LSC INFORMATION

1.4. General description

The **ALE Heavylift Innovation Series Lightweight Service Crane** (**LSC**) is a lightweight, compact crane, which can be used for lifting payloads up to 60 kN. It's outreach ranges from 2.5 m to 11 m. The LSC has full crane functionality. This includes lifting, luffing/topping, slewing and load moment monitoring/safety. It can be used in offshore and onshore situations and is classified as land based crane, as shipboard/industrial crane (and as offshore crane). Load charts and software settings are available for each of these use cases. The LSC's configurable masts allow the crane to be used in confined spaces.

The LSC is designed and certified for safe operations, under supervision of third party surveyors. Manual lowering is possible in emergency situations.

A great advantage of the LSC is its modular design, with 90% of the structural items weighing up to only 50 kg. It can be completely built by hand by two fitters within one day, with no additional equipment required. A few parts weigh up to 120 kg and are hoisted into place using a hoist on the LSC itself.

Control and monitoring come from a belly mounted wireless control panel.

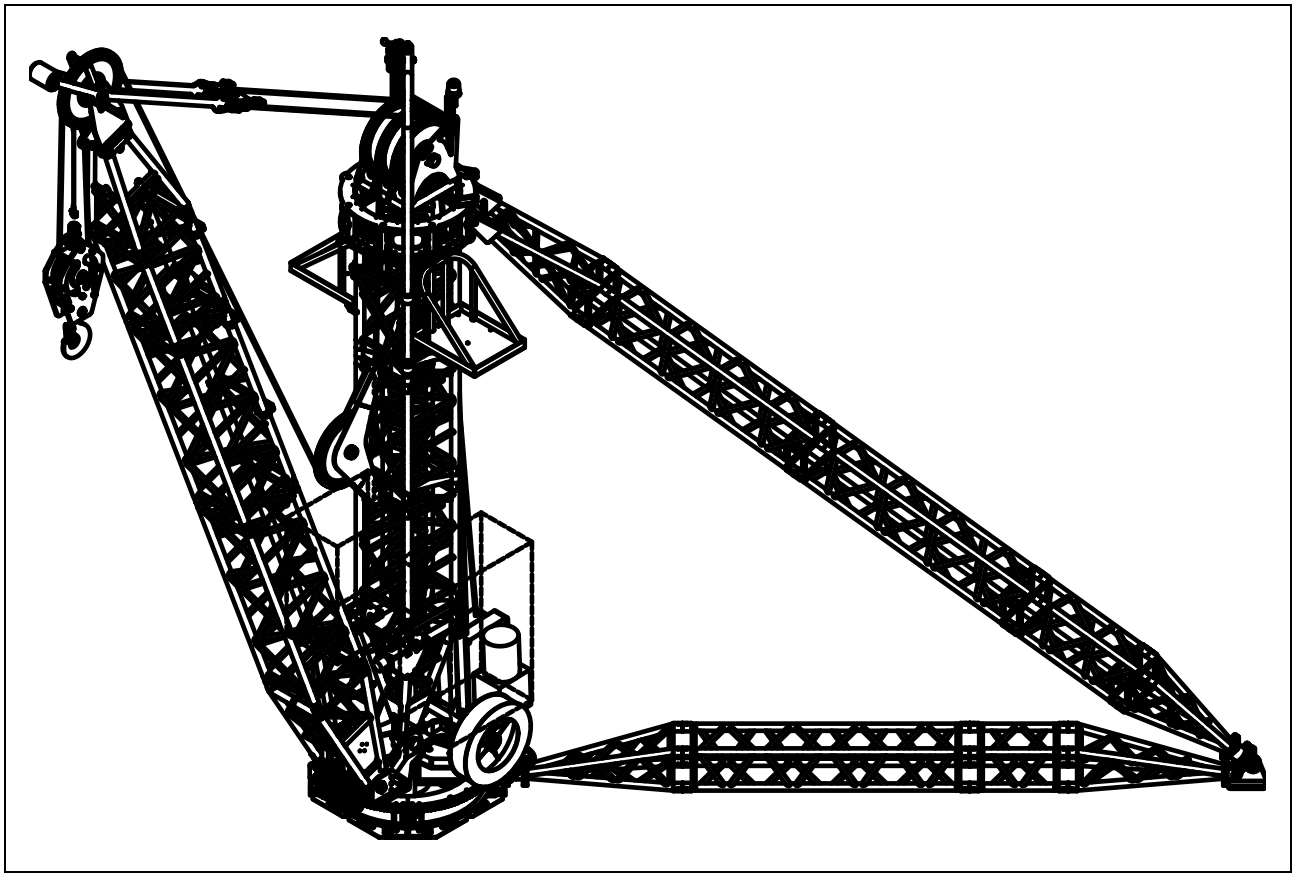


Figure 1-1 LSC overview

Design:

- The base configuration has a single boom of 8.5 / 10.5 or 12.5 m and a back mast of 5 m.
- Lifting of the load and luffing of the boom is done by traction winches.
- The LSC will be held in position by guy wire or braced laces that are mounted to the crown ring of the back mast.

3. Specifications

DIMENSIONS	
Main mast length	8.5, 10.5 and 12.5 m
Back mast height	5.0 m
Operational crane dimensions	Depending on mast size
Maximum installation dimensions	Depending on mast size
Minimum installation dimensions	Depending on mast size
Transportation	2 x 8 ft containers
Total crane weight	1 200 kg (excluding bracings)

INSTALLATION	
Base dimensions	L X W: 1 173 x 1 173 mm Ø1 364 mm
Permanent fixture system	• Base (bolted to foundation) • For back mast bracing, choose from: Truss bracings with only diagonal masts Truss bracings with diagonal and horizontal masts Bracing strands (guy-wires)
Temporary fixture system (installation)	Temporary bracing tubes for the back mast
Foundation requirements	Inclination < 1 mm height difference per 2 m

PERFORMANCE						
Vertical load capacity	Payload: 60 kN Man riding: 20 kN (optional) See Appendix A, Load charts					
Lifting height	Highest point: 12.5 meter Lowest point: depending on cable length.					
Lifting speed	3 m/min					
Outreach	**Main mast length**	**8.5m**	**10.5m**	**12.5m**		
	Minimum outreach	2.5	3	3.5		
	Maximum outreach	7	9	11		
Slewing range	360°					
Certification	• DNV GL®: electrical verification • Lloyd's Register: frames verification per EN 13001 & DNV 2.22					

