NATIONAL CRANE

Series 1400 Hydraulic Crane 33 Ton Load Ratings

⚠ DANGER

AN UNTRAINED OPERATOR SUBJECTS HIMSELF AND OTHERS TO

DEATH OR SERIOUS INJURY

YOU MUST NOT OPERATE THIS CRANE UNLESS

- **You have been trained in the safe operation of this crane.**
- **You read, understand and follow the safety and operating recommendations contained in the crane manufacturer's manuals, your employers work rules and applicable government regulations.**
- **You are sure that all safety signs, guards and other safety features are in place and in proper condition.**

878016

⚠ DANGER

GENERAL

1. This equipment can be hazardous if improperly maintained or operated. Read and comply with the Operator's Manual supplied with this machine for information on safety, operation and maintenance before operating this machine. If these manuals are missing, order replacements from National Crane through the distributor.
2. Rated loads shown on the capacity chart pertain to this machine as originally manufactured and equipped. Modifications to the machine or use of equipment that is not factory specified or approved can be hazardous. Refer to capacity deduction chart for weights which must be deducted from rated loads when accessories are attached to boom or loadline.

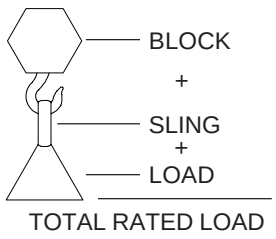
SET-UP

1. Inspect vehicle and crane including crane operation prior to use each day.
2. Load ratings shown on the appropriate charts are maximum allowable loads with the crane mounted on a factory approved truck and all outriggers at either full span or at mid span range and set on a firm level surface so the crane is level and the tires are suspended. This machine is not rated for use without outriggers. All outriggers must be extended equally - Mid span must be pinned. This machine is not rated for use with outriggers retracted.
3. Depending on the nature of the supporting surface, structural supports under the outrigger floats may be necessary to spread the load to a larger bearing surface.
4. Always level the crane with the level indicator located at each outrigger control station.

OPERATION

1. Operation of this equipment in excess of maximum load rating and disregard of instructions is hazardous. Always refer to the capacity chart for load and area limits before operating the crane. Rated loads at rated radius shall not be exceeded. Overloading this crane may cause structural collapse or instability.
2. Use the LMI/angle indicator as a reference only. When lifting maximum loads, measure radius and be certain of load weight.
3. Full extended outrigger rated loads do not exceed 85% of the tipping load as determined by SAE Crane Stability Test Code J765a when mounted on a factory recommended truck. Mid span outrigger stability loads are determined per ISO 4305, 1991. Structurally limited ratings on the capacity chart are shaded. Stability limited loads are not shaded. Machine will not always tip before structural damage occurs.

4. Rated loads include the weight of the hook block, slings, and other lifting devices. Their weights must be subtracted from the listed rated load to determine the net load that can be lifted.

