NATIONAL CRANE

Series 1800

Hydraulic Crane 40 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.

Assembly No. 80008451

⚠ 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.

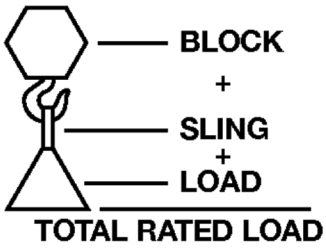
SET-UP

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 full, mid, or retracted outriggers 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 extended equally Mid span must be pinned.
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 and retracted 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. Refer to the chart labeled "Rated Load Reductions With Jib (lb)" 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 attempts 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 the 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. 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 handle personnel on loadline unless the requirements of the applicable national, state, and local regulations and safety codes are met. Do not permit anyone to ride loads, hooks, slings or other rigging for any reason. Handling of personnel is only permitted with full extension of all outrigger beams. Use only National Crane approved baskets.

18 If equipped with 31° offset jib, do not use personnel basket with jib deployed at 30° offset.

19. Operate controls slowly and smoothly to avoid damage to crane or personnel.

20. Boom must be in carrying rack and outriggers fully retracted for travel.

21. 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. 1 foot additional clearance is required for every additional 30,000 volts or less.

DEFINITIONS

1. Load radius—Horizontal distance from the centerline of rotation before loading to the center of the vertical loadline or block with load applied.

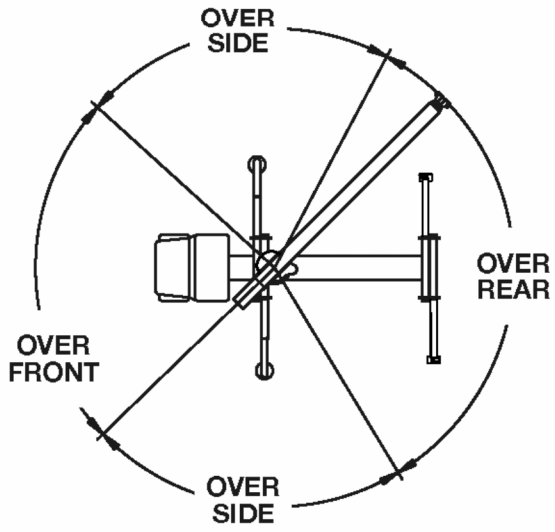
2. Loaded boom angle—Loaded boom angle is the angle between the first section boom and the horizontal, after lifting the rated load at the rated radius. The boom angle before loading should be greater to account for deflections. The loaded boom angle combined with the boom length give only an approximation 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

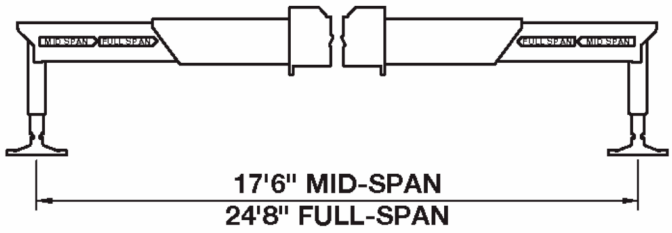
7. Structural length limit—An area where the boom or the boom with jib deployed cannot be extended because of structural limitations.

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 17'6" and at full-span is 24'8".
2. No outrigger pad load exceeds 63,000 pounds maximum at full-span or 74,000 pounds at mid-span.



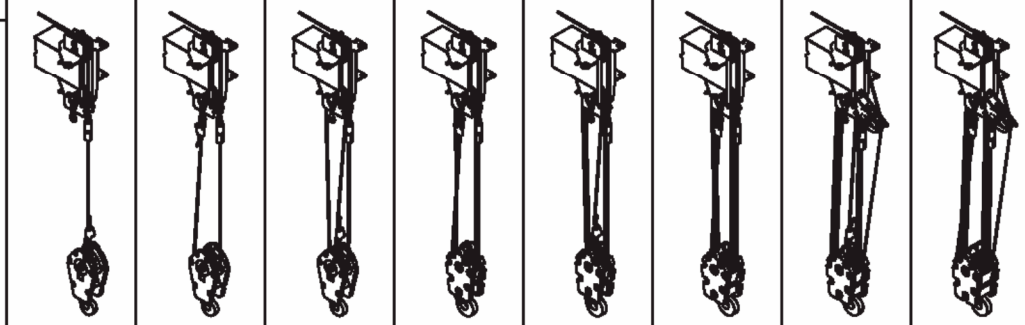
WEIGHT REDUCTIONS FOR LOAD HANDLING DEVICES (See load chart for jib deductions)

