB 15

## B-30 Screw-On Plastic Cones

Dayton Richmond Screw-On Plastic Cones are designed to thread onto the protruding coil of a B-3 Screw-On Coil Tie. Use a B-15 Cone Removal Wrench to back the cone off the tie and out of the concrete. B-30 plastic cones are normally reusable.



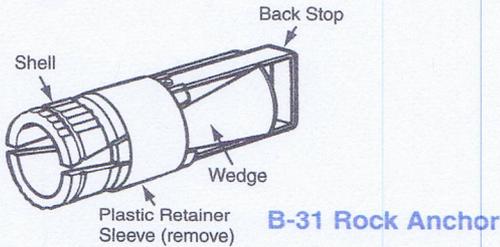
Bolt Dia.	Setback	A	B	C
1/2"	1"	1-3/8"	1-1/4"	1"
1/2"	1-1/2"	1-7/8"	1-1/4"	1"
1/2"	2"	2-3/8"	1-1/4"	1"
3/4"	1"	1-1/2"	1-5/8"	1-7/16"
3/4"	2"	2-1/2"	1-3/4"	1-7/16"
1"	2"	2-1/2"	2-1/8"	1-13/16"
1-1/4"	2"	2-1/2"	2-3/8"	2-1/8"

**Warning:** Cones are to be used for spreader action only and are not designed for scaffold bracket or other accessory loads.

## B-31 Rock Anchor

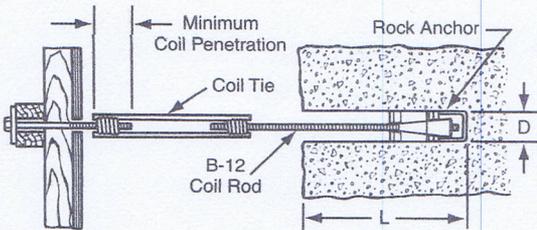
Dayton Richmond B-31 Rock Anchor is a preassembled unit tapped with 1/2", 3/4" or 1" diameter coil thread. NC thread is available on special order. Rock anchors used in sound rock or concrete allows one-sided forming of walls or similar applications to be completed quickly and economically.

The rock anchor is threaded onto the coil rod until the rod hits the backstop of the anchor. The plastic retaining sleeve is removed and the rock anchor/coil rod assembly is placed into the bore hole. The assembly is installed so that the anchor backstop "bottoms" in the bore hole. Tightening the coil rod will draw the anchor wedges forward to expand the anchor's shell. Care should be taken to not overtighten the anchor.



Coil Rod Diameter	Minimum Hole Depth "L" *	Required Hole Diameter "D"	Safe Working Load Tension (lbs.) **
1/2"	6"	1-3/8"	4,500
3/4"	8"	1-5/8"	9,000
1"	10"	1-3/4"	18,000

SWL provides a factor of safety of approximately 2 to 1.



**\*NOTE:** It is extremely important to drill the proper size bore hole for the appropriate rock anchor. Avoid "dog leg" or "rifled" holes, they will hinder anchor installation. It is also important to avoid letting the drill dwell at the bottom of the hole. This can cause an enlargement at the bottom of the hole and result in a loss of anchorage strength.

The bore hole for the rock anchor must be drilled perpendicular to the exposed bearing surface. The load carrying capacity of the rock anchor is greatly reduced when there is an angle between the nut on the coil rod and the bearing surface.

The B-31 Rock Anchor is not a reusable device. After the rock anchor has been set and the forming completed, do not attempt to reuse the rock anchor.

**To Order:**

Specify: (1) quantity, (2) name, (3) coil rod diameter.

**Example:**

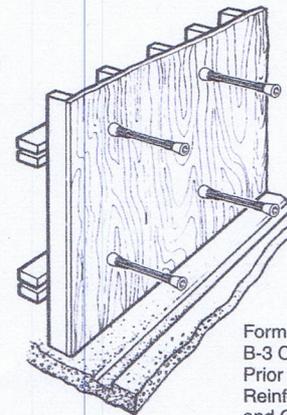
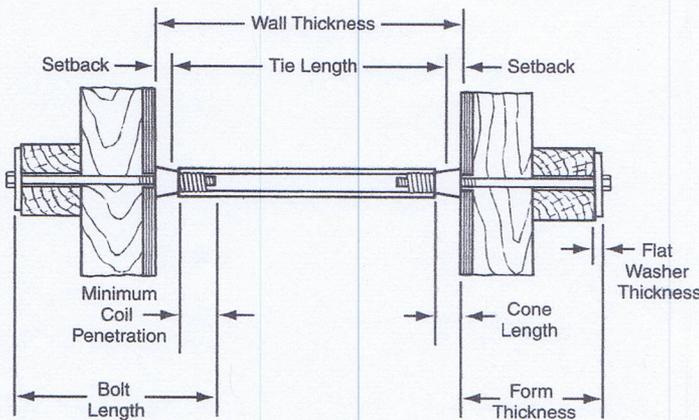
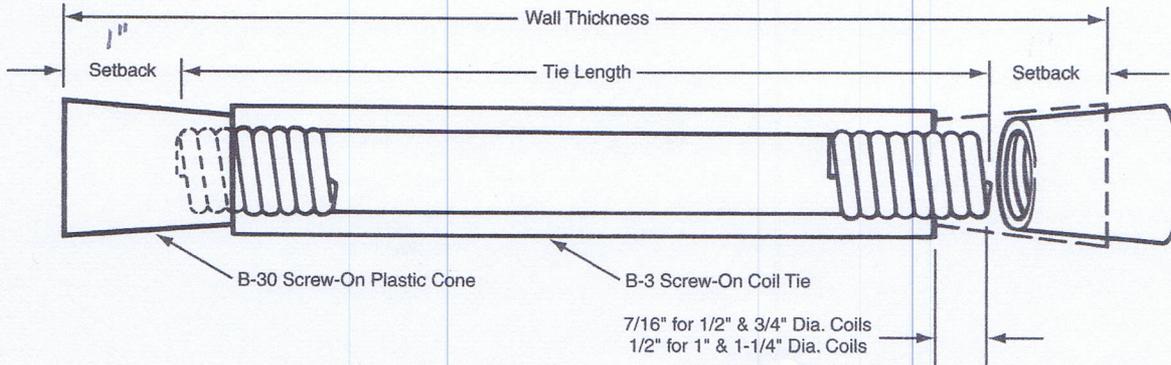
600 pcs. B-31 Rock Anchor, 1/2" coil thread.

**\*\*WARNING:** For safe construction practice, the most critical factor to consider is the actual anchorage capacity provided by the rock strata or concrete in which the rock anchor is to be installed. Correct hole depth and actual rock anchor capacity must always be determined by field tests before placing rock anchors into general use on a project.

## B-3 Screw-On Coil Tie

Dayton Richmond Screw-On Coil Tie is designed with longer coils that extend beyond the end of the struts. Plastic cones screw onto the projections to provide a positive setback and act as a fixed internal form spreader.

To determine proper screw-on coil tie length, subtract the required total setback (both sides) from the wall thickness.



Form Panel Showing B-3 Coil Ties in Place Prior to Installation of Reinforcing Steel and Closure Form.

B-3 Screw-On Coil Tie Selection Chart			
Type	Bolt Diameter	Number of Strut Wires	Safe Working Load Tension (lbs.)
B-3 Standard	1/2"	2	4,500
B-3 Heavy	1/2"	2	6,750
B-3 Standard	3/4"	2	6,750
B-3 Heavy	3/4"	2	9,000
B-3 Standard	1"	2	13,500
B-3 Standard	1"	4	18,000
B-3 Standard	1-1/4"	4	27,000

**To Order:**  
Specify: (1) quantity, (2) name, (3) safe working load, (4) bolt diameter, (5) tie length, (6) wall thickness, (7) setback.

**Example:**  
1,500 pcs. B-3 Screw-On Coil Tie, 6,750 lbs. SWL, 1/2" diameter, 22 long for a 24" wall, 1" setback.

**CHECK CAPACITY:**  
**DETERMINE MAX TENSION PER TIE:**  
 $T = yh \times \text{horizontal spacing} \times \text{vertical spacing}$   
 $T = 150 \text{ pcf} \times 5.67 \text{ ft} \times 2 \text{ ft} \times 2 \text{ ft}$   
 $T = 3402 \text{ lbs} < 4500 \text{ lbs OK}$

SWL provides a factor of safety of approximately 2 to 1.  
Warning: See Page 3.6 for minimum bolt length.

*\* SETBACKS ARE FILLED WITH A 3 PARTS SAND TO 1 PART CEMENT MIXTURE FROM ABUTMENT CONCRETE PRODUCER.*

**Prepour Inspection Form**

Product or Job: \_\_\_\_\_

Inspection Date:	Mon	Tue	Wed	Thu	Fri	Sat
Form Condition						
Form Cleanliness						
Form Joints						
Release Agent / Retarder						
Design Length (ft/in)						
Set Up Length (ft/in)						
Design Width (ft/in)						
Set Up Width (ft/in)						
Design Depth (ft/in)						
Set Up Depth (ft/in)						
Blockouts						
Squareness						
End and Edge Details						
Reinforcing Steel						
Reinforcing Size						
Reinforcing Spacing						
Reinforcing Rustification						
Cast-in Items						
Lifting Devices						

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

QC Inspector: \_\_\_\_\_ Date: \_\_\_\_\_

**Post Pour Inspection Form**

Product or Job: \_\_\_\_\_

	Mon	Tue	Wed	Thu	Fri	Sat
Casting Date:						
Inspection Date:						
Stripping Strength (psi)						
Casting Finish						
Coating Finish (if applicable)						
Cast Length (ft/in)						
Cast Width (ft/in)						
Cast Depth (ft/in)						
Cracks or Spalls						
Squareness						
Honeycombing / Bugholes						
Bowing / Camber						
Exposed reinforcement						
Embedment Item Locations						
Openings and Blockouts						
Lifting Devices						
Markings						
Outside temp <= 25 deg F.						
*Outside temp > 25 deg F.						

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

QC Inspector: \_\_\_\_\_ Date: \_\_\_\_\_

Calculate precast abutment weight:

→ Assume reinforced concrete wt =  $150 \text{ lb/ft}^3$   
    ↙ area of Abutment face (from CAD)

$$\rightarrow \text{Gross Volume} = 214.72 \text{ ft}^2 \times 3.5 \text{ ft} = 751.52 \text{ ft}^3$$

$$\rightarrow \text{Volume Voids @ Piles} = 4 (\pi \times (1 \text{ ft})^2) (5.5 \text{ ft}) = 69.12 \text{ ft}^3$$

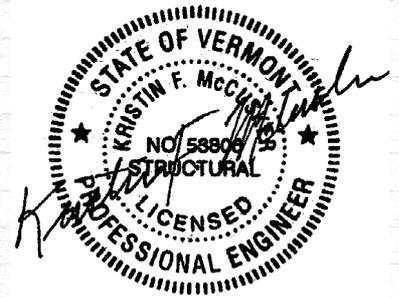
$$\begin{aligned} \rightarrow \text{Net Volume} &= 751.52 \text{ ft}^3 - 69.12 \text{ ft}^3 \\ &= 682.4 \text{ ft}^3 \end{aligned}$$

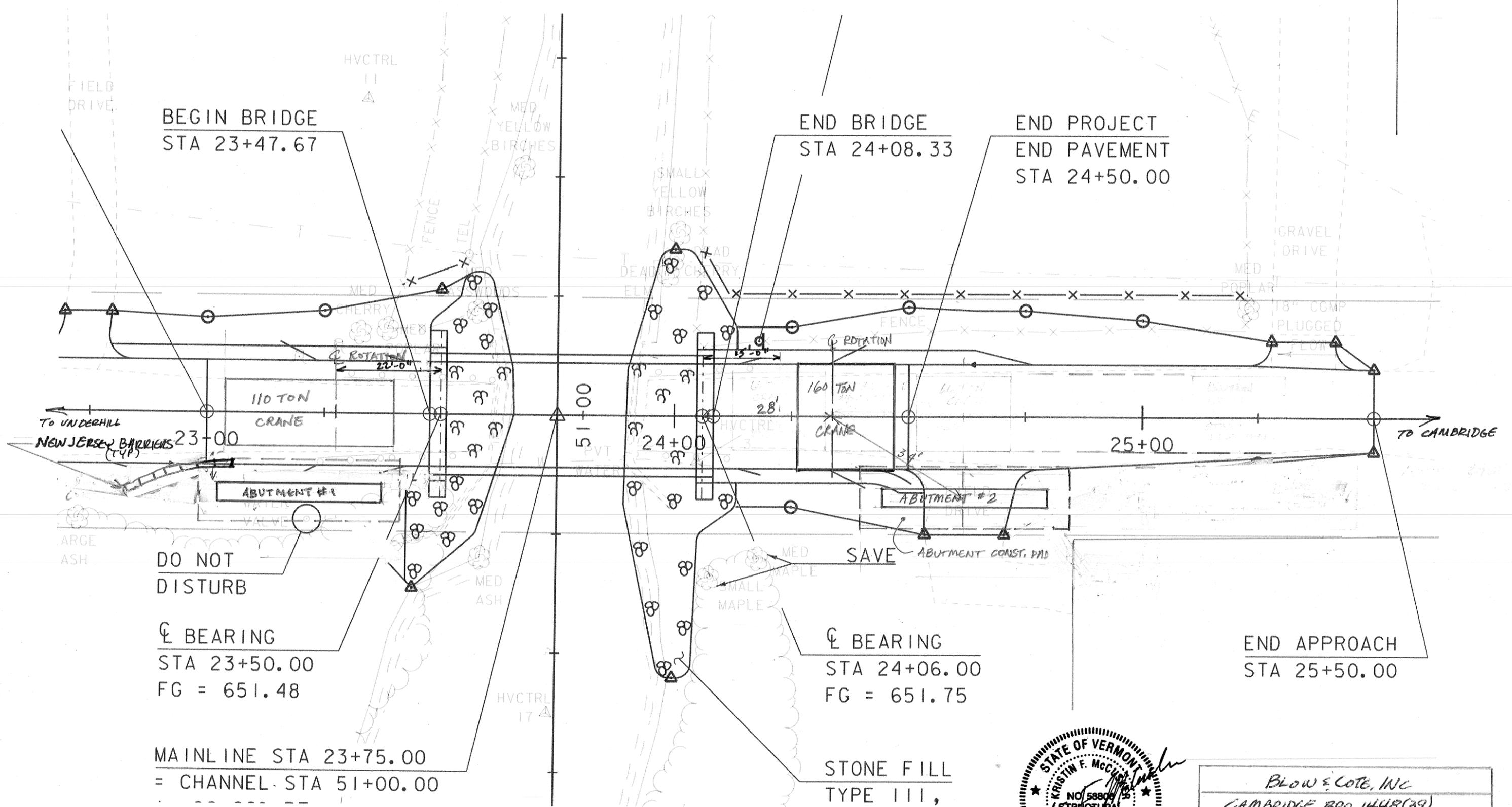
$$\rightarrow \text{Net Weight} = 682.4 \text{ ft}^3 \times 150 \text{ lb/ft}^3$$

$$= 102360.7 \text{ lbs}$$

$$W = 51.2 \text{ tons}$$

$$W = 51.2 \text{ tons} \times \frac{2000 \text{ lbs}}{\text{ton}} = 102,400 \text{ lbs}$$