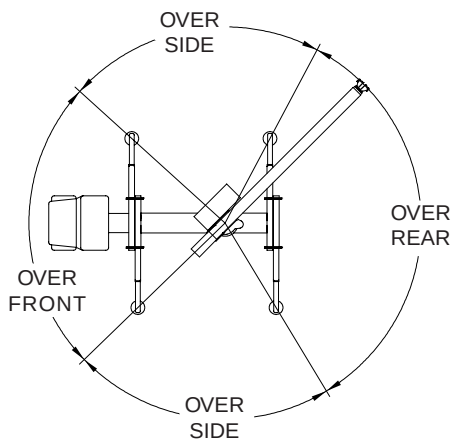


5. Rated loads must be reduced when lifting at the boom tip with a jib stowed or erected. Refer to the chart labeled "Rated Load Reductions with Jib" for the reduction at each boom length.
6. Rated loads are based on freely suspended loads. Always position the boom tip directly over the load before lifting. No attempt shall be made to push down with the boom or move the load sideways in any direction by pulling or dragging the load.
7. The user shall operate at reduced ratings to allow for adverse job conditions such as soft or uneven ground, high winds or erratic operation which produce swinging (side) loads, experience of personnel, two machine lifts, or other hazardous conditions for safe operation.
8. Rated loads account for wind to 20 MPH on the boom capacities and to 15 MPH on jib capacities. Above these wind velocities, loads and/or boom lengths must be appropriately reduced for safe operation.
9. Do not operate at any radii beyond stability limit line on range chart. At these positions, the machine can overturn without any load on the hook.
10. When boom length or radius or both are between points listed on capacity chart, the smallest load shown at either the next larger radius or boom length shall be used.
11. Do not exceed jib capacities at any reduced boom length.
12. It is safe to telescope or retract any load listed if rating is not exceeded. Boom must be fully retracted against boom stops at all times when lifting minimum boom length capacity loads.
13. Always pay out loadline before extending boom to avoid damaging loadline or crane structure.
14. Loads lifted must be within safe winch capacity as well as safe crane capacity. Multiple part rope reeving must be used on loads exceeding winch single part rated pull. Auxiliary boom head and jibs are rated for single part use only.
15. Do not operate the boom over personnel or allow them to walk or stand beneath the boom or load.
16. Do not allow personnel on carrier deck, or crane frame area when rotating crane.

17. Do not allow personnel to ride on hook, hook block, load or any device attached to the loadline. Handling of personnel is only permitted with full extension of all outrigger beams. Use only National Crane approved baskets.
18. Operate controls slowly and smoothly to avoid damage to crane or personnel.
19. Boom must be in carrying rack and outriggers fully retracted for travel.
20. Maintain a clearance of at least 10 feet between any part of the crane, loadline or load and any electrical line carrying up to 50,000 volts. One foot additional clearance is required for every additional 30,000 volts or less.

DEFINITIONS

1. **Load radius**—Horizontal distance from the center line of rotation before loading to the center of the vertical loadline or block with load applied.
2. **Load boom angle**—Loaded boom angle is the angle between the first section boom and the horizontal, after lifting the rated load at the rated radius. The boom angle before loading should be greater to account for deflections. The loaded boom angle combined with the boom length give only an approximation of the operating radius.
3. **Working area**—Area measured in a circular arc above the center line of rotation as shown on the Working Area diagram.
4. **Freely suspended load**—Load hanging free with no direct external force applied except by the loadline.
5. **Side load**—Horizontal side force applied to the lifted load either on the ground or in the air.
6. **No load stability limit**—The stability limit radius shown on the range diagrams is the radius beyond which it is not permitted to position the boom plus block configuration because machine can overturn without any load on the hook.



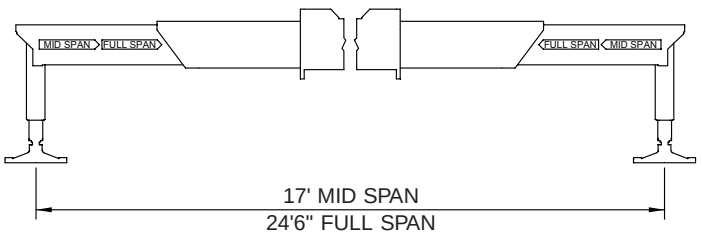
WORK AREA DIAGRAM

7. **Structural length limit**—An area where the boom or the boom with jib deployed cannot be extended because of structural limitations.
8. **PCSA**—Power Crane and Shovel Association.

INFORMATIONAL DATA

OUTRIGGERS

1. Outrigger spread from center to center of the outrigger floats at mid span is 17' and at full span is 24'6".
2. No outrigger pad load exceeds 55,000 pounds maximum at full span or 65,000 pounds maximum at mid span.



