Backup Documentation for LR1600 Ctwt Load Test

Load Test of LR1600/2 30 mt Monolithic Carbody Counterweights

Jason Ruggles

Director of Quality

January 31st, 2025

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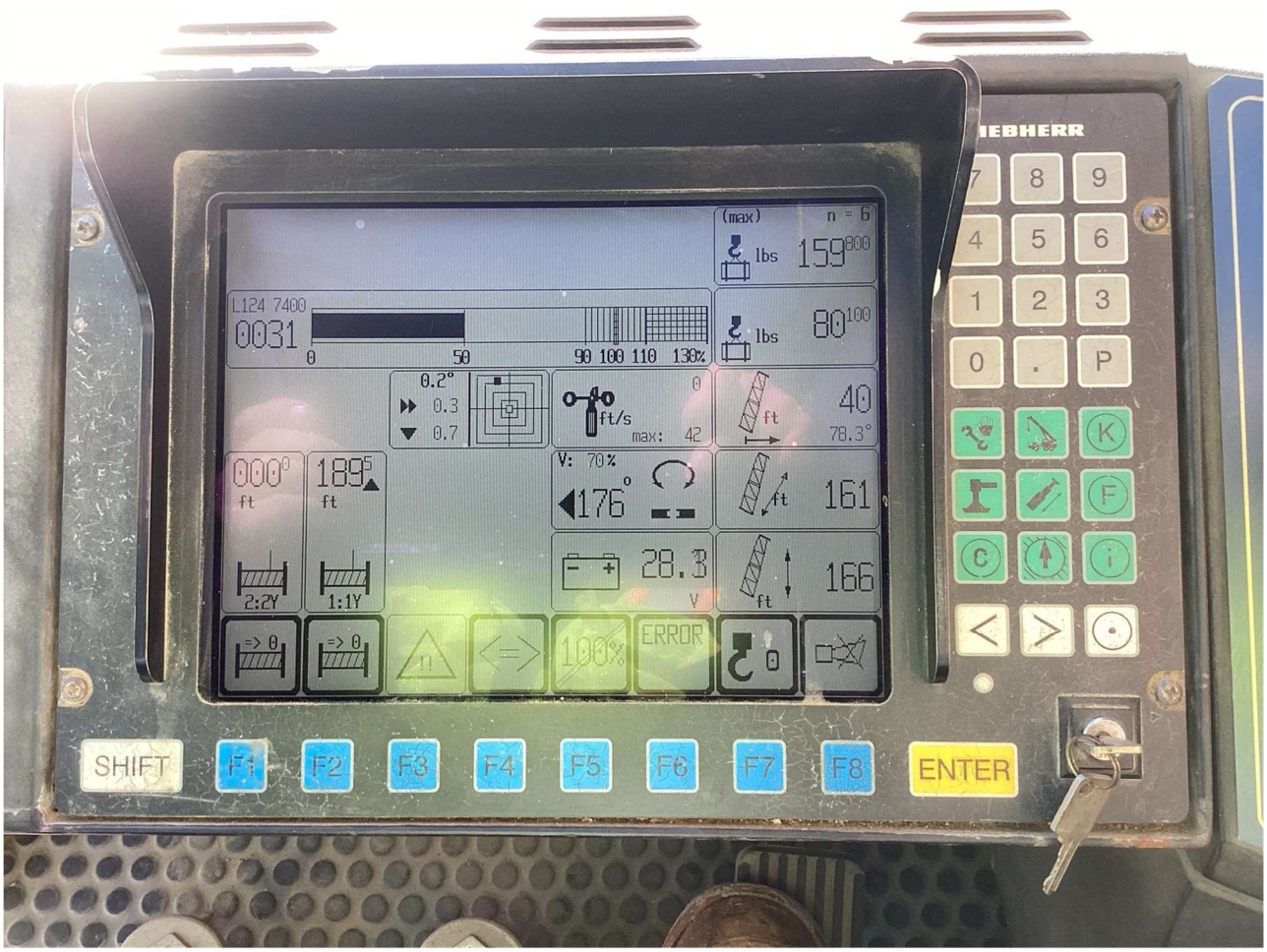
Summary Statement:

A load test was performed on a 30-metric ton monolithic counterweight manufactured by Ken Garner Mfg Co., specifically engineered for use as car-body ballast on the Liebherr LR1600 lattice boom crawler crane. The primary focus of the load test was to validate the integrity and performance of the integral lifting rings, which are critical for the handling of the counterweights. This load test was conducted in strict compliance with the engineered protocol outlined in the plan titled "LR1600 Ctwt Load Test." All test procedures were meticulously followed, and the results were thoroughly documented. The lifting ring design was confirmed to be compliant, safe, and without issue, ensuring its suitability for use in the handling and rigging of these counterweights. The overall counterweight design also successfully passed the load test, confirming its structural reliability and suitability for use as car-body ballast on the LR1600 crane.