OPERATING CONDITIONS	
Ambient operating temperature range	-25 °C to 50 °C
Ambient storage temperature range	-40 °C to 80 °C
Wind speed	Below 13.8 m/s
24 hr. weather forecast (wind)	Dropping
Visibility	Over 30 m
Potential lightning	Below 30% chance

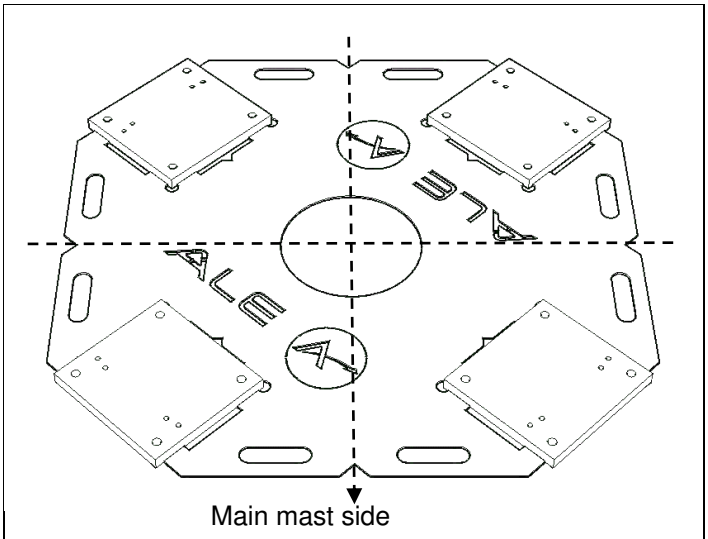
OPERATING CONDITIONS	
Additional features	
Remote-control with HMI	• Load monitoring • Positional monitoring of load, main mast and back mast • Operational load/movement safety limitations (Site restrictions)
Lights	• Aircraft light • Work light
Uninterrupted Power Supply	Yes

POWER REQUIREMENT	
Power supply system	Power generator / wall mount
Supply voltage	400 VAC; 32 A; 50/60 Hz
Control voltage	• 230 VAC; 50/60 Hz • 24 VDC
Battery	24 VDC / 12 Ah

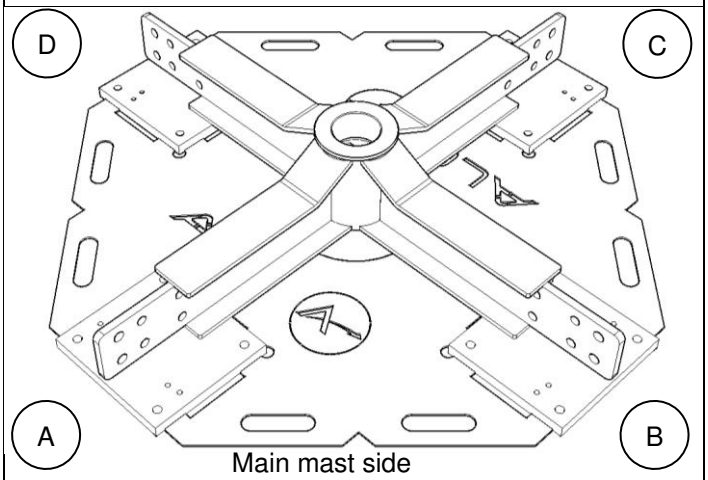
LIFTING/TOPPING SUBSYSTEM	
Winches	• 2x traction winch: TIRAK® X 3050 • Sound level: Max 78.5 dB(A) • Safety feature: Manual brake release lever, emergency stop, load limiting device (stops if winch load > 37.5 kN) • Max. rope speed: 6 m/min • Max. load: 30 kN • Max. power output: 3.8 kW
Wire ropes	Ø14.3 mm, non-rotating
Load pins	Brosa® 45 kN
Sheaves	• Plastic 330/286 (1x) • Plastic 580/536 (4x) • Wire rope block 300/200 (1x)

SLEWING DRIVES	
Drives	• 2x motor: B&R® ACP servo drive 3x400-480V 8.8A 4kW • 2x gearbox: i=0.64 IP65 • Max. power output: 4 kW

c. Lay the base plates in the designated recesses.



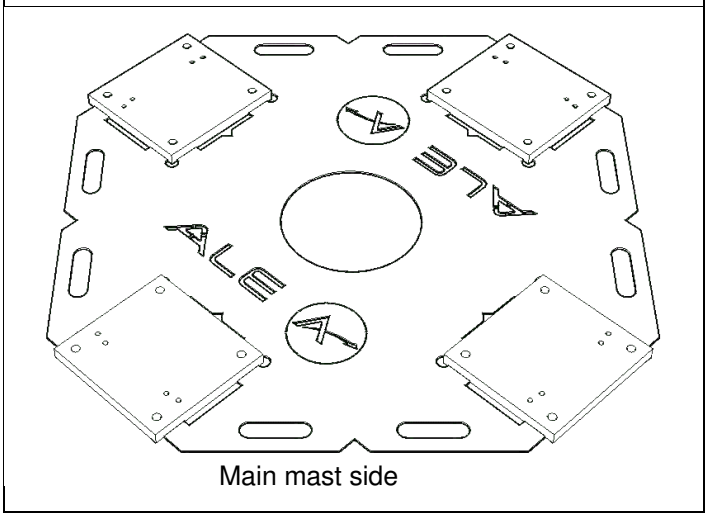
d. Temporarily lay the base cross part on the base plates and level the base cross part with a spirit level.
   I. Check the A, B, C, D markings on the base cross part.
   II. Lay the base cross part on the base plates with the main-mast-side between A and B.
   III. Level the base cross part base on the base.