WEIGHT REDUCTIONS FOR LOAD HANDLING DEVICES (See load chart for jib deductions)

1. Hook blocks are rated at maximum capacity for the block. Do not exceed rated cable pull with any block.

	Aux Boom Head	100 lb
5 Ton	Downhaul Weight	180 lb
15 Ton	1 Sheave Block	375 lb
25 Ton	2 Sheave Block	640 lb
35 Ton	3 Sheave Block	870 lb
36 Ton	4 Sheave Block	970 lb

NOTICE

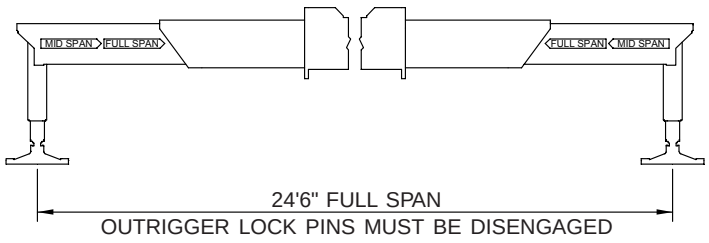
- Do not deadhead line block against boom tip when extending boom.
- Keep at least 3 wraps of loadline on drum at all times.
- Use only 5/8" diameter rotation resistant cable with 45,400 pounds breaking strength on this machine.

			1 Part Line	2 Part Line	3 Part Line	4 Part Line	5 Part Line	6 Part Line	7 Part Line	8 Part Line
										
MAXIMUM BOOM LENGTH AT MAXIMUM ELEVATION WITH RIGGING SHOWN WITH LOAD BLOCK AT GROUND LEVEL			154' Boom & Jib	100'	83'	64'	52'	43'	36'	31'
Winch	**Cable Supplied**	**Average Breaking Strength**	**Lift and Speed**	**Lift and Speed**	**Lift and Speed**	**Lift and Speed**	**Lift and Speed**	**Lift and Speed**	**Lift and Speed**	**Lift and Speed**
Standard Planetary Winch Low Speed	5/8" diameter rotation resistant 18 x 19 IWRC	45,400 lb	9,000 lb 170 fpm	18,000 lb 85 fpm	27,000 lb 57 fpm	36,000 lb 43 fpm	45,000 lb 34 fpm	54,000 lb 28 fpm	63,000 lb 24 fpm	66,000 lb 21 fpm
Standard Planetary Winch High Speed	5/8" diameter rotation resistant 18 x 19 IWRC	45,400 lb	4,400 lb 340 fpm	8,800 lb 170 fpm	13,200 lb 113 fpm	17,600 lb 85 fpm	22,000 lb 68 fpm	26,400 lb 57 fpm	30,800 lb 49 fpm	35,200 lb 43 fpm

All winch pulls and speeds are shown on the fourth layer. Winch line pulls would increase on the first, second and third layers. Winch line speed would decrease on the first, second and third layers. Winch line pulls may be limited by the winch capacity or the ANSI 5 to 1 cable safety factor. These are shown below:

Winch	Full Drum Pull	Allowable Cable Pull
Standard planetary & Auxiliary planetary	4,400 pounds (high speed) 9,000 pounds (low speed)	9,080 pounds

14100
100' BOOM
30'-54' JIB



FULL-SPAN OUTRIGGER

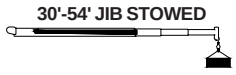
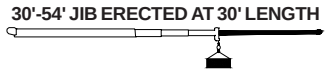
31 TO 100 FOOT BOOM RATED LOADS WITHOUT JIB

LOAD RADIUS (ft)	LOADED BOOM ANGLE	31 ft BOOM (lb)	LOADED BOOM ANGLE	A 44 ft BOOM (lb)	LOADED BOOM ANGLE	B 58 ft BOOM (lb)	LOADED BOOM ANGLE	C 72 ft BOOM (lb)	LOADED BOOM ANGLE	D 86 ft BOOM (lb)	LOADED BOOM ANGLE	100 ft BOOM (lb)
6	75.5	66,000										
8	71.2	52,500										
10	66.9	43,000	75	38,500								
12	62.5	39,400	72.3	34,000	77.5	28,000						
15	55.4	33,000	68	28,600	74.4	25,600	78	23,000				
20	42	24,350	60.3	22,000	69	19,700	73.8	18,400	77	17,100	78.9	11,850
25	23.3	17,500	52.5	18,000	63.4	16,500	69.7	15,000	73.4	14,000	76.1	11,200
30			43.5	15,300	57.6	14,000	65.1	12,700	69.7	11,750	73.3	10,800
35			32.6	12,800	51	12,500	60.3	10,900	66.2	10,200	70.2	9,400
40			15	10,000	44.3	10,750	55.5	9,650	62.8	9,200	67.2	8,300
45					37	8,800	50.8	8,100	58.8	7,600	64.2	7,300
50					27.1	7,000	45.2	7,200	54.3	6,500	60.8	6,300
55					10.1	5,600	39	6,000	50.3	5,900	57.3	5,200
60							31.4	4,800	45.5	5,000	53.6	4,500
65							22.1	4,000	40.2	4,000	49.9	4,000
70									34.3	3,400	45.9	3,300
75									27.6	2,700	41.5	2,800
80									18.1	2,200	36.7	2,300
85											31.1	1,700
90											24.4	1,300
95											15	1,000
	0	12,200	0	8,000	0	4,800	0	2,200	0	1,200	0	500