Picture 1 – Counterweight w/ Additional Ballast Weight Rigged in Test Configuration

Picture 2 – LICCON Screen Showing No-Load Condition Pre-Test

Picture 3 – Picture Showing Counterweight Free of the Ground – Full Load Applied to Lifting Rings



Picture 4 – LICCON Screen Showing Full Weight of Counterweight w/ Additional Ballast Free of the Ground – Full Load Applied to Lifting Rings

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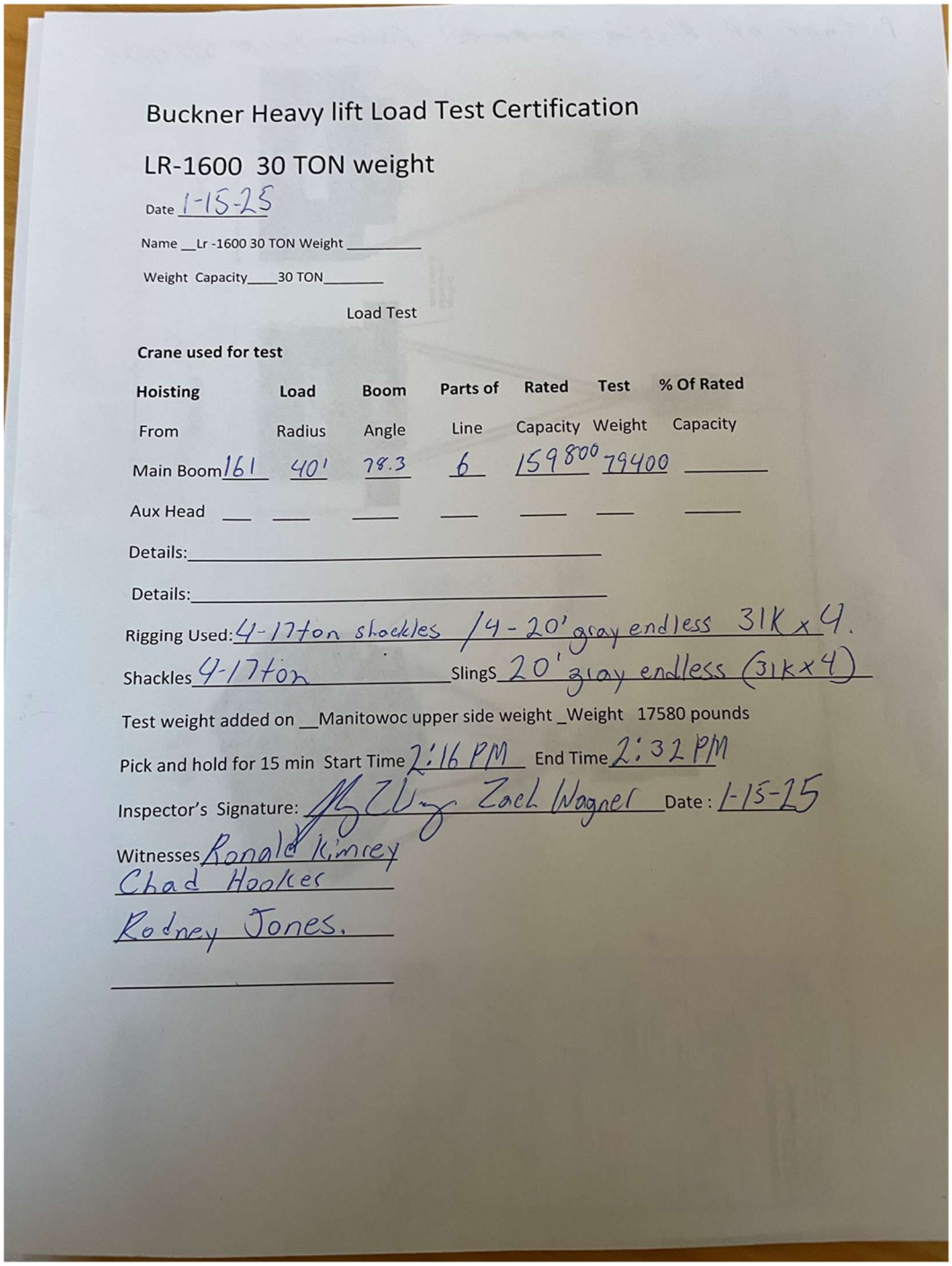


Buckner Heavy lift Load Test Certification

LR-1600 30 TON weight

Date 1-15-25

Name __Lr -1600 30 TON Weight _____

Weight Capacity____30 TON_____

Load Test

Crane used for test

Hoisting From	Load Radius	Boom Angle	Parts of Line	Rated Capacity	Test Weight	% Of Rated Capacity
Main Boom 161	40'	78.3	6	159800	79400	_____
Aux Head ___	___	___	___	___	___	___

Details:_____

Details:_____

Rigging Used: 4-17ton shackles /4-20' gray endless 31K x 4.

