IMPERATORE
CORPORATION
STEEL • CRANE & EQUIPMENT RENTAL • RIGGING

2550 PLAINFIELD PIKE
CRANSTON, RI 02921
P – **401-942-7790**
F – **401-944-1652**

Newport Naval Station
A-138 Static Lab
Newport, RI

Lightship Group
Foster-Wheeler Marine Boiler
Hoisting Information

"Safety First"

www.imperatorecrane.com

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→ **Operator Note**: The information in this lift plan is for preliminary planning purposes only. Prior to assembly / setup and performing any hoisting operations, refer to original manufacturer's operators manual & load charts based on actual crane model & serial number in conjunction with actual crane location & actual site conditions existing at the time of crane assembly / setup & hoisting operations

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CCO STANDARD LIFT PLAN CHECKLIST

DATE SUBMITTED	10/11/2016	CRANE CAPACITY	400 tons
PROJECT	NUWC Building #116	CRANE MAKE / MODEL NUMBER	TEREX / AC350
DESCRIPTION OF LOAD	Marine Boiler	BOOM LENGTH	108.3'
WEIGHT OF LOAD	86,400 lbs	JIB LENGTH / OFFSET	N / A
WEIGHT OF RIGGING & BLOCK	3,600 lbs	OVER REAR / 360 DEGREES	360 degrees
TOTAL GROSS LOAD	90,000 lbs	MAXIMUM RADIUS OF LIFT	50'
CRANE CHART CAPACITY AT MAXIMUM LIFT RADIUS	136,700 lbs	PERCENT OF CRANE CAPACITY AS CONFIGURED AT MAXIMUM LIFT RADIUS	70%
MAXIMUM PERMISSIBLE LINE PULL / # PARTS OF HOIST LINE	129,265 lbs / 5 Parts	MAXIMUM CRANE CAPACITY AS CONFIGURED	129,265 lbs

RIGGING GEAR	QUANTITY	TYPE AND SIZE	CAPACITY	WEIGHT
SHACKLES				
SHACKLES	4	2" Screw Pin Shackles	35 tons ea.	259 lbs
SLINGS	2	8" x 20' Polyester Round Slings (Vertical)	90,000 lbs ea.	271 lbs
SLINGS	2	1 1/2" x 36' Wire Rope Slings (Basket)	40,000 lbs ea.	200 lbs
SPREADER BAR(S)	1	Tandem-Loc Spreader Bar	50 tons	475 lbs
LOAD BLOCK / BALL	1	Multi Sheave Load block	88 tons	2,315 lbs
LIFTING Gear				

LOAD AND LIFTING INFORMATION

1. Has the weight of the load been documented or accurately calculated? (If not has 20% been added to the weight of load ?)	yes	2. Are all items that will be lifted with the equipment included in the weight?	yes
3. Have the lifting lugs that will be used to lift the load been designed for that purpose?	yes	4. Will the lifting lugs be used with the correct shackles?	yes
5. Will the lifting lugs be loaded only in the strong direction of the lug(s)?	yes	6. Are the lifting lugs visibly free of defects or damage?	yes
7. Has the load been checked for loose or unsecured items that might fall off during the lift?	yes	8. For a one crane lift will the crane hook be over the center of gravity at he initial pick?	yes

RIGGING CONSIDERATIONS

9. Have the capacities of the slings and shackles been checked for the load?	yes	10. Have the slings and shackles been visually inspected for defects or damage?	yes
11. Have the sling angles been considered when checking the capacity of the slings and shackles?	yes	12. Has the center of gravity been considered when checking the capacities of the slings and shackles?	yes
13. Is the total load less than the allowable crane capacity?	yes	14. Will taglines be used on the load?	yes
15. Has the crane received a daily inspection and operational check by the operator?	yes	16. Is the crane set up according to the manufacturer's specifications?	yes
17. Do approved crane mats / wood dunnage support the crane?	yes	18. Does the lift involve more than one crane?	no

LIFT INFORMATION

19. Has the radius of the lift been checked by a tape measure?	yes	20. Is the lift area free of process equipment, piping or live electrical lines?	yes
21. If there is a possibility for boom or equipment interference, has a rigging layout or clearance study been done?	yes	22. Is the wind less than 20 miles per hour? If not follow the Manufacturer's instructions	yes
23. Has the area under the lift been barricaded or everyone warned to stay away?	yes	24. Has one person been designated "Signalman-in-Charge" for the lift?	yes
25. Has the soil been inspected and determined to be adequate?	yes	26. Is FAA Clearance, Flag or Beacon Light Required?	no
27. Have underground utilities been identified and marked?	yes	28. What Type of Communication? Hand Signals	
29. Is there adequate access/egress for crane setup / trucks?	yes	30.	

CRANE INFORMATION

31.BOOM ANGLE AT ORIGIN OF LIFT	76.7	32. Is the lift based on structural or tipping portion of load chart?	str
33.BOOM ANGLE AT DESTINATION OF LIFT	59.5	34. Will the crane be completely level?	yes
35.Number of parts (Whipline)	N/A	36. Is the annual crane inspection current?	yes
37.Number of parts (Main Load)	5	38. Are load charts in the crane and clearly visible?	yes
39. Will outriggers be fully extended, and tires free of ground?	yes	40. Is the Operators Manual in the cab?	yes
41.Has an allowance been made for jib stowed	N/A	42. Is the Daily Log Book up to date?	yes

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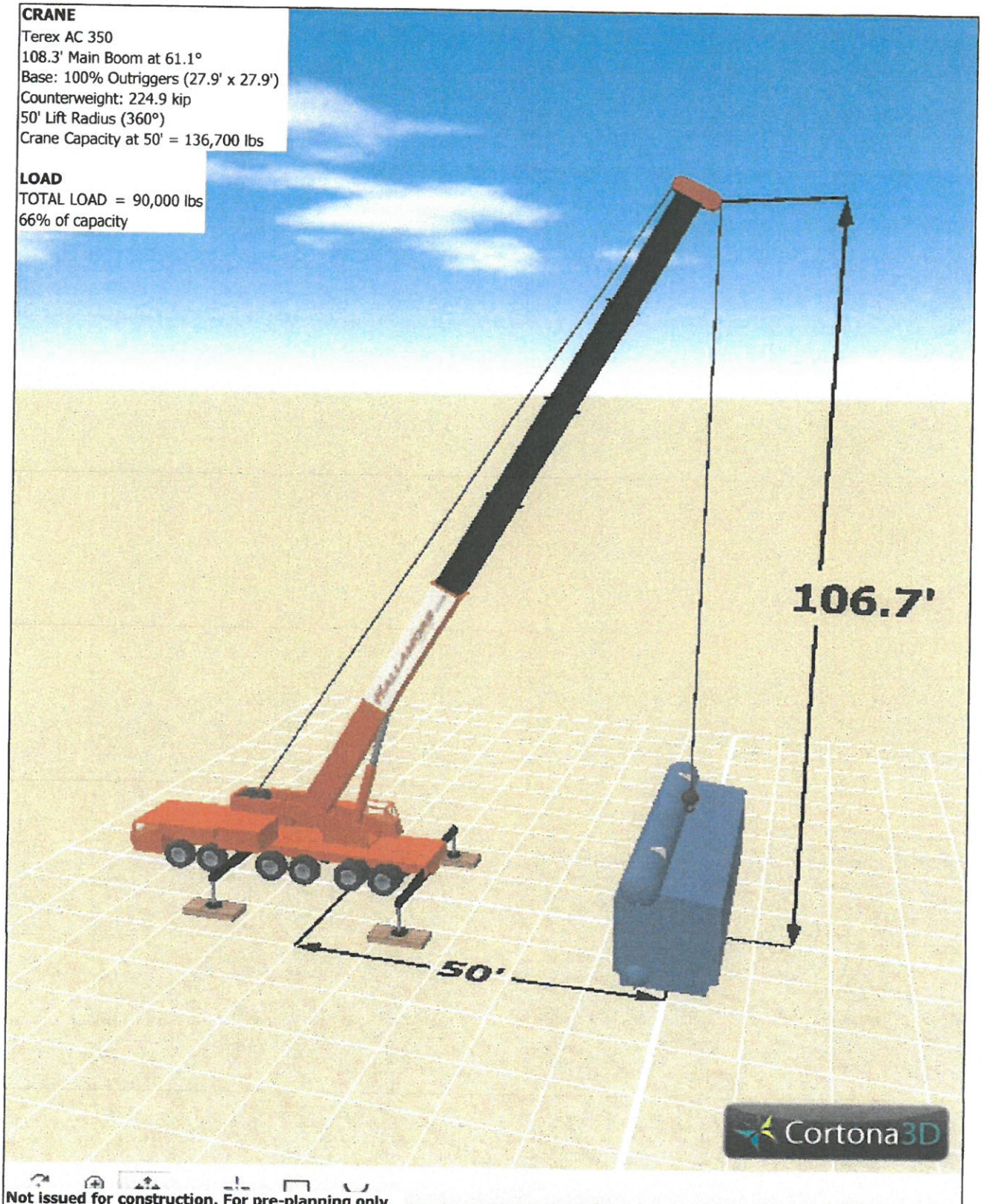
Site Logistics Plan

CRANE
Terex AC 350
108.3' Main Boom at 61.1°
Base: 100% Outriggers (27.9' x 27.9')
Counterweight: 224.9 kip
50' Lift Radius (360°)
Crane Capacity at 50' = 136,700 lbs

LOAD
TOTAL LOAD = 90,000 lbs
66% of capacity



Not issued for construction. For pre-planning only.

Title:	Lift Plan
Project:	Navy
Customer:	Imperator
Description:	Boiler
Drawn By:	Gary Spencer

10/3/2016

Created with 3D Lift Plan *www.3dliftplan.com*

Load Chart

Project
Customer
Description

Terex AC350

Boom:	Main Boom
Jib:	-
Base:	100% Outriggers (27.9' x 27.9')
Counterweight:	224.9 kip
Range:	360°
Capacity:	85%
Chart ID:	87970140

Boom Section Percentages	Boom Length (ft)	Boom Angle	Jib Length (ft)	Jib Offset	Tip Height (ft)	Lift Radius (ft)	Capacity (lbs)	Note
45-45-45-45	108.3	80.3°	-	-	118.2	16.4	240,300	
45-45-45-45	108.3	78.5°	-	-	117.4	19.7	233,700	
45-45-45-45	108.3	76.7°	-	-	116.6	23	227,100	
45-45-45-45	108.3	74.9°	-	-	115.6	26.2	216,100	
45-45-45-45	108.3	73.1°	-	-	114.5	29.5	205,000	
45-45-45-45	108.3	71.2°	-	-	113.3	32.8	194,000	
45-45-45-45	108.3	67.4°	-	-	110.5	39.4	172,000	
45-45-45-45	108.3	63.6°	-	-	107.3	45.9	152,100	
45-45-45-45	**108.3**	**59.5°**	**-**	**-**	**103.4**	**52.5**	**136,700**	
45-45-45-45	108.3	55.3°	-	-	98.8	59.1	119,000	
45-45-45-45	108.3	50.8°	-	-	93.5	65.6	105,600	
45-45-45-45	108.3	46°	-	-	87.1	72.2	91,700	
45-45-45-45	108.3	40.8°	-	-	79.7	78.7	80,700	
45-45-45-45	108.3	34.8°	-	-	70.5	85.3	71,700	
45-45-45-45	108.3	27.6°	-	-	58.5	91.9	64,400	
45-45-45-45	108.3	17.7°	-	-	41.1	98.4	53,800	
90-45-45-0	108.3	80.3°	-	-	118.2	16.4	235,900	
90-45-45-0	108.3	78.5°	-	-	117.4	19.7	218,300	
90-45-45-0	108.3	76.7°	-	-	116.6	23	200,600	
90-45-45-0	108.3	74.9°	-	-	115.6	26.2	185,200	
90-45-45-0	108.3	73.1°	-	-	114.5	29.5	172,000	
90-45-45-0	108.3	71.2°	-	-	113.3	32.8	158,700	
90-45-45-0	108.3	67.4°	-	-	110.5	39.4	138,900	
90-45-45-0	108.3	63.6°	-	-	107.3	45.9	119,000	
90-45-45-0	108.3	59.5°	-	-	103.4	52.5	105,600	
90-45-45-0	108.3	55.3°	-	-	98.8	59.1	93,000	
90-45-45-0	108.3	50.8°	-	-	93.5	65.6	83,100	
90-45-45-0	108.3	46°	-	-	87.1	72.2	74,700	
90-45-45-0	108.3	40.8°	-	-	79.7	78.7	68,100	
90-45-45-0	108.3	34.8°	-	-	70.5	85.3	62,400	
90-45-45-0	108.3	27.6°	-	-	58.5	91.9	57,100	
90-45-45-0	108.3	17.7°	-	-	41.1	98.4	49,800	
0-45-45-90	108.3	80.3°	-	-	118.2	16.4	163,100	
0-45-45-90	108.3	78.5°	-	-	117.4	19.7	154,300	
0-45-45-90	108.3	76.7°	-	-	116.6	23	145,500	

Specifications

Axle loads

Crane in travel order	
Axles	6 x 26,455 lb
Total weight	158,730 lb

Working speeds (infinitely variable)

Mechanisms	Normal speed	High speed	Max. permissible line pull	Rope diameter / Rope length
Hoist I	197 ft / min	476 ft / min	115 kN = 25,853 LBS	0.91' / 1,230 ft
Hoist II	197 ft / min	508 ft / min	115 kN	0.91' / 1,857 ft
Slewing				max. 1.1 1/min
Telescoping speed				46.6 – 183.7 ft: 420 s
Boom elevation				–1,6° – +82°: 85 s

Carrier performance

Travel speed	0 . . 53 mph
Gradability	41 %
Ground clearance	1.34 ft

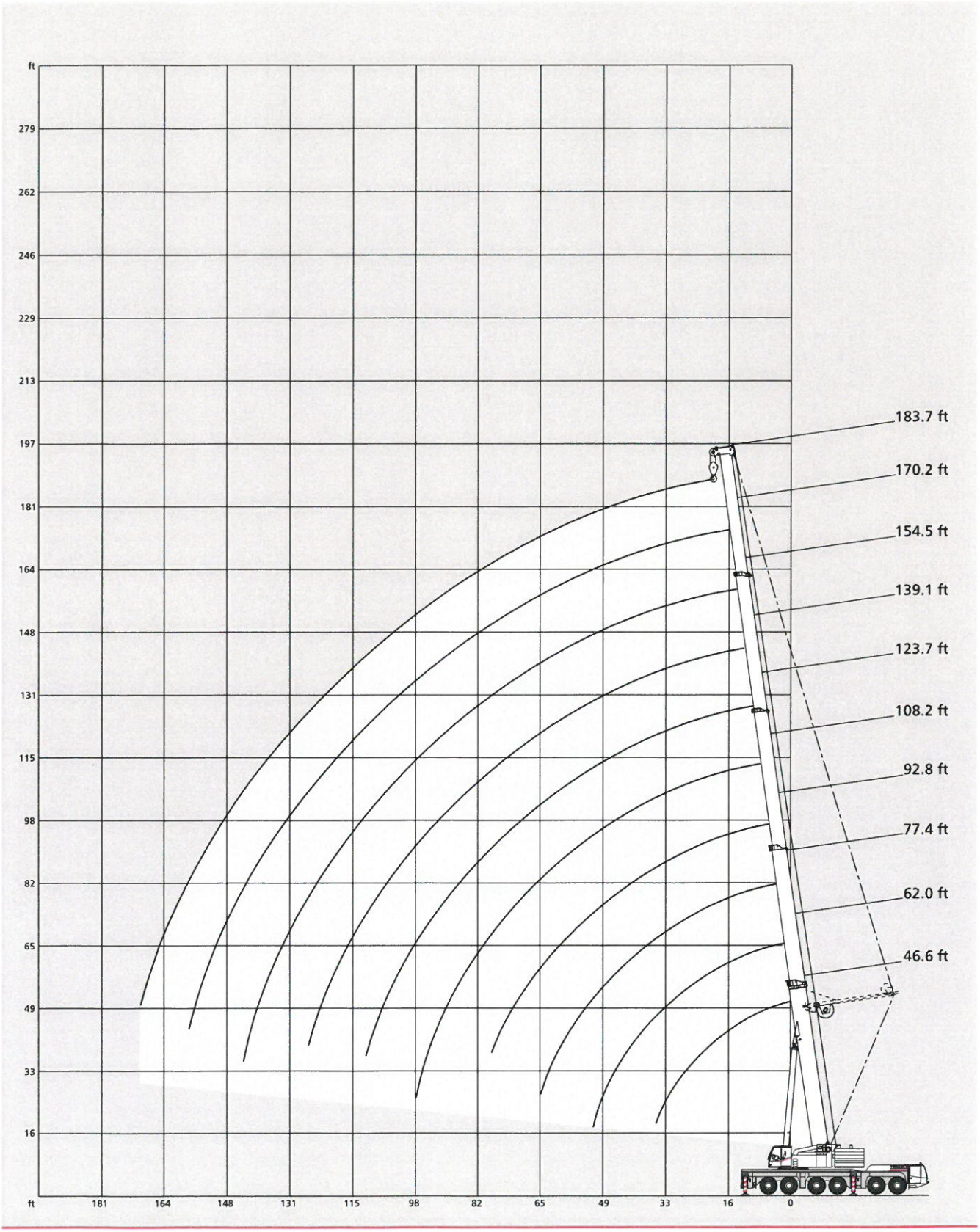
Hook block / Heavy-lift attachment

Type	Possible load	Number of sheaves	Weight	„D"	max. reeving	Heavy-lift attachment
250	523,6 klb	11	4,400 lb	9.8 ft	23	6 add'l sheaves
200/9	441,0 klb	9	4,400 lb	9.8 ft	19	6 add'l sheaves
200/7	355,0 klb	7	3,750 lb	9.8 ft	15	2 add'l sheaves
125	265,0 klb	5	2,645 lb	9.8 ft	11	
→ 80	172,0 klb	3	2,315 lb	9.8 ft	7	
40	75,0 klb	1	2,315 lb	8.6 ft	3	
12,5	25,3 klb	Single line hook	1,100 lb	6.6 ft	1	