BEGIN BRIDGE  
STA 23+47.67

END BRIDGE  
STA 24+08.33

END PROJECT  
END PAVEMENT  
STA 24+50.00

DO NOT  
DISTURB

CL BEARING  
STA 23+50.00  
FG = 651.48

CL BEARING  
STA 24+06.00  
FG = 651.75

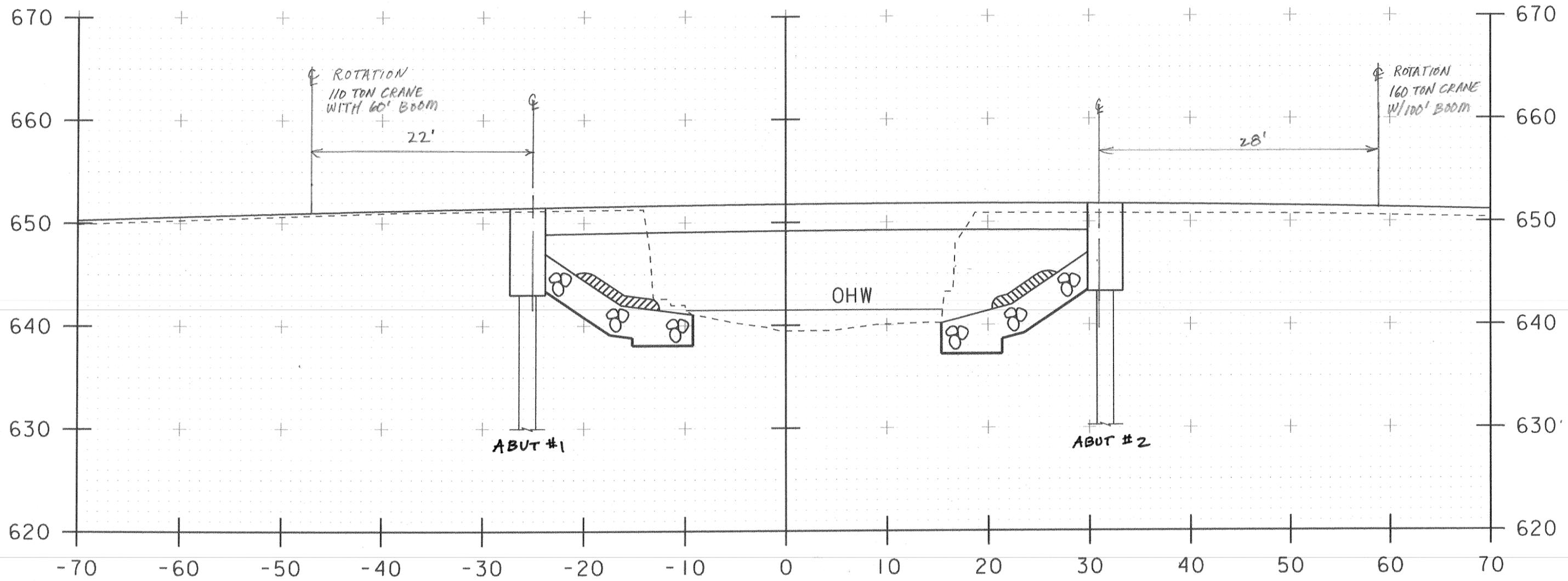
END APPROACH  
STA 25+50.00

MAINLINE STA 23+75.00  
= CHANNEL STA 51+00.00

STONE FILL  
TYPE III,



BLOW & COTE, INC
CAMBRIDGE BRO 1448(39)
ABUTMENT 1 & 2 LIFT PLAN VIEW



51+00



PROJECT NAME: CAMBRIDGE	OVERALL ABUTMENT LIFT ELEVATION
PROJECT NUMBER: BRO 1448(39)	
Page 15 of 38	

**Abutment #1 Lifting Equipment and Sequence:**

110T Truck Crane with 60' of boom, 22' lift radius and 7/8" Lift Cable rigged with 8 Part Line and rigged as follows:

Qty	Rigging Item	Weight Each (lbs)	Weight Total (lbs)	Working Load Capacity (Each, lbs)	Required Load (Each, lbs)	Check**
1	6 Sheave 110 ton hook block	3,500	3,500	220,000	103,956	OK
2	14' 36 ton 2" cable sling	225	450	126,000*	103,506	OK
2	30 ton 1 3/4" lifting shackle	30	60	60,000	51,723	OK
2	HCLW 44 ton Tilt-Up block	320	640	88,000	51,403	OK
2	24' 42 ton 1 1/2" cable sling	155	310	84,000	51,248	OK
4	17 ton lifting shackle	16	64	34,000	25,600	OK
4	WRA 160 Wire Rope Anchor	8	32	35,950	25,600	OK

\* total capacity for 2-leg bridle 60 degree sling

\*\*check that Required Load < Working Load Capacity

1. Crane will be set up with centerline of machine within 22' of Abutment #1.
2. Crane to lift Abutment #1 and swing 90 degrees to position Abutment #1 over rear of crane and lower it into position over piles #1-#4.
3. Crane will be moved away from the construction area.

**Abutment #2 Lifting Equipment and Sequence:**

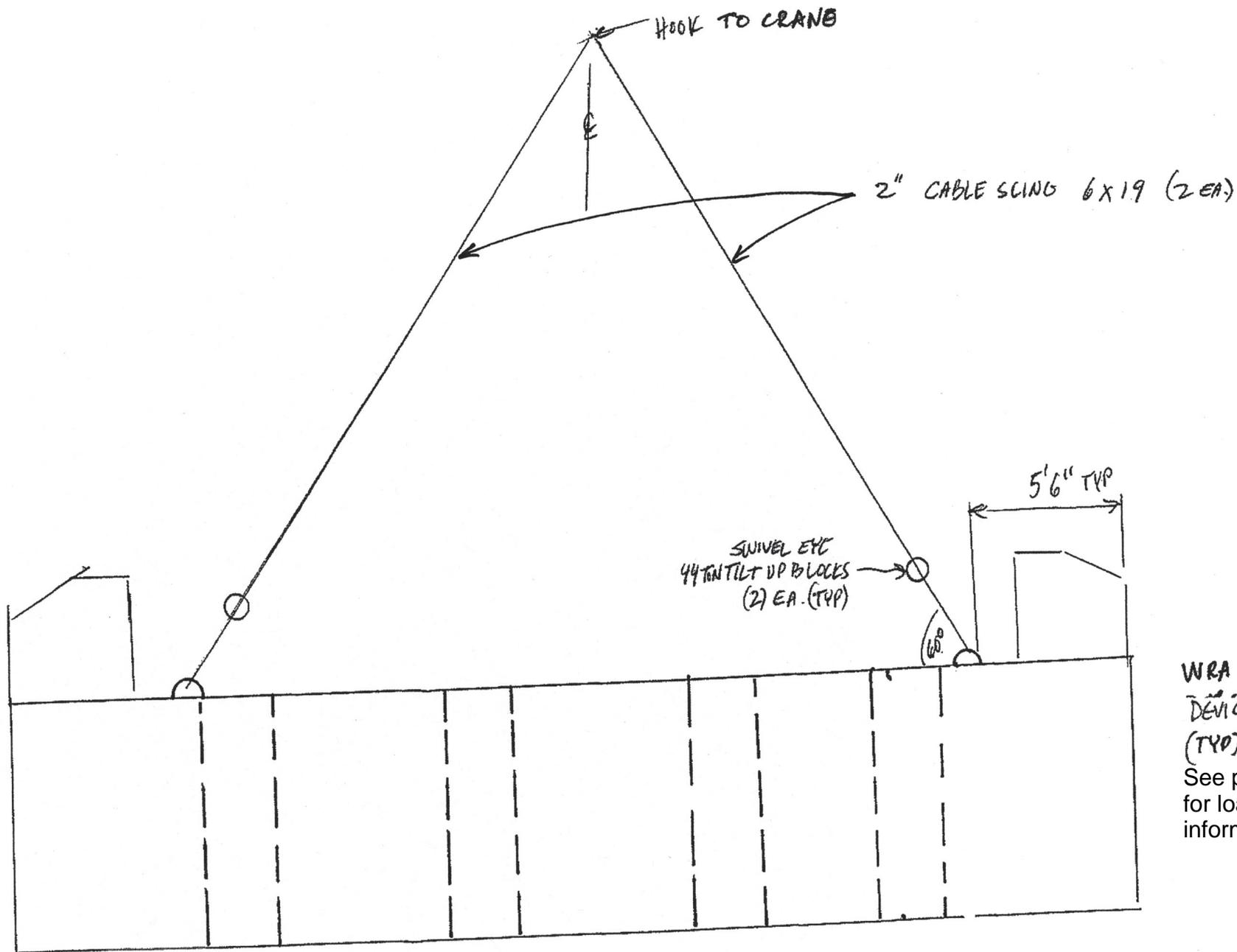
160 Ton Kobelco CK1600-II Crane with 100' of boom, 28' lift radius, 1" Lift Cable rigged with 4 Part Line and rigged as follows:

Qty	Rigging Item	Weight Each (lbs)	Weight Total (lbs)	Working Load Capacity (Each, lbs)	Required Load (Each, lbs)	Check**
1	3 Sheave 60 ton hook block	3,500	3,500	120,000	103,956	OK
2	14' 36 ton 2" cable sling	225	450	126,000*	103,506	OK
2	30 ton 1 3/4" lifting shackle	30	60	60,000	51,723	OK
2	HCLW 44 ton Tilt-Up block	320	640	88,000	51,403	OK
2	24' 42 ton 1 1/2" cable sling	155	310	84,000	51,248	OK
4	17 ton lifting shackle	16	64	34,000	25,600	OK
4	WRA 160 Wire Rope Anchor	8	32	35,950	25,600	OK

\* total capacity for 2-leg bridle 60 degree sling

\*\*check that Required Load < Working Load Capacity

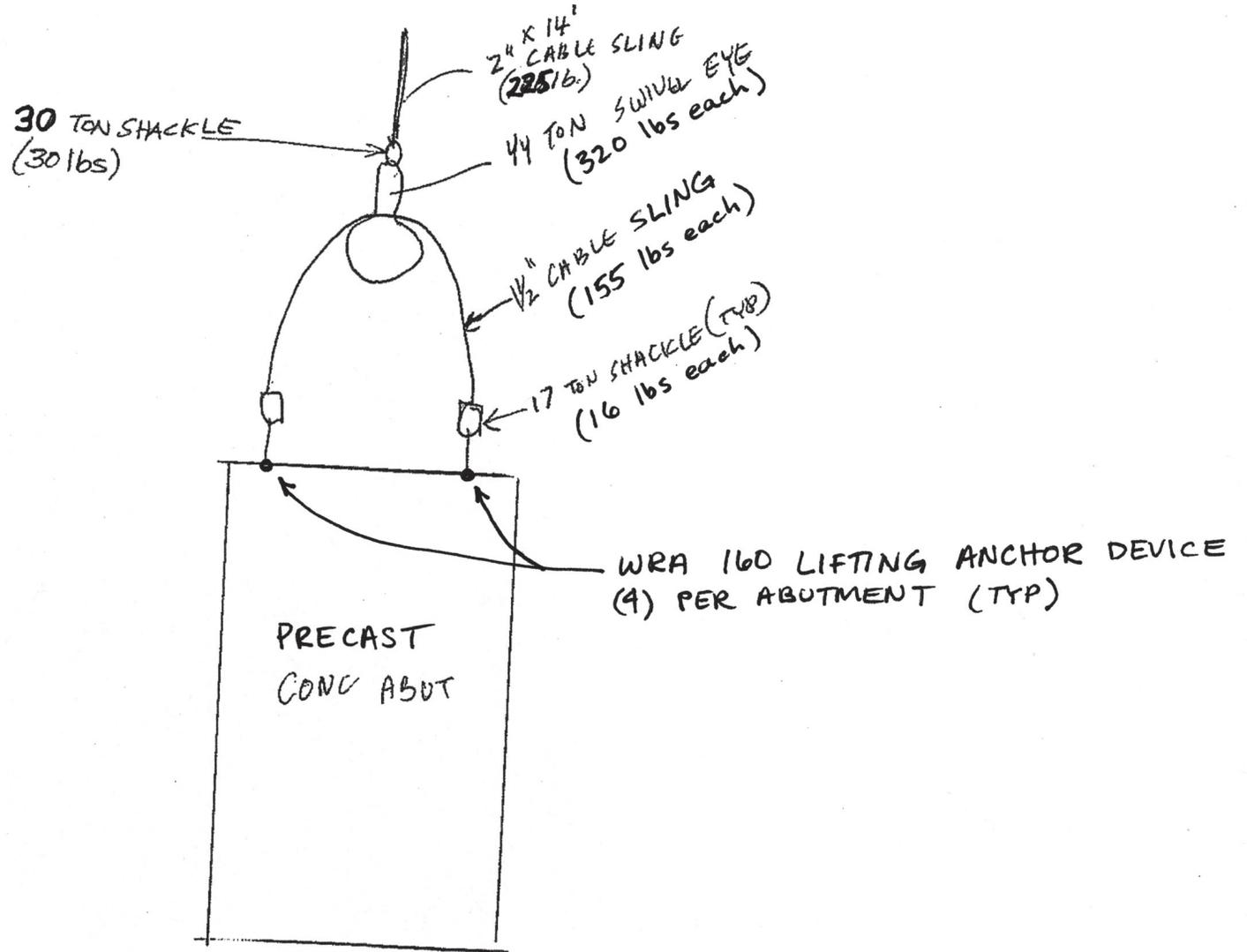
1. Crane will be positioned and leveled on pad built behind Abutment #2 with centerline of machine within 28' of Abutment #2.
2. Crane to lift Abutment #2 and swing 90 degrees to position Abutment #2 over the toe of the crane and lower it into position over piles #5-#8.
3. Crane will be moved away from the construction area.