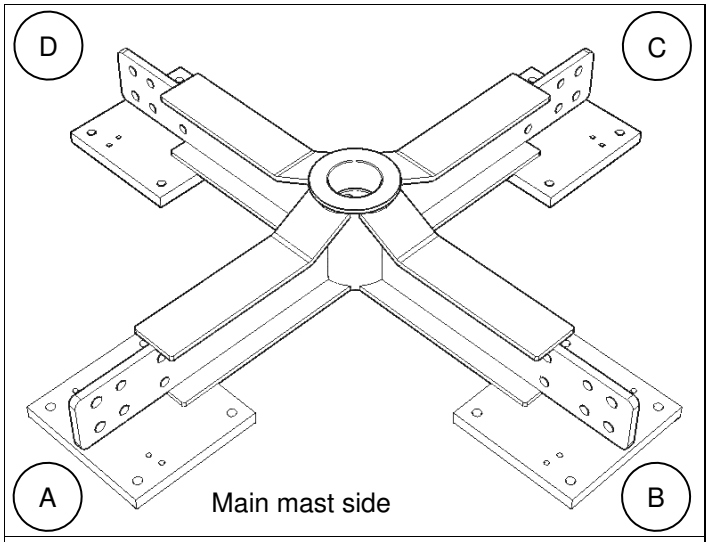
e. Choose the best fixation method for the base plates to the foundation:

   I. **Welding:** 50 mm tag welds.
   II. **Bolting (metal foundation):** 14 mm drill, M16 tap, M16 washers (16x) & M16 bolts (16x).
   III. **Bolting (concrete foundation):** 18 mm drill, chemical anchors, M16 washers (16x) & M16 bolts (16x).

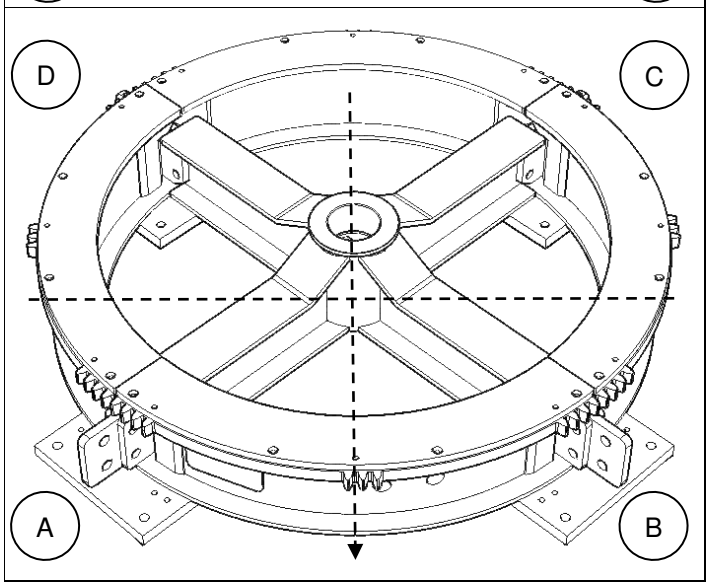
f. Remove the base cross part.
g. Apply one of the fixation methods from the previous step.
h. Remove the template.



5. Install the base on the base plates:
   a. Check the A, B, C, D markings on the base cross part.
   b. Lay the base cross part on the base plates with the main-mast-side between A and B.
   c. Level the base cross part base on the base.
   d. Bolt the levelled base plates to the foundation with M16 bolts.



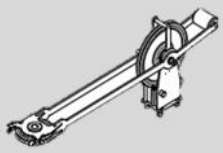
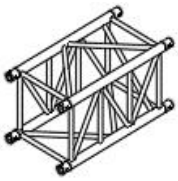
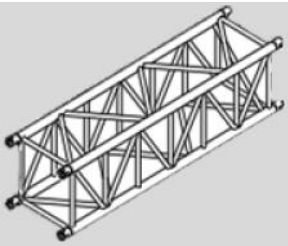
   e. Check the A, B, C, D markings on the ring base cross sections.
   f. Position the four ring base sections around the base cross part. Ensure that the A, B, C, D markings correspond to the same markings on the base cross part.



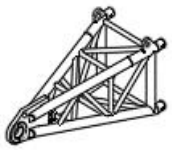
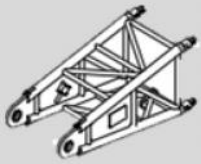
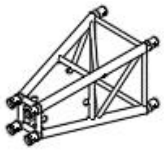
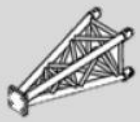
9.6.2. LSC Maintenance record - TIRAK® winch & hoisting cables

ALE SMARTER, SAFER, STRONGER	**LSC Maintenance Record TIRAK® winch & hoisting cables**				
Date:					
Equipment number:		Running Hours:			
Parts to be checked		Checked	Repaired	Replaced	Service Interval
Check winch anchoring					A
Check labels					A,D
Inspect electric cables					B,D
Inspect hoisting cables					B,D
Inspect hoistig cable ends					A
Lubricate hoisting cables					B,D
Lubricate winch drive disks					B
Check winch condition					C
For technical information check the manual					
Sequence					
every job/daily					A
every week					B
every year					C
after each transport					D
Maintenance done during or after job					
Remarks :					
Maintenance Done By :					

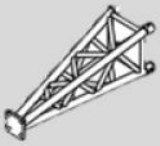
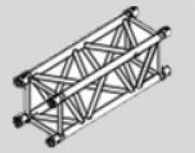
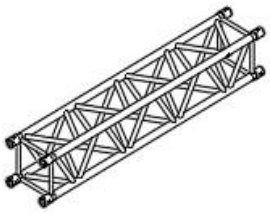
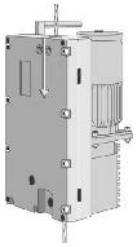
Lightweight Service Crane (LSC)	Part list	010640-001

Part	Description	Length [mm]	Width [mm]	Height [mm]	Quantity	Weight [kg]
	Base 190640-211	1634	1634	211	1	147.0
	Slewing superstructure 190640-221	858	586	528	1	112.0
	Back mast top 190640-261	790	790	1379	1	230.6
	Main mast top 190640-281	2361	461	860	1	79.2
	Truss 500 alu 1000 190640-431	530	530	1000	Var.	22.0
	Truss 500 alu 2000mm 190640-432	530	530	2000	Var.	39.0