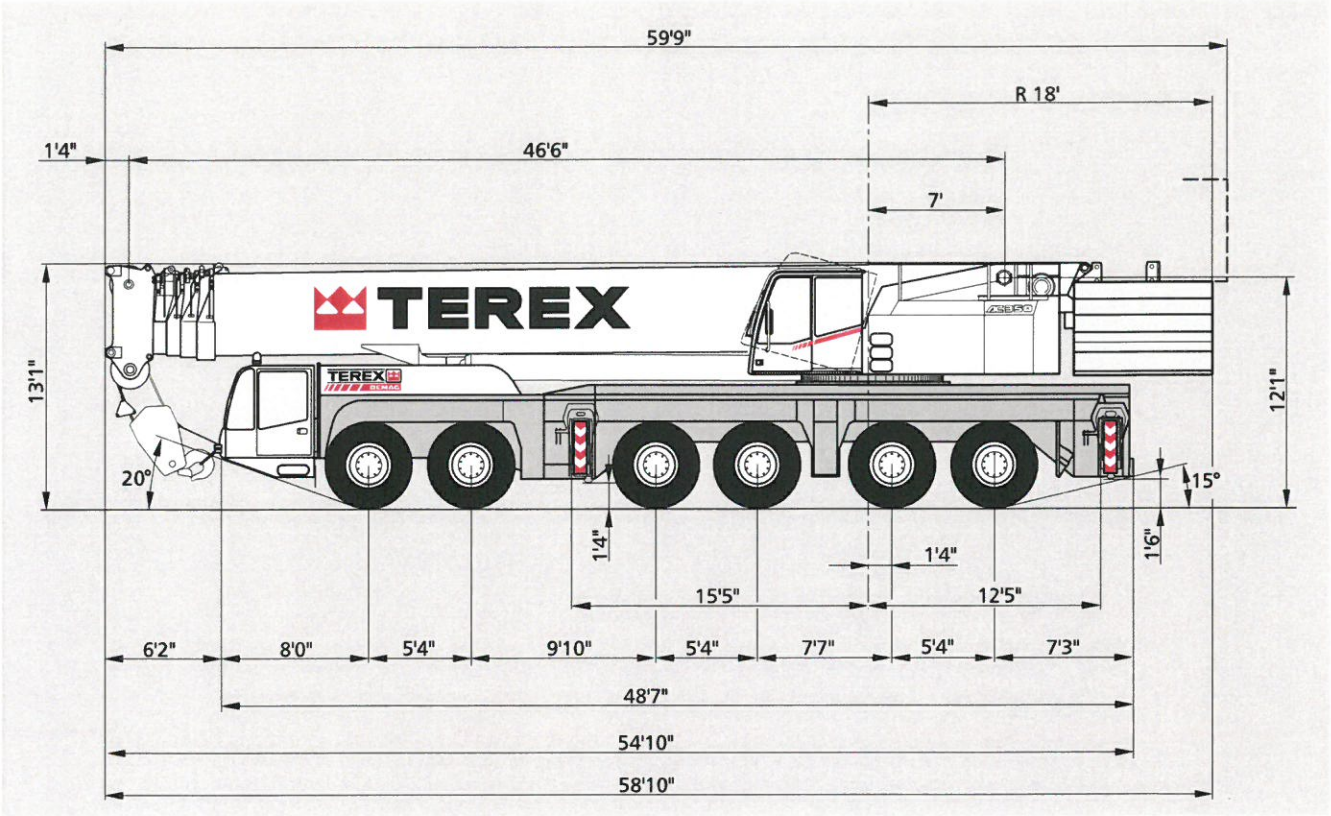
5 PARTS OF LINE

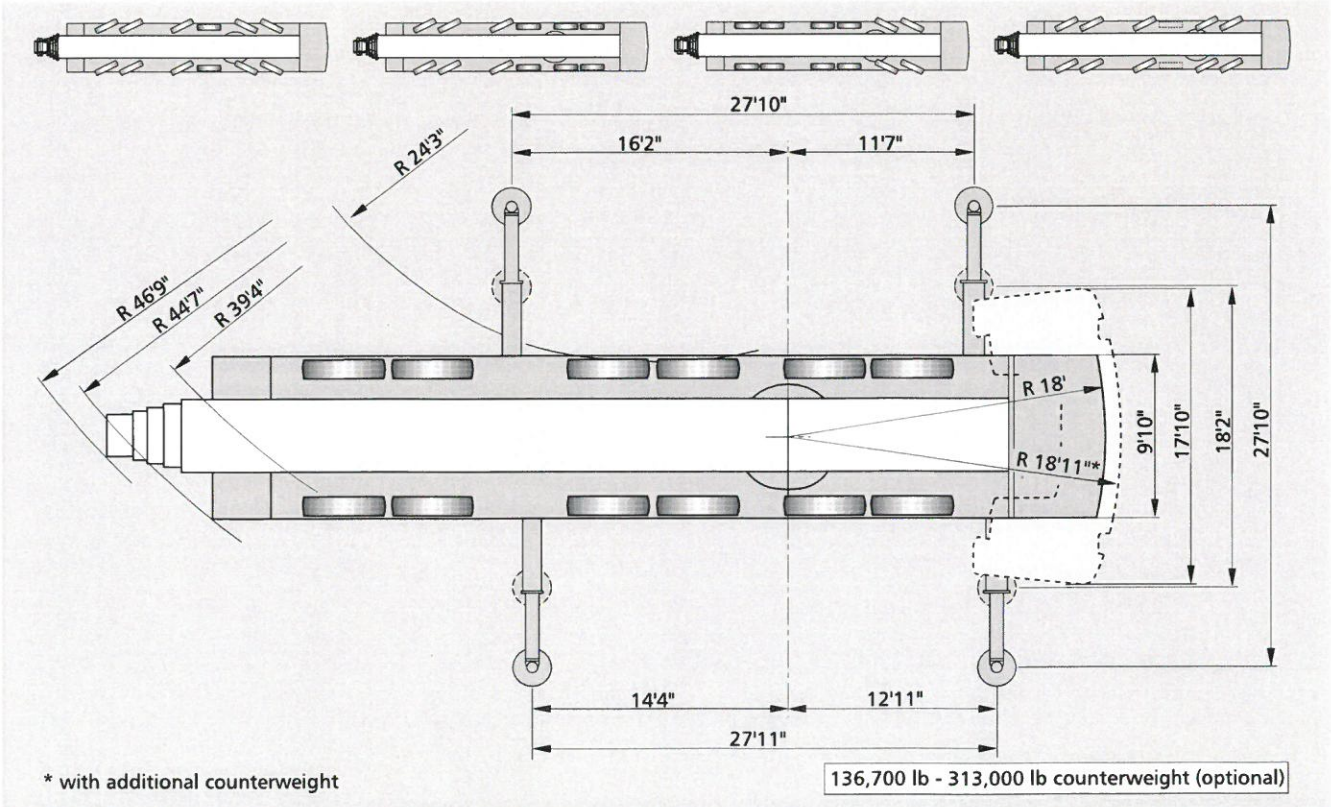
25,853 LB X 5 = 129,265 LBS

Working ranges main boom with / without SSL



Dimensions





* with additional counterweight

136,700 lb - 313,000 lb counterweight (optional)

Ground Bearing Pressure Below Crane Mats

Job Information

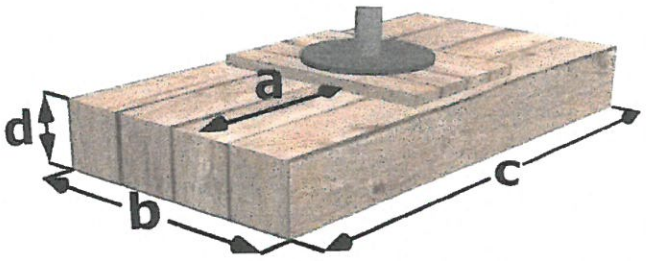
Project	Navy
Customer	Imperator
Description	Boiler
Drawn By	Phil OBrien
Date	10/6/2016

Crane Information

Terex AC350	
108.3' Main Boom	
100% Outriggers (27.9' x 27.9')	
Cwt: 224.9 kip	
Outrigger Load 'P'	26,700 lbs
Transition Pad Length	4 ft
Transition Pad Width	3 ft

Mat Information

Mat Material	Oak
Timber Width	12 in
Timber Depth	12 in
Mat Length	8 ft
Mat Width	8 ft
Mats in Width	1
Effective Mat Length 'c'	8 ft
Effective Mat Width 'b'	4 ft
Moment Arm 'a'	2.5 ft
Matting Layers 'n'	1
Total Mat Thickness 'd'	12 in



Calculations

Ground Bearing Pressure below mat...

$q = P / (b \cdot c)$ **834 psf** ←

Bending Stress on Mat...

$f = 3 \cdot n \cdot q \cdot a^2 / d^2$ 108.6 psi **OK**

1,200 psi maximum allowed

Horizontal Shear Stress on Mat...

$V = 1.5 \cdot q \cdot a / d$ 21.7 psi **OK**

100 psi maximum allowed

Notes

Not for construction use. For pre-planning only.

Main Boom
Length of main boom = 108.3 ft
Main boom sequence = 0-0-90-90 % LK = 86
Counterweight = 224.9 kip

Radius [ft]	Cap. [kip]	Outrigger Loadin[kip] (Pos.[Degrees]) 0-360 Degr.											
		1(0)				2(...)				3(90)			
		4(...)				5(180)				6(...)			
		A	B	C	D	A	B	C	D	A	B	C	D
13.1	449.1	265	265	148	148	286	225	182	134(38)	270	171	232	153
		231	154	252	190(129)	176	176	237	237	154	230	191	252(230)
14.8	418.7	262	262	136	136	286	216	175	119(39)	268	156	231	142
		223	136	253	185(130)	162	162	237	237	136	221	186	253(229)
16.4	392.0	260	260	125	125	287	207	169	106(40)	266	143	229	131
		215	121	254	180(131)	149	149	236	236	121	213	181	254(228)
19.7	347.2	256	256	106	106	287	193	159	85(41)	263	121	227	114
		202	96	255	171(132)	128	128	234	234	96	201	173	255(227)
23.0	311.5	253	253	92	92	287	183	150	68(41)	261	103	225	100
		193	76	256	164(132)	111	111	233	233	76	192	165	256(227)
26.2	282.0	250	250	80	80	287	174	144	54(42)	259	88	223	89
		184	59	257	159(133)	97	97	232	232	60	182	160	257(226)
29.5	256.6	247	247	70	70	287	166	138	43(42)	257	77	222	79
		178	46	257	153(133)	86	86	231	231	46	175	155	257(226)
32.8	235.2	245	245	61	61	286	160	133	33(42)	255	66	220	71
		172	34	257	149(133)	76	76	230	230	34	170	151	258(226)
39.4	199.5	240	240	49	49	283	155	120	19(40)	250	51	216	59
		160	17	256	143(134)	62	62	227	227	17	158	145	256(225)
45.9	167.6	230	230	42	42	273	146	113	13(40)	241	43	209	53
		151	9	248	136(134)	53	53	219	219	9	149	138	249(225)
52.5	144.0	224	224	37	37	266	139	108	8(40)	234	36	203	48
		154	3	242	123(130)	47	47	214	214	3	152	125	242(229)
59.1	125.7	218	218	33	33	261	134	104	4(40)	229	31	199	44
		147	0	240	116(130)	42	42	210	210	0	144	118	241(229)
65.6	111.1	214	214	30	30	257	130	101	1(40)	225	27	196	40
		138	0	241	109(130)	38	38	207	207	0	136	111	241(229)
72.2	99.2	211	211	28	28	256	125	96	0(40)	221	24	193	38
		132	0	241	103(130)	34	34	204	204	0	129	105	242(229)
78.7	89.5	208	208	25	25	256	120	91	0(40)	219	21	192	35
		126	0	243	98(130)	32	32	202	202	0	124	100	243(229)
85.3	81.1	206	206	23	23	255	116	88	0(40)	216	19	190	34
		121	0	243	94(130)	29	29	200	200	0	119	96	243(229)
91.9	74.1	204	204	22	22	255	112	84	0(40)	214	17	188	32
		117	0	244	90(130)	27	27	198	198	0	115	92	244(229)
98.4	67.9	202	202	20	20	254	109	82	0(40)	213	15	187	31
		114	0	244	87(130)	25	25	197	197	0	111	89	244(229)

HA=108.3 HI= 0.0 GGW= 224.9 SL= 0.0 MAX(A,B,C,D)= 26.7 24.6 23.9 23.9

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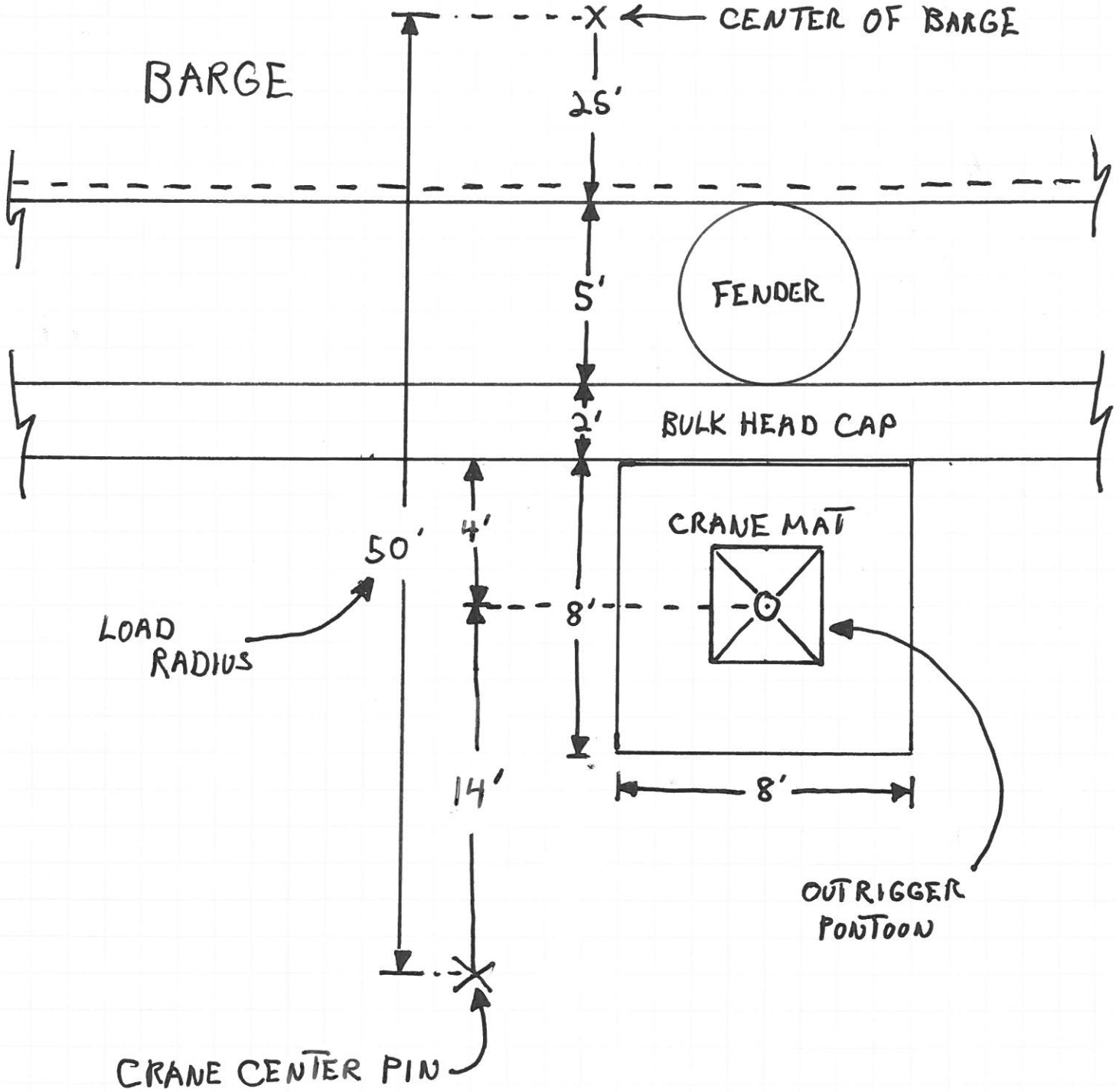
Project NEWPORT NAVAL STATION
Address A-138 STATIC LAB
City / State
Contact LIGHTSHIP GROUP
Phone Fax



10

Scale N/A Date

05/14 W10SF000220M

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Wind Speed Restrictions

If The Speed Is:	Rated Lifted Capacities Must Be Reduced By At Least:
0–20 mph	Normal Lifting Operations (See Capacity Charts)
21–29 mph	40%
30–39 mph	70%
40 mph or Greater	Crane operation must be shutdown and the boom retracted and lowered to horizontal.

