



29,600 lbs  
**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.

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# **! 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.

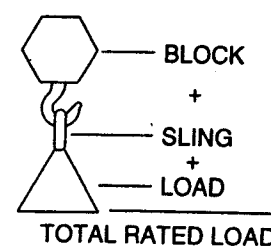
## **SET-UP**

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 or in cab.

## **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.

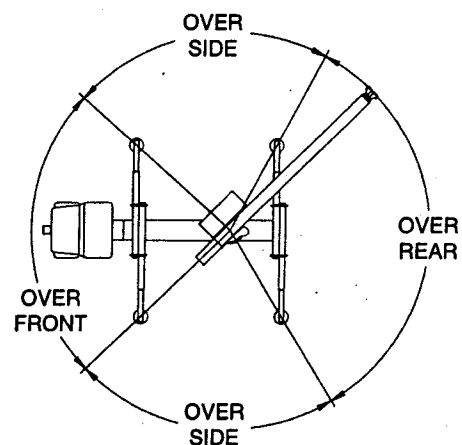
4. Rated loads include the weight of the hook block, slings, and other lifting devices. Their weights must be subtracted from the listed rated load to determine the net load that can be lifted.
5. Rated loads must be reduced when lifting at the boom tip with a jib stowed or erected. Refer to the chart 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. 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. 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.
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.

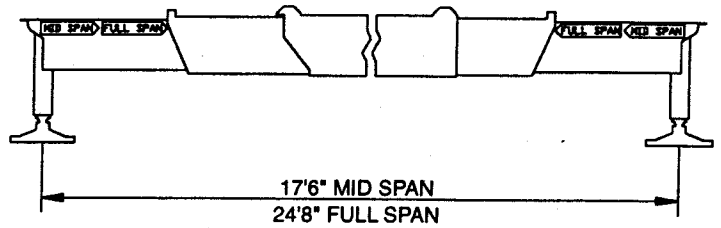


**WORK AREA DIAGRAM**

# 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 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 |
|        | Downhaul Weight | 180 lb |
| 5 Ton  | 1 Sheave Block  | 375 lb |
| 15 Ton | 2 Sheave Block  | 640 lb |
| 25 Ton | 3 Sheave Block  | 870 lb |
| 35 Ton | 4 Sheave Block  | 970 lb |
| 40 Ton |                 |        |

| NOTICE   |                                       |                           | 1 Part Line          | 2 Part Line          | 3 Part Line          | 4 Part Line          | 5 Part Line         | 6 Part Line         | 7 Part Line         | 8 Part Line         |
|--|---------------------------------------|---------------------------|----------------------|----------------------|----------------------|----------------------|---------------------|---------------------|---------------------|---------------------|
| <ul style="list-style-type: none"> <li>• Do not deadhead line block against boom tip when extending boom.</li> <li>• Keep at least 3 wraps of loadline on drum at all times.</li> <li>• Use only 5/8" diameter rotation resistant cable with 56,400 pounds breaking strength on this machine.</li> </ul> |                                       |                           |                      |                      |                      |                      |                     |                     |                     |                     |
|  |                                       |                           | 158' BOOM & JIB      | 114'                 | 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 IWRC | 56,400 lb                 | 10,000 lb<br>205 fpm | 20,000 lb<br>103 fpm | 30,000 lb<br>68 fpm  | 40,000 lb<br>51 fpm  | 50,000 lb<br>41 fpm | 60,000 lb<br>34 fpm | 70,000 lb<br>29 fpm | 80,000 lb<br>26 fpm |
| Standard Planetary Winch High Speed  | 5/8" diameter rotation resistant IWRC | 56,400 lb                 | 5,000 lb<br>410 fpm  | 10,000 lb<br>205 fpm | 15,000 lb<br>137 fpm | 20,000 lb<br>103 fpm | 25,000 lb<br>82 fpm | 30,000 lb<br>68 fpm | 35,000 lb<br>59 fpm | 40,000 lb<br>51 fpm |