30 TO 54 FOOT JIB RATED LOADS

LOAD RADIUS (ft)	LOADED BOOM ANGLE	30 ft JIB (lb)	LOADED BOOM ANGLE	54 ft JIB (lb)
30	78	5,500		
35	76	5,450	78.6	2,650
40	74	5,400	77	2,600
45	72	5,100	75.3	2,500
50	69.6	4,600	73.7	2,400
55	67.4	4,250	71.7	2,300
60	65	3,950	69.9	2,200
65	62.5	3,600	68	2,100
70	60	3,400	66	2,000
75	57.4	3,100	64	1,850
80	54.6	2,600	61.9	1,750
85	51.7	2,150	59.7	1,600
90	48.8	1,700	57.5	1,500
95	45.5	1,300	55.2	1,400
100	42	1,000	52.8	1,300
105	38.2	700	50.2	1,200
110			47.7	1,150
115			44.6	950
120			41.6	700
125			38.3	500

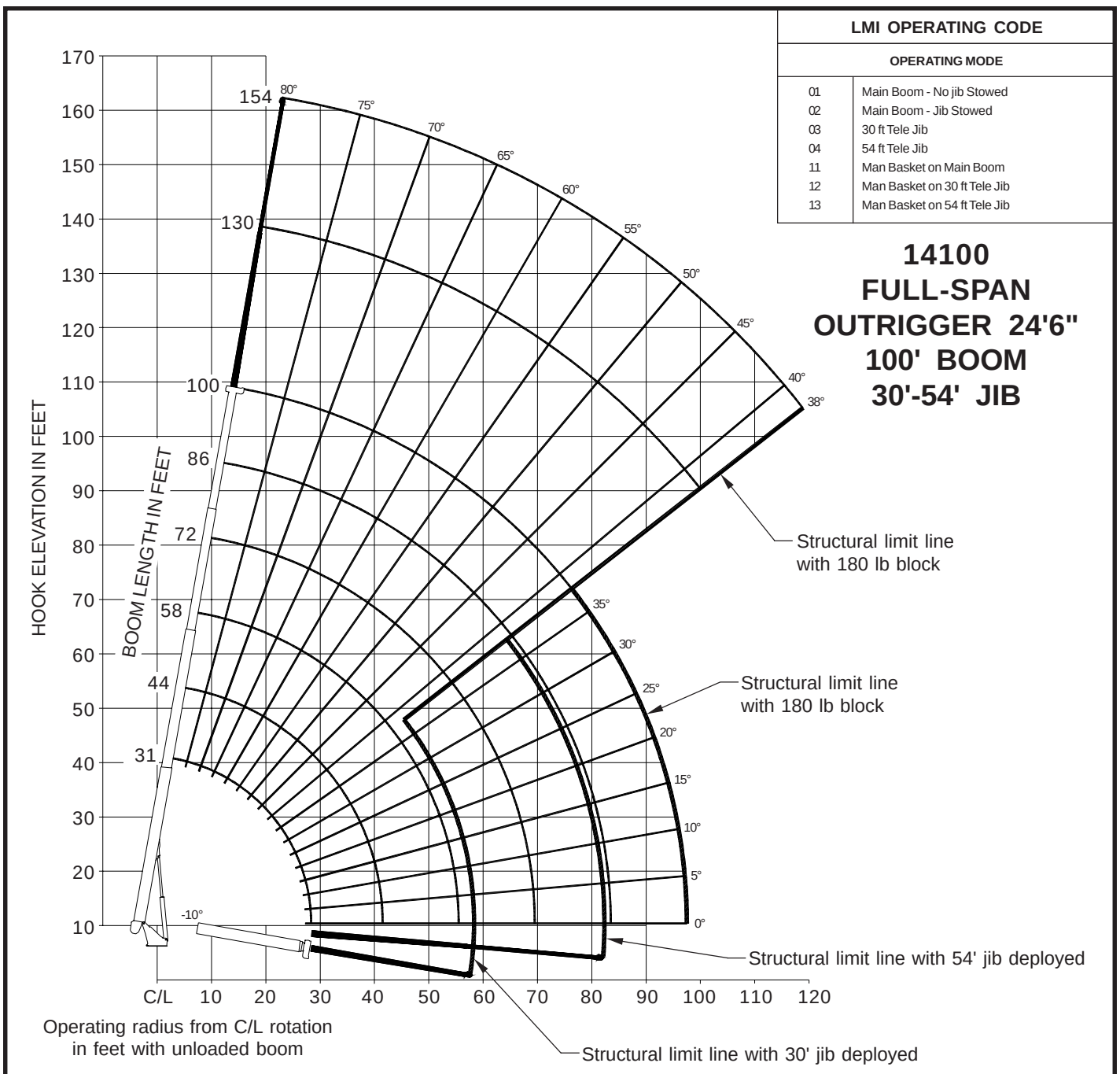
RATED LOAD REDUCTIONS WITH JIB

BOOM LENGTH	30'-54' JIB STOWED 	30'-54' JIB ERECTED AT 30' LENGTH 
31'	Reduce load 800 lb	Reduce load 2,150 lb
44'	Reduce load 600 lb	Reduce load 1,950 lb
58'	Reduce load 450 lb	Reduce load 1,800 lb
72'	Reduce load 350 lb	Reduce load 1,750 lb
86'	Reduce load 300 lb	Reduce load 1,700 lb
100'	Reduce load 250 lb	Reduce load 1,650 lb

Note:

1. All capacities are in pounds, angles in degrees, radius in feet.
2. Loaded boom angles are given as reference only.
3. Shaded areas are structurally limited capacities.
4. Handling of personnel is only permitted with full-span outriggers.

878018



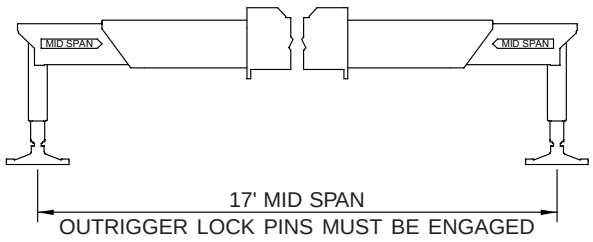
SET-UP

1. Fully extend and set outriggers to full-span location, level crane and set front stabilizer.

OPERATION

1. The 31 ft. boom length capacities are based on boom fully retracted. If not fully retracted, do not exceed 44 ft. boom length capacities.
2. Do not extend unloaded boom or jib beyond stability limit line on range chart as loss of stability may occur.
3. Load blocks and slings are considered to be a part of the load.
4. Operate with jib by radius when main boom is fully extended and by boom angle when main boom is partially extended. Do not exceed jib capacities at any partially extended boom length.
5. All jib loads must be lifted with single part reeving.