- Additional reductions are required for loads with large wind sail area.
- These restrictions are based on crane on fully extended outriggers.
- During high winds, the operator shall add 10° to all minimum boom angles due to no load stability and shall not boom down below that angle.

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Procedure for hazardous environmental conditions

1. Prior to the lift the competent person (Lift director) will monitor the local weather forecast, storm warnings, and current environmental conditions to determine if the lift can be made safely.

2. During the pre lift meeting the (lift director) will review the weather forecast and current conditions with all personnel involved to determine if the lift can be performed safely.

3. Once it is determined the lift can proceed the (Lift director) will review all potential hazardous environmental conditions with all personnel involved with the lift and set guidelines for the lift operations during hazardous environmental conditions.

A. when weather conditions are such that lightning is observed all hoisting operations shall cease. A period of 30 minutes between subsequent observations shall be observed prior to resuming hoisting operations.

B. when the wind is greater than 20 miles per hour all hoisting operations shall cease. Prior to resuming operations conditions shall be evaluated by the crane operator and the lift director. The crane manufacturer's instructions in the crane operators hand book shall be consulted and followed. The wind speed will be monitored by the crane operator with an anemometer.

C. During environmental conditions producing reduced visibility, from smoke, dust, rain, snow, and fog or the icing of the crane and hoisting equipment operations will proceed at reduced functional speeds and radio or hand signals will be used together which ever means is appropriate to the situation. If conditions reach a point where safe operation is threatened all operations shall cease. If darkness is the reason for reduced visibility temporary lighting is to be used to assist operations. If no lighting is available operations shall cease until daylight

d. Any type of environmental condition that arises that could threaten the safety of the lifting operations. Operations shall cease and the Lift director will evaluate the conditions to determine if the operation can proceed in a safe manner prior to proceeding.

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Beaufort Wind Scale

Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects	
			On the Water	On Land
0	Less than 1	Calm	Sea surface smooth and mirror-like	Calm, smoke rises vertically
1	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light Breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes begin to move
3	7-10	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate Breeze	Small waves 1-4 ft. becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move
5	17-21	Fresh Breeze	Moderate waves 4-8 ft taking longer form, many whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	Strong Breeze	Larger waves 8-13 ft, whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	28-33	Near Gale	Sea heaps up, waves 13-20 ft, white foam streaks off breakers	Whole trees moving, resistance felt walking against wind
8	34-40	Gale	Moderately high (13-20 ft) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks	Whole trees in motion, resistance felt walking against wind
9	41-47	Strong Gale	High waves (20 ft), sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs
10	48-55	Storm	Very high waves (20-30 ft) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	56-63	Violent Storm	Exceptionally high (30-45 ft) waves, foam patches cover sea, visibility more reduced	
12	64+	Hurricane	Air filled with foam, waves over 45 ft, sea completely white with driving spray, visibility greatly reduced	

I. Introduction

On November 29, 2011, the static cutaway model of a Foster Wheeler 2000 psi superheat marine boiler, located at the Navy Surface Warfare Office School (SWOS) in Newport RI, was lifted on four hydraulic jacks with the purpose of determining its overall weight. This lift was performed by Lightship Group and was observed by Carlos Montanez and Matthew Frain from Massachusetts Maritime Academy (MMA). Both the total weight and approximate lateral location of the center of gravity were determined from the results of this lift operation. These values are to be used for the planning of the rigging, transport, and installation of the boiler cutaway in the Bresnahan building at MMA.

II. Apparatus

The lift was performed using a hydraulic lifting system consisting of a pump and control valve unit connected to four hydraulic jacks placed on cribbing under the longitudinal support I-beams along the bottom of the boiler. This apparatus is shown in Figure 1.

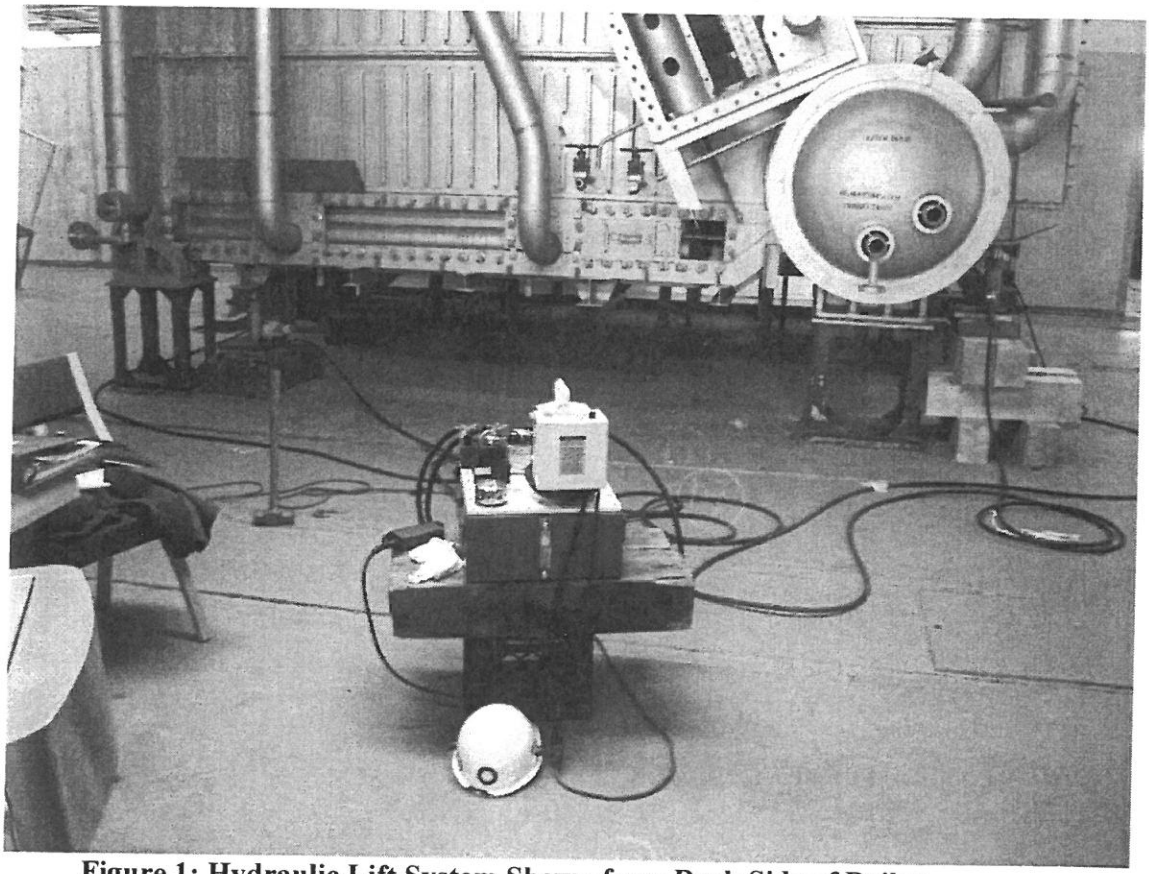

Figure 1: Hydraulic Lift System Shown from Back Side of Boiler

The hydraulic pressure to each jack could be controlled independently. Each jack had a pressure gage with a range from zero to 10,000 psig with a resolution of +/- 250 psig (half of the gage scale interval). The piston area inside the jack was 4 in^2. A detail of the jack is shown in Figure 2.

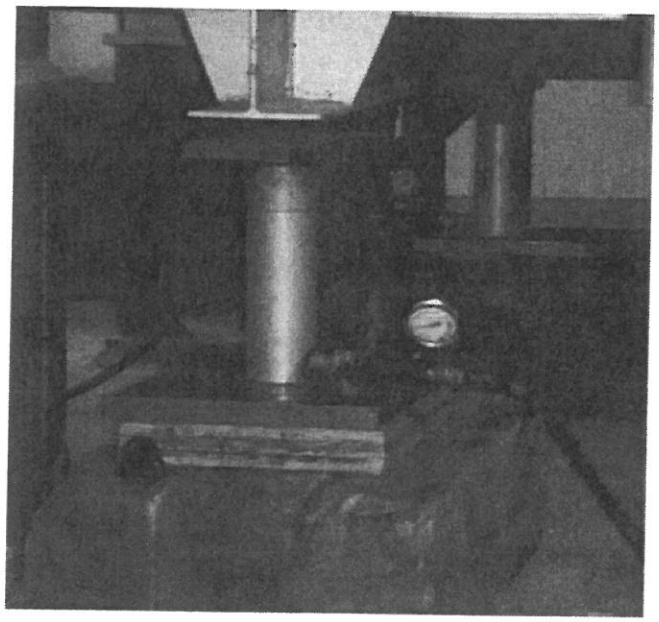

Figure 2: Detail of Pistons Placed Under Boiler Lateral Support Beam

III. Procedure

Lag bolts connecting two of the boiler supports (the two red supports in the foreground of Figure 1) to the floor were removed. The remaining two supports were left attached. Sliding feet on those supports, normally used to permit thermal expansion of the boiler while in operation, were loosened to permit 1-2 inches of lift. These were left attached to prevent accidental tipping of the boiler during the lift. Steel supports between the boiler and an elevated catwalk were also severed to permit unrestricted vertical movement.

Once the boiler was free to move, the hydraulic lift system was placed into position as shown in Figure 1. The hydraulic pressure was increased to each of the jacks until all four boiler supports were observed to clear the floor. When the boiler was clear of the floor, the indicated pressures were recorded on all four jacks. The pressure was then released and the boiler was slowly lowered back to the floor. This lift process was repeated four times to ensure that no binding occurred between the boiler and appurtances associated with the structure.

The location of each jack was measured laterally relative to the structure of the boiler to provide a means of determining the lateral position of the boiler's center of gravity.

IV. Analytical Procedure

The lifting force provided by each jack was determined by multiplying the indicated gage pressure by the piston area. The total weight of the boiler was determined by adding the lifting force of all four jacks. These weights were averaged over all four lifts.

The center of gravity of the boiler was determined by setting the sum of the lifting moments and weight moments to zero across the lateral dimensions of the boiler. A sample arrangement is shown in Figure 3.

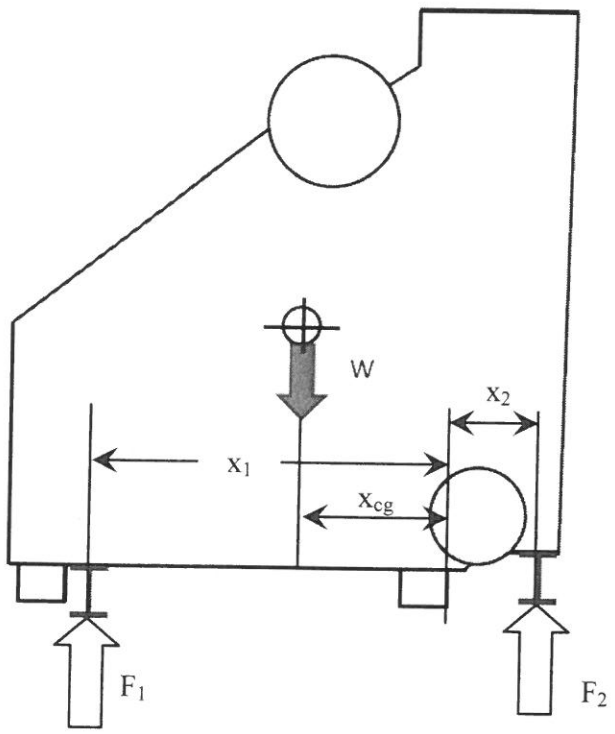

Figure 3: Sample Forces and Dimensions of Center of Gravity Determination

The total moments supplied by the lift forces must balance the moment due to the boiler's weight acting at a distance x_{cg} from the right support pad (Equation1):

(1)

Knowing the forces F_1 and F_2, dimensions x_1 and x_2, and total weight W, the lateral location of the center of gravity could be determined. This calculation was performed for both horizontal dimensions of the boiler and was repeated for all four lifts to account for any effect of tilt.

V. Results

The plan dimensions of the boiler supports, lifting points, and resulting center of gravity of the boiler are shown in Figure 4.