Lightweight Service Crane (LSC)	Part list	010640-001

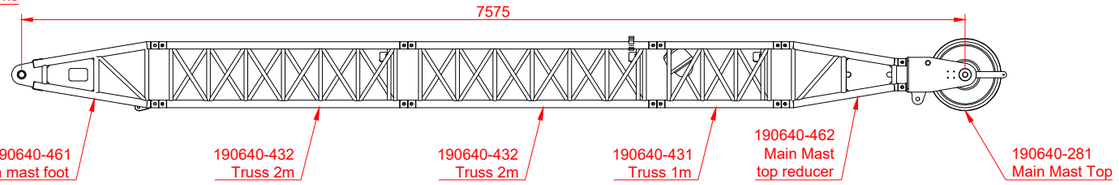
Part	Description	Length [mm]	Width [mm]	Height [mm]	Quantity	Weight [kg]
	Truss 500 alu Backmast foot 190640-451	530	530	1180	1	29.0
	Alu backmast hing rotating top 190640-453	990	990	268	1	64.0
	Sheaveframe 190640-458	1160	530	1250	1	53.8
	Truss 500 alu Mainmast foot 190640-461	530	530	1180	1	34.6
	Truss 500 alu mainmast reducer top 190640-462	530	530	1000	1	22.0
	Truss 299 alu bracing foot 190640-601	357.8	357.8	900	2	12.0
	Truss 299 alu bracing top 190640-602	357.8	357.8	1145	2	15.0

Lightweight Service Crane (LSC)	Part list	010640-001

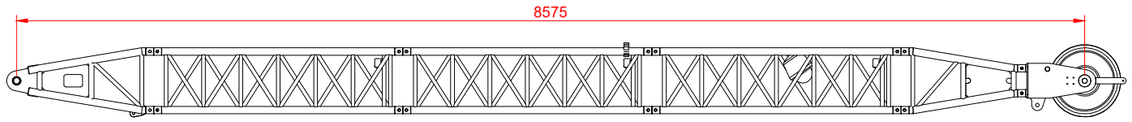
Part	Description	Length [mm]	Width [mm]	Height [mm]	Quantity	Weight [kg]
	Truss 299 alu horizontal bracing top/foot 190640-603	357.8	357.8	1100	4	14.0
	6t Hook	420	140	1124	1	30.0
	Truss 299 alu 1000mm 190640-441	357.8	357.8	1000	Var.	13.7
	Truss 299 alu 2000mm 190640-442	357.8	357.8	1000	Var.	22.9
	Bracing connection 190640-604	150	150	105	Var.	6.0
	Tirak X3050	405	375	700	1	117.0

Main Mast Configurations
(scale 1:25)

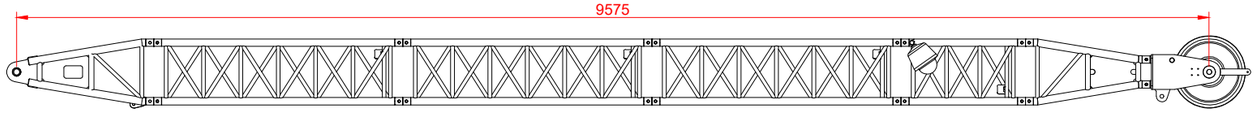
7.5m Main Mast
Min. Outreach 2.5m
Max. Outreach 7m



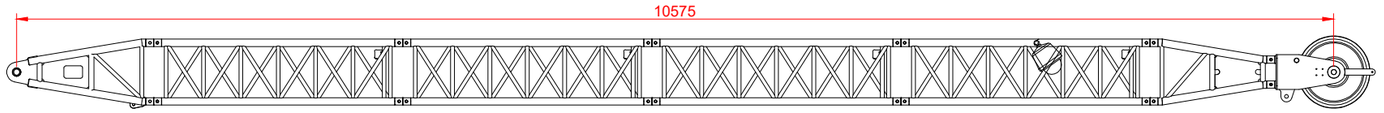
8.5m Main Mast
Min. Outreach 2.5m
Max. Outreach 7m



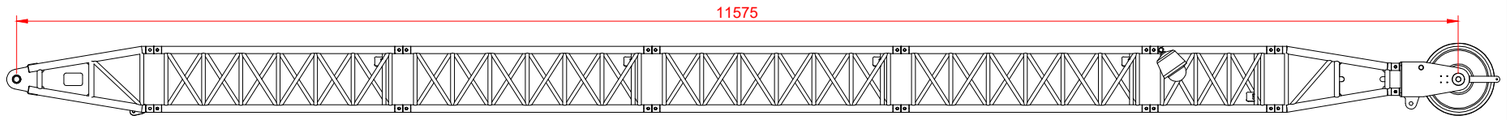
9.5m Main Mast
Min. Outreach 2.5m
Max. Outreach 8m



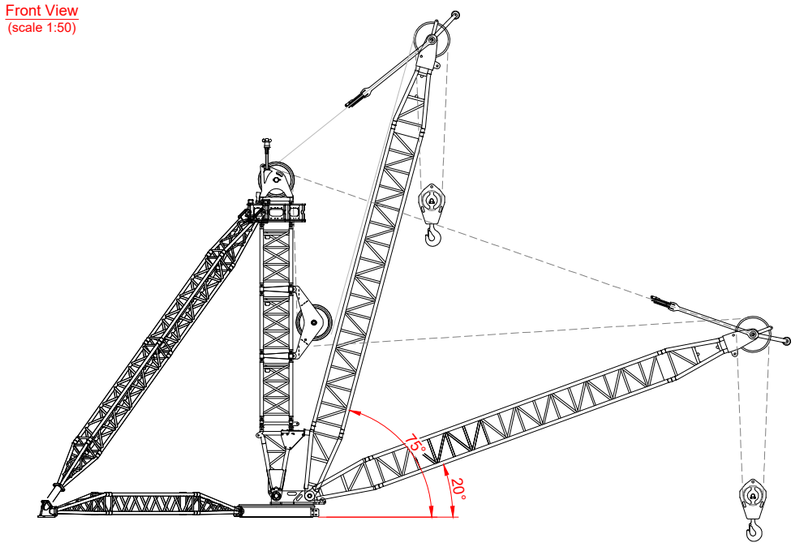
10.5m Main Mast
Min. Outreach 3.0m
Max. Outreach 9.0m