1. Hookblocks 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
40 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 56,400 pounds breaking strength on this machine.



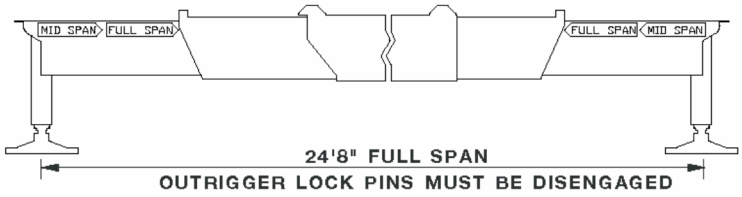
Maximum Boom Length at Maximum Elevation with Rigging Shown with Load Block at Ground Level			1 Part Line 168' BOOM & JIB	2 Part Line 114'	3 Part Line 83'	4 Part Line 64'	5 Part Line 52'	6 Part Line 43'	7 Part Line 36'	8 Part Line 31'
Winch	Cable Supplied	Average Breaking Strength	Lift and Speed	Lift 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 IWRC	56,400 lb	10,000 lb 205 fpm	20,000 lb 103 fpm	30,000 lb 68 fpm	40,000 lb 51 fpm	50,000 lb 41 fpm	60,000 lb 34 fpm	70,000 lb 29 fpm	80,000 lb 26 fpm
Standard Planetary Winch High Speed	5/8" diameter rotation resistant IWRC	56,400 lb	5,000 lb 410 fpm	10,000 lb 205 fpm	15,000 lb 137 fpm	20,000 lb 103 fpm	25,000 lb 82 fpm	30,000 lb 68 fpm	35,000 lb 59 fpm	40,000 lb 51 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	5,000 pounds (high speed) 10,000 pounds (low speed)	11,280 pounds

FULL-SPAN OUTRIGGER

18142
142' BOOM
26' JIB



34 TO 142 FOOT BOOM RATED LOADS WITHOUT JIB

34 FT BOOM			47 FT BOOM			61 FT BOOM			74 FT BOOM		
Radius	Angle	Capacity	Radius	Angle	Capacity	Radius	Angle	Capacity	Radius	Angle	Capacity
7	76.3	80,000									
8	74.3	74,000									
10	70.5	63,000	10	76.6	40,000						
12	66.7	55,000	12	74.2	40,000	12	78.7	40,000			
15	60.6	43,000	15	70.5	40,000	15	75.8	36,000	15	79.2	32,000
20	49.6	29,700	20	63.6	30,600	20	70.8	30,000	20	75.2	26,600
25	36.4	22,000	25	56.2	22,800	25	65.4	23,000	25	71	21,500
30	16.2	17,000	30	48.1	17,700	30	59.8	17,900	30	66.6	17,400
	0	15,800	35	38.9	14,100	35	53.8	14,300	35	62.1	14,400
			40	27.1	11,400	40	47.4	11,600	40	57.4	11,800
				0	9,400	45	40.9	9,700	45	52.9	9,900
						50	32.6	8,000	50	47.6	8,200
						55	21.5	6,800	55	41.7	6,900
							0	5,900	60	35.1	5,700
									65	27.1	4,850
									70	15.4	4,000
										0	3,800

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.