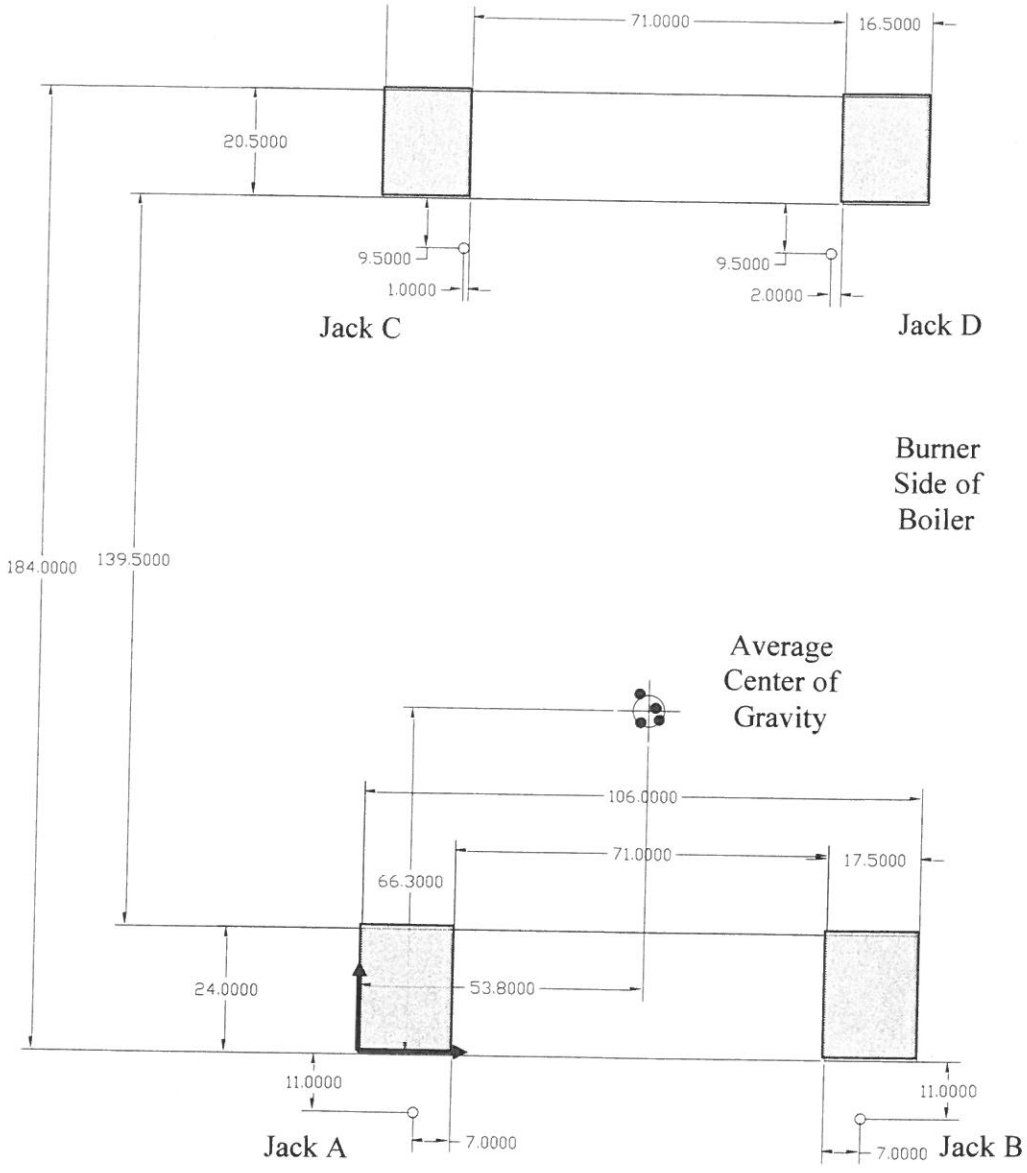

Figure 4: Lateral Dimensions of Boiler Supports, Lifting Points, and Center of Gravity

BOILER WEIGHT 86,400 LBS

The indicated pressures on each jack for all four lifts are summarized in Table 1.

	Indicated Pressure on Each Jack (psig)			
Lift	A	B	C	D
1	5800	5500	5300	5500
2	5000	6600	4800	5000
3	6100	5500	4500	5200
4	4900	6500	5200	5000

Table 1: Indicated Pressures on Lift Jacks

The corresponding forces on each jack for all four lifts are summarized in Table 1.

	Lifting Force on Each Jack (lbs)			
Lift	A	B	C	D
1	23200	22000	21200	22000
2	20000	26400	19200	20000
3	24400	22000	18000	20800
4	19600	26000	20800	20000

Table 2: Lifting Forces on Lift Jacks

The total weights of the boiler determined for each lift are shown in Table 3.

	Total Weight	
Lift	(lbs)	(tons)
1	88,400 lbs	44.2 tons
2	85,600 lbs	42.8 tons
3	85,200 lbs	42.6 tons
4	86,400 lbs	43.2 tons
Average over all 4 lifts	**86,400 lbs** ←	**43.2 tons**

Table 3: Total Boiler Weight

The variability in total weight is due to the resolution of the pressure gages on each jack. The average weight of the boiler was 86,400 lbs or 43.2 tons.

The lateral location of the center of gravity, measured from the corner of the support pad located nearest to Jack A as shown in Figure 4, was 53.8 inches (front to back) and 66.3 inches (side to side). The centers determined for each lift all fall within 6 inches of each other, indicating the average was not strongly influenced by tilt.

VI. Discussion

The total weight of 43.2 tons for the boiler includes all of the burners, soot blowers, safety relief valves, and other appurtances currently attached to the front and top of the boiler. It is anticipated that these items will be removed prior to transport, thus reducing the overall weight.

The location of the center of gravity is approximately centered front to back and is located under the steam drum at the top of the boiler. This was expected, as the steam drum is a thick-walled pressure vessel that contributes a significant fraction of the total weight of the current boiler. Removal of the burners and other appurtances is not expected to change the location of the center of gravity significantly.

This determination of the center of gravity suggests that the boiler is considerably top-heavy, with the center of gravity located high on the boiler under the steam drum. This is likely exacerbated by the fact that much of the refractory, tubing, and other structures have been removed from lower portions of the boiler. A rigging beam (not normally installed as part of the original boiler) is currently welded to the top of the steam drum and probably dates to the original installation of the boiler in the SWOS model building. This beam can and should be used as an attachment point for controlling the lateral motion of the boiler during rigging operations.

VII. Conclusion

The static Foster-Wheeler boiler cutaway at SWOS was lifted on four hydraulic jacks with the purpose of determining its overall weight. Both the total weight and approximate lateral location of the center of gravity could be determined from the results of this lift operation. These values will be used for the planning of the rigging, transport, and installation of the boiler cutaway in the Bresnahan building at MMA.

The total weight of the boiler, determined from an average of four lifts, was determined to be 86,400 lbs or 43.2 tons. This weight includes burners, soot blowers, safety relief valves, and other appurtances currently attached to the front and top of the boiler. The center of gravity is approximately centered front to back and is located under the steam drum at the top of the boiler. Removal of the burners and other appurtances is not expected to change the location of the center of gravity significantly.

As the steam drum is a significant fraction of the total boiler weight, and much of the lower structure of the boiler has been removed for training visualization, the boiler is likely to be top-heavy. The boiler should be secured in such a manner to avoid accidental tipping while skidding and during crane lifts.

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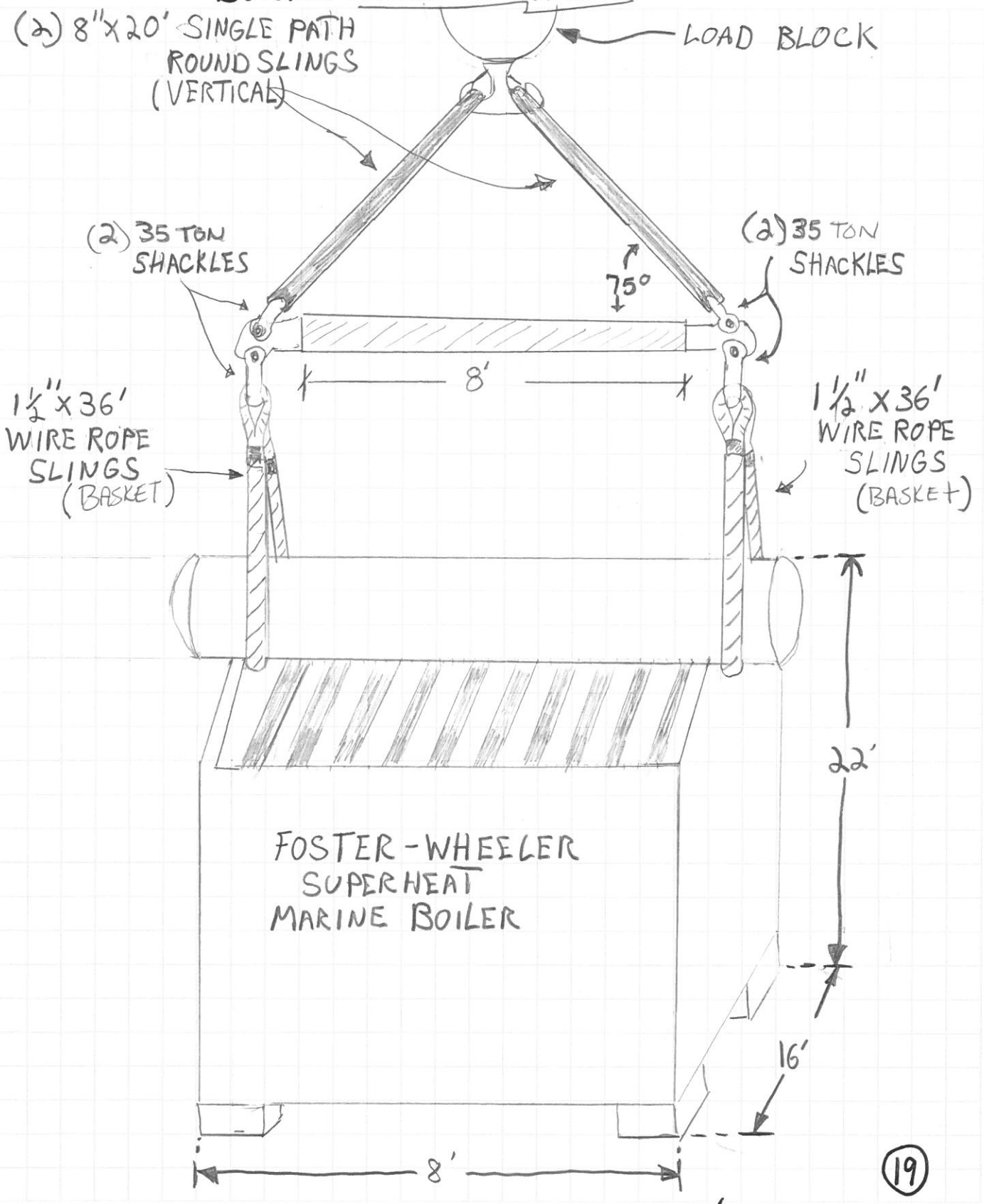
BOILER RIGGING SKETCH



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SLINGMAX® RIGGING SOLUTIONS

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OSHA TABLE N-184-4

6 x 19 Type, EIP, IWRC

Rope Size (in.)	Eye Size (In.)		Recommended Minimum Length	Rated Capacity in tons (2000 lbs.)*					
				Vertical	Choker Hitch	Basket Hitch			
	W	L				Vertical Basket	60°	45°	30°
1/4	3	6	1 6″	.65	.48	1.3	1.1	.91	.65
5/16	3	6	1 10″	1.0	.74	2.0	1.7	1.4	1.0
3/8	3	6	1 10″	1.4	1.1	2.9	2.5	2.0	1.4
7/16	4	8	2 4″	1.9	1.4	3.9	3.4	2.7	1.9
1/2	4	8	2 6″	2.5	1.9	5.1	4.4	3.6	2.5
9/16	4	8	2 8″	3.2	2.4	6.4	5.5	4.5	3.2
5/8	5	10	3 2″	3.9	2.9	7.8	6.8	5.5	3.9
3/4	6	12	3 8″	5.6	4.1	11.0	9.7	7.9	5.6
7/8	7	14	4 4″	7.6	5.6	15.0	13.0	11.0	7.6
1	8	16	4 10″	9.8	7.2	20.0	17.0	14.0	9.8
1-1/8	9	18	5 6″	12.0	9.1	24.0	21.0	17.0	12.0

6 x 36 Type, EIP, IWRC

Rope Size (in.)	Eye Size (In.)		Recommended Minimum Length	Rated Capacity in tons (2000 lbs.)*					
				Vertical	Choker Hitch	Basket Hitch			
	W	L				Vertical Basket	60°	45°	30°
1/4	3	6	1 6″	.65	.48	1.3	1.1	.91	.65
5/16	3	6	1 10″	1.0	.74	2.0	1.7	1.4	1.0
3/8	3	6	1 10″	1.4	1.1	2.9	2.5	2.0	1.4
7/16	4	8	2 4″	1.9	1.4	3.9	3.4	2.7	1.9
1/2	4	8	2 6″	2.5	1.9	5.1	4.4	3.6	2.5
9/16	4	8	2 8″	3.2	2.4	6.4	5.5	4.5	3.2
5/8	5	10	3 2″	3.9	2.9	7.8	6.8	5.5	3.9
3/4	6	12	3 8″	5.6	4.1	11.0	9.7	7.9	5.6
7/8	7	14	4 4″	7.6	5.6	15.0	13.0	11.0	7.6
1	8	16	4 10″	9.8	7.2	20.0	17.0	14.0	9.8
1-1/8	9	18	5 6″	12.0	9.1	24.0	21.0	17.0	12.0
1-1/4	10	20	6 2″	15.0	11.0	30.0	26.0	21.0	15.0
1-3/8	11	22	6 10″	18.0	13.0	36.0	31.0	25.0	18.0
1-1/2	12	24	7 4″	21.0	16.0	42.0	37.0	30.0	21.0
1-3/4	14	28	8 6″	28.0	21.0	57.0	49.0	40.0	28.0
2	16	32	9 10″	37.0	28.0	73.0	63.0	52.0	37.0

*Rated loads are based on a diameter of curvature of 20 times the individual rope diameter of points of sling contact with load.

▲ WARNING

Follow OSHA, ANSI B30.9 and Manufacturer's Guidelines. Can fail if damaged, misused or overloaded. Inspect before use. Use only if trained. Do not exceed rated capacity. Protect sling from contact with edges. DEATH or INJURY can occur from improper use or maintenance.

SINGLE-PATH ROUND SLINGS

		RATED CAPACITIES (LBS.)				
CODE	COLOR	VERTICAL	CHOKER	BASKET	WIDTH	Approx. Weight lbs. per ft.
SP300	Purple	3,000	2,400	6,000	2"	.30
SP450	Black	4,500	3,600	9,000	2"	.45
SP600	Green	6,000	4,800	12,000	2"	.48
SP900	Yellow	9,000	7,200	18,000	2"	.70
SP1200	Gray	12,000	9,600	24,000	3"	.90
SP1400	Red	14,000	11,200	28,000	3"	.95
SP1700	Brown	17,000	13,600	34,000	3"	1.20
SP2200	Blue	22,000	17,600	44,000	3"	1.40
SP2600	Orange	26,000	20,800	52,000	4"	1.70
SP3200	Orange	32,000	25,600	64,000	4"	1.90
SP5000	Orange	50,000	40,000	100,000	5"	2.70
SP6000	Orange	60,000	48,000	120,000	5"	3.00
SP6600	Black	66,000	52,800	132,000	6"	4.20
SP9000	Black	90,000	72,000	180,000	8"	4.80

Sling cover color can change to meet customer specifications **DO NOT EXCEED RATED CAPACITY.**

LIFTING FIBERS – Endless loops of polyester load bearing yarn

COVER – Polyester color cover
Aramid outer covers also available for heat protection

LABEL – Plastic or leather available - Private labeling also

CAPACITIES – 3000 pounds to 60,000 pounds vertical rated capacity

DESIGN FACTOR – 5 to 1

COLORS – Wide variety available (including BLACK for stage rigging)

CONFIGURATIONS – Roundsling or eye-and-eye

APPLICATIONS – Vertical, basket or choker

INSPECTION – Slings should be examined throughout their length for abrasion, cuts, heat damage, fitting distortion or damage, and tag legibility. Abrasion, heat damage, or cuts to the cover may indicate a loss of strength to the load core. If any doubts are held by the inspector, the sling should be taken out of service. Slings removed from service that are not capable of repair shall be destroyed and rendered completely unfit for future use.

Sling can fail if damaged, misused or overloaded. Inspect before use. Damaged sling shall not be used. Use only if trained. Do not exceed rated capacity. Protect sling from being cut by load edges, corners, protrusions and abrasive surfaces. Avoid exposure to acid, alkali and temperature over 180°F. DEATH or INJURY can occur from improper use or maintenance.

⚠ WARNING

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SCREW PIN ANCHOR SHACKLES

G-209 / S-209

G-209 Screw pin anchor shackles meet the performance requirements of Federal Specification RR-C-271F Type IVA, Grade A, Class 2, except for those provisions required of the contractor. For additional information, see page 426.

- Capacities 1/3 thru 55 metric tons.
- Forged - Quenched and Tempered, with alloy pins.
- Working Load Limit permanently shown on every shackle.
- Hot Dip galvanized or Self Colored.
- Fatigue rated.
- Shackles 25t and larger are **RFID EQUIPPED.**
- Shackles can be furnished proof tested with certificates to designated standards, such as ABS, DNV, Lloyds, or other certification. Charges for proof testing and certification available when requested at the time of order.
- Shackles are Quenched and Tempered and can meet DNV impact requirements of 42 joules (31 ft. lbs.) at -20 degree C (-4 degree F).
- 2t through 25t bow and screw pin are Certified to meet charpy impact testing of 42 joules (31 ft-lbs.) min. ave. at -20 degree C (-4 degree F)
- Meets or exceeds all requirements of ASME B30.26.
- Type Approval and certification in accordance with ABS 2006 Steel Vessel Rules 1-1-17.7, and ABS Guide for Certification of Cranes.
- Crosby 2t through 25t G209 anchor shackles are type approved to DNV Certification Notes 2.7-1 -Offshore Containers. These Crosby shackles are statistical proof and impact tested. The tests are conducted by Crosby and 3.1 test certification is available upon request.
- Look for the Red Pin® . . . the mark of genuine Crosby quality.