Shackles 4-17ton Slings 20' gray endless (31K x 4)

Test weight added on __Manitowoc upper side weight _Weight 17580 pounds

Pick and hold for 15 min Start Time 2:16 PM End Time 2:32 PM

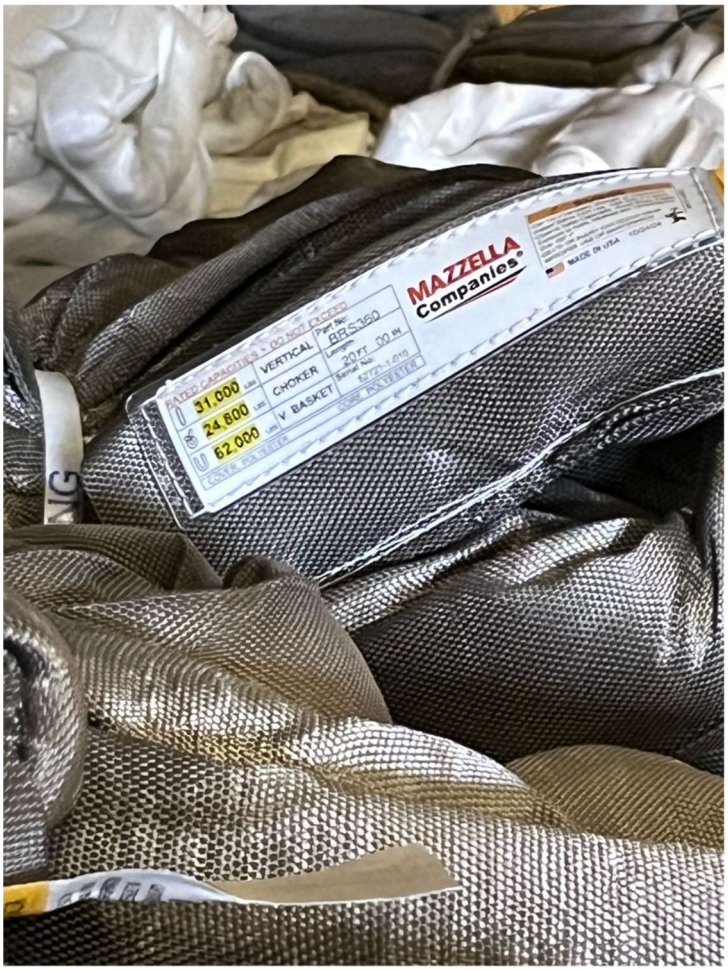
Inspector's Signature: Zach Wagner Date : 1-15-25

Witnesses Ronald Kinney

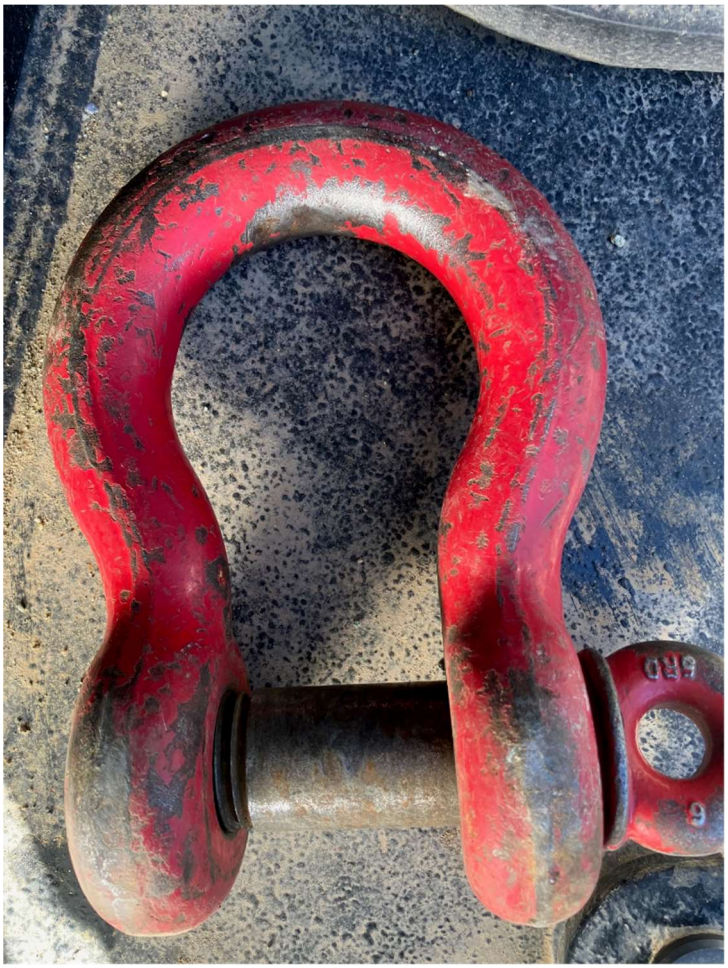
Chad Hoakes

Rodney Jones.

Picture 5 – Picture of Load test Document Completed at Time of Load Test



Picture 6 – Picture Documenting Mazzella Companies® BRS360 20' Grey Endless Slings ID / Capacity Tag used during the Load Test.