14100
100' BOOM
30'-54' JIB



MID-SPAN OUTRIGGER

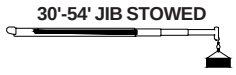
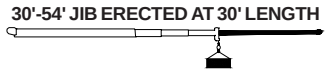
31 TO 100 FOOT BOOM RATED LOADS WITHOUT JIB

LOAD RADIUS (ft)	LOADED BOOM ANGLE	31 ft BOOM (lb)	LOADED BOOM ANGLE	A 44 ft BOOM (lb)	LOADED BOOM ANGLE	B 58 ft BOOM (lb)	LOADED BOOM ANGLE	C 72 ft BOOM (lb)	LOADED BOOM ANGLE	D 86 ft BOOM (lb)	LOADED BOOM ANGLE	100 ft BOOM (lb)
6	75.5	66,000										
8	71.2	52,500										
10	66.9	43,000	75	38,500								
12	62.5	39,400	72.3	34,000	77.5	28,000						
15	55.4	33,000	68	28,600	74.4	25,600	78	23,000				
20	41.9	18,700	60.3	22,000	69	19,700	73.8	18,400	77	17,100	78.9	11,850
25	23.3	11,500	52.4	14,200	63.2	12,800	69.4	13,200	73.7	13,300	76.1	11,200
30			43.2	9,800	57.7	8,800	65.2	9,100	69.8	9,250	73.3	9,500
35			33.1	7,100	51.4	6,350	60.4	6,400	66.2	6,800	70.2	6,950
40			16.6	5,100	44.4	4,700	55.5	4,850	62.3	5,100	66.9	5,200
45					36.5	3,500	50.3	3,650	58.3	3,850	63.5	3,950
50					26.5	2,500	44.7	2,700	54	2,850	60.1	3,000
55					9.3	1,700	38.4	1,900	49.6	2,100	56.5	2,200
60							31.1	1,250	44.9	1,500	52.8	1,600
65							21.6	750	39.7	950	48.9	1,050
70									33.9	500	44.9	650
75												
80												
85												
90												
95												
	0	7,500	0	4,000	0	700						

30 TO 54 FOOT JIB RATED LOADS

LOAD RADIUS (ft)	LOADED BOOM ANGLE	30 ft JIB (lb)	LOADED BOOM ANGLE	54 ft JIB (lb)
30	78	5,500		
35	76	5,450	78.6	2,650
40	74	5,400	77	2,600
45	71.4	4,300	75.3	2,500
50	68.7	3,250	73.5	2,400
55	66.1	2,500	71.7	2,300
60	63.4	1,800	69.9	2,200
65	60.6	1,250	67.2	2,000
70	57.9	800	64.8	1,500
75			62.3	1,100
80			59.9	750
85			57.5	500
90				
95				
100				
105				
110				
115				
120				
125				