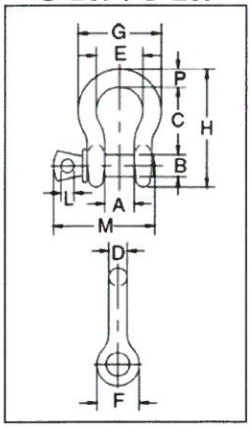
SCREW PIN CHAIN SHACKLES

G-210 / S-210

G-210 Screw pin chain shackles meet the performance requirements of Federal Specification RR-C-271F, Type IVB, Grade A, Class 2, except for those provisions required of the contractor. For additional information, see page 426.

G-209 / S-209 Screw Pin Anchor Shackles

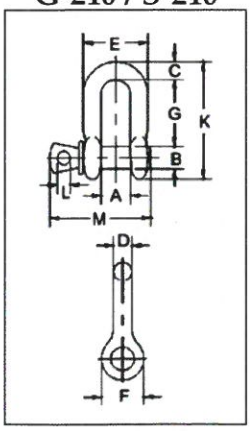
G-209 / S-209



Nominal Size (in.)	Working Load Limit (t)*	Stock No. G-209	Stock No. S-209	Weight Each (lbs.)	Dimensions (in.) A	B	C	D	E	F	G	H	L	M	P	Tolerance +/- C	A
3/16	1/3	1018357	–	.06	.38	.25	.88	.19	.60	.56	.98	1.47	.16	1.14	.19	.06	.06
1/4	1/2	1018375	1018384	.10	.47	.31	1.13	.25	.78	.61	1.28	1.84	.19	1.43	.25	.06	.06
5/16	3/4	1018393	1018400	.18	.53	.38	1.22	.31	.84	.75	1.47	2.09	.22	1.71	.31	.06	.06
3/8	1	1018419	1018428	.31	.66	.44	1.44	.38	1.03	.91	1.78	2.49	.25	2.02	.38	.13	.06
7/16	1-1/2	1018437	1018446	.38	.75	.50	1.69	.44	1.16	1.06	2.03	2.91	.31	2.37	.44	.13	.06
1/2	2	1018455	1018464	.72	.81	.63	1.88	.50	1.31	1.19	2.31	3.28	.38	2.69	.50	.13	.06
5/8	3-1/4	1018473	1018482	1.37	1.06	.75	2.38	.63	1.69	1.50	2.94	4.19	.44	3.34	.69	.13	.06
3/4	4-3/4	1018491	1018507	2.35	1.25	.88	2.81	.75	2.00	1.81	3.50	4.97	.50	3.97	.81	.25	.06
7/8	6-1/2	1018516	1018525	3.62	1.44	1.00	3.31	.88	2.28	2.09	4.03	5.83	.50	4.50	.97	.25	.06
1	8-1/2	1018534	1018543	5.03	1.69	1.13	3.75	1.00	2.69	2.38	4.69	6.56	.56	5.13	1.06	.25	.06
1-1/8	9-1/2	1018552	1018561	7.41	1.81	1.25	4.25	1.16	2.91	2.69	5.16	7.47	.63	5.71	1.25	.25	.06
1-1/4	12	1018570	1018589	9.50	2.03	1.38	4.69	1.29	3.25	3.00	5.75	8.25	.69	6.25	1.38	.25	.06
1-3/8	13-1/2	1018598	1018605	13.53	2.25	1.50	5.25	1.42	3.63	3.31	6.38	9.16	.75	6.83	1.50	.25	.13
1-1/2	17	1018614	1018623	17.20	2.38	1.63	5.75	1.54	3.88	3.63	6.88	10.00	.81	7.33	1.62	.25	.13
1-3/4	25	1018632	1018641	27.78	2.88	2.00	7.00	1.84	5.00	4.19	8.86	12.34	1.00	9.06	2.25	.25	.13
2	35	1018650	1018669	45.00	3.25	2.25	7.75	2.08	5.75	4.81	9.97	13.68	1.22	10.35	2.40	.25	.13
2-1/2	55	1018678	1018687	85.75	4.13	2.75	10.50	2.71	7.25	5.69	12.87	17.84	1.38	13.00	3.13	.25	.25

G-210 / S-210 Screw Pin Anchor Shackles

G-210 / S-210



Nominal Size (in.)	Working Load Limit (t)*	Stock No. G-210	Stock No. S-210	Weight Each (lbs.)	Dimensions (in.) A	B	C	D	E	F	G	K	L	M	Tolerance +/- G	A
1/4	1/2	1019150	1019169	.11	.47	.31	.25	.25	.97	.62	.97	1.59	.19	1.43	.06	.06
5/16	3/4	1019178	1019187	.17	.53	.38	.31	.31	1.15	.75	1.07	1.91	.22	1.71	.06	.06
3/8	1	1019196	1019203	.28	.66	.44	.38	.38	1.42	.92	1.28	2.31	.25	2.02	.13	.06
7/16	1-1/2	1019212	1019221	.43	.75	.50	.44	.44	1.63	1.06	1.48	2.67	.31	2.37	.13	.06
1/2	2	1019230	1019249	.59	.81	.63	.50	.50	1.81	1.18	1.66	3.03	.38	2.69	.13	.06
5/8	3-1/4	1019258	1019267	1.25	1.06	.75	.63	.63	2.32	1.50	2.04	3.76	.44	3.34	.13	.06
3/4	4-3/4	1019276	1019285	2.63	1.25	.88	.81	.75	2.75	1.81	2.40	4.53	.50	3.97	.25	.06
7/8	6-1/2	1019294	1019301	3.16	1.44	1.00	.97	.88	3.20	2.10	2.86	5.33	.50	4.50	.25	.06
1	8-1/2	1019310	1019329	4.75	1.69	1.13	1.00	1.00	3.69	2.38	3.24	5.94	.56	5.13	.25	.06
1-1/8	9-1/2	1019338	1019347	6.75	1.81	1.25	1.25	1.13	4.07	2.69	3.61	6.78	.63	5.71	.25	.06
1-1/4	12	1019356	1019365	9.06	2.03	1.38	1.38	1.25	4.53	3.00	3.97	7.50	.69	6.25	.25	.13
1-3/8	13-1/2	1019374	1019383	11.63	2.25	1.50	1.50	1.38	5.01	3.31	4.43	8.28	.75	6.53	.25	.13
1-1/2	17	1019392	1019409	15.95	2.38	1.63	1.62	1.50	5.38	3.62	4.87	9.05	.81	7.33	.25	.13
1-3/4	25	1019418	1019427	26.75	2.88	2.00	2.12	1.75	6.38	4.19	5.78	10.97	1.00	9.06	.25	.13
2	35	1019436	1019445	42.31	3.25	2.25	2.36	2.10	7.25	5.00	6.77	12.74	1.13	10.35	.25	.13
2-1/2	55	1019454	1019463	71.75	4.12	2.75	2.63	2.63	9.38	5.68	8.07	14.85	1.38	13.00	.25	.25

* NOTE: Maximum Proof Load is 2.0 times the Working Load Limit. Minimum Ultimate Strength is 6 times the Working Load Limit. For Working Load Limit reduction due to side loading applications, see page 80.

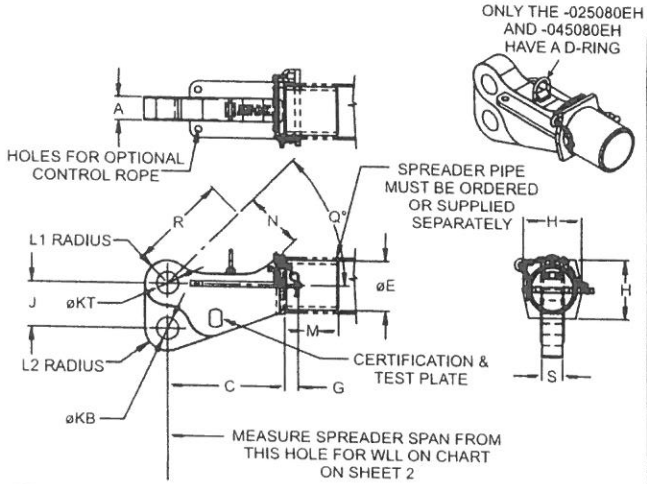
SPREADER BAR END CAP ASSEMBLY ("END CAPS") (AC25C TYPE)

Cage Code: 65059 | Drawing No: SAC25C | Revision: AU | Sheet: 1 of 4

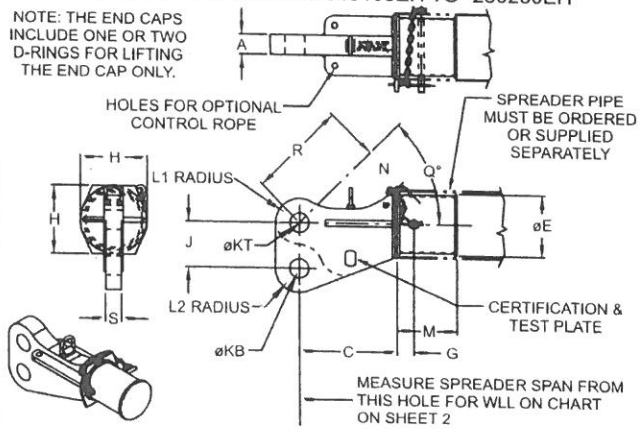
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES

U.S Pat # 7,967,352

END CAP SIZES AC25C-007030EH TO -045080EH



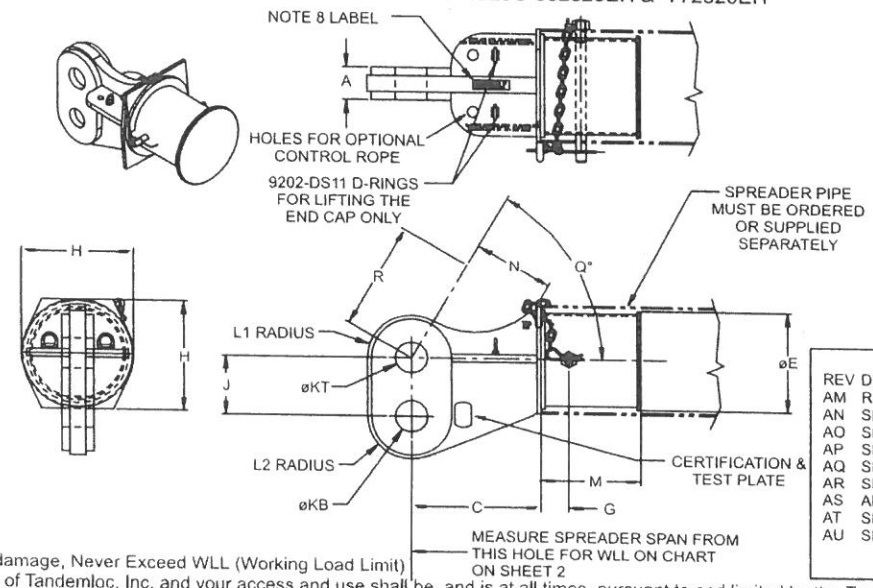
END CAP SIZES AC25C-045100EH TO -250260EH



NOTE:

1. DESIGNED & CONSTRUCTED TO CONFORM TO ASME B30.20 & AWS D14.1. TESTING ALSO CONFORMS TO OSHA 2232.
2. MATERIAL IS STEEL, PAINTED YELLOW.
3. ASSEMBLIES ARE PROOF TESTED & CERTIFIED FOR THE LOADS SHOWN IN THE CHART ON SHEET 2.
4. USE TWO END CAPS, ONE ON EACH END OF SPREADER PIPE FOR A CAPACITY OF 2X THE END CAP WORK LOAD LIMIT.
5. USE MANUAL #SAC25C, INCLUDED WITH EACH SET OF PIPE CAPS
6. SEE SHEETS 2, 3 & 4 FOR OTHER DATA
7. BECAUSE OF DIMENSIONAL MODIFICATIONS, THE END CAPS MADE AFTER 05/31/03 MAY NOT PROVIDE THE SPAN OR HAVE SAFETY PIN HOLE ALIGNMENT WITH SPREADER PIPES MADE TO SAC22P DIMENSIONS PRIOR TO 05/31/03. END CAPS ARE AVAILABLE TO FIT THOSE CONDITIONS. CONTACT YOUR TANDEMLOC ACCOUNT MGR FOR INFORMATION.
8. EACH PIPE CAP HAS A LABEL WITH DATA AS SHOWN BELOW AND THE NOMINAL PIPE SIZE IT FITS. LABEL MAY SAY "SCHED 60 WALL" INSTEAD OF "SCHED 80 WALL" DEPENDING ON SIZE OF END CAP.
9. EACH END CAP OVER 8" HAS ONE OR TWO D-RINGS FOR LIFTING THE END CAP ONLY.

END CAP SIZES AC25C-552320EH & -772320EH

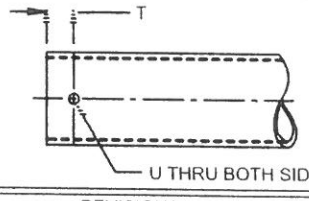


FOR ASTM- A53 TYPE E OR - A333/333M GR 6 OR 7 STEEL PIPE, SCHED 80 WALL NP SIZE:

www.tandemloc.com 1-800-882-3273

USE IN ACCORDANCE WITH USE MANUAL SAC25C

THIS DRAWING SHOWS SPREADER PIPE HOLE DIMENSION REQUIREMENTS FOR PROPER RETAINER PIN HOLE PLACEMENT



REVISIONS

REV	DESCRIPTION	DATE	APP.
AM	REMOVED D-RINGS FROM END CAPS LESS THAN 8"	04/02/09	DAH
AN	SEE SHEET 4	9/1/09	DAH
AO	SEE SHEET 4	10/5/09	DAH
AP	SEE SHEET 4	8/19/10	DAH
AQ	SEE SHEET 2	8/24/10	DAH
AR	SEE SHEET 4	9/20/10	DAH
AS	ADDED U.S. PATENT #7,967,352	6/30/11	DAH
AT	SEE SHEET 2	10/21/11	DAH
AU	SEE SHEET 2	9/13/12	DAH

To avoid lifter failure, potential death and property damage, Never Exceed WLL (Working Load Limit)

Dimensions are subject to manufacturing tolerance and change.

TANDEMLOC INC

Email: info@tandemloc.com • www.tandemloc.com
824 Highway 101 • Havelock, NC 28532
TEL: 1.800.258.7324 (252.447.7155)
FAX: 1.800.892.3273 (252.447.5502)

Tandemloc designs, manufactures and tests lifting, securing and mobilizing components for all industries. See our website for details and important safety information.

Read all safety labels and instructions prior to use. Product to be used by qualified personnel only.

SPREADER BAR END CAP ASSEMBLY ("END CAPS") (AC25C TYPE)

Cage Code: 65059 | Drawing No: SAC25C | Revision: AU | Sheet: 4 of 4

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES

U.S Pat # 7,967,352

STEEL SPREADER PIPE* CAPACITY CHART

WORK LOAD LIMITS ARE SHOWN IN TONS (2000 LB.), LOADS ARE IN CONFORMANCE TO ASME B30.9c AND B30.29. STEEL PIPE CONFORMS TO ASTM A500 GRADE B, ASTM A53 GRADE B, OR ANY STRUCTURAL PIPE RATED AT 35,000 PSI OR GREATER AND FOR LOW TEMPERATURE SERVICE (TO -50°F) TO ASTMA333/333M GR 6 OR 7.
*WALL THICKNESS IS DEFINED IN CHART.