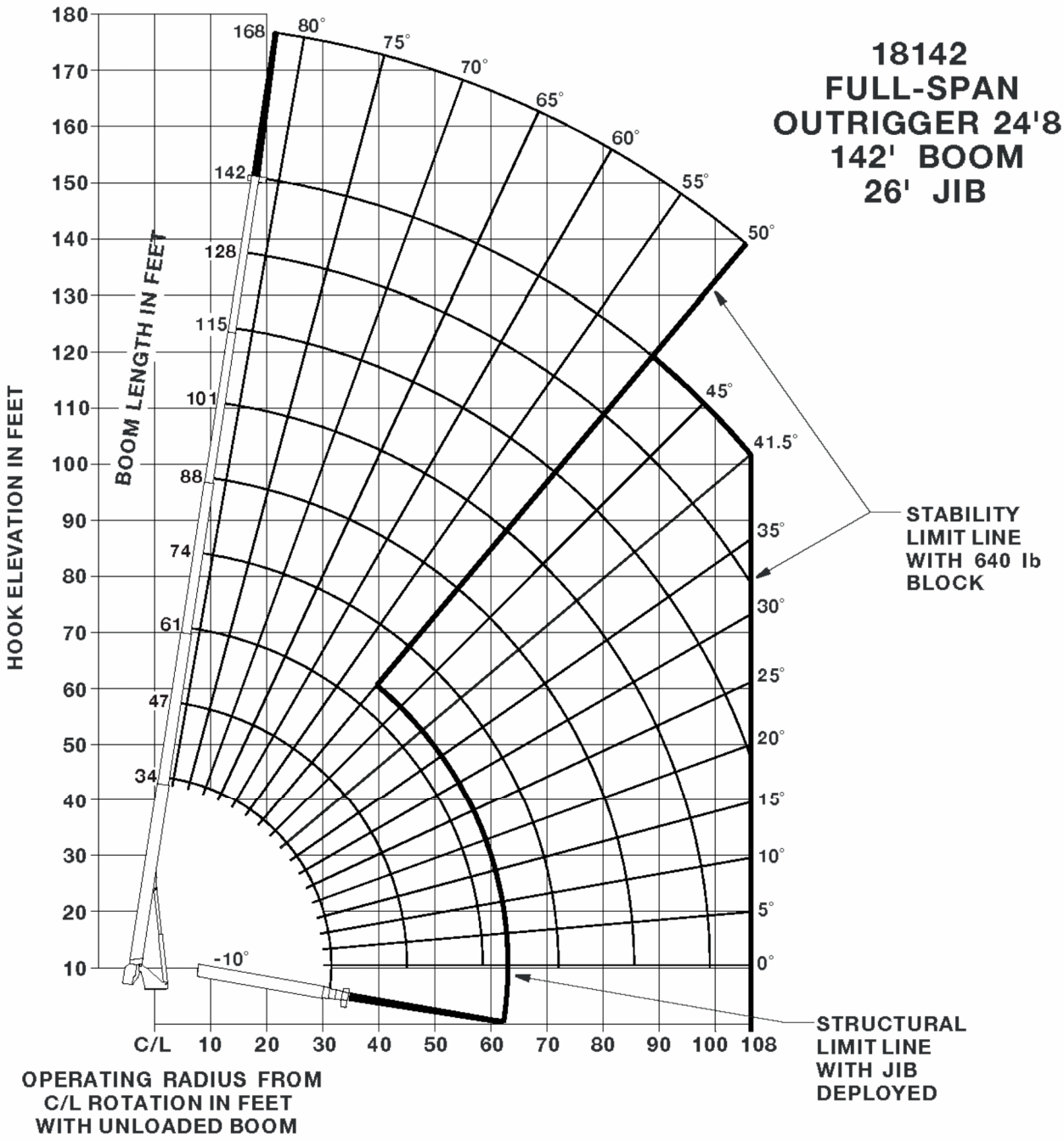
88 FT BOOM			101 FT BOOM			115 FT BOOM			128 FT BOOM			142 FT BOOM		
Radius	Angle	Capacity	Radius	Angle	Capacity	Radius	Angle	Capacity	Radius	Angle	Capacity	Radius	Angle	Capacity
20	78.2	23,000	20	79.9	17,000									
25	74.9	20,000	25	77.2	15,800	25	79.1	13,000						
30	71.3	17,000	30	74.4	14,200	30	76.7	11,900	30	78.5	9,500	30	79.7	8,000
35	67.7	14,600	35	71.5	12,700	35	74.2	10,900	35	76.5	9,000	35	77.8	7,500
40	63.8	11,900	40	68.3	10,800	40	71.9	9,800	40	74.4	8,500	40	75.9	7,000
45	60.3	10,000	45	65.4	9,500	45	69.3	9,000	45	72.1	7,800	45	73.9	6,400
50	56.2	8,300	50	62.1	8,200	50	66.5	8,000	50	69.6	7,000	50	71.8	5,800
55	51.9	7,000	55	58.6	7,000	55	63.6	7,100	55	67.1	6,200	55	69.5	5,200
60	47.3	5,800	60	54.9	5,800	60	60.5	5,900	60	64.4	5,300	60	67.3	4,700
65	42.3	4,900	65	51.1	4,950	65	57.3	5,000	65	61.7	4,600	65	65	4,200
70	36.8	4,100	70	47.1	4,150	70	54	4,200	70	59	4,000	70	62.7	3,750
75	30.5	3,400	75	42.7	3,450	75	50.5	3,500	75	56.2	3,400	75	60.2	3,300
80	22.5	2,800	80	38.1	2,850	80	46.9	2,900	80	53.2	2,900	80	57.8	2,950
85	8.6	2,300	85	32.8	2,300	85	43.1	2,350	85	50	2,350	85	55.1	2,400
	0	2,200	90	26.5	1,850	90	39	1,900	90	46.8	1,900	90	52.3	1,950
			95	18.3	1,450	95	34.4	1,500	95	43.3	1,500	95	49.4	1,500
				0	1,100	100	29.3	1,100	100	39.6	1,100	100	46.5	1,150
						105	23	750	105	35.7	800	105	43.4	800
						108	18.3	650	108	33.1	650	108	41.5	650