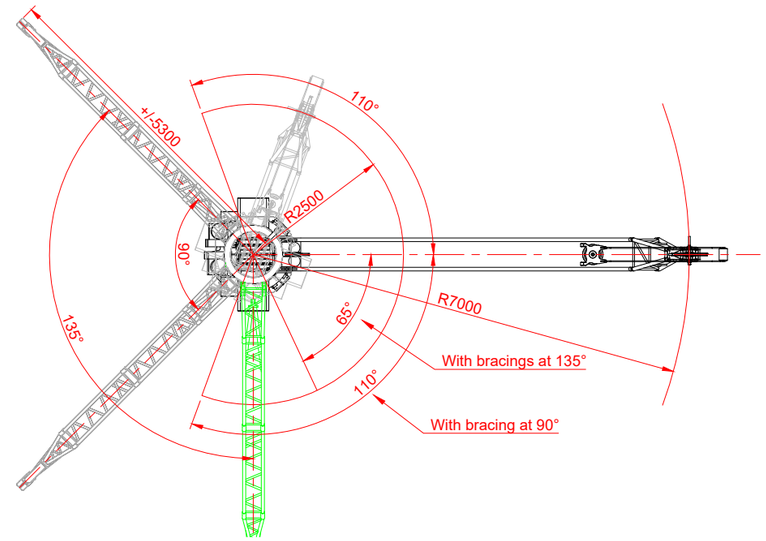
11.5m Main Mast
Min. Outreach 3.0m
Max. Outreach 10.0m



Front View
(scale 1:50)



Top View
(scale 1:50)



DRAWING NOTES:

-ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.

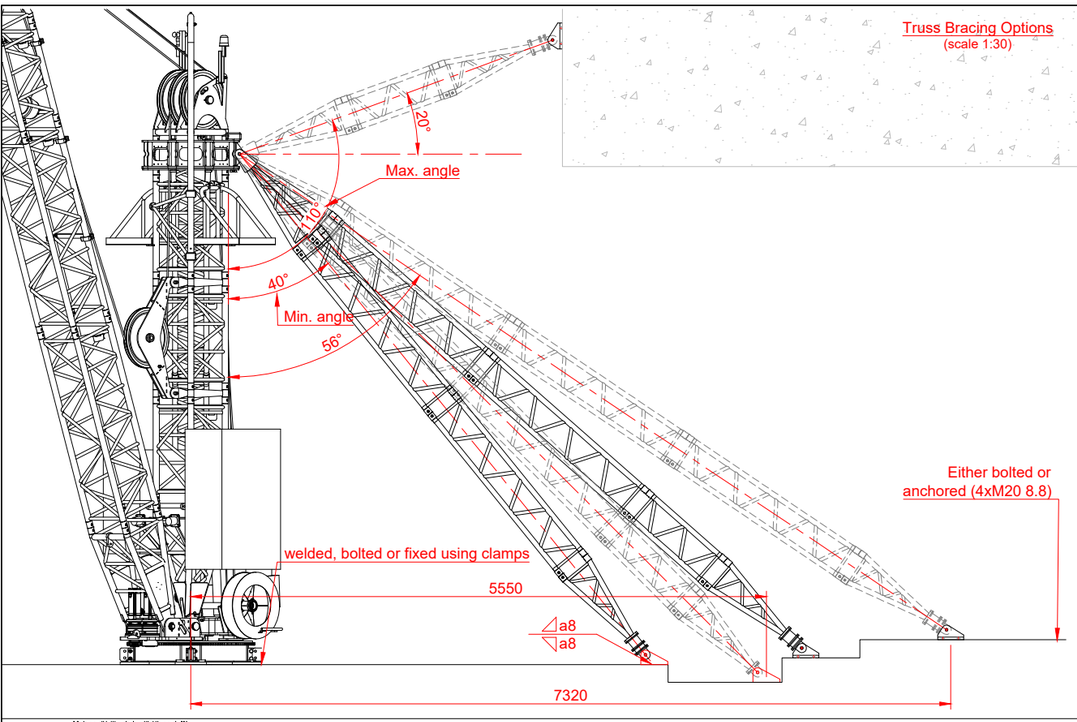
-ALL WEIGHTS ARE IN t (METRIC TONNES) UNLESS OTHERWISE STATED.

TECHNICAL NOTES:

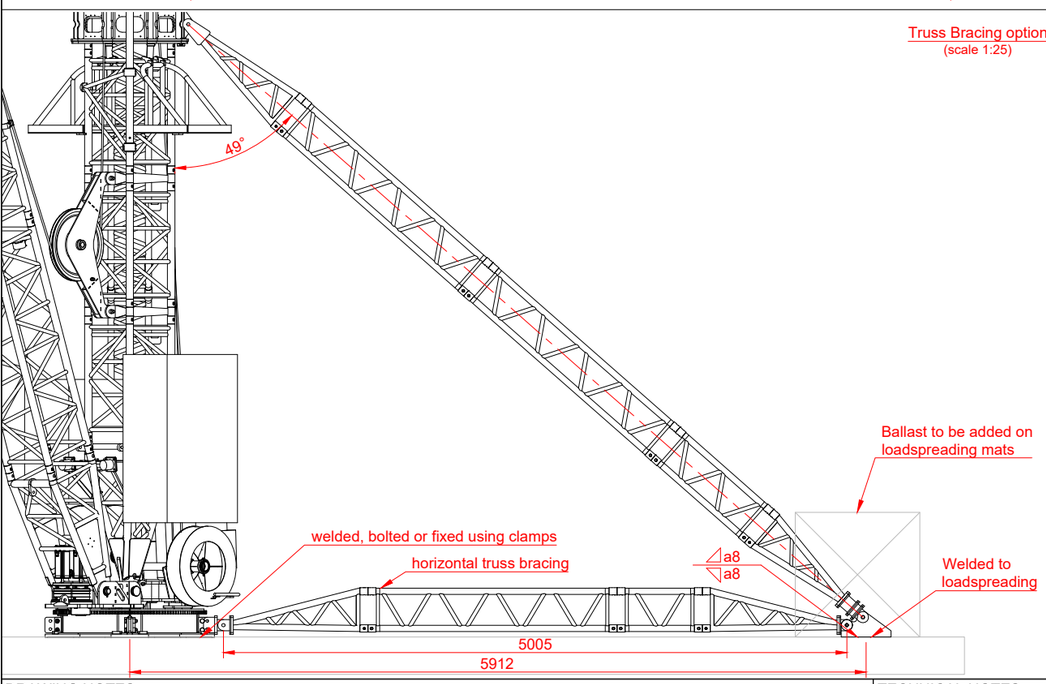
- Reference: User Manual RD-MAN-045.
  Installation: Paragraph 6.4