	NOM. PIPE SIZE/lb per ft. I.D./wall thickness	3"/10.25#ft 2.90/.300		4"/14.98#ft 3.826/.337		5"/20.78#ft 4.813/.375		6"/28.57#ft 5.761/.432		8"/43.39#ft 7.625/.500		10"/54.74#ft 9.750/.500		12"/65.42#ft 11.750/.500		14"/72.09#ft 13.000/.500	26"/136.2#ft 25.000/.500	32"/168.2#ft 32.000/.500
	LIFT ANGLE**	45°	60°	45°	60°	45°	60°	45°	60°	45°	60°	45°	60°	45°	60°	60°	60°	70°
SPAN BETWEEN TWO LIFT POINTS	3 FT.	25	26	39	50	50	50	90	90	90	90	130	130	130	130	170	500	1544
	6 FT.	23	26	36	50	50	50	75	90	90	90	130	130	130	130	170	500	1544
	8 FT.	20	26	33	50	50	50	70	90	90	90	130	130	130	130	170	500	1544
	10 FT.	16	26	30	50	46	50	68	90	90	90	130	130	130	130	170	500	1544
	15 FT.	8	14	20	35	36	50	57	90	90	90	130	130	130	130	170	500	1544
	20 FT.	4	7	11	19	26	45	44	77	86	90	122	130	130	130	170	500	1544
	25 FT.	X	X	8	14	17	30	30	52	71	90	109	130	130	130	170	500	1544
	30 FT.	X	X	X	X	11	19	21	36	55	90	95	130	130	130	170	500	1544
	35 FT.	X	X	X	X	X	X	15	26	40	70	79	130	118	130	170	500	1544
	40 FT.	X	X	X	X	X	X	10	17	31	54	62	108	101	130	170	500	1544
	45 FT.	X	X	X	X	X	X	X	X	20	35	40	70	81	130	170	500	1544
	50 FT.	X	X	X	X	X	X	X	X	X	X	28	49	55	96	141	500	1544
	55 FT.	X	X	X	X	X	X	X	X	X	X	16	28	45	79	116	500	1544
	60 FT.	X	X	X	X	X	X	X	X	X	X	8	14	40	69	91	500	1544
	66 FT.	X	X	X	X	X	X	X	X	X	X	X	X	33	57	74	500	1544
	70 FT.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	67	-	1544
	79 FT.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	52	-	1104
	90 FT.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-
	100 FT.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	220	-

** TOP SLING LIFT ANGLE TO HORIZONTAL
X SECTION TOO LONG FOR SAFE LIFTING
- UNCALCULATED AT THIS DATE, CALL FOR DETAILS

NON SHADED REGION SHOWS END CAP ASSEMBLIES WHERE CAPACITY IS REDUCED DUE TO SPAN AND/OR SLING ANGLE. SHADED REGION SHOWS ASSEMBLY LENGTHS THAT ARE LIMITED BY END CAP CAPACITIES. CUSTOM MADE END EYE CAPS ARE AVAILABLE ON REQUEST.

SEE SHEET 1, 2 & 3 FOR OTHER DATA

REVISIONS

REV	DESCRIPTION	DATE	APP.
AK	ADDED NOTE SAYING - STEEL PIPE CONFORMS TO ASTM A500 GRADE B, ASTM A53 GRADE B, OR ANY STRUCTURAL PIPE RATED AT 35,000 PSI OR GREATER.	1/8/09	DAH
AM	SEE SHEET 1	04/02/09	DAH
AN	ADDED NON SHADED REGION SHOWS END CAP..., ADDED ADDED BOTTOM 2 ROWS IN 12" COLUMN.	9/1/09	DAH
AO	ADDED "X" TO CHART WITH NOTE AND "-" NOTE FOR UNCALCULATED SECTIONS	10/5/2009	DAH
AP	REMOVED ALL 30° WLL NUMBERS AND REMOVED 45° WLL NUMBERS FROM THE 14" COLUMN	8/19/10	DAH
AQ	SEE SHEET 2	8/24/10	DAH
AR	ADDED 1544 TO 32" COLUMN AT 60', 66' AND 70'	9/20/10	DAH
AS	ADDED U.S. PATENT PENDING	6/30/11	DAH
AT	SEE SHEET 2	10/21/11	DAH
AU	SEE SHEET 2	9/13/12	DAH

TANDEMLOC INC

Email: info@tandemloc.com • www.tandemloc.com
824 Highway 101 • Havelock, NC 28532
TEL: 1.800.258.7324 (252.447.7155)
FAX: 1.800.892.3273 (252.447.5502)

Tandemloc designs, manufactures and tests lifting, securing and mobilizing components for all industries. See our website for details and important safety information.

Read all safety labels and instructions prior to use. Product to be used by qualified personnel only.

TEST CERTIFICATE

(TYPE 1; LIFTING ASSEMBLIES)

TEST DATE: 6/11/2013

PRODUCT DESCRIPTION: 6" PIPE END EYE CAP

PRODUCT PART NUMBER: AC25C-025060EH

SERIAL NUMBER(S): 130671

WORKING LOAD LIMIT (WLL) 50,000 LB @ 45° MIN

THE COMPONENT(S) OF THE PRODUCT ABOVE THAT WERE FABRICATED BY TANDEMLOC HAVE BEEN LOAD TESTED TO 125% OF THE WORKING LOAD LIMIT (WLL) LISTED ABOVE PER ASME B30.20-2010 AND TANDEMLOC PROCEDURE 1005.06.

THIS PRODUCT WAS FOUND TO BE ACCEPTABLE AND HAS BEEN PERMANENTLY MARKED WITH THE PART NUMBER, SERIAL NUMBER, AND WORKING LOAD LIMIT (WLL).

AUTHORIZED SIGNATURE _____

KYLE KLICKER
QUALITY ASSURANCE MANAGER
TANDEMLOC, INC

(NEVER EXCEED THE WORKING LOAD LIMIT)

TCA; P/N TLTC-1

email: **info@tandemloc.com**
Sales Telephone: 1-800-258-7324 • Sales Fax: 1-800-892-3273
International Telephone: 252-447-7155 • International Fax: 252-447-5502
824 Highway 101 • (Fontana Boulevard) • Havelock, NC 28532

25

TEST CERTIFICATE

(TYPE 1; LIFTING ASSEMBLIES)

TEST DATE: 6/11/2013

PRODUCT DESCRIPTION: 6" PIPE END EYE CAP

PRODUCT PART NUMBER: AC25C-025060EH

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THIS PRODUCT WAS FOUND TO BE ACCEPTABLE AND HAS BEEN PERMANENTLY MARKED WITH THE PART NUMBER, SERIAL NUMBER, AND WORKING LOAD LIMIT (WLL).

AUTHORIZED SIGNATURE _____

KYLE KLICKER
QUALITY ASSURANCE MANAGER
TANDEMLOC, INC

(NEVER EXCEED THE WORKING LOAD LIMIT)

TCA; P/N TLTC-1

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International Telephone: 252-447-7155 • International Fax: 252-447-5502
824 Highway 101 • (Fontana Boulevard) • Havelock, NC 28532

Independence Tube

6226 W. 74th St
Chicago, IL 60638
708-496-0380
Fax: 708-563-1950

independencetube.com
itctube.com
Certificate Number: MAR 89403

Sold By:
INDEPENDENCE TUBE CORPORATION
6226 W. 74th St.
Chicago, IL 60638
Tel: 708-496-0380
Fax: 708-563-1950

Purchase Order No: 4119
Sales Order No: MAR 248341 - 1
Bill of Lading No: MAR 144890 - 3
Invoice No: MAR 609722 - 1

Shipped: 10/18/2013
Invoiced: 10/18/2013

Sold To:
3504 - CENTRAL STEEL SUPPLY
85 AMES STREET
MARLBOROUGH, MA 01752

Ship To:
2 - CENTRAL STEEL SUPPLY
85 AMES STREET
800-345-3232
MARLBOROUGH, MA 01752

CERTIFICATE of ANALYSIS and TESTS

Customer Part No:

ROUND A500 GRADE B(C)
6.625"OD (6"NPS) X SCH80 X 42'

Certificate No: MAR 89403
Test Date: 10/16/2013

Total Pieces	Total Weight
7	8,408

Heat #: 341889 Yield: 68,590 psi Tensile: 80,230 psi Elongation: 32.4 % Y/T Ratio: 0.8549 Carbon Eq: 0.3423

C	Mn	P	S	Si	Al	Cu	Cr	Mo	V	Ni
0.2000	0.7900	0.0090	0.0030	0.0200	0.0500	0.0200	0.0300	0.0100	0.0030	0.0100

Bundle Tag	Pieces	Weight
743501	7	8,408

Certification:

I certify that the above results are a true and correct copy of records prepared and maintained by Independence Tube Corporation. Sworn this day, 10/16/2013

WE PROUDLY MANUFACTURE ALL OF OUR HSS IN THE USA.
INDEPENDENCE TUBE PRODUCT IS MANUFACTURED, TESTED, AND INSPECTED IN ACCORDANCE WITH ASTM STANDARDS.
****

CURRENT STANDARDS:
.....A500/A500M-10a
.....A513-07
.....A252-98 (2002)
.....A847/A847M-11

Jose Martinez, QMS Manager

Annual Certification

This is to certify that the unit described below received an TELESCOPING BOOM CRANE-ANNUAL in accordance with

OSHA 1926.1400, 1910.180,1926.601 ASME B30.5,B30.1

Equipment Owner: HALLAMORE

Model No.: AC-350.1

Equipment Make: DEMAG

Serial No.: 31164

Equipment Type: TELESCOPING BOOM CRANE

Unit Id: 96

Inspection ID: : 88.577.1445432646

Inspected on this: 20th (Tuesday) day of October, 2015

by: Enso Crane Services

P.O. Box 671 03821 Dover(NH)

603-781-7795

http://www.ensocrane.com

Steve Marquis
INSPECTOR
5IZKFY4U3EBU
89879-8706897
Valid Until:
11.15 2016
Enso Crane Services

This Certificate Expires One Year From The Date of Inspection Above

IMPERATORE CORPORATION
STEEL • CRANE & EQUIPMENT RENTAL • RIGGING

2550 PLAINFIELD PIKE
CRANSTON, RI 02921
P – **401-942-7790**
F – **401-944-1652**

JOB HAZARD ANALYSIS

Job Site: Newport Naval Station BLDG A-138 Static Lab

Activity Type: Building Renovations

Date Developed: 10-11-16

Potential Hazards: Multiple

Trade: Operating Engineer

Competency Requirements:
Equipment Operation / Valid State License & Certification / Knowledge of safety regulations Knowledge of crane assembly / disassembly Procedures / OSHA 29 CFR Part 1926 & ANSI B30.5

Facility Type: Static Lab

Task: Crane Assembly / Disassembly Setup / Breakdown

Note: Crane Operator will be the A/D director

Step-1	Potential Hazard - Step 1	Recommended Procedures - Step 1
Crane set-up area	Struck by Load, pinch points, poor or Unknown ground conditions. Electrocution Hazards. Dunnage / Mats collapse under pontoons	Inspect area where outriggers are to be extended make sure area is clear of obstructions use a spotter to make sure the area is clear of personal while extending or retracting out riggers. Use crane mats or dunnage under all outrigger floats to distribute outrigger loads evenly. Make sure dunnage / mats are packed tight with no spaces in Between. Operator to get out of crane and confirm there are no power lines in area prior to raising Boom out of cradle or making any lifts. Operator to visually inspect outrigger position on mats/dunnage prior to operating crane
Step-2	**Potential Hazard – Step 2**	**Recommended Procedures – Step 2**
Decking/Undecking Counterweights. (if weights are required)	Picking or raising counterweights over equipment or personnel. Faulty slings possible loss of load. Crush, pinch points.	Prevent access to work area, swing points of crane. Utilize competent personnel for inspection of the pins & rigging used to hoist or raise counterweights. Watch For pinch points during the decking or undecking Procedure or when landing counterweights on trailer bed or crane deck. If crane has permanent mount counterweights check integrity of mounting hardware before operating
Step-3	**Potential Hazard – Step 3**	**Recommended Procedures – Step 3**
Assemble/Disassemble Crane Boom & Jib (if jib is required)	Struck by, pinch points. Incorrect Boom/Jib Assembly.	A. If Jib is not to be used make sure jib hinge pins are removed prior to extending boom. Allow safe area for jib pin removal. Make sure jib is securely attached to boom base in stowed position B. If jib is used Follow manufacturer's recommended boom / jib erection procedures; allow safe area for jib pin removal & replacement. Operator to inspect Boom/Jib assembly prior to raising boom.
Step-4	**Potential Hazard – Step 4**	**Recommended Procedures – Step 4**
Mounting the trailers or crane deck	Fall Hazard	Use OEM ladders on crane and step ladders for trucks and tie off where applicable.
Step-5	**Potential Hazard – Step 5**	**Recommended Procedures – Step 5**
Handling large Crane mats. (If required)	Struck by, crush, pinch points Fall Hazard.	Prevent access to area underneath boom & work area. Use caution hoisting & placing mats on trailer/ground.
Step-6	**Potential Hazard – Step 6**	**Recommended Procedures – Step 6**
Jobsite Travel of Trucks & Crane	Struck by, run over	Utilize personnel as needed to escort trucks & crane on to site Ensure proper operation of back-up alarms.

Commonwealth of Massachusetts
Department of Public Safety

License: [redacted]
Hoisting Engineer

[redacted]

Commissioner

Expiration:
09/02/2017

Hoisting Engineer
Restricted to:
HE-3A- Air or electric powered

HE-4A- Unlimited Specialty Series

HE-1A- Derricks/ Lattice Cranes

HE-2A- Excavators

DIG SAFE Call Center: (888) 344-7233
In case of accident call: (508) 820-1444
DPS Licensing information visit: WWW.MASS.GOV/DPS

OSHA

U.S. Department of Labor
Occupational Safety and Health Administration

[redacted]

has successfully completed a 10-hour Occupational Safety and Health Training Course in

Construction Safety & Health

[redacted] 11-2-05
(Trainer) (Date)

NCCCO CERTIFIED
Operator
Certification #: [redacted]
Certification Designations:
LBT,LBC,TSS,TLL

Issued to: [redacted]
Issue Date: 04/30/2013 **Expiration Date:** 04/30/2018

Thane Sicklesteel, President, NCCCO Board of Directors — Graham J. Ernst, Executive Director, NCCCO

For identification purposes only. Subject to provisions of suspension or revocation.

National Commission for the Certification of Crane Operators

State of Rhode Island and Providence Plantations
Rhode Island Department of Labor and Training

HYDRAULIC CRANES **00013489**

[redacted]

JOHN SHAW
Administrator

~~09/30/2017~~
Expiration Date

MEDICAL EXAMINER'S CERTIFICATE

I certify that I have examined [redacted]
in accordance with the Federal Motor Carrier Safety Regulations (49 CFR 391.41-391.49) and with knowledge of the driving duties, I find this person is qualified; and, if applicable, only when:

- ☐ wearing corrective lenses
- ☐ wearing hearing aid
- ☐ accompanied by a _____ waiver/exemption
- ☐ driving within an exempt intracity zone (49 CFR 391.62)
- ☐ accompanied by a Skill Performance Evaluation Certificate (SPE)
- ☐ qualified by operation of 49 CFR 391.64

The information I have provided regarding this physical examination is true and complete. A complete examination form with any attachment embodies my findings completely and correctly, and is on file in my office.

SIGNATURE OF MEDICAL EXAMINER	DATE 10/2/2015
MEDICAL EXAMINER'S NAME (PRINT) [redacted]	☐ MD ☐ Advanced Practice Nurse
MEDICAL EXAMINER'S LICENSE OR CERTIFICATE NO. / ISSUING STATE MA # [redacted]	☐ DO ☑ Physician Assistant ☐ Other Practitioner
NATIONAL REGISTRY # [redacted]	☐ Chiropractor
SIGNATURE OF DRIVER [redacted]	INTRASTATE ONLY ☐ YES ☑ NO / CDL ☐ YES ☐ NO
DRIVER'S LICENSE NO [redacted]	STATE MA
ADDRESS OF DRIVER [redacted]	MEDICAL CERTIFICATION EXPIRATION DATE 10/2/2017

ORIGINAL – DRIVER

CRANE OPERATOR

U.S. Department of Transportation
Federal Motor Carrier Safety Administration

Medical Examiner's Certificate
(for Commercial Driver Medical Certification)

JAN 05 2016 RI DMV

I certify that I have examined Last Name: [redacted] First Name: [redacted] in accordance with *(please check only one)*:

☒ the Federal Motor Carrier Safety Regulations (49 CFR 391.41-391.49) and, with knowledge of the driving duties, I find this person is qualified, and, if applicable, only when *(check all that apply)* OR
○ the Federal Motor Carrier Safety Regulations (49 CFR 391.41-391.49) with any applicable State variances (which will only be valid for intrastate operations), and, with knowledge of the driving duties, I find this person is qualified, and, if applicable, only when *(check all that apply)*:

- ☐ Wearing corrective lenses
- ☐ Wearing hearing aid
- ☐ Accompanied by a ____ waiver/exemption
- ☐ Accompanied by a Skill Performance Evaluation (SPE) Certificate
- ☐ Driving within an exempt intracity zone (49 CFR 391.62) *(Federal)*
- ☐ Qualified by operation of 49 CFR 391.64 *(Federal)*
- ☐ Grandfathered from State requirements *(State)*

The information I have provided regarding this physical examination is true and complete. A complete Medical Examination Report Form, MCSA-5875, with any attachments embodies my findings completely and correctly, and is on file in my office.