Picture 7 – Picture Documenting Crosby® 17-Ton Screw Pin Shackle Used in the Load Test

Picture 8 – Picture Documenting Crosby® 17-Ton Screw Pin Shackle Used in the Load Test

Picture 9 – Picture Documenting Crosby® 17-Ton Screw Pin Shackle Used in the Load Test

Picture 10 – Picture Documenting Crosby® 17-Ton Screw Pin Shackle Used in the Load Test

Picture 11 – Picture Documenting Crosby® 17-Ton Screw Pin Shackle Used in the Load Test

Picture 12 – Picture Documenting Manitowoc 7.974t (17,580 lb.) Counterweight Used as the Additional Ballast in the Load Test

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Load Test of LR1600/2 30 mt Monolithic Carbody Counterweights

In Reference to Exhibits listed below:

- Ken Garner Mfg. Co.
  - Title: 30 mt Carbody Weldment
  - DRWG# 6LB30MTCB-00
- Buckner HeavyLift Cranes
  - Title: LR1600 Ctwt Load Test
  - REV 000 – 12.17.24

Documents Reviewed and Complied By:

Jason Ruggles
Director of Fleet Quality
Buckner HeavyLift Cranes

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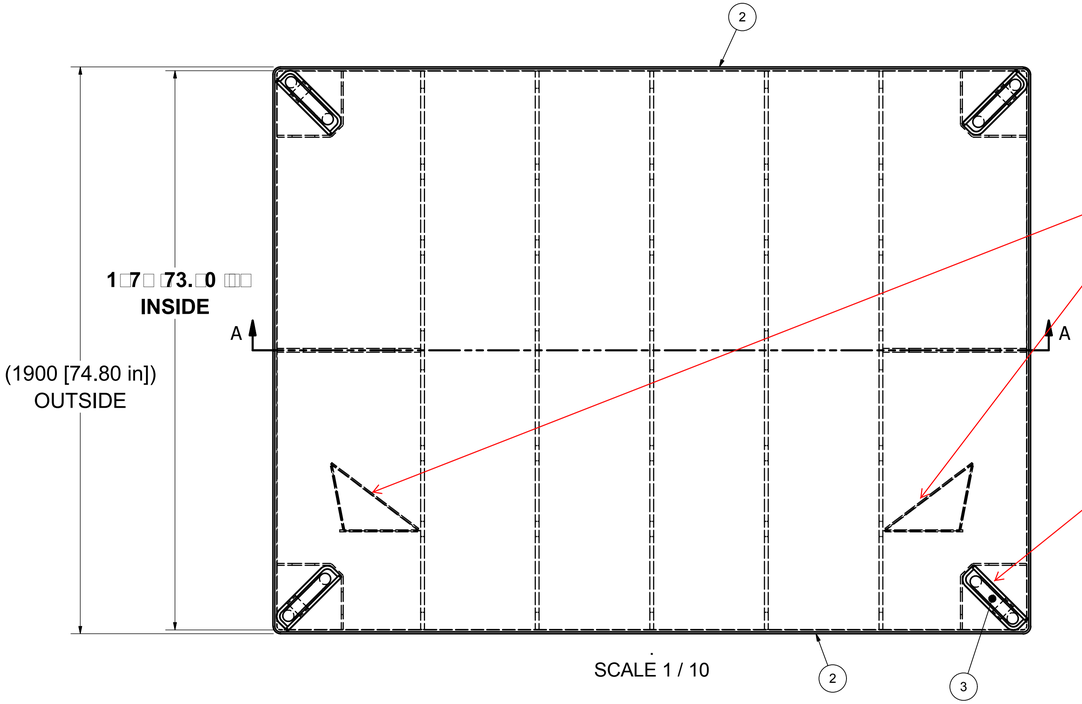
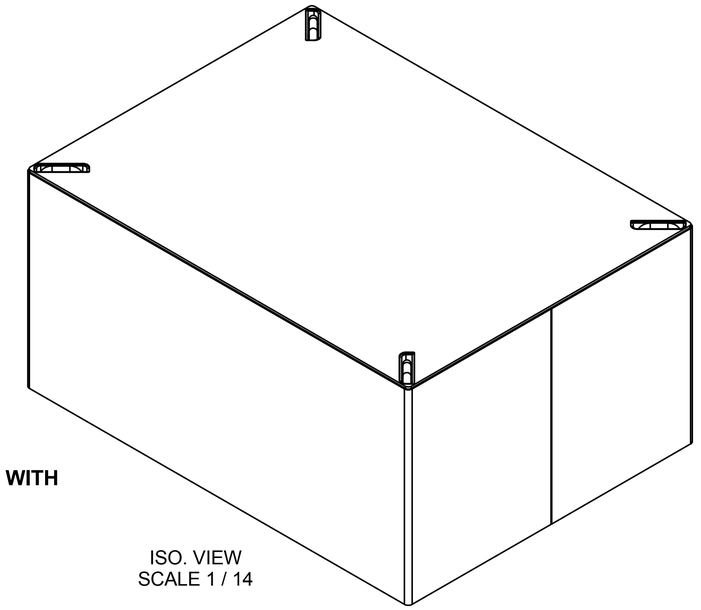
Jason A. Ruggles