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

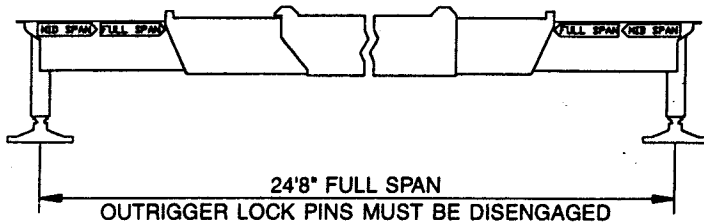
**Winch**  
Standard planetary  
& Auxiliary planetary

**Full Drum Pull**  
5,000 pounds (high speed)  
10,000 pounds (low speed)

**Allowable Cable Pull**  
11,280 pounds

# FULL-SPAN OUTRIGGER

**18127  
127' BOOM  
31' JIB**



**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.

## 31 TO 127 FOOT BOOM RATED LOADS WITHOUT JIB

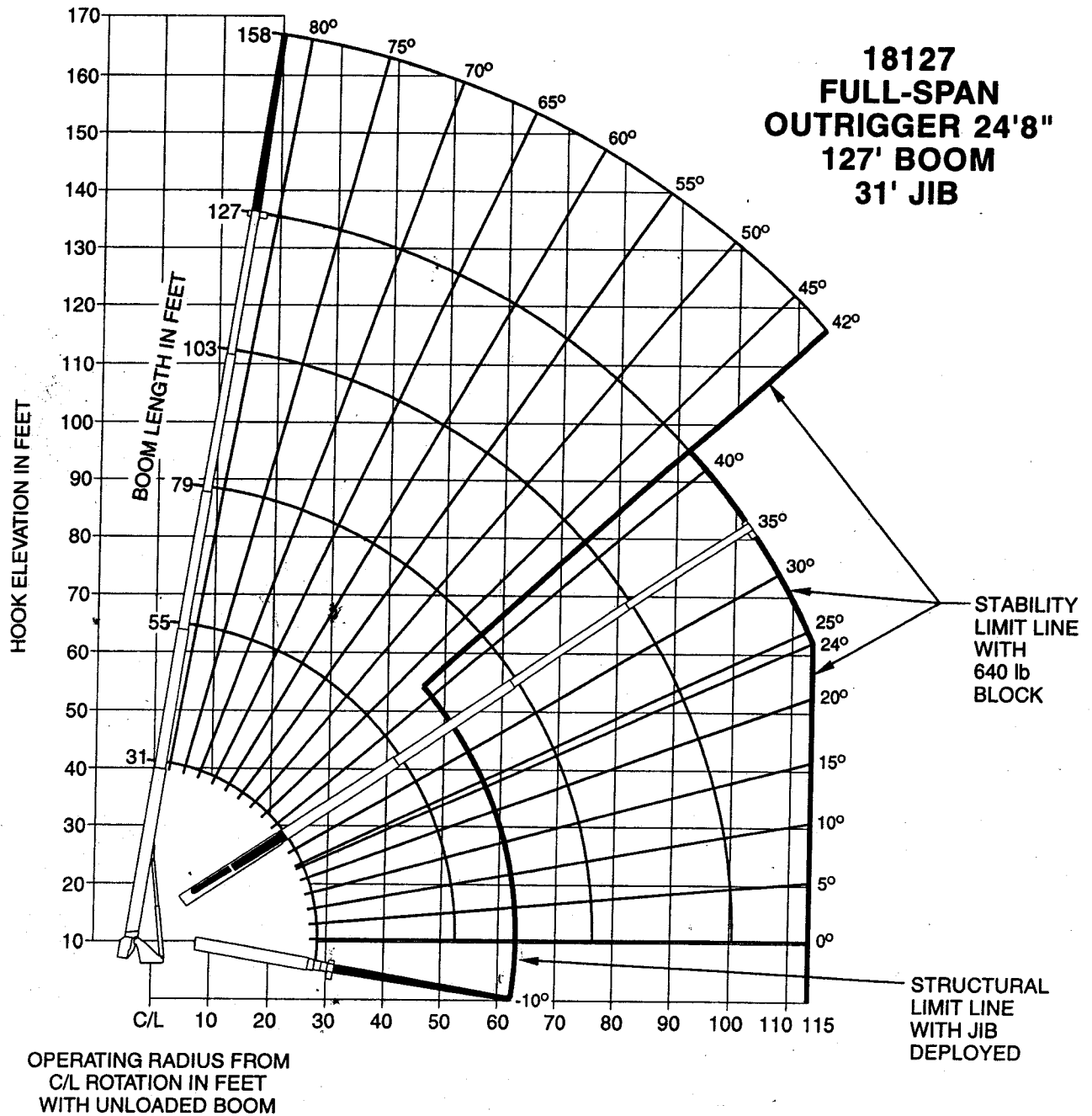
| LOAD RADIUS (FEET) | LOADED BOOM ANGLE | 31 FT BOOM (lb) | LOADED BOOM ANGLE | 55 FT BOOM (lb) | LOADED BOOM ANGLE | 79 FT BOOM (lb) | LOADED BOOM ANGLE | 103 FT BOOM (lb) | LOADED BOOM ANGLE | 127 FT BOOM (lb) |
|--------------------|-------------------|-----------------|-------------------|-----------------|-------------------|-----------------|-------------------|------------------|-------------------|------------------|
| 7                  | 74.5              | 80,000          |                   |                 |                   |                 |                   |                  |                   |                  |
| 8                  | 72.4              | 74,000          |                   |                 |                   |                 |                   |                  |                   |                  |
| 10                 | 68.2              | 64,000          |                   |                 |                   |                 |                   |                  |                   |                  |
| 12                 | 63.8              | 56,000          | 76.9              | 40,000          |                   |                 |                   |                  |                   |                  |
| 15                 | 56.9              | 43,000          | 73.8              | 38,000          | 79.8              | 29,000          |                   |                  |                   |                  |
| 20                 | 44.2              | 30,000          | 68.1              | 31,000          | 76.2              | 25,000          | 80                | 16,000           |                   |                  |
| 25                 | 27.4              | 22,500          | 62                | 23,400          | 72.5              | 21,500          | 77.2              | 14,500           | 80                | 10,000           |
| 30                 |                   |                 | 55.5              | 18,300          | 68.5              | 18,700          | 74.4              | 13,000           | 78                | 9,500            |
| 35                 |                   |                 | 48.6              | 14,800          | 64.3              | 15,100          | 71.5              | 11,500           | 75.9              | 9,000            |
| 40                 |                   |                 | 40.7              | 12,100          | 59.9              | 12,500          | 68.6              | 10,500           | 73.6              | 8,100            |
| 45                 |                   |                 | 31.3              | 10,100          | 55.3              | 10,400          | 65.9              | 9,500            | 71.2              | 7,200            |