Medical Examiner's Certificate Expiration Date: 12/30/2017

Medical Examiner's Signature: Cheryl Trager PAc
Medical Examiner's Telephone Number: [redacted]
Date Certificate Signed: 12/30/15
Medical Examiner's Name *(please print or type)*: Cheryl Trager, PA
○ MD ☒ Physician Assistant ○ Advanced Practice Nurse
○ DO ○ Chiropractor ○ Other Practitioner *(specify)*
Medical Examiner's State License, Certificate, or Registration Number: PA00097
Issuing State: Rhode Island
National Registry Number: [redacted]

Driver's Signature: Michael Marott
Driver's License Number: [redacted]
Issuing State/Province: Rhode Island
Driver's Address
Street Address: [redacted] City: [redacted] State/Province: RI Zip Code: 02816
CLP/CDL Applicant/Holder ☒ Yes ○ No

IUOE Local 57

[redacted]

Has completed the Qualified Rigger and Signalperson course in accordance with OSHA 29 CFR 1926.1403-1411, 1419-1428

Instructors Signature: Christopher Treml

Date: 11/3/10

OSHA Occupational Safety and Health Administration   15-600993687

This card acknowledges that the recipient has successfully completed a 30-hour Occupational Safety and Health Training Course in
Construction Safety and Health

[redacted]

Kerry McGee — (Trainer name – print or type)
4/20/2013 — (Course end date)

Commonwealth of Massachusetts
Department of Public Safety
Hoisting Engineer
License: [redacted]

[redacted]
Coventry RI [redacted]

Commissioner

Expiration:
01/29/2017

Rhode Island
COMMERCIAL DRIVER LICENSE
Class A License No [redacted]
Birthdate 01-29-1988 Expires 01-29-2021
Sex M Ht 509 Wt 150 Eyes BLUE Hair [redacted] Issue Date [redacted]
Restrictions H Endorsements: [redacted]

[redacted]

CDL

State of Rhode Island and Providence Plantations
Rhode Island Department of Labor and Training

FULL LICENSE [redacted]

[redacted]

JOHN SHAW
Administrator

01/31/2018
Expiration Date

NCCCO CERTIFIED
Crane Operator

Certification #: [redacted]
Certification Designations:
LBT,LBC,TSS,TLL

Issued to: [redacted]
Issue Date: 11/30/2011 **Expiration Date: 11/30/2016**

J. Chris Ryan, President, NCCCO Board of Directors
Graham J. Brent, Executive Director, NCCCO
For identification purposes only. Subject to provisions of suspension or revocation.

National Commission for the Certification of Crane Operators

LOCAL 57 **Forklift Operator**

This is to certify that

[redacted]

has completed the Forklift Operator course in accordance with OSHA 29 CFR Parts 1910, 1915, 1917, 1918, 1926.

Instructors Signature: Christopher Treml

Date: 4/29/13

IUOE National Training Fund
National HAZMAT Program
1293 Airport Road • Beaver, West Virginia • 25813 • (304) 253-8674

Completion Date: 1/24/09
IUOE Local Union #: 57

This is to certify that
[redacted]
has successfully completed the
40-hour HAZWOPER
General Site Worker
specifically designed for workers in accordance with OSHA 29 CFR 1910.120.

Steven Rogers
Certified Instructor

RECEIPT No [redacted]

RIGGING LIFT SUPERVISOR

(31)

State of Rhode Island and Providence Plantations
Rhode Island Department of Labor and Training

FULL LICENSE

[redacted]

MA 02739

JOHN SHAW
Administrator

04/30/2017
Expiration Date

Commonwealth of Massachusetts
Department of Public Safety

License: [redacted]
Hoisting Engineer

[redacted]

Commissioner

Expiration:
04/23/2018

LOCAL 57

Forklift Operator

This is to certify that

[redacted]

has completed the Forklift Operator course in accordance with OSHA 29 CFR Parts 1910, 1915, 1917, 1918, 1926.

Instructors Signature Christopher Lemal

Date 12/27/08

NCCCO CERTIFIED
Crane Operator
Signalperson

Certification Number: [redacted]

Certification Designations
TSS,TLL,SGP

Issue Date: 11/30/2009 Expiration Date: 11/30/2014
Issued To [redacted]

John M. Kennedy, President, NCCCO Board of Directors
Graham J. Brent, Executive Director, NCCCO

For identification purposes only. Subject to provisions of suspension or revocation.

National Commission for the Certification of Crane Operators

OSHA [redacted]

U.S. Department of Labor
Occupational Safety and Health Administration

has successfully completed a 10-hour Occupational Safety and Health Training Course in

Construction Safety & Health

William Ball
(Trainer)

01-21-07
(Date)

HILTI 3969680

3004631 5121 3/08

DATE: 12/8

QUALIFIED OPERATOR — Powder Actuated Tools

[redacted]

this certifies that [redacted]
(NAME OF OPERATOR – PRINT)

Has received the prescribed training in the operation of powder operated tools manufactured by

CHECK APPLICABLE TOOLS

- ☑ DX E37 / DX E72
- ☑ DX 350 / DX 35
- ☑ DX 460
- ☐ DX 450 / DX 451
- ☐ DX 750 / DX 750MX
- ☐ DX 860 - HSN
- ☑ DX A70R
- ☑ DX 600N
- ☑ DX 462HM / DX 462CM
- ☑ DX 36M
- ☑ DX A40 / DX A41
- ☑ DX 860ENP
- ☑ DX A40HM / A40CM
- ☑ DX 351
- ☑ DX 76 / DX 76MX

[redacted]
(SIGNATURE OF AUTHORIZED INSTRUCTOR)

11 DMG
(INSTRUCTOR CARD NO.)

I have received the instruction in the safe operation and maintenance of powder actuated fastening tools from HILTI and models specified and agree to conform to all rules and regulations governing their use.

SIGNATURE [redacted]

POWDER ACTUATED TOOL MANUFACTURERS INSTITUTE INC.

Revocation of card — Failure to comply with any of the rules and regulations for safe operation of powder actuated fastening tools shall be cause for the immediate revocation of this card, and it must be surrendered upon demand of the proper authority.

IMPERATORE CRANE
2550 Plainfield Pike, Cranston, RI. 02921
Phone (401) 942-7790 I Fax (401) 944-1652

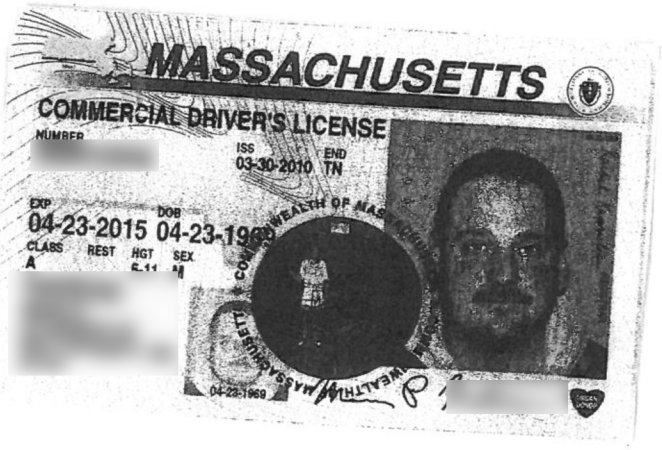
This is to certify that

[redacted]

has completed the Qualified Signalperson and Rigger course in accordance with OSHA 29CFR 1926.1403-1411, 1419-1422

Instructor Signature Brad Bilodeau

Date 11-12-10 SAFETY FIRST



RIGGER SIGNALPERSON

(32)

IMPERATORE CORPORATION

STEEL CONSTRUCTION ● CRANE & EQUIPMENT RENTALS ● RIGGING SERVICES

2550 PLAINFIELD PIKE – CRANSTON, RI. 02921
PHONE 401.942.7790 – FAX 401.944.1652
www.imperatorecrane.com

October 11, 2016

I Marty Cardon Project Manager certify that the following employee(s) of Imperatore (Operator / Marc Knights, Rigging Lift Supervisor / Michael Marrietti meets all the requirements of EM 385-1-1 Section 15.B in its entirety as listed below

15. B PERSONNEL QUALIFICATIONS

15. B.01 Any worker acting in the capacity of **Rigging Lift Supervisor** shall meet the requirements of this section.

15. B.02 Any worker engaged in the duties and the performance of rigging shall be a **Qualified Rigger** and as such, shall meet the following requirements:

a. Be at least 18 years of age;

b. Be able to communicate effectively with the crane operator, the lift supervisor, flagman and affected employees on site;

c. Have basic knowledge and understanding of equipment operating characteristics, capabilities, and limitations.

15. B.03 In addition, Qualified Riggers and Lift Supervisors shall be able to demonstrate knowledge and proficiency to appropriate management personnel in the following;

a. Personnel roles and responsibilities;

b. Site preparation (terrain, environment);

c. Rigging equipment and materials;

d. Safe Operating procedures;

e. Principles of safe rigging;

f. Environmental hazards (overhead interferences);

g. Rigging the load, handling the load, common causes of crane-related accidents.

Respectfully Submitted,

Marty Cardon

Project Manager

IMPERATORE CORPORATION

STEEL CONSTRUCTION ● CRANE & EQUIPMENT RENTALS ● RIGGING SERVICES

2550 PLAINFIELD PIKE – CRANSTON, RI. 02921
PHONE 401.942.7790 – FAX 401.944.1652
www.imperatorecrane.com

October 11, 2016

I Marty Cardon Project Manager certify that the following employees of Imperatore (Signal Person(s) / (Michael Marrietti & Marc Nadeau) have met all the requirements of EM 385-1-1 Section 16.B.07 in its entirety as listed below. All of the requirements of this section were covered in the course curriculum and he has demonstrated that he is qualified and competent by passing a written examination and a practical examination administered by a third party evaluator or Imperatore's qualified evaluator.

16.B.07 Signal Person Qualifications

a. The employer shall insure that the signal person is qualified either by a third party qualified evaluator or the employer's qualified evaluator.

b. The qualification means that the evaluator has assessed the individual's capabilities and knowledge and has determined that the individual meets the following qualification requirements

(1) Know and understand the type of signals used (radio, cell hand, etc). If hand signals are used, the signal person must know and understand the Standard Method for hand signals.

(2) Be competent in the application of the type of signals used.

(3) Have a basic understanding of crane operation and limitations, including crane dynamics involved in swinging and stopping loads and boom deflection from hoisting loads.

(4) Demonstrate that he/she meets the requirements above through a practical test.

Respectfully Submitted,

Marty Cardon

Project Manager

IMPERATORE CORPORATION

STEEL CONSTRUCTION ● CRANE & EQUIPMENT RENTALS ● RIGGING SERVICES

2550 PLAINFIELD PIKE – CRANSTON, RI. 02921
PHONE 401.942.7790 – FAX 401.944.1652
www.imperatorecrane.com

Lift Plan Signature Page

Signatures		
This Lift plan is to be signed during the pre lift meeting prior to commencing any hoisting activities		
Person who prepared this lift plan **Marty Cardon**	Signature: 	Date Prepared: **10/11/2016**
Crane Operator	Signature:	Date:
Qualified Signalperson	Signature :	Date:
Qualified rigger	Signature(s):	Date:
By signing I have acknowledged the I have attended a pre lift meeting and reviewed this plan		

APPENDIX P-CONTRACTOR CRANE (OR ALTERNATE MACHINE USED TO LIFT SUSPENDED LOAD) AND RIGGING GEAR REQUIREMENTS

CERTIFICATE OF COMPLIANCE

This certificate shall be signed by an official of the company that provides cranes(or multi-purpose machines, material handling equipment, or construction equipment used to lift loads suspended by rigging gear) or rigging gear for any application under this contract. Post a completed certificate on each crane or alternate machine (or in the contractor's on-site office for rigging operations) brought onto Navy property.

CONTRACTING OFFICER'S POINT OF CONTACT Nick Brown P.E.	PHONE (401) 841-1183
PRIME CONTRACTOR/PHONE Lightship Group / Peter Starr / (401) 294-3341	CONTRACT NUMBER
CRANE OR ALTERNATE MACHINE SUPPLIER/PHONE (if different from prime contractor) Imperatore Steel Erectors / 401-942-7790	CRANE OR ALTERNATE MACHINE NUMBER (i.e.,ID number) 31164

CRANE OR ALTERNATE MACHINE MANUFACTURER / TYPE / CAPACITY
TEREX / AC-350 / 400 Tons

CRANE OR ALTERNATE MACHINE OPERATOR'S NAME(S) Mark Knights

I certify that

1. The above noted crane or alternate machine and all rigging gear conform to applicable OSHA regulations (host country regulations for naval activities in foreign countries) and applicable ASME B30 standards. The following OSHA regulations and ASME standards apply: OSHA 1926.1400 & ASME B30.5, ASME B30.9, ASME B30.20, & ASME B30.26
2. The operators noted above have been trained and are qualified for the operation of the above noted crane(s) or alternate machines.
3. The operators noted above have been trained not to bypass safety devices during lifting operations.
4. The operators, riggers and company officials are aware of the actions required in the event of an accident as specified in the contract NAVAC P-307 section 1.7.2

COMPANY OFFICIAL SIGNATURE	DATE 10/11/2016

COMPANY OFFICIAL NAME/TITLE
Marty Cardon / Manager

POST ON CRANE (OR ALTERNATE MACHINE

(IN CAB OR VEHICLE)
(OR IN THE CONTRACTOR'S ON-SITE OFFICE FOR RIGGING OPERATIONS)

FIGURE P-1

COMNAVREGMIDLANTINST 11262.1A
6 FEB 2013

CONTRACTOR CRANE/WHE ENTRY PACKAGE CHECKLIST

1	Company / Equipment Information	Company Name: IMPERATORE Equipment Manufacture / Equipment Model / Equipment Number: TEREX / AC 350 / 96				
2	Date of Annual Inspection Expiration: 10-20-16		CONTRACT NUMBER			
3	Date of Quadrennial Inspection Expiration: —					
4	Name & phone number of Contracting Official (or designated local representative)	Contracting Official: NICK BROWN P.E. Phone Number: 841-1183				
5	Does the package include a routine or critical lift plan?			(YES)	NO	
6	Has the contract been verified to contain all the requirements of NAVFAC P-307 Paragraphs 1.7.2 a.-j. as applicable?			(YES)	NO	
7	Location of lift site: NEWPORT NAVAL STATION A-138 STATIC LAB					
8	Duration equipment will be continuously on the job site (hrs, days, weeks…): 1-2 DAYS					
9	Does plan include certification from contractor that the equipment complies with applicable ASME standards IAW Ref. (c)?			(YES)	NO	
10	Does plan include a certificate of compliance per COMNAVREGMIDLANTINST 11262.1A (enclosure (1))?			(YES)	NO	
11	Which OSHA regulations does the certificate of compliance indicate? (For cranes used in cargo transfer, 29 CFR 1917 applies; for cranes used in construction, demolition, or maintenance, 29 CFR 1926 applies; for cranes used in shipbuilding, ship repair, or ship breaking, 29 CFR 1915 applies).	29 CFR 1926				
12	Does plan include valid medical certificate and proof of operator qualification from a source that qualifies crane/equipment operators (union, governmental agency, or an organization that tests and qualifies crane/equipment operators)? Verify qualification for each back-up operator (if provided) on the certificate of compliance.			(YES)	NO	N/A
13	Does the plan designate a qualified Rigger-in-Charge?			(YES)		NO
14	What is the weight of the heaviest load to be lifted?			86,400 lbs.		
15	What is the weight of the rigging gear?			1,285 lbs.		
16	What are the crane components (and their weights) that add to the weight of the load (hook, jib, etc.)?	Main Block		2,315 lbs.		
		Aux. Block		— lbs.		
		Jib (Stowed)		— lbs.		
		Jib (Erected)		— lbs.		
		Other		— lbs.		
17	What is the maximum total crane lift (sum of 13, 14 & 15 above)?	TOTAL		90,000 lbs.		
18	What is the capacity of the equipment as configured? BASED ON LINE PULL 5 PARTS			129,265 lbs.		
19	What percentage of the equipment capacity does this lift represent?			70 %		
20	What is the main boom length? If a jib will be utilized, indicate the length and offset.		Main: 108.3'	Jib: —	Offset: —	
21	What are the minimum and maximum load radii?	Min: 30'		Max: 50'		
22	Does the plan include the manufacturer's load chart for entire range of lift(s)?				(YES)	NO
23	Does plan include ground loading and outrigger reaction data to determine cribbing requirements, or a Waterfront Operational Permit?			(YES)	NO	N/A