01/31/25



SCALE 1 / 10

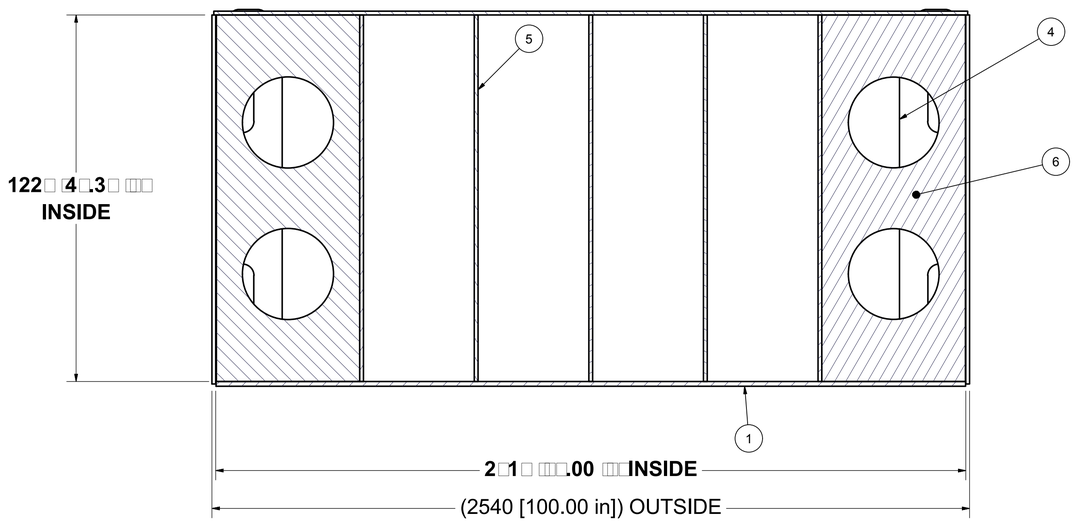


ISO. VIEW
SCALE 1 / 14

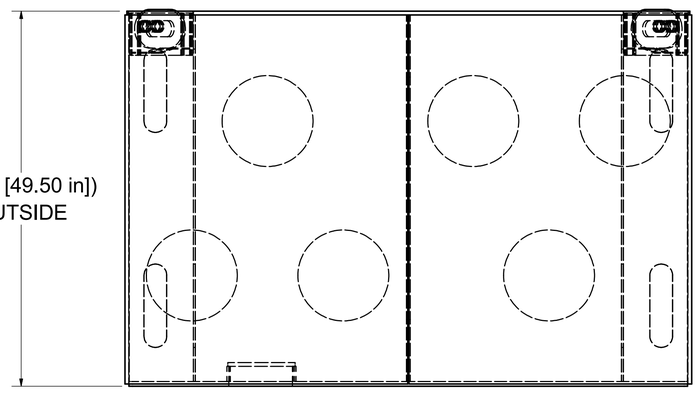
NOTES:

1. **UNLESS OTHERWISE SPECIFIED, ALL SEAMS TO BE WELDED WITH 10 mm WELD**
2. **ALL WELDS TO BE WATERTIGHT**
3. **SHELL WEIGHT: 3272 kg (7214 lb.)**

NOMINAL WEIGHT = 30 mT
TOLERANCE = + 2%



SECTION A-A
SCALE 1 / 10



TOLERANCES TO BE AS SPECIFIED BELOW UNLESS OTHERWISE STATED
Do not scale drawing . Dimensions in millimeters . Dimensions in [ ] are reference only.

FABRICATIONS	ASSEMBLIES	WEIGHT +/- 1%
0 - 315 +/- 1 mm 315 - 1000 +/- 1.5 mm 1000 - 2000 +/- 2 mm 2000 - 4000 +/- 3 mm All corners R3 max.	0 - 500 +/- 1 mm 500 - 2000 +/- 1.5 mm 2000 AND OVER +/- 3 mm	ANGLES +/- 1 DEGREE FINISH 125 RMS

MACHINING

RANGE IN mm	OVER 0.5 TO 3	OVER 3 TO 6	OVER 6 TO 30	OVER 30 TO 120	OVER 120 TO 315	OVER 315 TO 1000	DRILLED HOLES UP TO 8 mm DIA. + 0.16 mm
TOLERANCE IN mm	+/- 0.1	+/- 0.15	+/- 0.3	+/- 0.5	+/- 0.8	+/- 1.1	DRILLED HOLES OVER 8 mm DIA. +2% OF DIA.