| 50                 |                   |                 | 19.4              | 8,500           | 50.9              | 8,800           | 62.7              | 8,500            | 68.8              | 6,500            |
| 55                 |                   |                 |                   |                 | 45.8              | 7,500           | 59.3              | 7,500            | 66.3              | 5,800            |
| 60                 |                   |                 |                   |                 | 40.1              | 6,400           | 55.7              | 6,500            | 63.7              | 5,300            |
| 65                 |                   |                 |                   |                 | 33.6              | 5,400           | 52                | 5,600            | 61.1              | 4,800            |
| 70                 |                   |                 |                   |                 | 25.6              | 4,600           | 48.1              | 4,700            | 58.4              | 4,300            |
| 75                 |                   |                 |                   |                 | 13.5              | 3,850           | 43.9              | 3,950            | 55.6              | 3,900            |
| 80                 |                   |                 |                   |                 |                   |                 | 39.3              | 3,350            | 52.6              | 3,400            |
| 85                 |                   |                 |                   |                 |                   |                 | 34.3              | 2,800            | 49.4              | 2,850            |
| 90                 |                   |                 |                   |                 |                   |                 | 28.4              | 2,300            | 46                | 2,350            |
| 95                 |                   |                 |                   |                 |                   |                 | 21                | 1,850            | 42.5              | 1,900            |
| 100                |                   |                 |                   |                 |                   |                 | 8.2               | 1,500            | 38.8              | 1,550            |
| 105                |                   |                 |                   |                 |                   |                 |                   |                  | 34.6              | 1,200            |
| 110                |                   |                 |                   |                 |                   |                 |                   |                  | 30                | 900              |
| 115                |                   |                 |                   |                 |                   |                 |                   |                  | 24.6              | 650              |
|                    | 0                 | 19,000          | 0                 | 7,700           | 0                 | 3,600           | 0                 | 1,450            |                   |                  |