File Location: Z:\EQ_IFS_DRAWINGS\06_Gantries\40_Truss system 500x500\010640-000-000-MDL-02-B 3D model IP [MvB.dwg

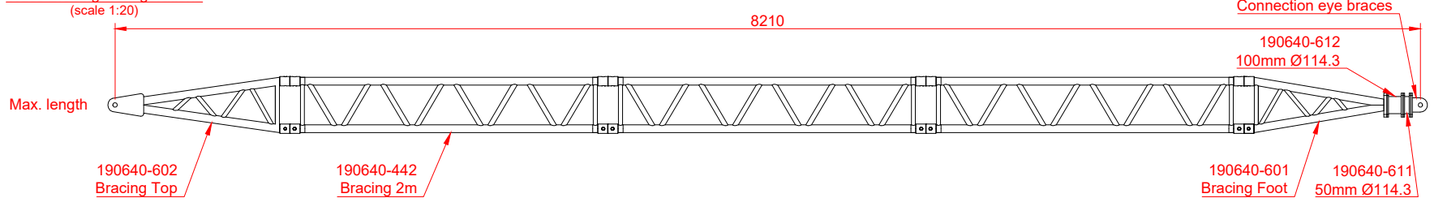
Truss Bracing Options
(scale 1:30)



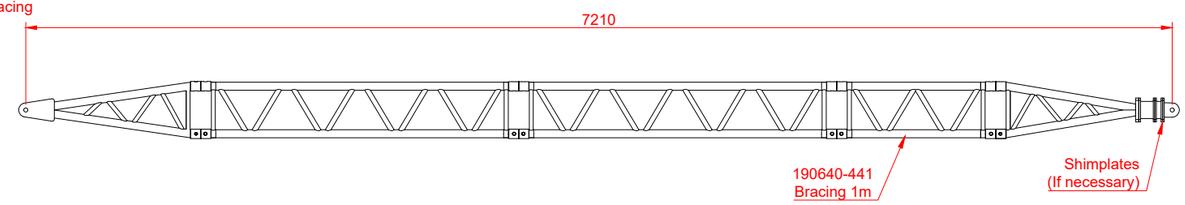
Truss Bracing option
(scale 1:25)



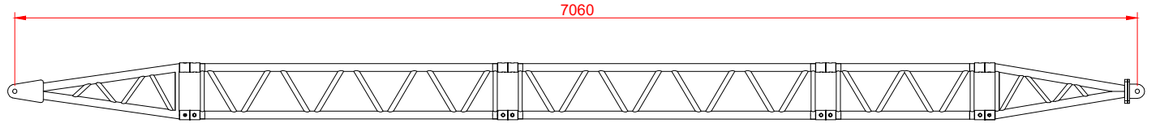
Truss Bracing Configurations
(scale 1:20)



Example
short truss bracing

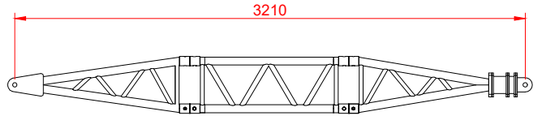


Example
short truss bracing



Example
short truss bracing

Example
Short truss bracing, For Horizontal purpose



Truss Bracing Item List:	
- 2000mm truss	190640-442
- 1000mm truss	190640-441
- 500mm truss	190640-440
- 100mm Ø114.3	190640-612
- 50mm Ø114.3	190640-611
- 20mm shim	190640-610
- 10mm shim	190640-609
- 5mm shim	190640-608
- 2mm shim	190640-607
- 1mm shim	190640-606

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TECHNICAL NOTES:

- Reference: User Manual RD-MAN-045.
  Installation: Paragraph 6.4

File Location: Z:\EQ_IFS_DRAWINGS\06_Gantries\40_Truss system 500x500\010640-000-000-MDL-02-B 3D model IP [MvB.dwg

Duty chart for LSC (Double hoist rope)

	[m]	[ft]
Backmast length	4.970	16' 4"
Mainmast length	8.575	28' 2"
LCM	7.060	23' 2"

LR		P	
[m]	[ft]	[t]	[lbs]
2.5	8' 2"	5.4	11905
3	9' 10"	5.4	11905
4	13' 1"	5.1	11244
5	16' 4"	4.5	9921
6	19' 8"	4.0	8818
7	22' 11"	3.6	7937

	[m]	[ft]
Backmast length	4.970	16' 4"
Mainmast length	10.575	34' 8"
LCM	7.060	23' 2"