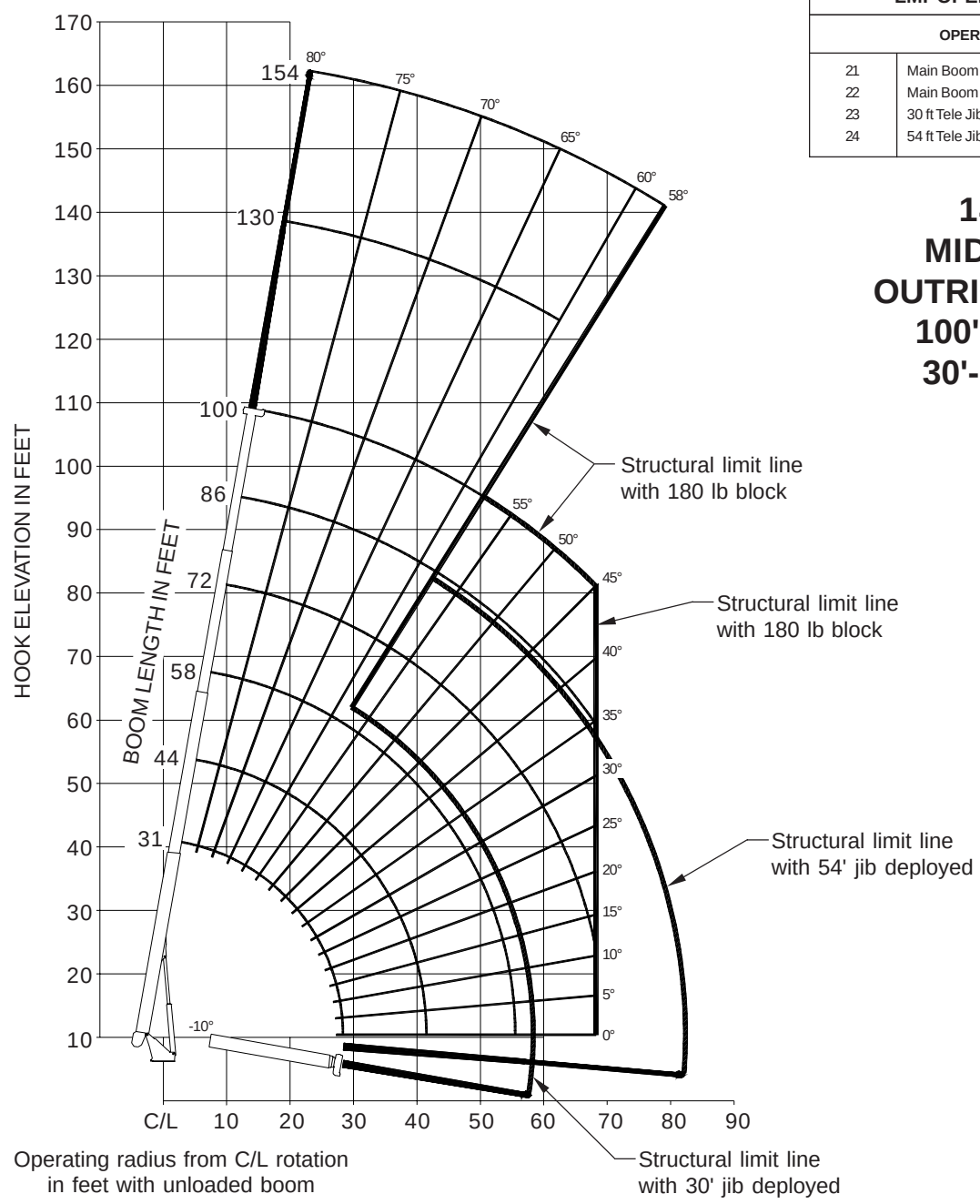
RATED LOAD REDUCTIONS WITH JIB

BOOM LENGTH	30'-54' JIB STOWED 	30'-54' JIB ERECTED AT 30' LENGTH 
31'	Reduce load 800 lb	Reduce load 2,150 lb
44'	Reduce load 600 lb	Reduce load 1,950 lb
58'	Reduce load 450 lb	Reduce load 1,800 lb
72'	Reduce load 350 lb	Reduce load 1,750 lb
86'	Reduce load 300 lb	Reduce load 1,700 lb
100'	Reduce load 250 lb	Reduce load 1,650 lb

Note:

1. All capacities are in pounds, angles in degrees, radius in feet.
2. Loaded boom angles are given as reference only.
3. Shaded areas are structurally limited capacities.
4. Handling of personnel is only permitted with full-span outriggers.

878019



LMI OPERATING CODE	
OPERATING MODE	
21	Main Boom - No jib Stowed
22	Main Boom - Jib Stowed
23	30 ft Tele Jib
24	54 ft Tele Jib

14100 MID-SPAN OUTRIGGER 17' 100' BOOM 30'-54' JIB

SET-UP

1. Engage mid-span outrigger lock pins, extend and set outriggers to mid-span location, level crane and set front stabilizer.

OPERATION

1. The 31 ft. boom length capacities are based on boom fully retracted. If not fully retracted, do not exceed 44 ft. boom length capacities.
2. Do not extend unloaded boom or jib beyond stability limit line on range chart as loss of stability may occur.
3. Load blocks and slings are considered to be a part of the load.
4. Operate with jib by radius when main boom is fully extended and by boom angle when main boom is partially extended. Do not exceed jib capacities at any partially extended boom length.
5. All jib loads must be lifted with single part reeving.

DIMENSIONAL SPECIFICATIONS

NOTE:
DIMENSIONS ARE inches (mm)
UNLESS OTHERWISE SPECIFIED.