### 31' JIB RATED LOADS

| RADIUS FULLY EXTENDED | LOADED BOOM ANGLE | RATED LOADS ALL BOOM LENGTHS |
|-----------------------|-------------------|------------------------------|
| 30                    | 80                | 4,000                        |
| 46                    | 75                | 3,800                        |
| 60                    | 70                | 3,300                        |
| 73                    | 65                | 2,800                        |
| 85                    | 60                | 2,300                        |
| 96                    | 55                | 1,800                        |
| 106                   | 50                | 1,350                        |
| 115                   | 45                | 900                          |
| 120                   | 42                | 650                          |

### RATED LOAD REDUCTIONS WITH JIB

| BOOM LENGTH | 31' JIB STOWED     | 31' JIB ERECTED      |
|-------------|--------------------|----------------------|
|             |                    |                      |
| 31'         | Reduce load 500 lb | Reduce load 1,600 lb |
| 55'         | Reduce load 300 lb | Reduce load 1,400 lb |
| 79'         | Reduce load 200 lb | Reduce load 1,300 lb |
| 103'        | Reduce load 150 lb | Reduce load 1,250 lb |
| 127'        | Reduce load 100 lb | Reduce load 1,200 lb |

**SET-UP**

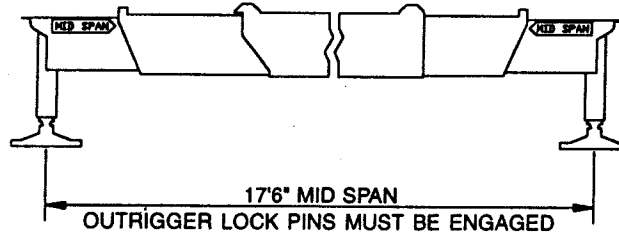
1. Fully extend and set outriggers to full-span location, level crane and set front stabilizer.

**OPERATION**

1. The 31 ft. boom length capacities are based on boom fully retracted. If not fully retracted, do not exceed 55 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