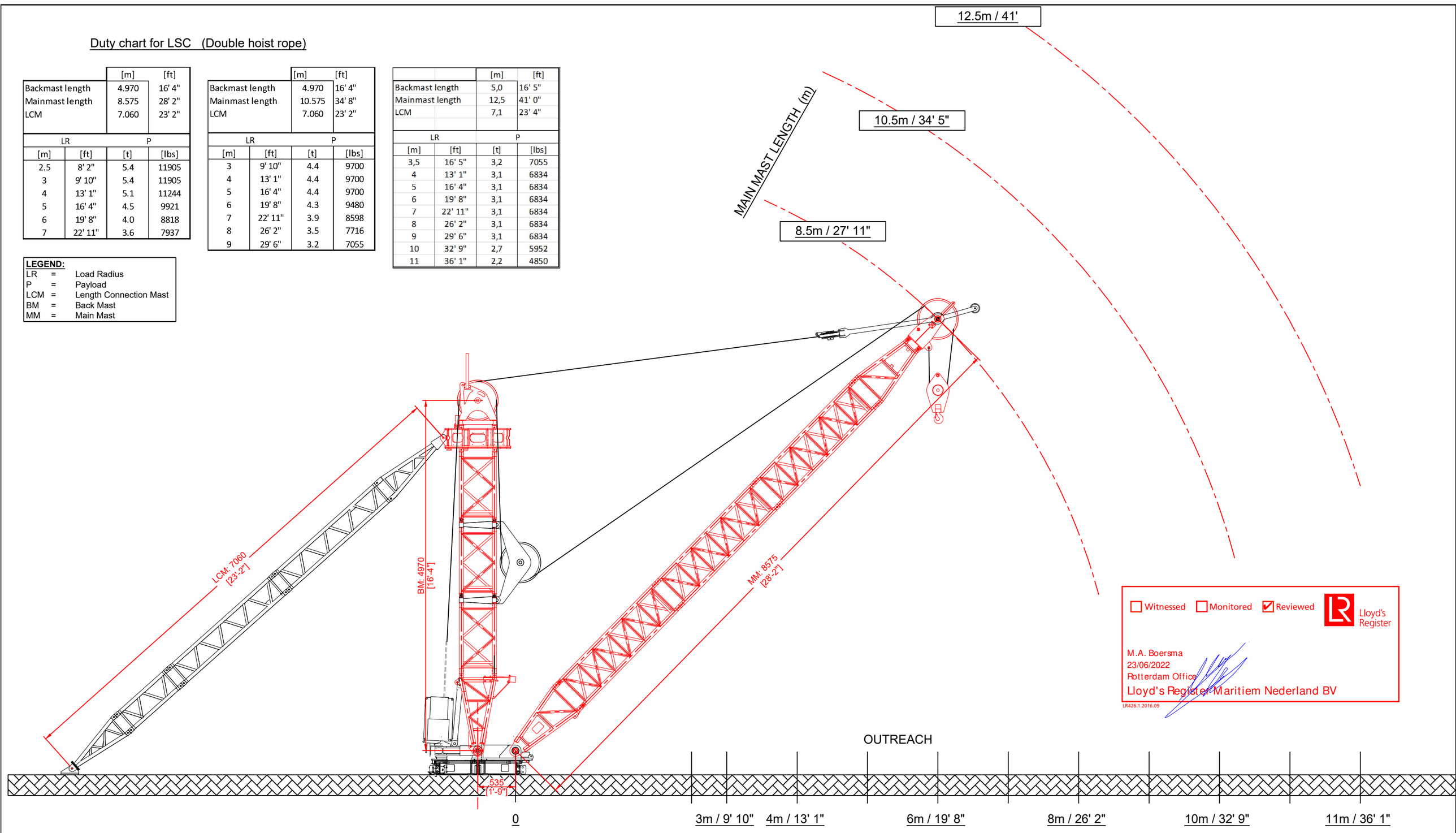
LR		P	
[m]	[ft]	[t]	[lbs]
3	9' 10"	4.4	9700
4	13' 1"	4.4	9700
5	16' 4"	4.4	9700
6	19' 8"	4.3	9480
7	22' 11"	3.9	8598
8	26' 2"	3.5	7716
9	29' 6"	3.2	7055

	[m]	[ft]
Backmast length	5,0	16' 5"
Mainmast length	12,5	41' 0"
LCM	7,1	23' 4"

LR		P	
[m]	[ft]	[t]	[lbs]
3,5	16' 5"	3,2	7055
4	13' 1"	3,1	6834
5	16' 4"	3,1	6834
6	19' 8"	3,1	6834
7	22' 11"	3,1	6834
8	26' 2"	3,1	6834
9	29' 6"	3,1	6834
10	32' 9"	2,7	5952
11	36' 1"	2,2	4850

LEGEND:

LR	=	Load Radius
P	=	Payload
LCM	=	Length Connection Mast
BM	=	Back Mast
MM	=	Main Mast



Witnessed ☐ Monitored ☐ Reviewed ☑ Lloyd's Register

M.A. Boersma
23/06/2022
Rotterdam Office
Lloyd's Register Maritiem Nederland BV

LR426.1.2016.09

DRAWING NOTES:

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-ALL WEIGHTS ARE IN t (METRIC TONNES) UNLESS OTHERWISE STATED.

-ALL DETAILS ARE PROVISIONAL AND ARE SUBJECT TO CONFIRMATION.

REFERENCES:
- L665-1-001-01-D

NOTES:

* OTHER CONFIGURATIONS AVAILABLE ON REQUEST
* CAN BE ASSEMBLED COMPLETELY BY HAND
* NO ADDITIONAL EQUIPMENT REQUIRED FOR ASSEMBLING
* ASSEMBLING BY 2 MAN
* LIGHT WEIGHT MEANS LOW SHIPPING COST
* OPERATIONAL WIND SPEED: < 13.8m/s (30.8mph)
* DURING STORM (WIND SPEED: > 13.9m/s (30.9mph)

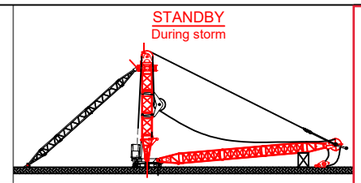
STANDBY PROCEDURE:

*PRE CHECK THE WEATHER FORECAST BEFORE STANDBY PERIOD

-If expected windspeeds < 13.8m/s (30.8mph)
- no load in hoisting hook block
- Main mast in parking position
- All emergency stops active
(See manual for detailed standby procedure)

-If expected windspeed > 13.9m/s (30.9mph)
- No load in hoisting hook block
- Boom-down the main mast
- Lower hook block on the ground
- All emergency stops active
(See manual for detailed standby procedure)

STANDBY
During storm



E	18-05-2022	DD	HdH	Crane configuration update
D	29-05-2019	MvdL	RA	Comment added
C	13-02-2019	MvdL	RA	Operational Wind speed added
B	25-09-2018	MvdL	RA	10.5m Mast added
A	31-08-2018	MvdL	RA	First Issue

File Location: D:\06_Gantries\40_Truss system 500x500\010640-001-000-MDL-E1.dwg

Duty chart for LSC (Single hoist rope)

	[m]	[ft]
Backmast length	4.970	16' 4"
Mainmast length	8.575	28' 2"
LCM	7.060	23' 2"

LR		P	
[m]	[ft]	[t]	[lbs]
2.5	8' 2"	3.0	6614
3	9' 10"	3.0	6614
4	13' 1"	3.0	6614
5	16' 4"	2.7	5952
6	19' 8"	2.4	5291
7	22' 11"	2.2	4850

	[m]	[ft]
Backmast length	4.970	16' 4"
Mainmast length	10.575	34' 8"
LCM	7.060	23' 2"