WRA 160 LIFTING  
 DEVICE (4) PER ABUTMENT  
 (TYP)  
 See page 17, 35 and 36  
 for load capacity  
 information and check.

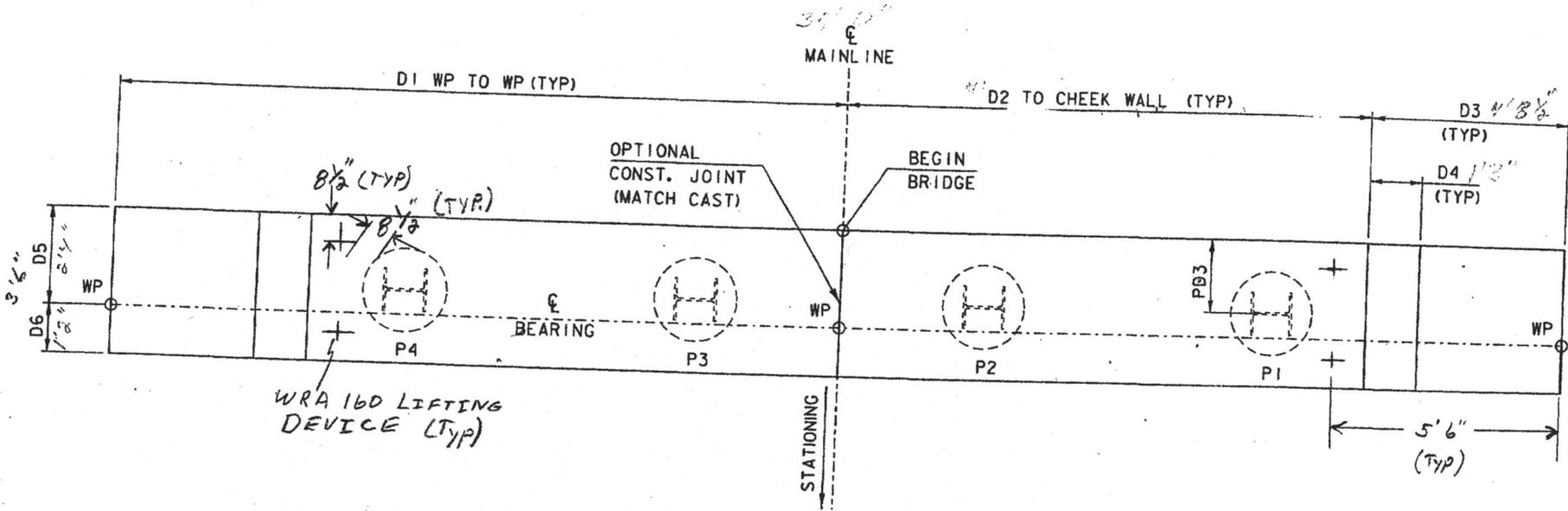
TYPICAL ABUTMENT LIFT DIAGRAM - SIDE VIEW

NO SCALE:



TYPICAL ABUTMENT LIFT DIAGRAM - END VIEW

Not to Scale

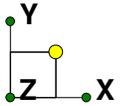


ABUTMENT WIRE ROPE LIFTING POINTS PLAN

SCALE 1/2" = 1'-0

BLOW & COTE, INC.  
 815 VT Rte 15E  
 MORRISVILLE, VT 05661

CAMBRIDGE  
 BRD 144B (39)

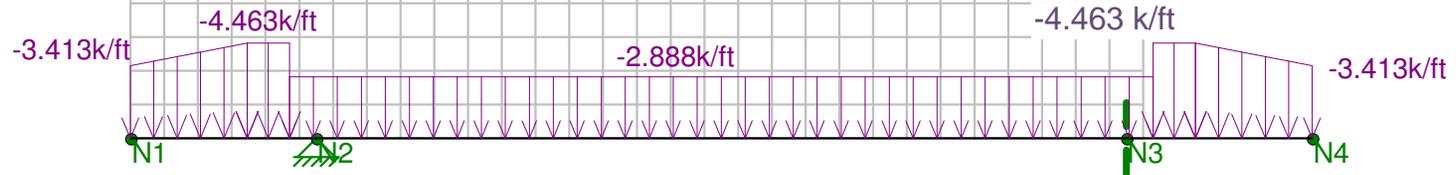
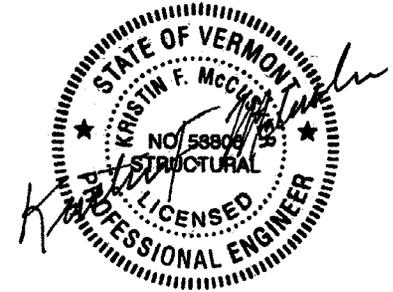


dead weight calculations:

$$6.5 \text{ ft} \times 3.5 \text{ ft} \times 150 \text{ pcf} = 3413 \text{ lb/ft}$$

$$8.5 \text{ ft} \times 3.5 \text{ ft} \times 150 \text{ pcf} = 4463 \text{ lb/ft}$$

$$5.5 \text{ ft} \times 3.5 \text{ ft} \times 150 \text{ pcf} = 2888 \text{ lb/ft}$$



Loads: BLC 1,  
Results for LC 1, dead weight

Thayer R. Fellows

Kristin McCusker

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ABUTMENT DEAD WEIGHT LOADING DIAGRAM

May 19, 2015

11:01 AM

Cambridge Abutments.r2d

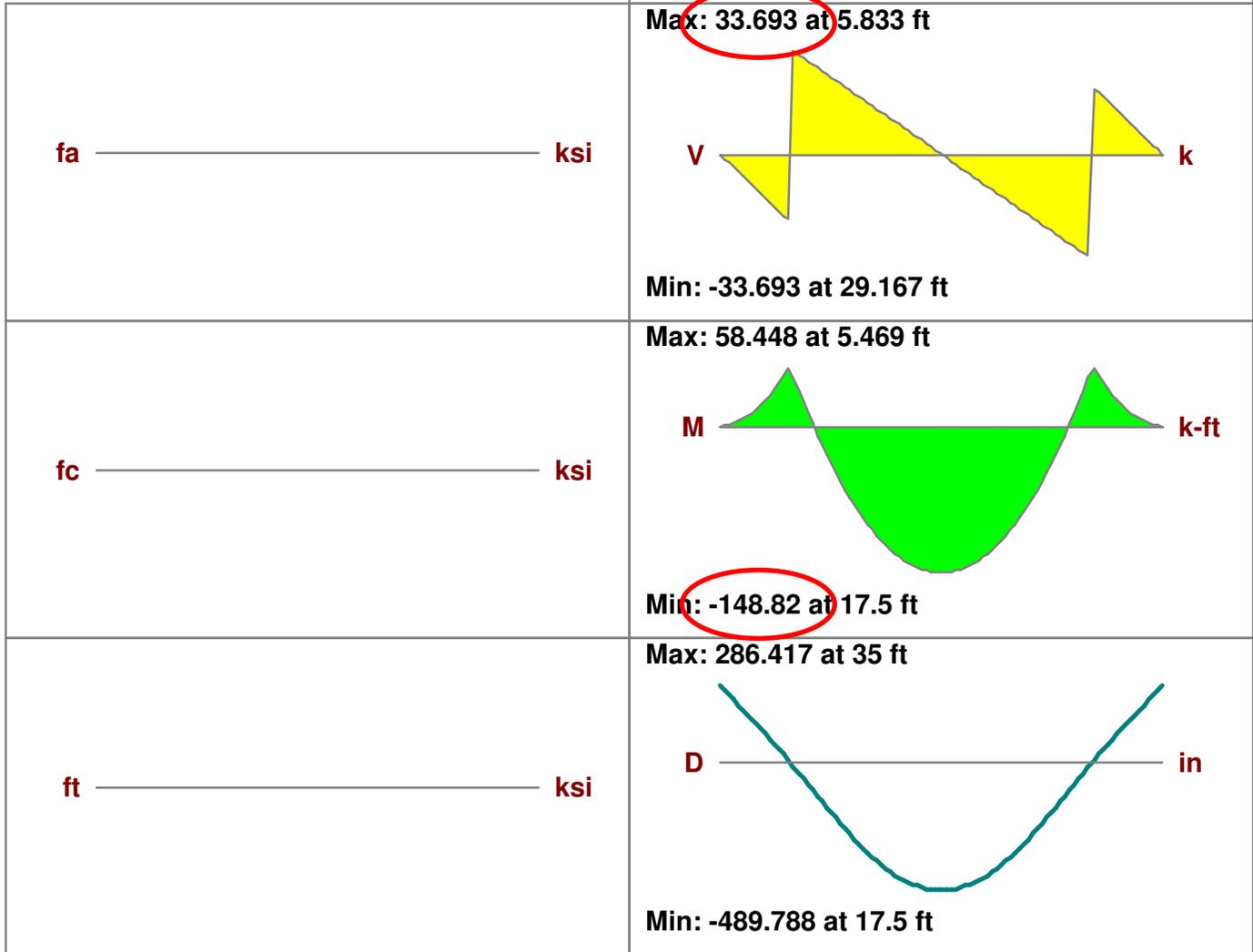
Abutment Lift Shear and Moment Diagrams (RISA output)

Member: **ABUTMENT**

Shape:  
 Length: **35 ft**  
 I Joint: **N1**  
 J Joint: **N4**

LC 1: dead weight

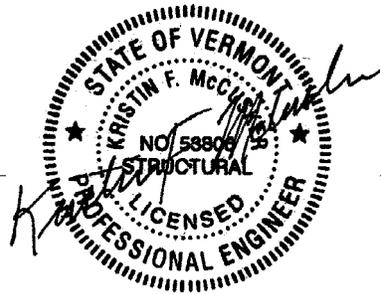
Max Code Check: **No Calc**



**AISC ASD 9th Ed. Code Check**

- Steel code check not calculated -

Max Defl Ratio **L/1**



T.R. Fellows Engineering - Reinforced Concrete Simple Beam Design						
Reference: Reinforced Concrete Design, 2nd Edition, by Kenneth Leet						
INPUT	value	units	description	Leet reference page	ACI 318-02 ref. section	CAMBRIDGE BRO1448(39) NOTES
fy	60,000	psi	reinforcing steel yield stress			
f'c	5,000	psi	concrete compressive stress			minimum required at 28 days
d	58.0	in	effective depth to center of reinforcing bar(s)			see Note 2 below regarding estimation of effective depth
h	67.0	in	gross beam depth			conservatively taken at middle section between cheek walls
b	18.0	in	width of beam section			reduced effective width at pile cavities (3.5' gross width - 2' diam pile cavity)
M_service	148,820	lb-ft	maximum bending moment due to service loads			see RISA analysis output, page 21
V_service	33,693	lbs	maximum shear due to service loads			see RISA analysis output, page 21
OUTPUT	value	units	description			
Mu	178,584	lb-ft	M_service x 1.2 dead load factor			Mu = required flexural strength
$\beta$	0.80	unitless	coefficient	Leet pg 90, eqn 3.32	ACI 10.2.7.3	
p_required	0.00066	unitless	min reinf. ratio required to meet Mu			user input, iterate to determine correct value
As_required	0.69	sq in	min area of reinforcing steel required to meet Mu			calculated from p_required
p_min	0.00088	unitless	min reinf. ratio required to meet ACI code		ACI 10.5.1 and 10.5.3	minimum of (200/fy) or (4/3*amount req'd by analysis)
As_provided	1.86	sq in	actual area of reinforcing steel provided in beam section			user input based on Cambridge BRO1448(39) beam section in question <sup>1</sup>
p_provided	0.00178	unitless	actual reinf. ratio provided in beam section			calculated from p_provided
a	0.539	in	depth of compression stress block	Leet pg 90, eqn 3.35 with p_required	ACI 10.2.7.1	
au	4.48	unitless	coefficient	Leet pg 108, Table 3.4 with p_required		
Mu= $\Phi$ Mn	178,597	lb-ft	flexural design strength, $\Phi=0.9$ , using p_required	Leet pg 100, eqn 3.52 with p_required		
$\Phi$ Mn	479,355	lb-ft	flexural design strength, $\Phi=0.9$ , using p_provided	Leet pg 100, eqn 3.52 with p_provided		flexural capacity of Cambridge beam section
fr	530	psi	modulus of rupture of concrete	Leet pg 50, eqn 3.1 & 3.2	ACI 9.5.2.3 eqn 9-10	
Mcr	595,163	lb-ft	cracking moment	Leet pg 50, eqn 3.2	ACI 9.5.2.3 eqn 9-9	cracking moment of Cambridge beam section, independent of reinf. ratio
Shear, Vc	147,644	lbs	shear strength of concrete	Leet pg 171, eqn 4.8	ACI 11.3.1.1	shear capacity of Cambridge beam section
<b>Notes:</b>						
1. Estimate As_provided at the effective depth d = 58": (6) #5 bars or 6 x 0.31 sq in = 1.86 sq in						
2. Estimate effective depth d: $\pm 67$ " total beam depth - 3" cover - 6" = 58" ----- Assume (6) #5 bars symmetrically placed about this 58" depth.						
<b>CONCLUSIONS:</b>						
<ul style="list-style-type: none"> <li>The flexural capacity of the effective beam section (at the reduced effective width of 18" at pile cavities) with an area of steel, As = 1.86 sq in at an effective depth of 58 inches is 479,355 lb-ft. This capacity is more than twice the required flexural strength of 178,584 lb-ft.</li> <li>The cracking moment of the effective beam section (at the reduced effective width of 18" at pile cavities) is 595,163 lb-ft. This cracking moment is more than twice the applied (factored) moment of 178,584 lb-ft which indicates that no cracking will occur during the lift.</li> <li>The shear capacity of the effective beam section (at the reduced effective width of 18" at pile cavities) is 147,644 lbs. This capacity is more than four times the required shear strength of 33,693 lbs.</li> <li>Since the reinforcement in the section is symmetric above and below the neutral axis, the above analysis shows that the section is sufficient for both positive and negative moment regions.</li> </ul>						



# T.R. FELLOWS ENGINEERING

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## Lifting Analysis for Bucyrus-Erie 110T Truck Crane:

According to page 13 of this submittal, the total weight of each abutment is 51.2 tons (102,400 lbs). Assuming balanced loading, the maximum load to be carried by the Bucyrus-Erie 110T Truck Crane is the sum of the following: the total weight of the abutment (102,400 lbs), one 6-sheave 110-ton hook block (3,500 lbs), (2) 36-ton 2” cable slings (450 lbs), (2) 30-ton 1-3/4” shackles (60 lbs), (2) HCLW 44 ton Tilt-Up blocks (640 lbs), (2) 24’ 42 ton 1-1/2” cable slings (310 lbs), (4) 17-ton shackles (64 lbs) and (4) WRA 160 Wire Rope Anchors (32 lbs). The maximum load to be carried by the crane is therefore:

$$102,400 \text{ lbs} + 3,500 \text{ lbs} + 640 \text{ lbs} + 310 \text{ lbs} + 450 \text{ lbs} + 60 \text{ lbs} + 64 \text{ lbs} + 32 \text{ lbs} = 107,500 \text{ lbs}$$

Unbalanced loading is not an issue in this lifting situation when checking the crane lift capacity because each abutment is lifted by only one crane. Each abutment will be picked in accordance with the Abutment 1 & 2 Lift Plan View (see page 14), the Overall Abutment Lift Elevation (see page 15), the Abutment Lift Equipment and Sequence Descriptions (see page 16), the Typical Abutment Lift Diagram – Side View (see page 17), the Typical Abutment Lift Diagram – End View (see page 18), and the Abutment Wire Rope Lifting Point Plan (see page 19).