18127  
127' BOOM  
31' JIB



## 31 TO 127 FOOT BOOM RATED LOADS WITHOUT JIB

| LOAD RADIUS (FEET) | LOADED BOOM ANGLE | 31 FT BOOM (lb) | LOADED BOOM ANGLE | 55 FT BOOM (lb) | LOADED BOOM ANGLE | 79 FT BOOM (lb) | LOADED BOOM ANGLE | 103 FT BOOM (lb) | LOADED BOOM ANGLE | 127 FT BOOM (lb) |
|--------------------|-------------------|-----------------|-------------------|-----------------|-------------------|-----------------|-------------------|------------------|-------------------|------------------|
| 7                  | 74.5              | 80,000          |                   |                 |                   |                 |                   |                  |                   |                  |
| 8                  | 72.4              | 72,000          |                   |                 |                   |                 |                   |                  |                   |                  |
| 10                 | 68.2              | 64,000          |                   |                 |                   |                 |                   |                  |                   |                  |
| 12                 | 63.9              | 56,000          | 76.9              | 40,000          |                   |                 |                   |                  |                   |                  |
| 15                 | 57                | 43,000          | 73.8              | 38,000          | 79.8              | 29,000          |                   |                  |                   |                  |
| 20                 | 44.2              | 27,700          | 67.8              | 27,000          | 76.2              | 25,000          | 80                | 16,000           |                   |                  |
| 25                 | 27.4              | 17,500          | 61.6              | 17,200          | 71.9              | 17,600          | 77.2              | 14,500           | 80                | 10,000           |
| 30                 |                   |                 | 55                | 12,000          | 67.7              | 12,300          | 74.3              | 12,400           | 78                | 9,500            |
| 35                 |                   |                 | 48.7              | 8,700           | 63.7              | 9,100           | 71.3              | 9,200            | 75.9              | 9,000            |
| 40                 |                   |                 | 41                | 6,500           | 59.4              | 6,900           | 68                | 7,000            | 73.2              | 7,100            |
| 45                 |                   |                 | 31.8              | 4,900           | 54.8              | 5,200           | 64.7              | 5,300            | 70.5              | 5,400            |
| 50                 |                   |                 | 18.7              | 3,700           | 50                | 4,000           | 61.3              | 4,100            | 67.8              | 4,150            |
| 55                 |                   |                 |                   |                 | 44.8              | 3,050           | 57.9              | 3,150            | 65.1              | 3,200            |
| 60                 |                   |                 |                   |                 | 39.1              | 2,250           | 54.4              | 2,350            | 62.4              | 2,400            |
| 65                 |                   |                 |                   |                 | 32.7              | 1,600           | 50.7              | 1,700            | 59.7              | 1,750            |
| 70                 |                   |                 |                   |                 | 24.6              | 1,050           | 46.8              | 1,150            | 56.9              | 1,200            |
| 75                 |                   |                 |                   |                 | 12.5              | 650             | 42.6              | 700              | 53.9              | 750              |
|                    | 0                 | 12,400          | 0                 | 3,150           |                   |                 |                   |                  |                   |                  |

### 31' JIB RATED LOADS

| RADIUS FULLY EXTENDED | LOADED BOOM ANGLE | RATED LOADS ALL BOOM LENGTHS |
|-----------------------|-------------------|------------------------------|
| 30                    | 80                | 4,000                        |
| 46                    | 75                | 3,800                        |
| 58                    | 70                | 2,500                        |
| 69                    | 65                | 1,450                        |
| 80                    | 60                | 650                          |