CONTRACTOR CRANE/WHE ENTRY PACKAGE CHECKLIST (CONT)

24	For crawler crane, does the plan indicate area restrictions for operation?	YES	NO	(N/A)
25	For floating crane, does plan include maximum allowable list?	YES	NO	(N/A)
26	For mobile crane mounted on barge, is crane equipped with load indicating device? Wind indicating device? Marine type list and trim indicator (readable in one-half degree increments)?	YES	NO	(N/A)
27	For mobile crane mounted on barge, does plan include revised load chart?	YES	NO	(N/A)
28	What are the environmental conditions under which crane/WHE operations are to be stopped?	LIGHTNING, 40 MPH WIND + LOW VISIBILITY		
29	Will the crane perform critical lifts per COMNAVREGMIDLANTINST 11262.1A? (If no, skip items 29-49.)		YES	(NO)
30	What circumstances require this lift to be classified as a critical lift? (Blind lift, 75% of load chart non-routine rigging, etc.)	NONE		
31	What are the exact dimensions of the load? (L x W x H)	16'L x 22'H x 8'W		
32	Does the plan indicate the crane position? (Overhead view)		(YES)	NO
33	What is the maximum lift height of the lift?	8'		
34	What is the minimum boom angle?	59.5		
35	What is the maximum boom angle?	73.1		
36	What is the name of the operator?	MARK KNIGHTS		
37	Indicate name(s) of backup operator (if required).	N/A		
38	Does the plan show lift points?		(YES)	NO
39	Does the plan describe the rigging procedures?		(YES)	NO
40	Does the plan indicate rigging hardware requirements?		(YES)	NO
41	For personnel lifts, does the plan demonstrate compliance with 29 CFR 1926.1431?	(YES)	NO	N/A
42	Does EM 385-1-1 govern this lift?	(YES)	NO	N/A
43	What are the coordination and communication requirements for the lift (e.g., radio and hand signals)?	HAND + RADIO SIGNALS		
44	For tandem or tailing crane lifts, does the plan indicate the make and model of the crane, the line, boom, and swing speeds, and the requirement for an equalizer beam?	YES	NO	(N/A)
45	For floating cranes, refer to questions 20-22?	N/A		
46	What is the name of the lift supervisor?	MICHAEL MARRIETTI		
47	Does the plan indicate the qualifications of the lift supervisor?		(YES)	NO
48	What are the names of the riggers?	MICHAEL MARRIETTI + MARC NADEAU		
49	Does the plan indicate the qualifications of the riggers?		(YES)	NO
50	Did all involved personnel (Operator, Riggers, Lift Supervisor, etc.) sign the critical lift plan?		(YES)	NO

Signature below verifies crane package complies with CNRMA INST 11262.1A and NAVFAC P-307

Contracting Official:	Organization:	Signature:	Date:	Phone:
Reviewed By:				

COMNAVREGMIDLANTINST 11262.1A

6 FEB 2013

CONTRACTOR CRANE/WHE PRE-ENTRY CHECKLIST

Contracting Office:	Contractor's Package Rec'd:	Proposed Date(s) of Entry:	Prime Contractor: LIGHTSHIP GROUP	Prime Contractor POC: PETER STARR	Date: 10-11-16
			Contracting Officer: NICK BROWN P.E.	Phone: 841-1183	Contract Number:

Crane Supplier / Phone (If different from prime contractor):	Serial number	Approved/Qualified Operator(s) and Rigger-in-Charge:
IMPERATORE	31164	1. MARK KNIGHTS

Equipment Manufacturer	Equipment Model	Equipment Number	
TEREX	AC-350	96	2. MIKE MARRIETTI

Manufacturers Maximum Rated Capacity:	Heaviest Lift	
400 TONS	90,000 LBS	3. MARC NADEAU

Cert. Type	Exp. Date	Equipment Setup Site:	Lift Type:
Quadrennial:	—	NEWPORT NAVAL STATION	☐ Critical
Annual:	10-20-16	A-138 STATIC LAB	☒ Routine

Equipment Type at Check in Point

- ☐ Mobile RT
- ☐ Floater
- ☐ Other (Specify): _____
- ☒ Mobile Truck
- ☐ Mobile on barge
- ☐ Crawler
- ☐ Boom truck

If Boom Truck, will boom be used for lift? Y / N
If yes, does Boom Truck have required papers? Y / N

Boom Type

Telescopic manufactured after 02/28/92? (Y) N / NA
Lattice manufactured after 02/28/92? Y / N / NA
Equipped with Anti Two-Blocking device? (Y) N / NA
Boom free of obvious defects? (Y) N / NA

Equipment at Check in Point

Same as identified in submitted crane/WHE package? Y / N
Configured same as identified in submitted crane/WHE package? Y / N
All Hoist Block Hooks equipped with positive latching device? Y / N
Hoist wire rope free of obvious defects? Y / N / NA
List / trim angle indicator visible to operator while at controls? Y / N / NA
Calibrated Load Moment / Load Indicator present in operator's cab? Y / N / NA
Crane equipped with appropriately rated fire extinguisher? Y / N / NA
Crane equipped with spill containment kit? Y / N / NA

Hoist wire rope dead ended with:

Poured Socket? Y / N
Wedge Socket? Y / N
If wedge type socket, is pig tail clamped correctly? Y / N

Operator at Check in Point in Possession of:

Completed Certificate of Compliance? Y / N
Copy of Required Crane/WHE Certifications? Y / N / NA
Current Crane/WHE Operator Qualifications? Y / N / NA
Copy of Approved Lift Plan? Y / N / NA
Copy of approved Ground Loading restrictions for all set up/work locations? Y / N / NA
Approved cribbing plan and cribbing at pass office prior to entry? Y / N / NA
Load Rating Charts visible to operator while at controls? Y / N / NA
Boom angle indicator visible to operator while at controls? Y / N / NA
Rigging gear free of obvious defects? Y / N

General Notes:

Reviewing Surveillance Team Member	Phone	Expiration of Permit	Date of Entry	Time of Entry

CONTRACTOR CRANE/WHE OPERATING PERMIT

NAVFAC MIDLANT CONTRACTOR CRANE/WHE OPERATING PERMIT

DATE ISSUED

EXPIRATION DATE

CONTRACTING AGENT NAME & PHONE# _____

_____

CONTRACT #

_____

AUTHORIZED LOCATION

_____

EQUIPMENT CONTRACTOR

_____

EQUIPMANT NUMBER

_____

CONTRACTOR CRANE/WHE NON-OPERATION PERMIT

POST THIS PERMIT IN A CONSPICUOUS LOCATION ON THE EQUIPMENT	
Company:	Point of Contact (Name/Phone)
Equipment Type/Manufacture:	Vehicle ID / Serial Number:
Contracting Official:	Phone:
Work Location:	
I certify that this equipment will be used for the transportation of personnel and materials only. At no time will the equipment be operated while on Navy property.	
Company Official / Title: (print) _____ Signature:_____ Date:_____	

CONTRACTOR CRANE OR RIGGING OPERATIONS CHECKLIST				
		YES	NO	N/A
1	Is the Certificate of Compliance, P-1, in the operator's cab (or in the contractor's on-site office for rigging operations) with the current operator's name listed?			
2	Is the crane/machine transited to and from the job site correctly? Are the OEM instructions for travel being followed?			
3	Does the operator know the weight of the load to be lifted?			
4	Is the load to be lifted within the crane/machine manufacturer's rated capacity in its present configuration?			
5	Are outriggers or stabilizers required?			
6	If outriggers are required, are outriggers fully extended and down, and the crane load off the wheels?			
7	Is the crane/machine level and on firm ground, if the ground is not firm is the crane/machine blocked?			
8	If blocking is required, is the entire surface of the outrigger pad supported and is the blocking material of sufficient strength to safely support the loaded outrigger pad?			
9	If outriggers are not used, is the crane/machine rated for on-rubber lifts by the manufacturer's load chart? If stabilizers are used and not outriggers and the wheels are not off the ground is this the correct setup in accordance with the OEM?			
10	Is the swing radius of the crane counterweight clear of people and obstructions and accessible areas within the swing area barricaded to prevent injury or damage?			
11	Has the hook been centered over the load in such a manner to minimize swing?			
12	Is the load well secured and balanced in the sling or lifting device before it is lifted more than a few inches?			
13	Is the lift and swing path clear of obstructions?			
14	If rotation of the load being lifted is hazardous, is a tag or restraint line being used?			
15	Are personnel prevented from standing or passing under a suspended load?			
16	Is the operator's attention diverted?			
17	Are proper signals being used at all times? Is the operator responding properly to the signals? Are radios used for blind lifts?			
18	Is the load lifted a few inches to ensure it is secure and balanced?			
19	Are empty hooks lashed or otherwise secured during travel to prevent swinging?			
20	Does the operator remain at the controls while the load is suspended?			
21	Do the operations ensure that side loading is prohibited?			
22	Are personnel prevented from riding on a load?			
23	Are start and stop motions in a smooth fluid motion (no sudden acceleration or deceleration)?			
	CONTRACTOR CRANE OR RIGGING OPERATIONS			

	CHECKLIST (CONT).			
24	If operating near electric power lines, are the rules and guidelines understood and adhered to?			
25	Is the lift a critical lift?			
26	If so, are all regulations understood and check-off sheets initialed and signed off?			
27	Are any overhead power lines in the vicinity?			
28	If so, are complex lift rules and 1926.1407-1411 being followed?			
29	If pick and carry operations are allowed and performed, are OEM directions followed (e.g. rotation lock engaged, boom centered over front or rear, etc.)?			
30	When the crane/machine is left unattended, is it in a safe condition?			
31	Is rigging gear undamaged and acceptable for the application?			
32	Does rigging gear meet applicable ASME or host country standards (e.g. ASME B30.9 for slings, B30.10 for hooks, B30.26 for hardware such as shackles, safety hoist rings, eyebolts, etc, B30.20 for below the hook lifting devices, etc.)?			
33	Is the rigging gear inspected prior to use?			
34	Is chafing gear used to protect slings (especially synthetic slings) and equipment from damage due to sharp corners and edges?			
35	Is the rigging gear used in accordance with its working load limit? Is the load limit visible?			
36	Are positive latching devices used on crane and rigging hooks, or are the hooks "moused"?			

Contractor:	Subcontractor:
Location:	Date:
Notes:	
Signature of Contracting Officer's Representative:	

CONTRACTOR CRANE/WHE OVERSIGHT DISCREPANCY FORM

Date:	Equipment: _____ Rigging: _____ Operations: _____	Package ID Control #
Contractor:	Subcontractor:	
Equipment Owner:	Equipment Mfg.:	Model / Ser #
Location Of Operations:		
Contracting Official:	Phone:	Contract #

Note:

Contracting Officials shall submit a written response to all discrepancies within 10 working days to the NAVFAC MIDLANT CST. Identify the root cause(s) and any corrective / preventive actious taken to prevent recurrence.

Item#	Discrepancy
Oversight Personnel's Signature:	Date:

CONTRACTOR CRANE/WHE DISCREPANCY RESPONSE FORM

Date:	Package ID Control #	Contractor:
Sub Contractor:		Equipment Owner:
Location Of Operations:		
Contracting Officer:	Phone:	Contract #
Root Cause		
Corrective / Preventive Action (s) Taken To Prevent Recurrence		
Contracting Representative Signature:		Date:

Note:Contracting Officials shall submit a written response to all discrepancies within ten (10) working days to the NAVFACMIDLANT C S T. Identify the root cause(s) and any corrective / preventive actions taken to prevent recurrence.

FOR OFFICIAL USE ONLY

CRANE AND RIGGING GEAR ACCIDENT REPORT

Accident Category: ☐ Crane Accident ☐ Rigging Gear Accident

From: UIC:	To: Navy Crane Center Bldg. 491 NNSY Portsmouth, VA 23709 Fax: 757-967-3808
Activity:	Report No:
Crane No: / Category: / Accident Date: / Time: hrs:	
Category of Service: ☐ SPS ☐ GPS / Crane Type: / Crane Manufacturer:	
Was Crane/Rigging Gear Being Used in SPS: ☐ Yes ☐ No	Was Crane/Rigging Gear Being Used in a Complex Lift/Critical Non-Crane Rigging Operation: ☐ Yes ☐ No
Location:	Weather:
Crane Capacity: / Hook Capacity: / Weight of Load on hook:	
Fatality or Permanent Disability? ☐ Yes ☐ No Reported to NAVSAFECEN? ☐ Yes ☐ No	Material/Property Cost Estimate:

Accident Type:

☐ Personal Injury ☐ Overload ☐ Derail ☐ Damaged Rigging Gear

☐ Load Collision ☐ Two Blocked ☐ Dropped Load ☐ Damaged Crane

☐ Crane Collision ☐ Damaged Load ☐ Other: Specify _____

Cause of Accident:

☐ Improper Operation ☐ Equipment Failure ☐ Inadequate Visibility

☐ Improper Rigging ☐ Switch Alignment ☐ inadequate Communication

☐ Track Condition ☐ Procedural Failure ☐ Other: Specify _____

Chargeable to:

☐ Crane Walker ☐ Rigger ☐ Operator

☐ Maintenance ☐ Management/Supervision ☐ Other: Specify _____

Crane Function:

☐ Travel ☐ Hoist ☐ Rotate ☐ Luffing ☐ Telescoping ☐ Other ☐ N/A

Is this accident indicative of a recurring problem? ☐ Yes ☐ No

If yes, list Accident Report Nos.: _____

ATTACH COMPLETE AND CONCISE SITUATION DESCRIPTION AND CORRECTIVE/PREVENTIVE ACTIONS TAKEN AS ENCLOSURE (1). Include probable cause and contributing factors. Assess damages and define responsibility. For equipment malfunction or failure, include specific description of the component and the resulting effect or problem caused by the malfunction or failure. List immediate and long term corrective/preventive actions assigned and respective codes.

Preparer:	Phone:	E-mail:	Code:	Date:

Concurrences: (Include Code, Signature and Date)

	Code:	Date:
	Code:	Date:
Certifying Official (Crane Accident Only):	Code:	Date:

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CRANE AND RIGGING GEAR ACCIDENT REPORT (CONT)

Brief Description:

Background and Detailed Description:

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CRANE AND RIGGING GEAR NEAR MISS REPORT

Near Miss Category: ☐ Crane Near Miss ☐ Rigging Gear Near Miss			
From: **UIC:**		**To:** Navy Crane Center Bldg. 491 NNSY Portsmouth, VA 23709 Fax (757) 967-3808 nfsh_ncc_accident@navy.mil	
Activity:			**Report No.**
Crane/Equipment No.:	**Category:**	**Near Miss Date:**	**Time:** **Hrs.**
Category of Service: ☐ SPS ☐ GPS	**Crane Equipment type:**	**Crane Equipment manufacturer:**	
Location:		**Weather:**	
Crane/Equipment Capacity:	**Hook capacity:**	**Weight of Load on Hook:**	

Is this near miss indicative of a recurring problem? ☐ **Yes** ☐ **No**
If yes, list report numbers: _____

In the space below, include a brief description of the event and corrective actions taken to prevent recurrence:

Preparer:	**Phone:**	**Email:**	**Date:**
Certifying Official:		**Code:**	**Date:**