According to the attached lifting chart for the Bucyrus-Erie 110T Truck Crane (see page 25), with a 60 ft boom length, when the crane is positioned with maximum radius of load equal to 22 ft from centerline of machine, the lift capacity of the crane is 135,600 lbs. This safely exceeds the required capacity of 107,500 lbs. The outriggers must be set to achieve the required capacities.

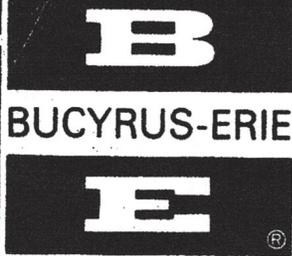
During the lift, the crane will be supported on the (4) outriggers which will each bear on a 5’ x 5’ x 2” steel plate to distribute the outrigger load on the ground surface. The approximate uniform ground pressure exerted under the steel plates by the crane when loaded is as follows:

$$(107,500 \text{ lbs} + 135,800 \text{ lbs}) / (4 \times 5 \text{ ft} \times 5 \text{ ft}) = 2,433 \text{ psf}$$

2,433 psf is less than the allowable soil bearing pressure of 3,000 psf.

Care shall be taken to ensure that the crane is positioned on a firm, level, and uniform supporting surface per manufacturer’s recommendations.

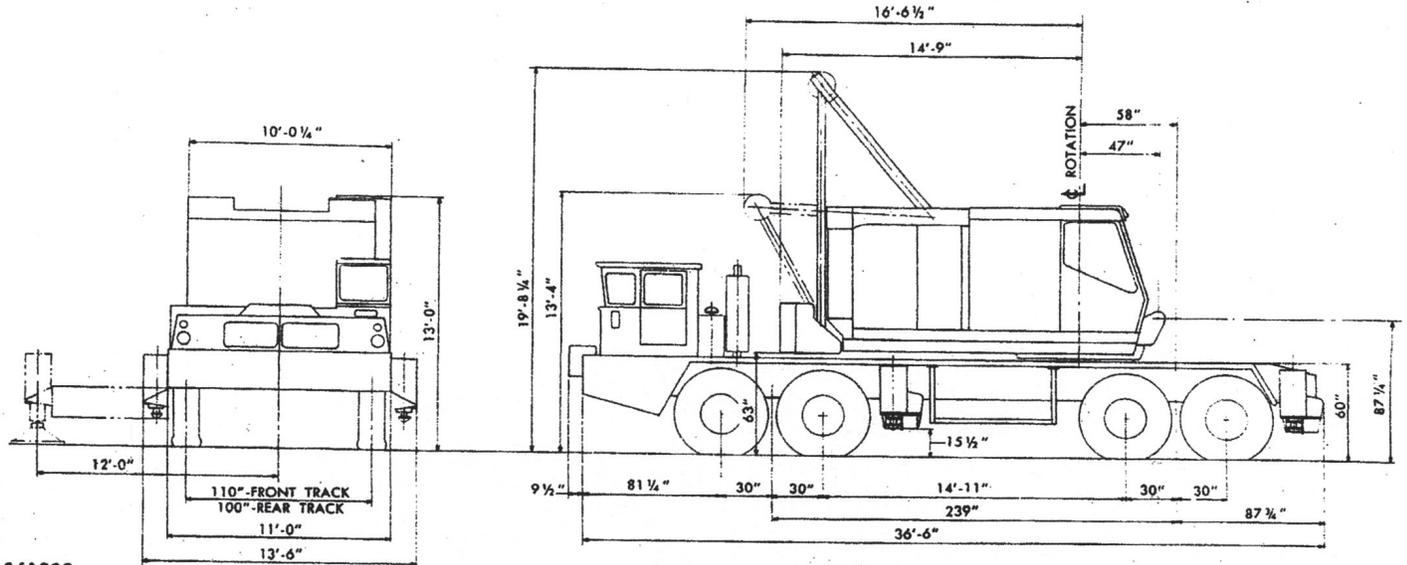




# 110-T

## 110 TON TRUCK CRANE SPECIFICATIONS

☒ rotation to rear of CRANE 12' 2"



861099

### CRANE

**Front Shaft:**  
 Main hoist drum, smooth .....16 1/2 in. Pitch Diameter  
 Hoist rope ..... 3/4 in. or 7/8 in. Diameter  
 Auxiliary hoist rope ..... 3/4 in. or 7/8 in. Diameter  
 Auxiliary hoist drum, smooth .....16 1/2 in. Pitch Diameter

**Rear Shaft:**  
 Boom hoist drum, smooth .....15 in. Pitch Diameter  
 Boom hoist rope ..... 3/4 in. Diameter  
 Third drum, smooth .....12 in. Pitch Diameter  
 Third drum rope ..... 5/8 in. Diameter

Boom point sheaves (6) .....18 in. Pitch Diameter  
 7/8 in. diameter rope required for loads over 200,000 pounds.

### LINE PULLS AND SPEEDS

Drum Pitch Diameter	1-Part Line		2-Part Line	
	Pull in Pounds	Speed (Feet/Minute)	Pull in Pounds	Speed (Feet/Minute)
16 1/2 in.	21,100	157	41,600	78.5

**Swing Speed:**  
 Standard ..... 2.25 revolutions/minute  
 Micro-Swing ..... 0.65 revolutions/minute

Speeds and line pulls based on engine with torque converter drive operating at full load speed of the output shaft. When torque converter is operating at full stall, line pulls are approximately 220 per cent of those shown in table.

### WEIGHTS IN POUNDS

	Crane 40 Ft. Boom
Net weight domestic, approx.	130,150
Working weight, approx.	<u>135,800</u>
Export shipping weight, approx.	135,450
Ship option tons	139

Hook block included in working weight and export shipping weight for lifting crane, but not in domestic net weight.

### POWER SPECIFICATIONS

Make - Model Type	Cummins N-855P Diesel
Type of drive	Torque Converter
Cylinders	6
Bore x stroke, inches	5 1/2 x 6
Displacement, cubic inches	855
H.P. net @ full load speed	149
Full load speed (R.P.M.)	2,000
Fuel tank capacity, gallons	75
Starting	Elec. - 12 volt
Altitude range, feet	0-9,000

BLOW & GOTE, INC.

815 VT Rte 15E  
 MORRISVILLE, VT 05661

CAMBRIDGE  
 RRD 1448(39)

# 110 TON TRUCK CRANE

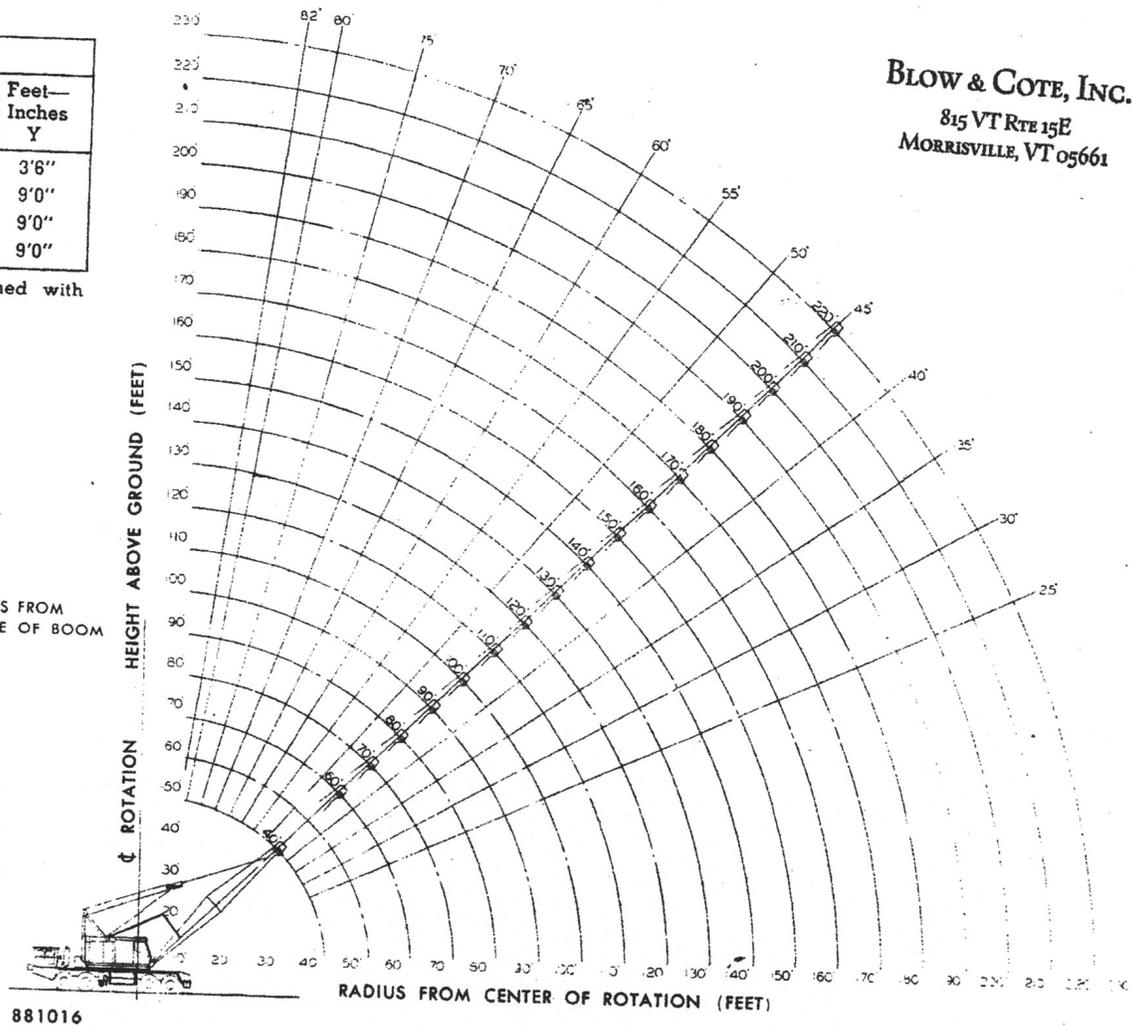
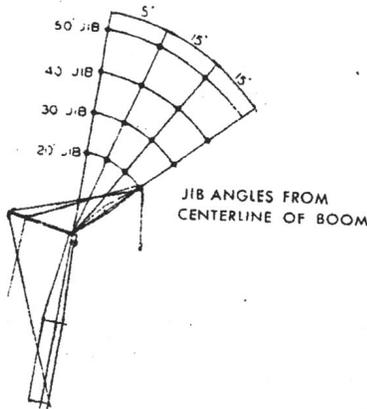
## MAXIMUM ALLOWABLE LOADS IN POUNDS — CRANE SERVICE