RATED LOAD REDUCTIONS WITH JIB

BOOM LENGTH	26 FT JIB STOWED	26 FT JIB ERECTED
34'	Reduce load 525 lb	Reduce load 1,050 lb
47'	Reduce load 400 lb	Reduce load 1,000 lb
61'	Reduce load 300 lb	Reduce load 950 lb
74'	Reduce load 250 lb	Reduce load 925 lb
88'	Reduce load 200 lb	Reduce load 900 lb
101'	Reduce load 200 lb	Reduce load 900 lb
115'	Reduce load 150 lb	Reduce load 875 lb
126'	Reduce load 150 lb	Reduce load 875 lb
142'	Reduce load 125 lb	Reduce load 850 lb

26 FT JIB RATED LOADS

Radius Fully Extended	Loaded Boom Angle	Rated Loads All Boom Lengths
33	80	4,000
50	75	3,800
65	70	3,200
78	65	2,450
90	60	1,800
101	55	1,250
112	50	650



SET-UP

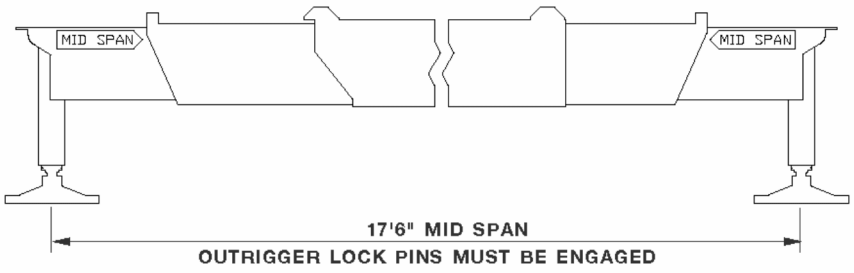
1. Fully extend and set outriggers to full-span location, level crane and set front stabilizer.

OPERATION

1. The 34 ft. boom length capacities are based on boom fully retracted. If not fully retracted, do not exceed 61 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.