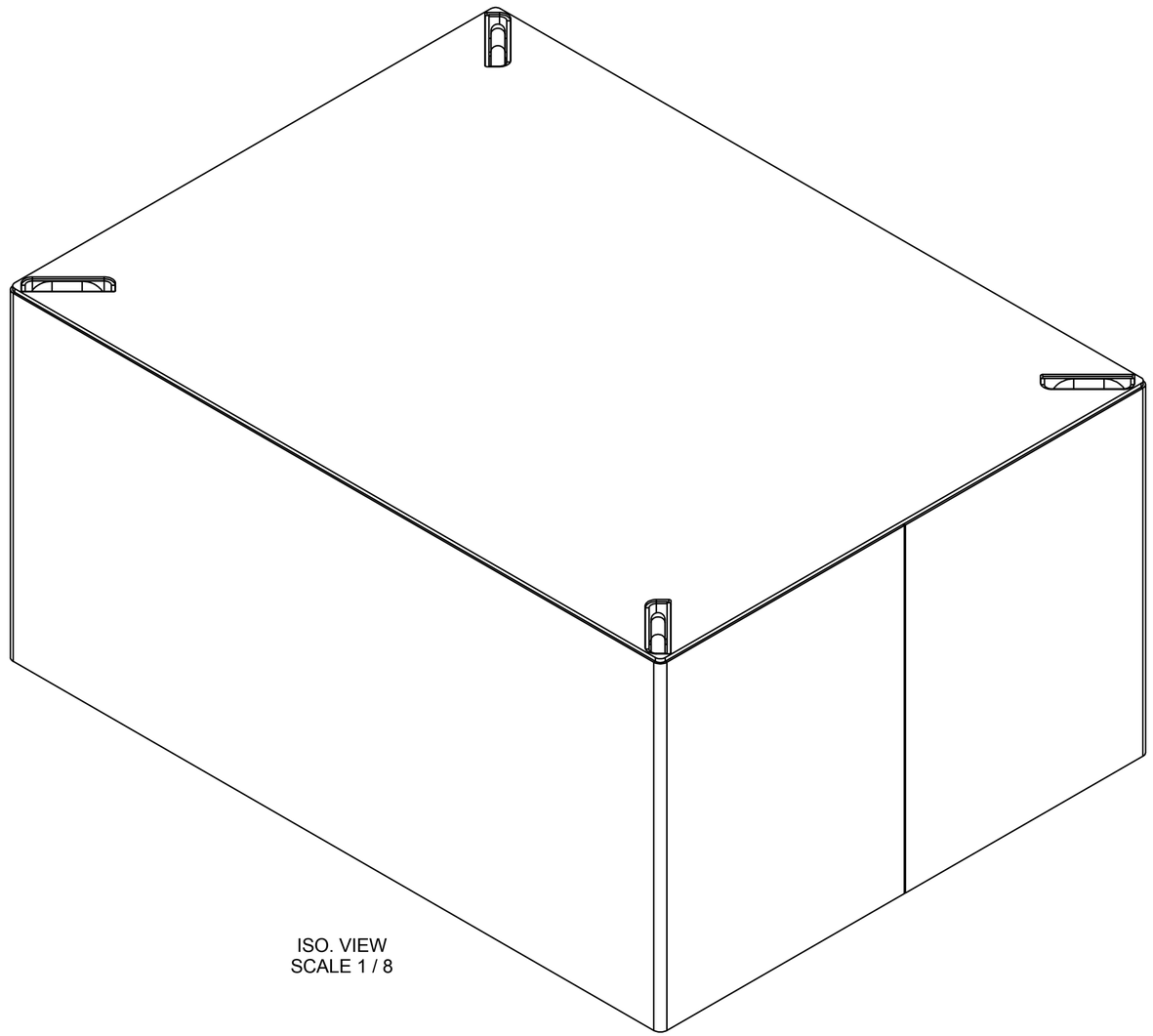
KEN GARNER MFG. CO.

DRAWN	RAH	12/1/2010
DWG. STATUS	WorkInProgress	
APPROVED		
CUSTOMER DWG NO.		

TITLE: 30 mt. CARBODY WELDMENT

SIZE	SCALE	DWG NO	REV
D		6LB30MTCB-00	

I:\Engineering\Liebherr\CARBODY\6LB30MTCB-00.idw



ISO. VIEW
SCALE 1 / 8

TOLERANCES TO BE AS SPECIFIED BELOW UNLESS OTHERWISE STATED
Do not scale drawing . Dimensions in millimeters . Dimensions in [ ] are reference only.

FABRICATIONS
0 - 315 +/- 1 mm
315 - 1000 +/- 1.5 mm
1000 - 2000 +/- 2 mm
2000 - 4000 +/- 3 mm
All corners R3 max.

ASSEMBLIES
0 - 500 +/- 1 mm
500 - 2000 +/- 1.5 mm
2000 AND OVER +/- 3 mm

WEIGHT +/- 1%
ANGLES +/- 1 DEGREE
FINISH 125 RMS

MACHINING

RANGE IN mm	OVER 0.5 TO 3	OVER 3 TO 6	OVER 6 TO 30	OVER 30 TO 120	OVER 120 TO 315	OVER 315 TO 1000	DRILLED HOLES UP TO 8 mm DIA. + 0.16 mm
TOLERANCE IN mm	+/- 0.1	+/- 0.15	+/- 0.3	+/- 0.5	+/- 0.8	+/- 1.1	DRILLED HOLES OVER 8 mm DIA. +2% OF DIA.