Boom Length In Feet	Radius In Feet	Boom Angle In Degrees	Boom Point Pin Height (Ft. -In.)	Outriggers Set Over Side or Rear	Without Outriggers On Tires		Boom Length In Feet	Radius In Feet	Boom Angle In Degrees	Boom Point Pin Height (Ft. -In.)	Outriggers Set Over Side or Rear	
					Over Side	Over Rear						
40	12	78	46-6	*220,000	96,900	139,700	150	35	78	154-0	65,600	
	16	74	45-9	*185,000	68,600	97,400		40	76	152-9	52,800	
	20	66	44-0	*149,000	45,900	64,600		50	72	150-0	37,200	
	25	58	41-3	118,900	34,100	47,900		60	68	146-6	28,200	
	30	49	37-6	86,700	26,900	37,800		70	64	142-0	22,200	
	35	39	22-6	67,900	22,100	31,100		80	60	136-6	18,000	
60	15	79	86-3	*180,000	67,900	97,000		90	55	130-0	14,900	
	20	74	85-0	*147,000	45,200	63,900		100	50	122-6	12,500	
	25	69	83-6	118,500	33,400	47,200		110	45	113-3	10,600	
	30	64	81-3	86,200	26,200	37,100		120	39	102-3	9,050	
	35	59	67-6	67,400	21,400	30,300		130	33	88-6	7,750	
	40	53	55-3	54,700	17,900	25,500		160	35	80	164-3	65,300
50	40	45-9	39,400	13,200	19,100	40			77	163-3	52,600	
80	20	78	96-9	*145,000	44,600	63,300	50		73	160-6	37,000	
	25	75	84-6	118,200	32,800	46,600	60		69	157-0	27,900	
	30	71	83-0	85,900	25,600	36,500	70		66	153-0	22,000	
	35	67	81-0	67,000	20,800	29,700	80		62	148-0	17,700	
	40	63	78-9	54,300	17,300	24,900	90		57	142-3	14,600	
	50	55	72-9	38,900	12,600	18,500	100		53	135-3	12,200	
90	60	45	64-2	29,900	9,550	14,300	110		48	127-0	10,300	
	70	34	52-3	24,000	7,550	11,500	120		43	117-6	8,750	
	20	80	96-9	*143,000	44,300	63,100	130		38	105-9	7,450	
	25	76	94-9	*117,200	32,500	46,300	170		40	78	173-6	52,400
	30	73	93-6	85,700	25,300	36,200			50	74	171-0	36,800
	40	66	89-9	54,100	17,000	24,600		60	71	167-9	27,700	
50	59	84-6	38,600	12,300	18,200	70		67	164-0	21,700		
60	51	77-9	29,600	9,250	14,100	80		63	159-3	17,500		
70	43	68-3	23,800	7,200	11,200	90		60	153-9	14,400		
100	80	32	56-3	19,600	5,650	9,150		100	56	147-6	11,900	
	25	78	105-0	*116,000	32,200	46,100		110	51	140-0	10,000	
	30	75	103-9	85,500	25,000	36,000		120	47	131-6	8,450	
	40	69	100-6	53,900	16,700	24,400		130	42	121-3	7,150	
	50	63	98-0	38,400	10,600	17,900		180	40	78	183-6	52,200
	60	56	90-0	29,400	7,950	13,800			50	75	180-3	36,500
70	49	82-3	23,500	6,100	11,000	60			72	178-3	27,400	
80	41	72-3	19,400	4,650	8,900	70	68		174-9	21,500		
90	31	56-3	16,300	3,700	7,300	80	65		170-6	17,200		
110	25	80	115-3	*115,000	31,900	45,700	90		61	165-3	14,100	
	30	76	114-3	85,300	24,700	35,600	100		58	159-6	11,700	
	40	71	111-3	53,600	16,400	24,000	110		54	152-6	9,800	
	50	65	107-3	38,200	11,700	17,600	120		50	144-9	8,200	
	60	59	102-0	29,100	8,650	13,500	130		46	136-9	6,900	
	70	53	96-3	23,200	6,550	10,600	140		41	125-0	5,900	
120	80	46	86-9	19,100	5,000	8,550	190		40	79	193-9	51,900
	90	39	75-9	16,000	3,850	6,950			50	76	191-6	36,300
	100	29	60-9	13,600	2,900	5,650		60	73	188-9	27,100	
	25	80	125-6	*114,000	31,600	45,500		70	70	185-6	21,200	
	30	77	124-6	85,100	24,400	35,400		80	66	181-3	16,900	
	40	73	121-9	53,400	16,100	23,800		90	63	176-9	13,800	
130	50	67	118-9	38,000	11,400	17,300		100	60	171-3	11,400	
	60	62	113-3	28,900	8,400	13,200		110	56	165-0	9,450	
	70	57	107-6	23,000	6,300	10,300		120	52	157-9	7,900	
	80	51	100-0	18,800	4,750	8,300		130	48	149-6	6,600	
	90	44	90-9	15,700	3,600	6,650		140	44	139-9	5,500	
	100	37	79-3	13,300	2,650	5,400		200	50	77	201-9	36,100
110	28	63-3	11,400	1,900	4,400	60			74	199-3	26,900	
30	78	134-6	84,900	24,100	35,100	70	71		196-0	20,900		
40	74	132-3	53,200	15,800	23,500	80	68		192-3	16,700		
50	69	128-9	37,700	11,100	17,000	90	65		187-9	13,600		
60	64	124-6	28,700	8,100	12,900	100	61		182-9	11,100		
140	70	59	119-3	22,800	6,000	10,000	110		58	176-9	9,250	
	80	54	112-6	18,600	4,450	8,000	120		55	170-3	7,650	
	90	49	104-0	15,500	3,300	6,400	130		51	162-6	6,350	
	100	42	94-9	13,000	2,350	5,100	140		47	153-9	5,250	
	110	35	82-6	11,100	1,600	4,100	210		50	77	212-3	35,800
	120	27	65-9	9,600	950	3,250			60	75	209-9	26,700
30	79	144-9	84,700	23,900	34,800	70			72	206-6	20,700	
40	75	142-6	53,000	15,500	23,200	80		69	203-0	16,500		
50	71	139-6	37,500	10,800	16,800	90		66	198-9	13,300		
60	66	135-6	28,500	7,850	12,700	100		63	194-0	10,900		
150	70	62	130-9	22,500	5,750	9,800		110	60	188-6	8,950	
	80	57	124-9	18,300	4,200	7,700		120	56	182-3	7,400	
	90	52	117-9	15,200	3,000	6,100		130	53	175-3	6,050	
	100	47	108-0	12,800	2,100	4,850		140	50	167-3	4,950	
	110	41	98-9	10,900	1,350	3,850		220	50	78	222-3	35,600
	120	34	85-6	9,350	—	3,000			60	75	220-0	26,500
130	26	68-3	8,050	—	2,250	70			73	217-0	20,500	
160	20	78	96-9	*145,000	44,600	63,300	80		70	213-9	16,200	
	25	75	84-6	118,200	32,800	46,600	90		67	209-9	13,100	
	30	71	83-0	85,900	25,600	36,500	100		64	206-3	10,600	
	35	67	81-0	67,000	20,800	29,700	110		61	200-0	8,700	
	40	63	78-9	54,300	17,300	24,900	120		58	194-3	7,150	
	50	55	72-9	38,900	12,600	18,500	130		55	187-6	5,850	
170	60	45	64-2	29,900	9,550	14,300	140		52	180-3	4,700	
	70	34	52-3	24,000	7,550	11,500	150		48	171-9	3,800	
	20	80	96-9	*143,000	44,300	63,100	160		45	162-3	2,950	
	25	76	94-9	*117,200	32,500	46,300	220		50	77	201-9	36,100
	30	73	93-6	85,700	25,300	36,200		60	74	199-3	26,900	
	40	66	89-9	54,100	17,000	24,600		70	71	196-0	20,900	
50	59	84-6	38,600	12,300	18,200	80		68	192-3	16,700		
60	51	77-9	29,600	9,250	14,100	90		65	187-9	13,600		
70	43	68-3	23,800	7,200	11,200	100		61	182-9	11,100		
180	80	32	56-3	19,600	5,650	9,150		110	58	176-9	9,250	
	25	78	105-0	*116,000	32,200	46,100		120	55	170-3	7,650	
	30	75	103-9	85,500	25,000	36,000		130	51	162-6	6,350	
	40	69	100-6	53,900	16,700	24,400		140	47	153-9	5,250	
	50	63	98-0	38,400	10,600	17,900		220	50	77	212-3	35,800
	60	56	90-0	29,400	7,950	13,800			60	74	209-9	26,700
70	49	82-3	23,500	6,100	11,000	70			71	206-6	20,700	
80	41	72-3	19,400	4,650	8,900	80	68		203-0	16,500		
90	31	56-3	16,300	3,700	7,300	90	66		198-9	13,300		
190	25	80	115-3	*115,000	31,900	45,700	100		63	194-0	10,900	
	30	76	114-3	85,300	24,700	35,600	110		60	188-6	8,950	
	40	71	111-3	53,600	16,400	24,000	120		56	182-3	7,400	
	50	65	107-3	38,200	11,700	17,600	130		53	175-3	6,050	
	60	59	102-0	29,100	8,650	13,500	140		49	167-3	4,950	
	70	53	96-3	23,200	6,550	10,600	220		50	77	201-9	36,100
80	46	86-9	19,100	5,000	8,550	60			74	199-3	26,900	
90	39											

# 110 TON TRUCK CRANE

HOOK BLOCKS		
Capacity	No. Parts	Feet—Inches Y
8½ Ton	1	3'6"
25 Ton	2	9'0"
60 Ton	6	9'0"
110 Ton	12	9'0"

"Y" dimension determined with boom at 82°.



**BLOW & COTE, INC.**  
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MORRISVILLE, VT 05661

881016

## CRANE SERVICE

Loads shown in table are for general crane service with the machine on firm, level ground, with tire pressures not less than 105 psi. For prolonged highway travel, reduce this pressure to 95 psi. Suspension—14 part tackle with pendants. Intermediate suspension is required on booms 170' and longer. Maximum boom angle is 82°.

## RECOMMENDED HOIST TACKLE

Loads Over	16,500	33,000	50,000	67,000	84,000	100,000
Part of Line	2	3	4	5	6	7
		117,000	134,000	151,000	168,000	184,000
		8	9	10	11	12

\*For loads over 200,000 lbs. use 7/8" hoist cable. Deduct weight of hook blocks, hooks and slings from listed loads.

## JIBS

Use jibs for lifting crane service only. Allowable loads on main boom sheaves, with jib attached, must be reduced as follows:  
 20 ft. jib.....1900 lbs.                      40 ft. jib.....2500 lbs.  
 30 ft. jib.....2100 lbs.                      50 ft. jib.....3000 lbs.  
 Maximum length of boom to which a jib may be attached is 200 feet. Maximum allowable jib loads are as follows:

Jib Offset* in Degrees	Jib Length			
	20-ft.	30-ft.	40-ft.	50-ft.
0	20,000	17,000	13,000	10,000
15	20,000	17,000	13,000	10,000
30	15,000	12,000	9,000	6,000
45	10,000	7,000	4,000	—

\*Maximum offset (angular) from centerline of boom to centerline of jib.

The allowable load over the jib sheave, at any radius from the centerline of rotation of the machine, is the same load that may be lifted over the boom point sheave (without jib) with boom lowered to that radius, but not to exceed the loads in the jib table. For jib loads over 16,500 lbs., use 2-part line.

## GENERAL

Maximum boom or boom-jib combinations that can be lifted off the ground unassisted are:

	With Outriggers		
	With Bumper Cwt.	Without Bumper Cwt.	Without Outriggers
Boom Over Side	210 ft.	200 ft.	130 ft.
Over Rear	220 ft.	210 ft.	140 ft.
Boom-Jib Over Side	190 ft. + 30 ft.	170 ft. + 50 ft.	100 ft. + 50 ft.
Over Rear	200 ft. + 50 ft.	180 ft. + 40 ft.	120 ft. + 50 ft.

The maximum boom-jib combination that can be lifted off the ground unassisted over the rear of the carrier with outriggers set and with a front bumper counterweight is 200' + 50'.

Maximum boom or boom-jib combination that can be carried in a lowered position and with A-frame in the lowered position is 110 ft. or 90 ft. plus a 30 ft. jib. With boom-jib combination in a horizontal position, clearance height over the jib mast is 17' 2".

## MACHINE EQUIPMENT

Alloy steel tubular "Trigon" boom, 15,600 lbs. outside counterweight, 31" high and 27½" wide, distance between center of jacks with outriggers fully extended is 24' 0", 9,500 lb. front bumper counterweight is used for erection purposes only. Remove bumper counterweight when traveling.

# T.R. FELLOWS ENGINEERING

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## Lifting Analysis for Kobelco 160 Ton CK1600-II Crawler Crane

According to page 13 of this submittal, the total weight of each abutment is 51.2 tons (102,400 lbs). Assuming balanced loading, the maximum load to be carried by the Kobelco CK1600-II crane is the sum of the following (see page 16): the total weight of the abutment (102,400 lbs), one 6-sheave 110-ton hook block (3,500 lbs), (2) 36-ton 2” cable slings (450 lbs), (2) 30-ton 1-3/4” shackles (60 lbs), (2) HCLW 44 ton Tilt-Up blocks (640 lbs), (2) 24’ 42 ton 1-1/2” cable slings (310 lbs), (4) 17-ton shackles (64 lbs) and (4) WRA 160 Wire Rope Anchors (32 lbs). The maximum load to be carried by the crane is therefore:

$$102,400 \text{ lbs} + 3,500 \text{ lbs} + 640 \text{ lbs} + 310 \text{ lbs} + 450 \text{ lbs} + 60 \text{ lbs} + 64 \text{ lbs} + 32 \text{ lbs} = 107,500 \text{ lbs}$$

Unbalanced loading is not an issue in this lifting situation when checking the crane lift capacity because each abutment is lifted by only one crane. Each abutment will be picked in accordance with the Abutment 1 & 2 Lift Plan View (see page 14), the Overall Abutment Lift Elevation (see page 15), the Abutment Lift Equipment and Sequence Descriptions (see page 16), the Typical Abutment Lift Diagram – Side View (see page 17), the Typical Abutment Lift Diagram – End View (see page 18), and the Abutment Wire Rope Lifting Point Plan (see page 19).

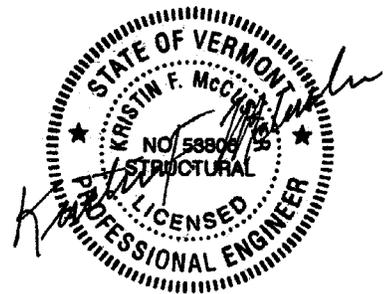
According to the attached lifting charts for the 160 Ton Kobelco CK1600-II Crane (see page 33), with a 100 ft boom length, when the crane is positioned with maximum radius of load equal to 28 ft from centerline of machine, the lift capacity of the crane is 152,300 lbs. This safely exceeds the required capacity of 107,500 lbs.

The approximate uniform average pressure exerted by the crane tracks when loaded is as follows:

$$(138,890 \text{ lbs} + 107,500 \text{ lbs}) / (2 \times 22.6 \text{ ft} \times 4 \text{ ft}) = 1,363 \text{ psf}$$

This pressure is averaged over the full area of the crane tracks.

Care shall be taken to ensure that the crane is positioned on a firm, level, and uniform supporting surface per the manufacturer’s recommendations.



# SPECIFICATIONS FOR CK1600-II CRAWLER CRANE

The Kobelco CK1600-II Crawler Crane is designed from the ground up for reliable operation, convenient maintenance and easy transport. Please consult your Kobelco distributor for additional information regarding specifications, operating parameters and maintenance requirements.

## 1. GENERAL DESCRIPTION

Type	Crawler mounted, fully revolving
Maximum lifting capacity	320,000 lbs (145,200 kg) (at 15' operating radius, with 50' boom)
Basic boom length	50' (15.2 m)
Maximum boom length	250' (76.2 m)
Maximum boom & jib length	200' + 100' (61.0 m + 30.5 m)

Boom hoist line speed	157 ~ 7 ft/min (48 ~ 2 m/min)
2 minutes: 250 ft (76.2 m) boom raise 0 to 80 degree	
Boom lowering line speed	157 ~ 7 ft/min (48 ~ 2 m/min)
Swing speed	2.1 rpm (2.1 min <sup>-1</sup> )
Travel speed (High / Low)	0.81 / 0.56 mph (1.3 / 0.9 km/hour)

## 2. GENERAL DIMENSIONS

Height to top of cab	11' 9" (3.57 m)
Width of upper machine with operator's cab	10' 6" (3.20 m)
Radius of rear end (counterweight)	18' 1" (5.50 m)
Counterweight ground clearance	4' 5" (1.34 m)
Center of rotation to boom foot pin	4' 7" (1.40 m)
Height from ground to boom foot pin	8' 4" (2.53 m)
Height over gantry (raised)	25' 11" (7.89 m)
Overall length of crawler	25' 11" (7.89 m)
Center to center of tumbler	12' 7" (6.89 m)
Overall width of crawlers	21' 9" (6.62 m)
Shoe width	48" (1.22 m)
Ground clearance of carbody	19" (0.48 m)

## 5. UPPER MACHINERY

### 5.1 Power plant

Diesel engine, make and model	Hino P11C-UN (Comply with EPA "Tier 3")
No. of cylinders	6
Bore X stroke	4-13/32" X 5-29/32" (122 mm X 150 mm)
Cycles	4
Total displacement	642 cu.in (10,520 cm <sup>3</sup> )
Rated output SAE GROSS	331 HP / 2,000 rpm (247 kW / 2,000 min <sup>-1</sup> )
Maximum torque	959 lbs-ft / 1,500 rpm (1,300 Nm / 1,500 min <sup>-1</sup> )
Starter	24 Volts / 6.0 kW
Alternator	24 Volts / 50 Amp
Batteries	Two 12 volt, 136 AH capacity series connected.