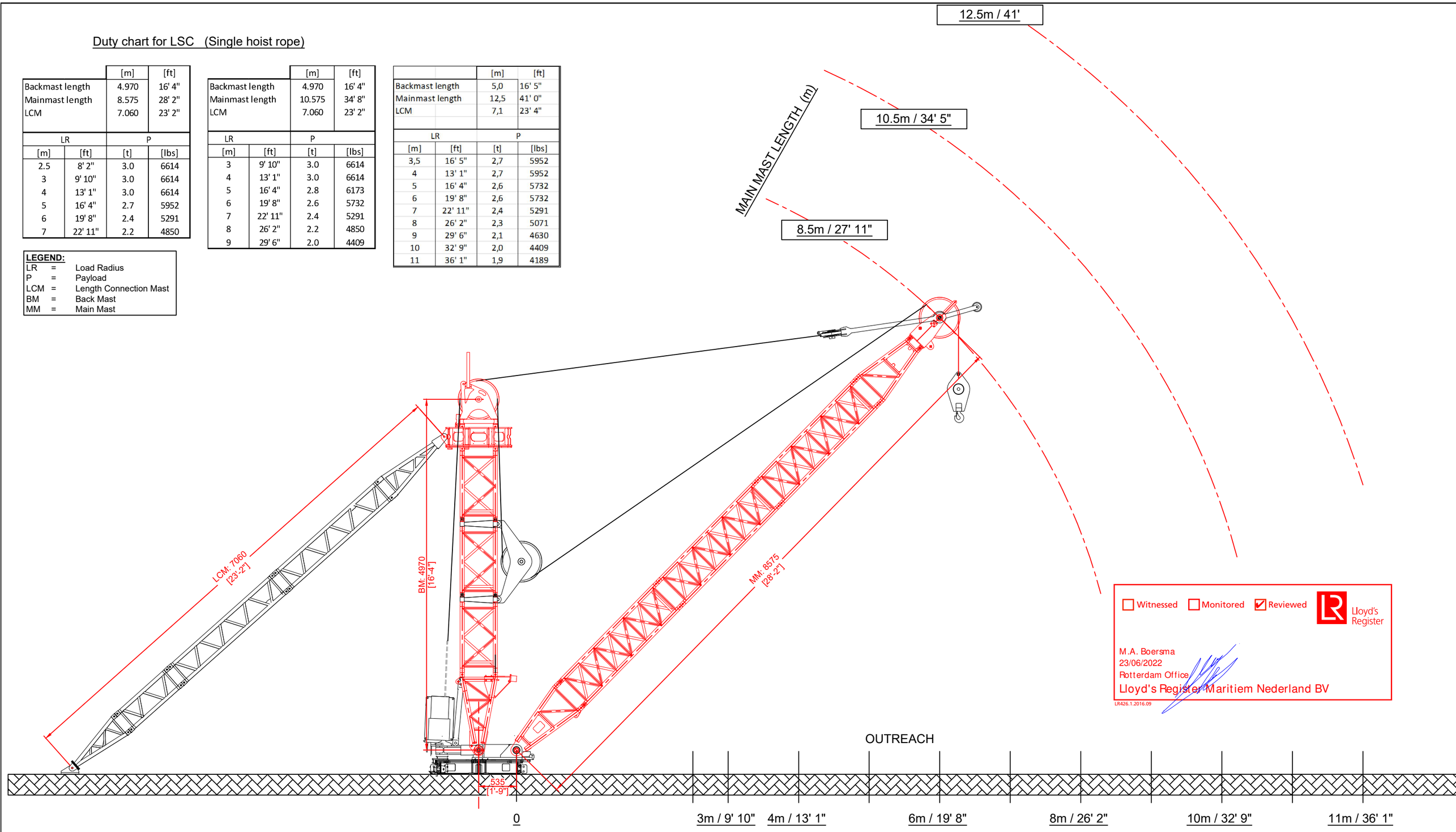
LR		P	
[m]	[ft]	[t]	[lbs]
3	9' 10"	3.0	6614
4	13' 1"	3.0	6614
5	16' 4"	2.8	6173
6	19' 8"	2.6	5732
7	22' 11"	2.4	5291
8	26' 2"	2.2	4850
9	29' 6"	2.0	4409

	[m]	[ft]
Backmast length	5,0	16' 5"
Mainmast length	12,5	41' 0"
LCM	7,1	23' 4"

LR		P	
[m]	[ft]	[t]	[lbs]
3,5	16' 5"	2,7	5952
4	13' 1"	2,7	5952
5	16' 4"	2,6	5732
6	19' 8"	2,6	5732
7	22' 11"	2,4	5291
8	26' 2"	2,3	5071
9	29' 6"	2,1	4630
10	32' 9"	2,0	4409
11	36' 1"	1,9	4189

LEGEND:

LR	=	Load Radius
P	=	Payload
LCM	=	Length Connection Mast
BM	=	Back Mast
MM	=	Main Mast



Witnessed ☐ Monitored ☑ Reviewed

Lloyd's Register

M.A. Boersma
23/06/2022
Rotterdam Office
Lloyd's Register Maritiem Nederland BV

LR426.1.2016.09

DRAWING NOTES:

-ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.

-ALL WEIGHTS ARE IN t (METRIC TONNES) UNLESS OTHERWISE STATED.

-ALL DETAILS ARE PROVISIONAL AND ARE SUBJECT TO CONFIRMATION.

REFERENCES:
- L665-1-001-01-D

NOTES:

* OTHER CONFIGURATIONS AVAILABLE ON REQUEST
* CAN BE ASSEMBLED COMPLETELY BY HAND
* NO ADDITIONAL EQUIPMENT REQUIRED FOR ASSEMBLING
* ASSEMBLING BY 2 MAN
* LIGHT WEIGHT MEANS LOW SHIPPING COST
* OPERATIONAL WIND SPEED: < 13.8m/s (30.8mph)
* DURING STORM (WIND SPEED: > 13.9m/s (30.9mph)

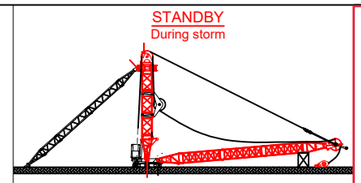
STANDBY PROCEDURE:

*PRE CHECK THE WEATHER FORECAST BEFORE STANDBY PERIOD

-If expected windspeeds < 13.8m/s (30.8mph)
- No load in hoisting hook block
- Main mast in parking position
- All emergency stops active
(See manual for detailed standby procedure)

-If expected windspeed > 13.9m/s (30.9mph)
- No load in hoisting hook block
- Boom-down the main mast
- Lower hook block on the ground
- All emergency stops active
(See manual for detailed standby procedure)

STANDBY
During storm



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Operation:

LSC on support beams 820' above sidewalk