KEN GARNER MFG. CO.

DRAWN	RAH 12/1/2010
DWG. STATUS	WorkInProgress
APPROVED	
CUSTOMER DWG NO.	

TITLE
30 mt. CARBODY WELDMENT

SIZE	SCALE	DWG NO	REV
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I:\Engineering\Liebherr\CARBODY\6LB30MTCB-00.idw

* Preliminary Only *

BUCKNER HEAVYLIFT CRANES

Contents	
Sheet	Description
001	Title Page
002	Rigging Layout

PROJECT:
LR1600 Ctwt Load Test

LOCATION:	Graham, NC
BUCKNER CONTACT:	Dallas Snow, PE DallasS@BucknerHeavylift.com
LIFT PLAN BY:	Dallas Snow, PE DallasS@BucknerHeavylift.com

DRAWING NOTES:
Title Page

FILE: C:\Users\DallasSnow\OneDrive – Buckner HeavyLift Cranes\Desktop\Sales Info\LR1600 Ctwt Load Test.dwg

CREATED:	12.16.2024 @ 12:46:33 PM		
EDITING TIME:	22h27m	FILE SIZE:	2349.57Kb
PAPER SIZE:	ANSI B (17.00 x 11.00 Inches)		
SAVED:	01.31.2025 @ 10:34:51 AM		
PLOTTED:	01.31.2025 @ 10:56:08 AM		

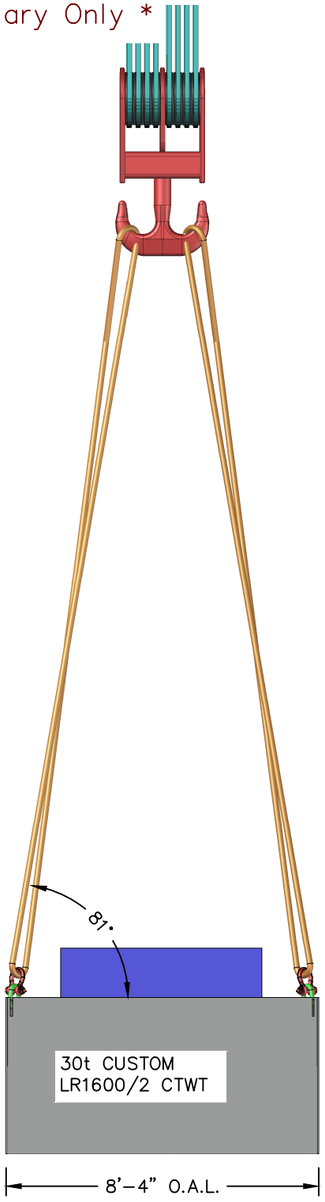
Revisions

All Sheets Same Revision Level

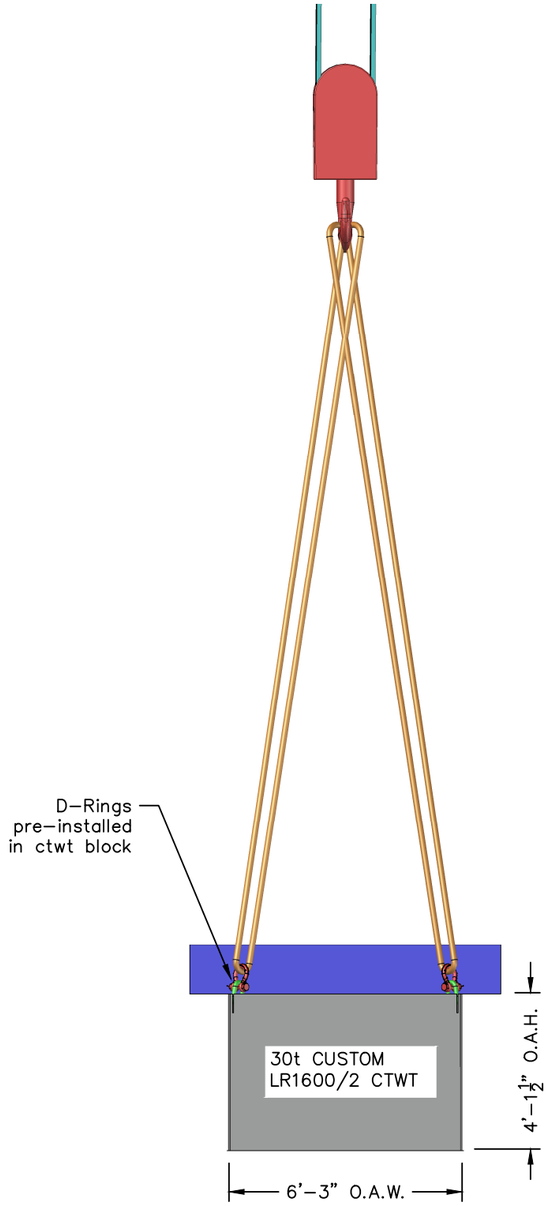
Rev.	Date	Description
000	12.17.2024	Preliminary Planning & Initial Layout
001	----	----
002	----	----
003	----	----
004	----	----
005	----	----
006	----	----
007	----	----
008	----	----
009	----	----
010	----	----