**Radiator**  
Corrugated type core, thermostatically controlled.

**Throttle**  
Twist grip type hand throttle, electrically controlled.

**Air cleaner** Dry type with replaceable paper element.

**Fuel tank capacity** 106 US gal. (400 liters)

**Lube oil filter**  
Full flow and by-pass type with spin off type cartridge.

**Fuel filter** Heavy duty with spin off type cartridge.

**Approximate fuel consumption**  
0.362 lb / HP-hr (220 g / kW-hr)  
17.3 US gal. / hr at 100 % HP

### 5.2 Hydraulic pumps

All driven from heavy duty pump drive.

Load hoist and propel	2 Piston pumps
Boom hoist	1 Piston pump
Swing	1 Piston pump
Control system and auxiliary	2 Gear pumps
Break cooling system	2 Gear pumps

## 3. WORKING WEIGHT

Type of Counterweight	Light	Standard
Working Weight	273,000 lbs (124,000 kg)	306,000 lbs (139,000 kg)
Ground Bearing Pressure	10.5 psi	11.7 psi
Gradeability	30%	30%

Calculations to determine working weight ground bearing pressure and gradeability include the weight of the base machine, 50' boom and hook block.

## 4. WORKING SPEED

Line speeds based on single line, no load and first layer of rope on the drum.

Hoist line speed (front and rear drum)	390 ~ 10 ft/min (120 ~ 3 m/min)
Lowering line speed (front and rear drum)	390 ~ 10 ft/min (120 ~ 3 m/min)

**Counterweight**

**Weight**

one (1) base counterweight (A) and eight (8) side counterweights (B) 105,820 lbs(48,000 kg)

**Standard Weight**

In addition Standard Weight, add optional Additional Weight

one (1) base counterweight (A), eight (8) side counterweight (B) and two side counterweights (C) 116,840 lbs (53,000 kg)

two (2) carbody weight 22,050 lbs (10,000 kg)

Additional weight consists of two (2) side counterweights (C) and two (2) carbody weights.

Description		Light	Standard
Base Counterweight (A)		1	1
Side Counterweight (B)		8	8
Side Counterweight (C)		0	2
Carbody Counterweight		0	2
Total Weight	Upper	105,820 lbs (48,000 kg)	116,840 lbs (53,000 kg)
	Lower	None	22,050 lbs (10,000 kg)

*Side counterweight (C) and Carbody weight is set as Additional Weight (Optional)*

**5.4 Gantry**

This high folding type gantry is fitted with a sheave frame for boom hoist reeving. Hydraulic lift is standard. It provides full up, full down positions with linkage.

**5.5 Operator's cab**

Totally enclosed from weather, this full-vision cab has safety glass all around. The adjustable, high-backed seat with armrest is standard, allowing operators to customize the position. Auxiliary controls and instruments are on a side mounted console. A signal horn, windshield wipers, air conditioner are all standard features.

**5.6 Controls**

At operator's right are console-mounted adjustable short levers for the front and rear drum and the boom hoist control. Beside the operator's seat on the right are two short levers for propel control, individual speed shifts for front drum, rear drum and boom drum. At the operator's left are the console mounted swing lever, knobs for front and rear drum, boom drum pawls, engine start / stop key. A swing brake control switch and signal horn button are on the swing lever.

**5.7 Electric system**

All wiring corded for easy serving, individual fused branch circuit.

**5.8 Hydraulic system**

Maximum pressure rating 4,620 psi (32.0 MPa)

Cooling Oil to air heat exchanger

**Filtration**

Full flow filters with replaceable paper elements

**5.9 Boom hoist**

Powered by hydraulic motor through planetary reducer.

**Drum**

Single drum.  
Grooved for 20.0 mm dia. wire rope.

**Brake**

A spring set, hydraulically-released, multiple-disc holding brake is mounted inside the boom hoist motor and is operated through a counter-balance valve. An external ratchet is fitted for locking the drum.

**5.10 Front drum**

Powered by hydraulic motor through planetary reducer.

**Drum**

26.2" (666 mm) P.C.D. X 26.5" (672 mm) Lg.  
Grooved for 26 mm dia. wire rope.

**Brake**

A spring set, hydraulically-released, multiple-disc holding brake is mounted inside the hoist motor and is operated through a counter-balance valve. An external ratchet is fitted for locking the drum.

**Free-Fall (Optional)**

Wet-type disk brake free-fall is mounted inside the drum.

**5.11 Rear drum**

Powered by hydraulic motor through planetary reducer.

**Drum**

26.2" (666 mm) P.C.D. X 26.5" (672 mm) Lg.  
Grooved for 26 mm dia. wire rope.

**Brake**

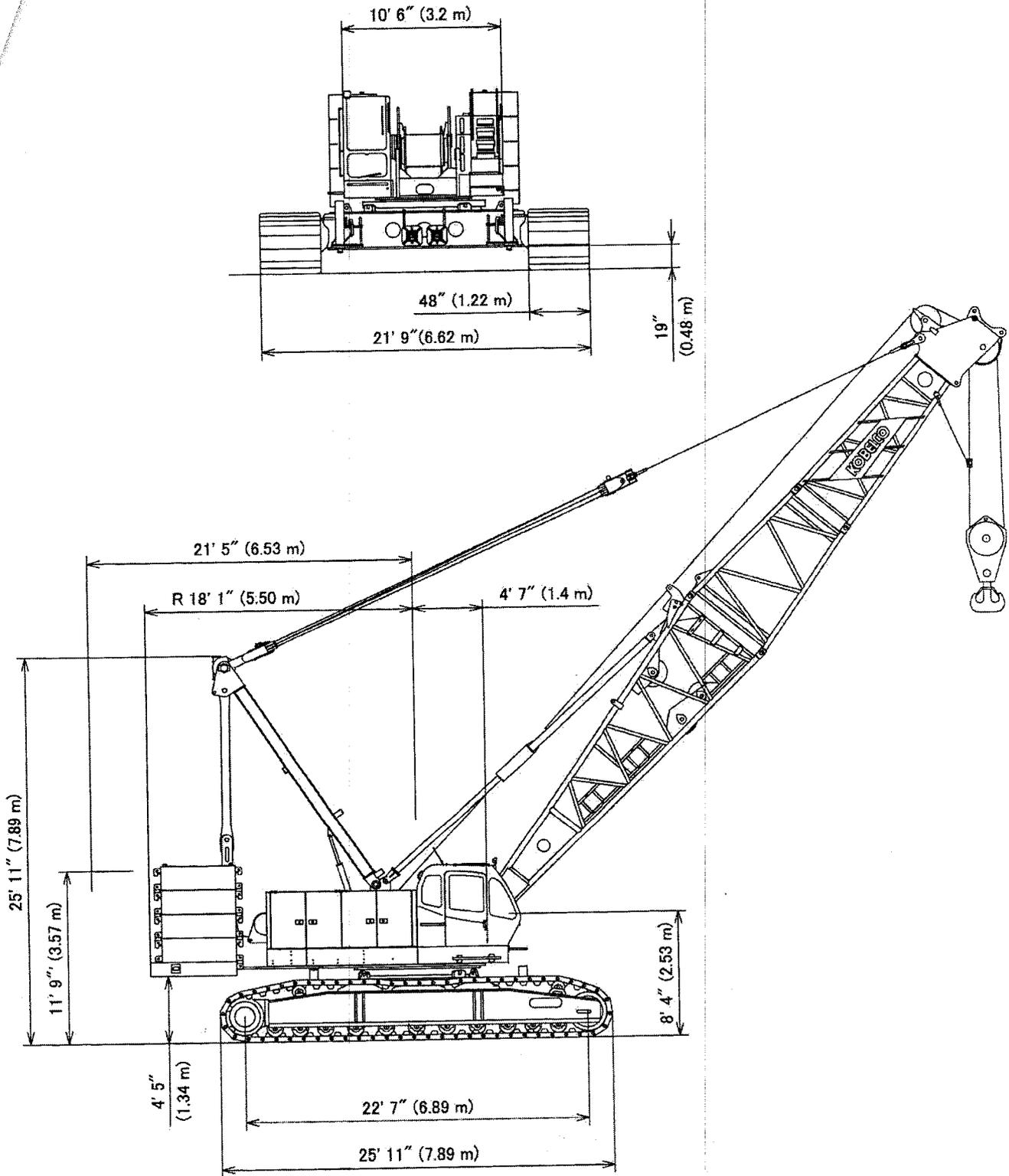
A spring set, hydraulically-released, multiple-disc holding brake is mounted inside the hoist motor and is operated through a counter-balance valve. An external ratchet is fitted for locking the drum.

**Free-Fall (Optional)**

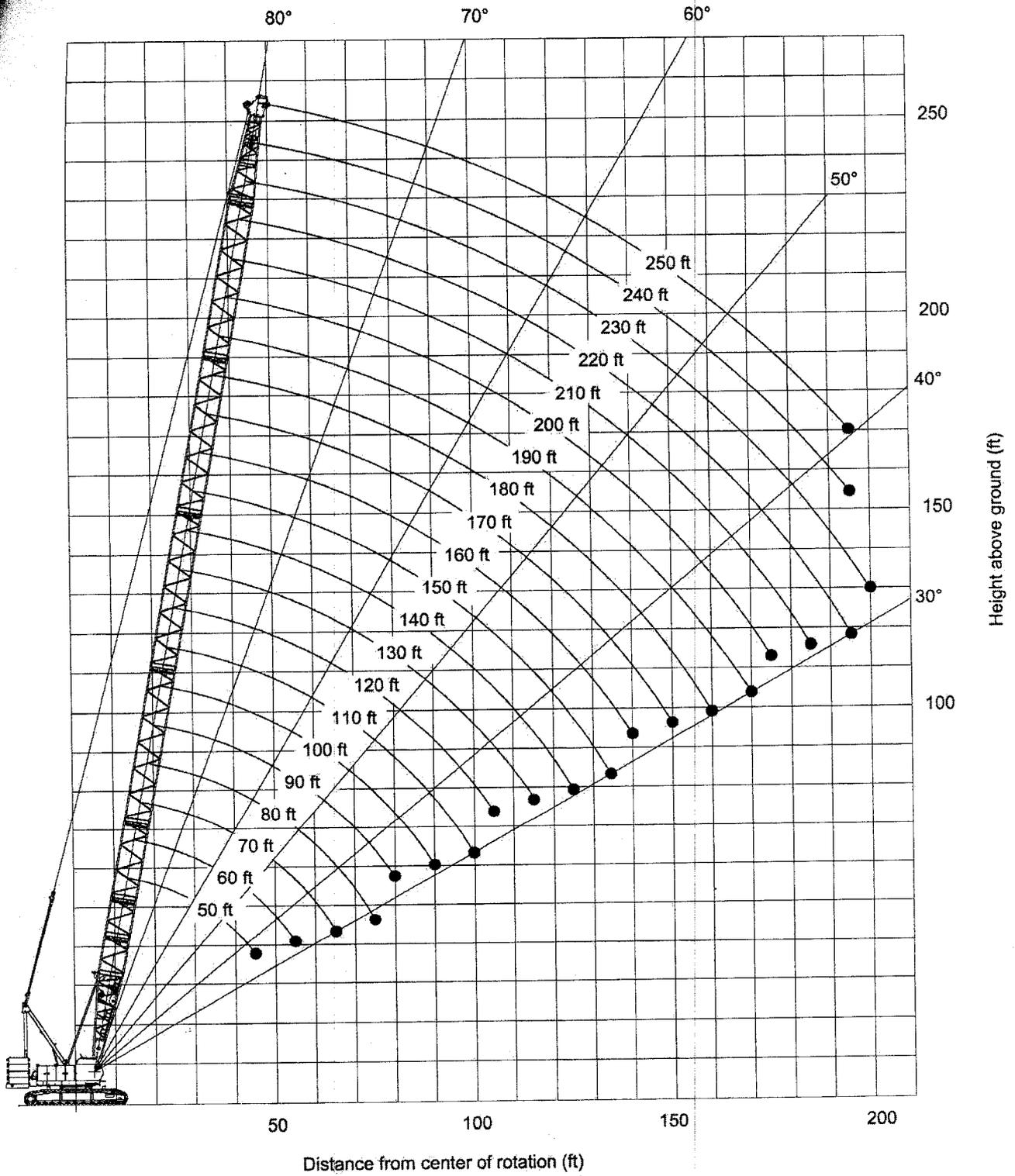
Wet-type disk brake free-fall is mounted inside the drum.

# K1600-II General Dimensions

# KOBELCO



# K1600-II Main Boom Working Range **KOBELCO**



# KOBELCO CK1600-II Main boom rated loads in pounds

Counterweight: 116,840 lbs (53,000 kg)

Carbody weight: 22,050 lbs (10,000 kg)

## Supplemental Data

- Rated loads included in the charts are the maximum allowable freely suspended loads at a given boom length, boom angle and load radius, and have been determined for the machine standing level on firm supporting surface under ideal operating conditions. The user must limit or de-rate rated loads to allow for adverse conditions (such as soft or uneven ground, out-of-level conditions, wind, side loads, pendulum action, jerking or sudden stopping of loads, inexperience of personnel, multiple machine lifts, and traveling with a load).
- Rated loads do not exceed 75% of minimum tipping loads. Rated loads based on factors other than machine stability such as structural competence are shown by asterisk \* in the charts.

3. The machine must be reeved and set-up as stated in the operation manual and all the instruction manuals if these manuals are missing, obtain replacements.