MID-SPAN OUTRIGGER

18142
142' BOOM
26' JIB



34 TO 142 FOOT BOOM RATED LOADS WITHOUT JIB

34 FT BOOM			47 FT BOOM			61 FT BOOM			74 FT BOOM		
Radius	Angle	Capacity	Radius	Angle	Capacity	Radius	Angle	Capacity	Radius	Angle	Capacity
7	76.3	80,000									
8	74.3	74,000									
10	70.5	63,000	10	76.6	40,000						
12	66.7	55,000	12	74.2	40,000	12	78.7	40,000			
15	60.6	43,000	15	70.5	40,000	15	75.8	36,000	15	79.2	32,000
20	49.5	25,400	20	63.6	26,400	20	70.6	26,500	20	75.2	26,600
25	36.3	15,900	25	55.9	16,700	25	65	17,000	25	70.5	17,100
30	16.2	10,700	30	47.8	11,500	30	59.3	11,800	30	65.9	11,900
	0	9,500	35	39.4	8,300	35	53.9	8,600	35	61.8	8,700
			40	27.9	6,000	40	47.4	6,300	40	57	6,400
				0	4,300	45	40.3	4,600	45	52	4,800
						50	31.9	3,400	50	46.7	3,600
						55	20.7	2,400	55	40.9	2,600
							0	1,750	60	34.3	1,800
									65	26.2	1,100
									70	14.5	650

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.

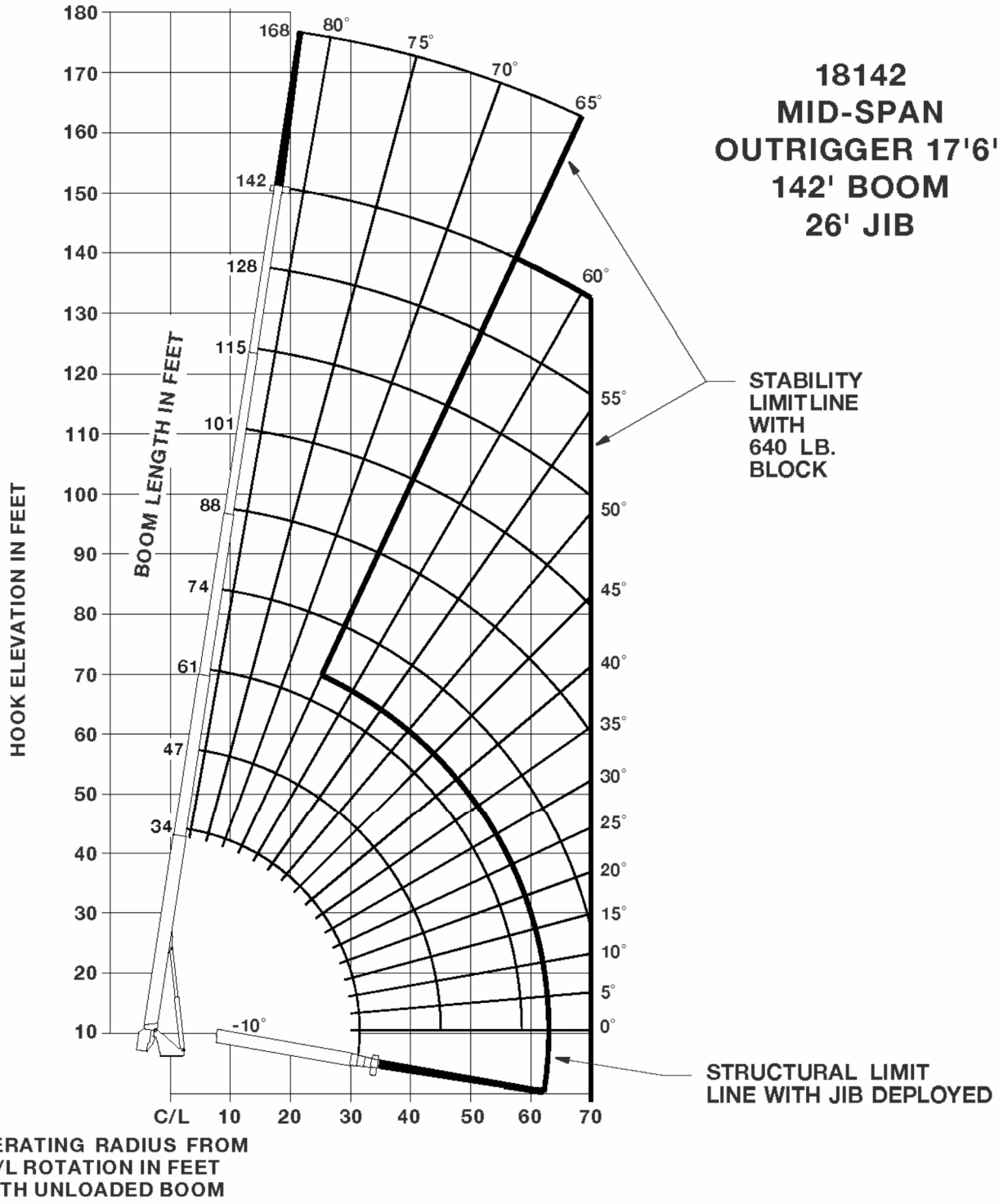
88 FT BOOM			101 FT BOOM			115 FT BOOM			128 FT BOOM			142 FT BOOM		
Radius	Angle	Capacity	Radius	Angle	Capacity	Radius	Angle	Capacity	Radius	Angle	Capacity	Radius	Angle	Capacity
20	78.2	23,000	20	79.9	17,000									
25	74.4	17,200	25	77.2	15,800	25	79.1	13,000						
30	70.5	12,000	30	74	12,100	30	76.7	11,900	30	78.5	9,500	30	79.7	8,000
35	67	8,800	35	70.9	8,900	35	74	9,000	35	76.5	9,000	35	77.8	7,500
40	63.1	6,500	40	67.6	6,600	40	71	6,700	40	73.6	6,700	40	75.7	6,700
45	59.2	4,950	45	64.3	5,100	45	68	5,200	45	71	5,200	45	73.3	5,200
50	55.1	3,700	50	60.8	3,800	50	65	3,900	50	68.3	3,900	50	70.8	3,900
55	50.8	2,700	55	57.3	2,800	55	62	2,900	55	65.6	2,900	55	68.4	2,900
60	46.2	1,900	60	53.7	2,000	60	59	2,100	60	62.9	2,100	60	66	2,100
65	41.3	1,200	65	49.9	1,300	65	55.8	1,400	65	60.2	1,400	65	63.5	1,400
70	35.8	700	70	45.9	750	70	52.6	800	70	57.4	800	70	61	800