BUCKNER HEAVYLIFT CRANES

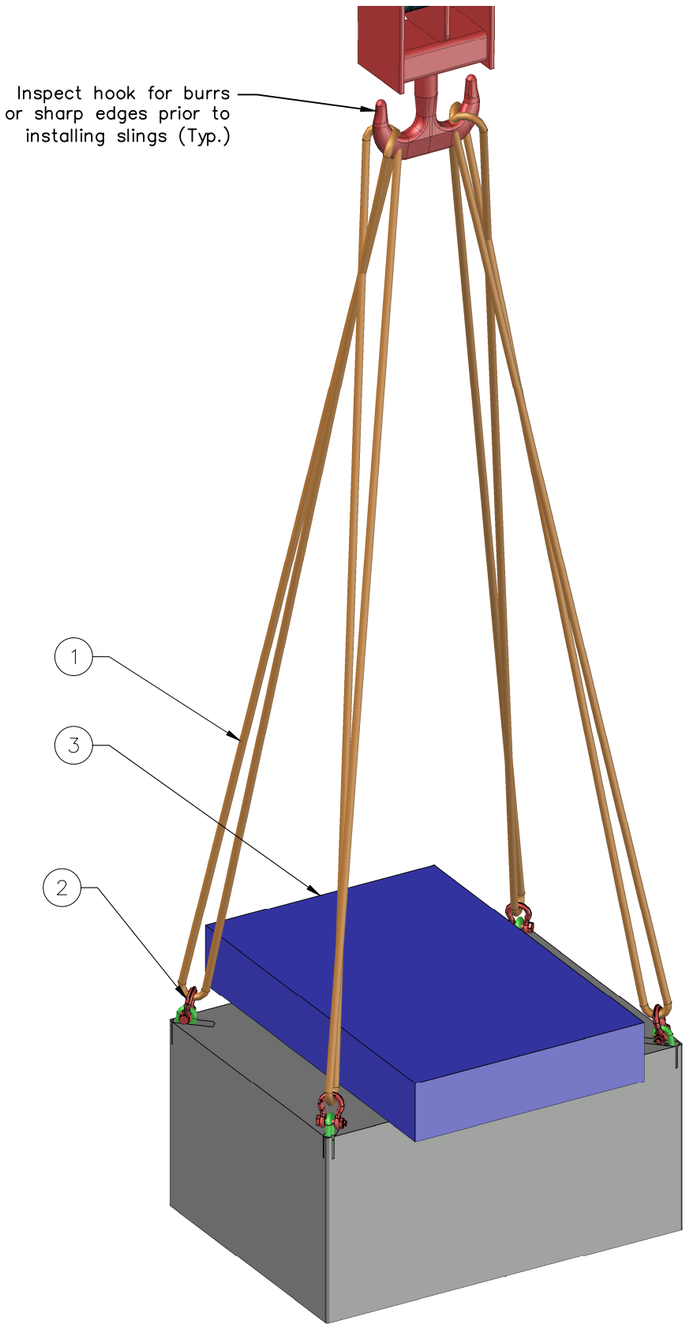
* Preliminary Only *



1 FRONT VIEW
N.T.S.



2 END VIEW
N.T.S.



3 3D VIEW
N.T.S.

PROJECT:
LR1600 Ctwt Load Test

LOCATION:	Graham, NC
BUCKNER CONTACT:	Dallas Snow, PE DallasS@BucknerHeavylift.com
LIFT PLAN BY:	Dallas Snow, PE DallasS@BucknerHeavylift.com

DRAWING NOTES:
Rigging Layout

Rigging Summary

Mark	Description	Qty	Cap. (Kip)	Load (Kip)	% Cap.
1	31k x 20' Synthetic Sling	4	31.0	28.3	95%
2	17t Shackle	4	37.4	28.3	79%
3	7.974t Manitowoc Ctwt	1			

Sling Tension (Load/3):
V_1 = (30t+7.974)*(2.20462t/kip) = 83.8k
V_1 = 83.8/3 = 28k
T_1 = V_1/Sin(81°) = 28.3k
Notes:
1. Load test shall be performed to approx. 125% of Ctwt weight (30t) ≈ 38t
2. Rigging shown may be substituted provided SWLL of rigging is not exceeded.
3. Lift load clear of ground and hold for approx. 5 minutes.

FILE: C:\Users\DallasSnow\OneDrive – Buckner HeavyLift Cranes\Desktop\Sales Info\LR1600 Ctwt Load Test.dwg

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008	----	----
009	----	----
010	----	----

SHEET: 002 OF 002

BUCKNER HEAVYLIFT CRANES