- The crane must be leveled to within 1% on a firm supporting surface.
- Boom backstops are required for all boom length.
- Gantry must be fully raised position for all operations.
- Counterweight: 116,840 lbs (53,000 kg)  
Refer to Fig.1.
- Carbody weight: 22,050 lbs (10,000 kg)  
Carbody weights are fully installed.

- Do not attempt to lift where no radius on load is listed as crane may tip or collapse.
- Attempting to lift more than rated loads may cause machine to tip or collapse. Do not tip machine to determine rated loads.
- Weight of hooks, hook blocks, slings and other lifting devices are a part of the total load. Their total weight must be subtracted from the rated load to obtain the weight that can be lifted.
- When lifting over boom point with jib or auxiliary sheave, rated loads for the boom must be deducted as shown below.

Jib length (ft)	Aux	40	60	80	100
Deductions (lbs)	1,250	7,055	8,010	8,965	9,920

- The total load that can be lifted by jib is limited by rated jib loads.
- Boom lengths for jib mounting are 90 ft (27.4 m) to 200 ft (61.0 m)

10. The total load that can be lifted by the auxiliary sheave is: the rated load for the boom (without auxiliary sheave installed) minus 1,250 lbs; however, the auxiliary sheave rated load should not exceed 59,000 lbs.

11. Boom lengths that can attach auxiliary sheave are from 50 ft (15.2 m) to 240 ft (73.2 m).

12. The boom should be erected over the front of the crawlers, not laterally.  
When lifting from or lowering to the ground the boom at length of 240 ft (73.2 m) or over, the blocks must be placed at the end of crawlers.

13. Least stable position is over the side.

14. Maximum hoist load for number of reeving parts of line for hoist rope.

### Main Boom Hoist Loads

No. of Parts of Line	1	2	3	4
Maximum Loads (lbs)	29,500	59,000	88,500	118,000

No. of Parts of Line	5	6	7	8
Maximum Loads (lbs)	147,500	177,000	206,500	236,000

No. of Parts of Line	9	10	11
Maximum Loads (lbs)	265,500	295,000	320,000

### Jib Hoist Loads

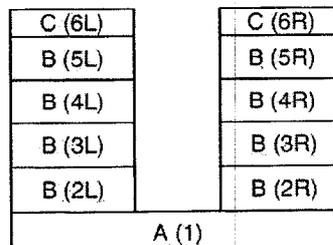
No. of Parts of Line	1	2
Maximum Loads (lbs)	29,500	59,000

### Auxiliary Sheave Hoist Loads

No. of Parts of Line	1	2
Maximum Loads (lbs)	29,500	59,000

15. Rated loads listed apply only to the machine as originally manufactured and designed by KOBELCO CRANES CO., LTD. Modifications to this machine or use of equipment other than that specified can reduce operating capacity.

16. Designed and rated to comply with ANSI Code B30.5.



Total weight of counterweight is 116,840 lbs (53,000 kg).

Fig.1 Counterweight Arrangement

Operation of this equipment in excess of rated loads or disregard of instruction voids the warranty

### CK1600-II Main Boom Rated Loads

with 11 counterweights (116,840 lbs) and 2 carbody weights (22,050 lbs)

50' Boom			60' Boom			70' Boom			80' Boom		
Load Radius (ft)	Boom Angle (deg.)	360° Rated Load (lbs)	Load Radius (ft)	Boom Angle (deg.)	360° Rated Load (lbs)	Load Radius (ft)	Boom Angle (deg.)	360° Rated Load (lbs)	Load Radius (ft)	Boom Angle (deg.)	360° Rated Load (lbs)
15.0	79.9	320,000 *	17.0	79.6	280,000 *	19.0	79.5	251,100 *	22.0	78.6	211,800 *
16.0	78.7	300,100 *	18.0	78.7	266,000 *	20.0	78.6	238,500 *	24.0	77.1	190,200 *
17.0	77.5	282,500 *	19.0	77.7	251,900 *	22.0	76.9	217,100 *	26.0	75.7	172,600 *
18.0	76.3	266,800 *	20.0	76.7	239,300 *	24.0	75.3	194,600 *	28.0	74.2	157,800 *
19.0	75.1	252,700 *	22.0	74.7	218,000 *	26.0	73.5	176,300 *	30.0	72.7	145,500 *
20.0	73.9	240,100 *	24.0	72.7	197,500 *	28.0	71.8	160,900 *	32.0	71.1	134,400
22.0	71.5	218,300 *	26.0	70.7	178,300 *	30.0	70.1	147,900 *	34.0	69.6	123,000
24.0	69.1	197,700 *	28.0	68.6	162,200 *	32.0	68.3	134,700	36.0	68.1	113,300
26.0	66.5	177,400 *	30.0	66.5	148,300	34.0	66.5	123,400	38.0	66.5	105,100
28.0	64.0	160,400 *	32.0	64.4	134,900	36.0	64.7	113,700	40.0	64.9	97,800
30.0	61.4	145,900 *	34.0	62.2	123,600	38.0	62.8	105,500	45.0	60.8	83,300
32.0	58.7	133,300 *	36.0	60.0	113,900	40.0	61.0	98,300	50.0	56.6	72,300
34.0	55.9	122,100 *	38.0	57.7	105,800	45.0	56.1	83,700	55.0	52.1	63,900
36.0	53.0	112,200 *	40.0	55.4	98,500	50.0	50.9	72,700	60.0	47.4	56,800
38.0	50.0	103,300 *	45.0	49.3	83,900	55.0	45.3	64,300	65.0	42.2	51,300
40.0	46.8	95,200 *	50.0	42.4	72,000 *	60.0	39.0	57,300 *	70.0	36.3	46,700 *
45.0	38.0	76,900 *	55.0	34.4	60,100 *	65.0	31.7	48,700 *	75.0	29.5	40,300 *
90' Boom			100' Boom			110' Boom			120' Boom		
Load Radius (ft)	Boom Angle (deg.)	360° Rated Load (lbs)	Load Radius (ft)	Boom Angle (deg.)	360° Rated Load (lbs)	Load Radius (ft)	Boom Angle (deg.)	360° Rated Load (lbs)	Load Radius (ft)	Boom Angle (deg.)	360° Rated Load (lbs)
22.0	79.9	207,600 *	24.0	79.8	183,400 *	26.0	79.6	164,200 *	28.0	79.5	147,000 *
24.0	78.6	186,500 *	26.0	78.6	166,400 *	28.0	78.6	150,100 *	30.0	78.6	135,500 *
26.0	77.3	169,000 *	28.0	77.4	152,300 *	30.0	77.5	138,200 *	32.0	77.6	125,600 *
28.0	76.0	154,700 *	30.0	76.2	140,400 *	32.0	76.4	128,300 *	34.0	76.6	117,000 *
30.0	74.6	142,600 *	32.0	75.0	130,200 *	34.0	75.4	119,400 *	36.0	75.6	109,500 *
32.0	73.3	132,200 *	34.0	73.8	121,400 *	36.0	74.3	111,900 *	38.0	74.6	102,900 *
34.0	72.0	122,700	36.0	72.6	112,800	38.0	73.2	104,400	40.0	73.6	96,700
36.0	70.6	113,000	38.0	71.4	104,700	40.0	72.1	97,200	45.0	71.1	82,200
38.0	69.3	104,700	40.0	70.2	97,400	45.0	69.3	82,600	50.0	68.6	71,200
40.0	67.9	97,400	45.0	67.1	82,800	50.0	66.5	71,600	55.0	65.9	62,600
45.0	64.4	82,800	50.0	63.9	71,800	55.0	63.6	63,000	60.0	63.3	55,500
50.0	60.8	72,000	55.0	60.7	63,200	60.0	60.6	56,200	65.0	60.6	50,000
55.0	57.0	63,400	60.0	57.3	56,400	65.0	57.5	50,400	70.0	57.8	45,100
60.0	53.1	56,400	65.0	53.8	50,700	70.0	54.4	45,600	75.0	54.9	41,200
65.0	48.9	50,900	70.0	50.1	46,000	75.0	51.1	41,600	80.0	51.9	37,600
70.0	44.4	46,200	75.0	46.2	41,800	80.0	47.6	38,300	85.0	48.7	34,800
75.0	39.6	42,300	80.0	42.0	38,500	85.0	43.9	35,200	90.0	45.4	32,100
80.0	34.1	38,800 *	85.0	37.4	35,700	90.0	39.9	32,800	95.0	41.9	29,900
			90.0	32.3	32,800 *	95.0	35.6	30,400	100.0	38.1	27,900
						100.0	30.7	27,900 *	105.0	34.0	26,000

# 1-Part Slings

## MECHANICAL SPLICE IWRC

### 2-LEG BRIDLE

RATED CAPACITY IN TONS OF 2,000 lbs.  
RATED CAPACITIES SHOWN APPLY ONLY TO 6X19 AND 6X36 CLASSIFICATION WIRE ROPE

ROPE DIA. (IN)	VERTICAL			60°			45°			30°		
	IPS	EIPS	EEIPS	IPS	EIPS	EEIPS	IPS	EIPS	EEIPS	IPS	EIPS	EEIPS
1/4	1.1	1.3	1.4	0.97	1.1	1.2	0.79	0.91	1.0	0.56	0.65	0.7
5/16	1.7	2.0	2.2	1.5	1.7	1.9	1.2	1.4	1.6	0.87	1.0	1.1
3/8	2.5	2.9	3.2	2.2	2.5	2.7	1.8	2.0	2.2	1.2	1.4	1.6
7/16	3.4	3.9	4.3	2.9	3.4	3.7	2.4	2.7	3.0	1.7	1.9	2.1
1/2	4.4	5.1	5.5	3.8	4.4	4.8	3.1	3.6	3.9	2.2	2.5	2.8
9/16	5.5	6.4	7.0	4.8	5.5	6.1	3.9	4.5	5.0	2.8	3.2	3.5
5/8	6.8	7.8	8.6	5.9	6.8	7.5	4.8	5.5	6.1	3.4	3.9	4.3
3/4	9.7	11	12	8.4	9.7	11	6.9	7.9	8.7	4.9	5.6	6.2
7/8	13	15	17	11	13	14	9.3	11	12	6.6	7.6	8.3
1	17	20	22	15	17	19	12	14	15	8.5	9.8	11
1 1/8	21	24		18	21		15	17		10	12	
1 1/4	26	30		22	26		18	21		13	15	
1 3/8	31	36		27	31		22	25		15	18	
1 1/2	37	42		32	37		26	30		18	21	
1 5/8	43	49		37	42		30	35		21	24	
1 3/4	49	57		43	49		35	40		25	28	
1 7/8	56	64		49	56		40	46		28	32	
2	64	73		55	63		45	52		32	37	
2 1/8	69	80		60	69		49	56		35	40	
2 1/4	77	89		67	77		55	63		39	44	
2 3/8	86	99		75	85		61	70		43	49	
2 1/2	94	109		82	94		67	77		47	54	
2 5/8	104	119		90	103		73	84		52	60	
2 3/4	113	130		98	113		80	92		57	65	
2 7/8	123	141		106	122		87	100		61	71	
3	133	153		115	133		94	108		67	77	
3 1/8	144	165		124	143		102	117		72	82	
3 1/4	154	177		134	153		109	125		77	89	
3 3/8	165	190		143	165		117	135		83	95	
3 1/2	177	203		153	176		125	144		88	102	

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

BLOW & COPE, INC.  
815 VT Rte 15E  
MORRISVILLE, VT 05661  
CAMBRIDGE  
BRD 1448 (37)

## MECHANICAL SPLICE IWRC

### VERTICAL, CHOKER OR VERTICAL BASKET

RATED CAPACITY IN TONS OF 2,000 lbs.  
RATED CAPACITIES SHOWN APPLY ONLY TO 6X19 AND 6X36 CLASSIFICATION WIRE ROPE

ROPE DIAMETER (INCHES)	VERTICAL			CHOKER			VERTICAL BASKET		
									
	IPS	EIPS	EEIPS	IPS	EIPS	EEIPS	IPS	EIPS	EEIPS
1/4	0.56	0.65	0.71	0.41	0.48	0.52	1.1	1.3	1.4
5/16	0.87	1.0	1.1	0.64	0.74	0.81	1.7	2.0	2.2
3/8	1.2	1.4	1.6	0.92	1.1	1.2	2.5	2.9	3.2
7/16	1.7	1.9	2.1	1.2	1.4	1.6	3.4	3.9	4.3
1/2	2.2	2.5	2.8	1.6	1.9	2.0	4.4	5.1	5.5
9/16	2.8	3.2	3.5	2.0	2.4	2.6	5.5	6.4	7.0
5/8	3.4	3.9	4.3	2.5	2.9	3.2	6.8	7.8	8.6
3/4	4.9	5.6	6.2	3.6	4.1	4.5	9.7	11	12
7/8	6.6	7.6	8.3	4.8	5.6	6.1	13	15	17
1	8.5	9.8	11	6.3	7.2	8.0	17	20	22
1 1/8	10	12		7.9	9.1		21	24	
1 1/4	13	15		10	11		26	30	
1 3/8	15	18		12	13		31	36	
1 1/2	18	21		14	16		37	42	
1 5/8	21	24		16	18		43	49	
1 3/4	25	28		19	21		49	57	
1 7/8	28	32		21	24		56	64	
2	32	37		24	28		64	73	
2 1/8	35	40		27	31		69	80	
2 1/4	39	44		30	35		77	89	
2 3/8	43	49		33	38		86	99	
2 1/2	47	54		37	42		94	109	
2 5/8	52	60		40	46		104	119	
2 3/4	57	65		44	51		113	130	
2 7/8	61	71		48	55		123	141	
3	67	77		52	60		133	153	
3 1/8	72	82		56	64		144	165	
3 1/4	77	89		60	69		154	177	
3 3/8	83	95		64	74		165	190	
3 1/2	88	102		69	79		177	203	

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

**BLOW & COTE, INC.**

815 VT Rte 15E

MORRISVILLE, VT 05661

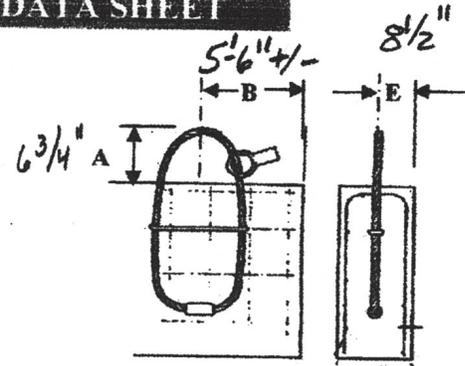
CAMBRIDGE

BRD 144B (39)