RATED LOAD REDUCTIONS WITH JIB

BOOM LENGTH	26 FT JIB STOWED	26 FT JIB ERECTED
34'	Reduce load 525 lb	Reduce load 1,050 lb
47'	Reduce load 400 lb	Reduce load 1,000 lb
61'	Reduce load 300 lb	Reduce load 950 lb
74'	Reduce load 250 lb	Reduce load 925 lb
88'	Reduce load 200 lb	Reduce load 900 lb
101'	Reduce load 200 lb	Reduce load 900 lb
115'	Reduce load 150 lb	Reduce load 875 lb
126'	Reduce load 150 lb	Reduce load 875 lb
142'	Reduce load 125 lb	Reduce load 850 lb

26 FT JIB RATED LOADS

Radius Fully Extended	Loaded Boom Angle	Rated Loads All Boom Lengths
33	80	4,000
50	75	3,800
62	70	2,100
74	65	750



SET-UP

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

OPERATION

1. The 34 ft. boom length capacities are based on boom fully retracted. If not fully retracted, do not exceed 61 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.

LMI OPERATING CODE

OPERATING MODE	
01	Main Boom - No Jib Stowed
02	Main Boom - Jib Stowed
03	26 ft (7.9m) Jib
11	Man Basket on Main Boom
12	Man Basket on 26 ft (7.9m) Jib
21	Mid Span Main Boom - No Jib Stowed
22	Mid Span Main Boom - Jib Stowed
23	Mid Span 26 ft (7.9m) Jib