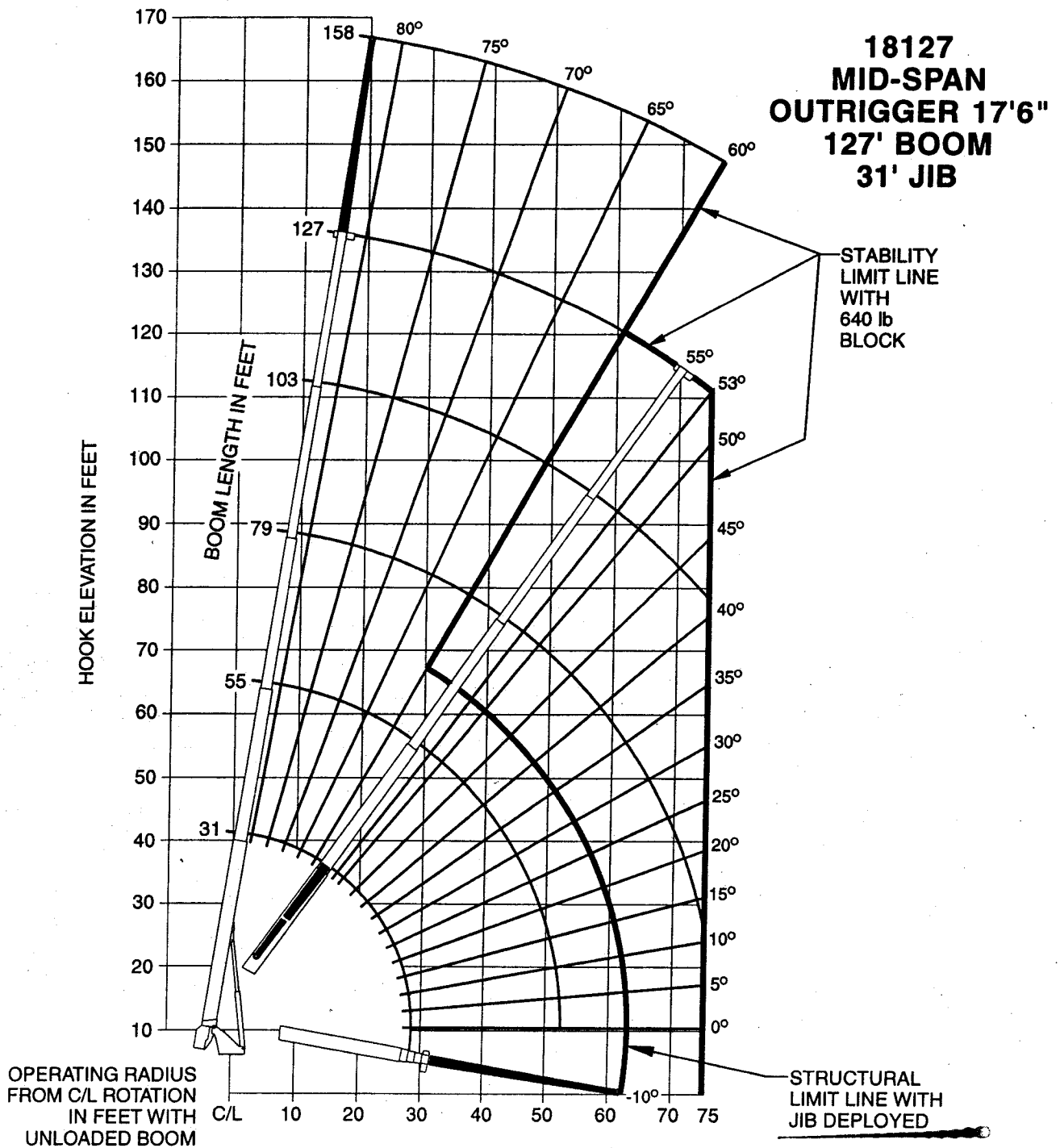
### RATED LOAD REDUCTIONS WITH JIB

| BOOM LENGTH | 31' JIB STOWED     | 31' JIB ERECTED      |
|-------------|--------------------|----------------------|
|             |                    |                      |
| 31'         | Reduce load 500 lb | Reduce load 1,600 lb |
| 55'         | Reduce load 300 lb | Reduce load 1,400 lb |
| 79'         | Reduce load 200 lb | Reduce load 1,300 lb |
| 103'        | Reduce load 150 lb | Reduce load 1,250 lb |
| 127'        | Reduce load 100 lb | Reduce load 1,200 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.





### SET-UP

1. Engage mid-span outriggers 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 55 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 | 31 ft (9.4m) Jib                   |
| 11 | Man Basket on Main Boom            |
| 12 | Man Basket on 31 ft (9.4m) Jib     |
| 21 | Mid Span Main Boom - No Jib Stowed |
| 22 | Mid Span Main Boom - Jib Stowed    |
| 23 | Mid Span 31 ft (9.4m) Jib          |