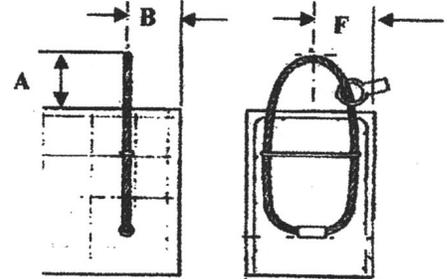
**WIRE ROPE ANCHORS - DATA SHEET**

Clearances - Projected Installation			Parallel Installation		Transverse Install'n	
Anchor Part No.	Suggested Projection A [ in ]	Min End Distance B [ in ]	Edge Dist. at 2,200 psi E <sub>22</sub> [ in ]	Edge Dist. at 4,500 psi E <sub>45</sub> [ in ]	Edge Dist. at 2,200 psi F <sub>22</sub> [ in ]	Edge Dist. at 4,500 psi F <sub>45</sub> [ in ]
WRA 008	2-3/8	10-1/2	1-1/2	1-1/4	2-5/8	2-5/8
WRA 012	2-1/2	12	1-3/4	1-1/2	2-3/4	2-3/4
WRA 016	2-3/4	13-3/4	2-3/8	1-3/4	3-3/8	3-3/8
WRA 020	3-1/8	16-1/2	2-3/4	2	3-1/2	3-1/2
WRA 025	3-3/8	17-3/4	3-1/8	2-1/8	3-5/8	3-5/8
WRA 038	4	19-1/2	4-3/8	3	4-3/8	4-3/8
WRA 050	4	20-1/2	5-3/4	4	5-3/4	4-3/8
WRA 063	4-1/2	22-3/4	6-1/4	4-3/8	6-1/4	5-3/8
WRA 080	5	25-1/2	7-7/8	5-1/2	7-7/8	5-1/2
WRA 099	5-1/2	28-3/4	8-3/4	6-1/8	8-3/4	6-1/8
WRA 120	6	31-3/4	11	7-5/8	11	7-5/8
WRA 160	6-3/4	36-1/2	12	8-1/2	12	8-1/2
WRA 180	7	41-3/4	13-3/8	9-3/8	13-3/8	9-3/8
WRA 250	8	47-1/2	14-3/4	10-1/2	14-3/4	10-1/2

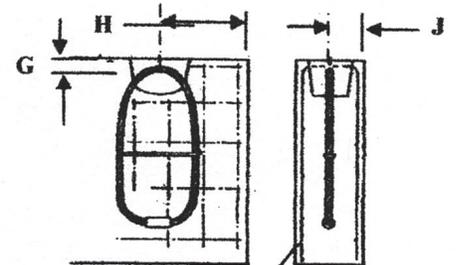
NOTE: Minimum spacing between adjacent anchors = 2 x B  
 Minimum panel thickness = 2 x E for parallel installation.  
 Minimum panel thickness = 2 x F for transverse installation.



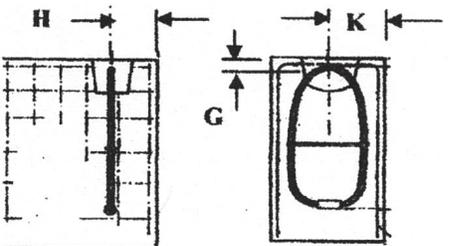
Projected and Parallel Installation



Projected and Transverse Installation



Recessed and Parallel Installation



Recessed and Transverse Installation

Clearances - Recessed Installation			Parallel Installation		Transverse Install'n	
Anchor Part No.	Depth below surface G [ in ]	Min End Distance H [ in ]	Edge Dist. at 2,200 psi J <sub>22</sub> [ in ]	Edge Dist. at 4,500 psi J <sub>45</sub> [ in ]	Edge Dist. at 2,200 psi K <sub>22</sub> [ in ]	Edge Dist. at 4,500 psi K <sub>45</sub> [ in ]
WRA 020	9/16	23-1/2	1-3/4	1-1/2	3-3/8	3-3/8
WRA 038	9/16	29	3-1/8	2-1/8	4	4
WRA 063	11/16	33-1/2	4-3/4	3-3/8	5-3/8	5-3/8
WRA 099	1/2	42-1/2	7	5	7	6
WRA 160	1/2	53	9-1/2	6-5/8	9-1/2	7-1/8
WRA 250	1/2	67	12	8-1/2	12	8-5/8

NOTE: Minimum spacing between adjacent anchors = 2 x H  
 Minimum panel thickness = 2 x J for parallel installation.  
 Minimum panel thickness = 2 x K for transverse installation.

(4) WRA 160 (2) EACH END PER ABUTMENT

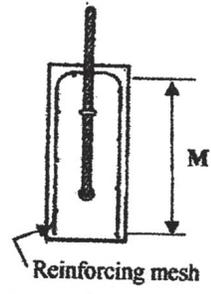
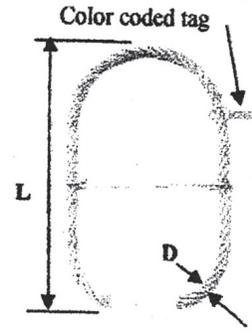
BLOW & COTE, INC.  
 815 VT Rte 15E  
 MORRISVILLE, VT 05661  
 CAMBRIDGE  
 BRD 1448 (39)

**WRA Series WIRE ROPE ANCHORS**

Manufactured from high-quality wire rope, with steel swage.

**Dimensions & Load Capacities**

Nominal System Capacity	Anchor Part No.	Color Code	Allowable Capacity T <sub>A</sub> [ lb ]	Loop Length L [ in ]	Rope Diameter D [ in ]	Weight 100 pcs [ lb ]	Min. Reinf. Mesh	
							Depth M [ in ]	Area [ in <sup>2</sup> /ft ]
0.8 T	WRA 008	White	1,800	8	0.236	18	12	0.062
1.2 T	WRA 012	Red	2,700	9	0.276	26	14	0.062
1.6 T	WRA 016	Pink	3,600	9-3/4	0.315	38	14	0.062
2 T	WRA 020	Lt green	4,500	11-3/4	0.354	60	17	0.089
2.5 T	WRA 025	Dark gray	5,600	12-3/4	0.394	66	20	0.089
3.8 T	WRA 038	Emerald	9,000	14-1/2	0.472	110	22	0.089
5 T	WRA 050	Lt yellow	11,700	15	0.551	181	22	0.089
6.3 T	WRA 063	Lt blue	14,150	16-3/4	0.630	242	24	0.089
8 T	WRA 080	Lt gray	18,000	18-7/8	0.709	353	27	0.104
10 T	WRA 099	Dark purple	22,450	21	0.787	463	31	0.104
12 T	WRA 120	Yellow	28,100	23-1/4	0.866	661	35	0.104
16 T	WRA 160	Lt purple	35,950	26-3/8	1.024	1,036	39	0.104
18 T	WRA 180	Yellow-grn	44,950	29-1/2	1.102	1,300	45	0.178
25 T	WRA 250	Lt brown	56,200	33-1/2	1.260	1,850	51	0.178

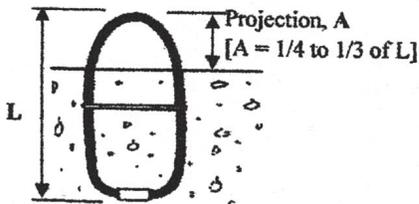


NOTE: Allowable Tension Capacity is based on a Safety Factor of 4:1 against wire rope breakage  
 Allowable Tension Capacity is based on use in 2,200 psi normal weight concrete.  
 No additional strength increase can be gained in higher strength concrete.  
 Additional sizes available with capacities up to 220,000 lb [110 tons].

**INSTALLATION METHODS**

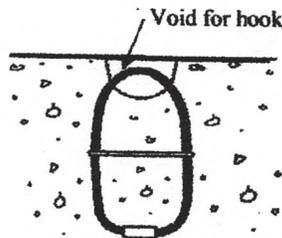
**PROJECTED INSTALLATION**

No extra reinforcement required  
 See following page.

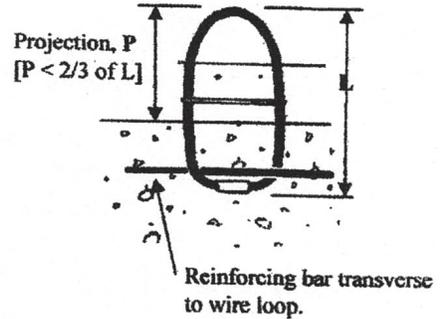


**RECESSED INSTALLATION**

No extra reinforcement required  
 See following page.



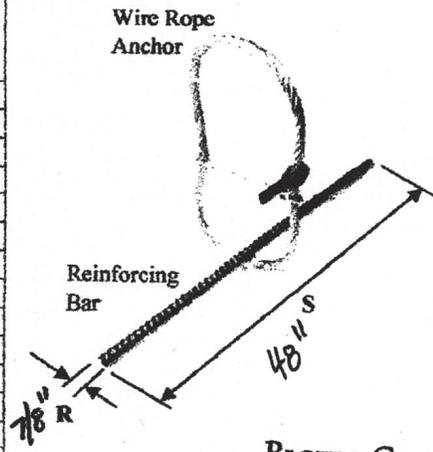
**PROJECTED INSTALLATION WITH REINFORCEMENT**



**WBR Series SHEAR BARS**

Use for reinforcement of Wire Rope Anchor

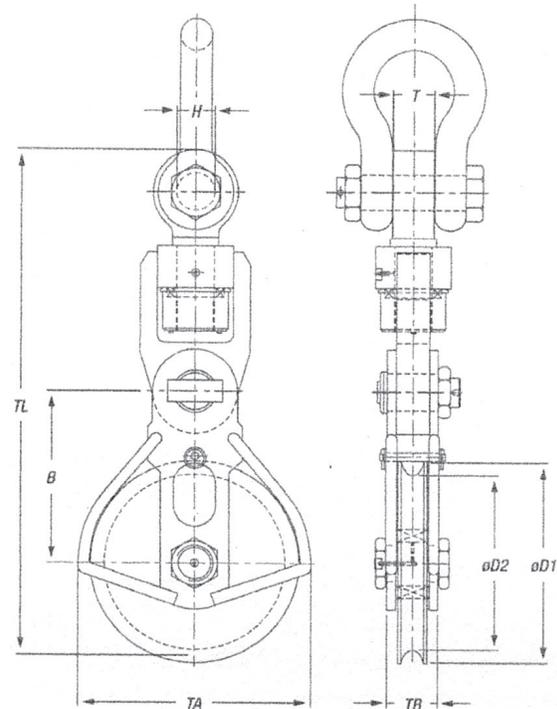
Nominal System Capacity	Anchor Part No.	Use with Wire Rope Part No.	Projection		Length S [ in ]	Weight 100 pcs [ lb ]
			P [ in ]	R [ in ]		
0.8 T	WBR 008	WRA 008	5	[#3] 7/16	13-3/4	68
1.2 T	WBR 012	WRA 012	5-1/2	[#3] 7/16	15-3/4	76
1.6 T	WBR 016	WRA 016	6	[#3] 7/16	17-3/4	84
2 T	WBR 020	WRA 020	7	[#4] 9/16	19-1/4	128
2.5 T	WBR 025	WRA 025	8	[#4] 9/16	21-1/2	144
3.8 T	WBR 040	WRA 038	9	[#5] 5/8	23	198
5 T	WBR 063	WRA 050	9-1/2	[#5] 5/8	27-1/2	238
6.3 T	WBR 063	WRA 063	10-1/2	[#5] 5/8	27-1/2	238
8 T	WBR 080	WRA 080	12	[#6] 3/4	33-1/2	450
10 T	WBR 125	WRA 099	13-1/2	[#6] 3/4	39-1/2	546
12 T	WBR 125	WRA 120	14-1/2	[#6] 3/4	39-1/2	546
16 T	No Part #	WRA 160	16-1/2	[#7] 7/8	48	818
18 T	No Part #	WRA 180	18-1/2	[#8] 1	54	1,156
25 T	No Part #	WRA 250	21	[#9] 1-1/8	60	1,700



**BLOW & COTE, INC.**

815 VT RTE 15E  
 MORRISVILLE, VT 05661  
 CAMBRIDGE  
 BRD 1448 (39)

# HCLW Series Tilt-Up Blocks

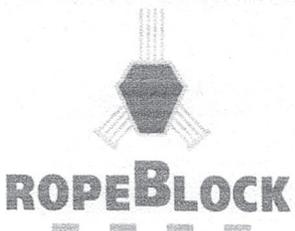


## Swivel Eye

Stock Number	WLL (US Tons)	Wire Diameter (Inches)	Dimensions (Inches)								Weight (lbs)
			D1	D2	B	H	T	TA	TB	TL	
HCLW 355.32.1.27.S	30	1-1/8 - 1-1/4	16-9/16	14	14-3/4	1-3/4	2-1/4	18-3/4	4-7/16	39-1/8	265
HCLW 355.36.1.32.S	35	1-1/4 - 1-7/16	16-9/16	14	14-3/4	1-3/4	2-1/4	18-3/4	4-13/16	39-1/8	265
HCLW 430.38.1.32.S	35	1-1/4 - 1-1/2	19-1/2	16-15/16	16-5/16	1-3/4	2-1/4	21-11/16	4-7/8	42-3/16	290
HCLW 430.38.1.40.S	44	1-1/4 (1-1/2)	19-1/2	16-15/16	16-5/16	2-1/16	2-3/4	21-11/16	4-13/16	43-9/16	320
HCLW 520.44.1.55.S	60	1-3/4 - 2	23-7/8	20-1/2	19-1/8	2-13/16	3-15/16	25-5/8	4-7/8	51-13/16	465
HCLW 520.52.1.55.S	60	1-3/4 - 2	23-7/16	20-1/2	19-1/8	2-5/16	3-1/8	25-5/8	5-3/16	51-1/2	490
HCLW 630.58.1.81.S	89	1-3/4 - 2-1/4	27-15/16	24-13/16	22-5/8	3-9/16	3-15/16	30-9/16	6	73-1/4	882
HCLW 630.64.1.81.S	89	2-1/4 - 2-1/2	27-15/16	24-13/16	22-5/8	3-9/16	3-15/16	30-9/16	6	73-1/4	882

Minimum Ultimate Strength = 4 x WLL  
 Models available up to 350 Ton Capacity  
 Other wire rope sizes available on request  
 Available with jaw end, hook, round or oblong swivel eye  
 All blocks Proof Tested and supplied with Factory Certificates

[www.associatedwirerope.com](http://www.associatedwirerope.com)



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