TECHNICAL DATA

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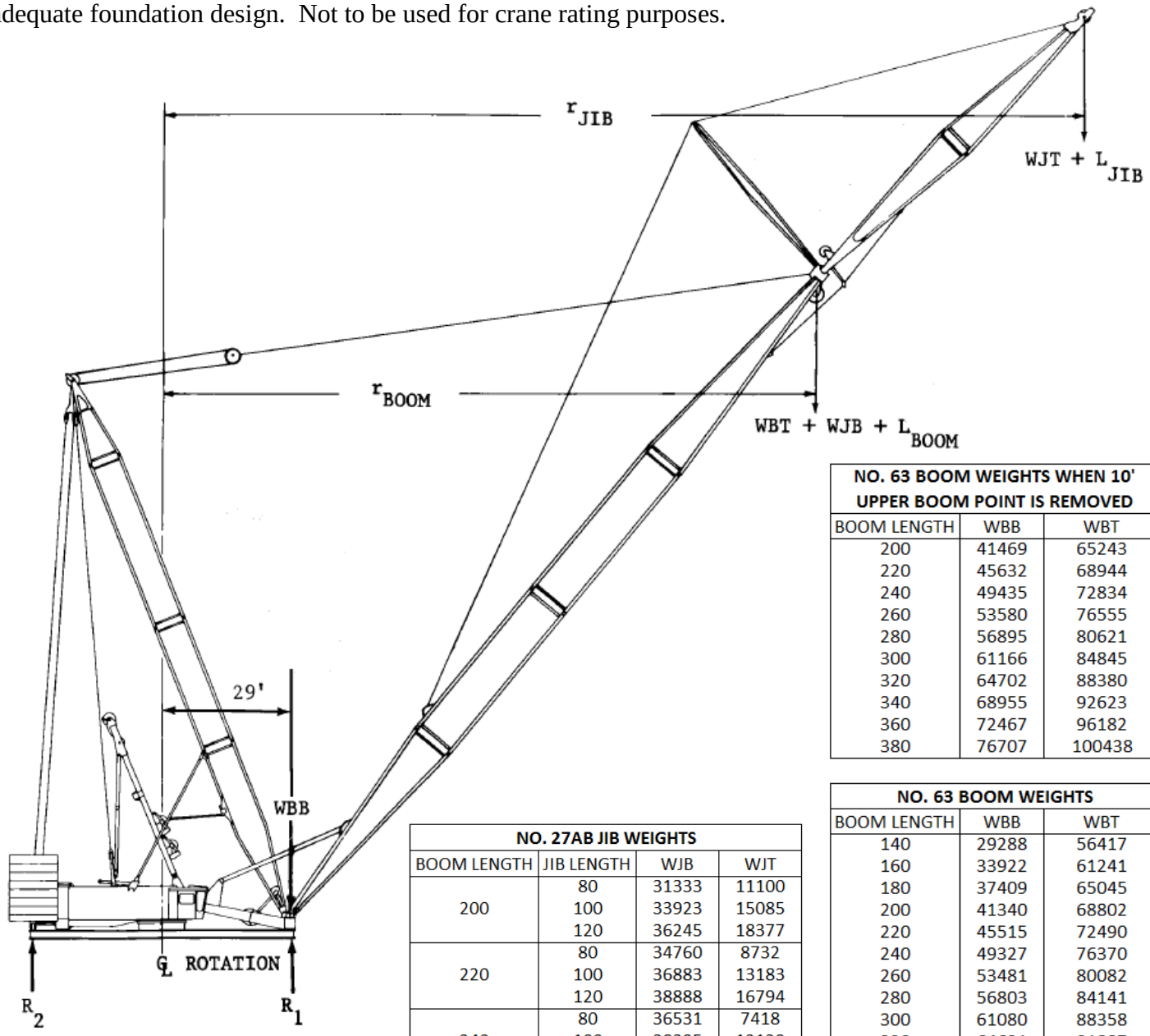
(Rev. 6-29-12)

FOUNDATION REACTION ESTIMATE
4600 Series 4 RINGER® Series 3 No. 63 Boom

This ground reaction estimation method applies only to a 4600 Series 4 RINGER® Series 3 operating on firm, level, uniformly supporting surface, and static operating conditions. The dynamic load effects of hoisting, booming, swinging, wind conditions or any adverse operating conditions are not included in these calculations. For these reasons, sufficient design tolerances should be used by a competent foundation engineer to ensure adequate foundation design. Not to be used for crane rating purposes.



NO. 63 BOOM WEIGHTS WHEN 10' UPPER BOOM POINT IS REMOVED		
BOOM LENGTH	WBB	WBT
200	41469	65243
220	45632	68944
240	49435	72834
260	53580	76555
280	56895	80621
300	61166	84845
320	64702	88380
340	68955	92623
360	72467	96182
380	76707	100438

NO. 27AB JIB WEIGHTS			
BOOM LENGTH	JIB LENGTH	WJB	WJT
200	80	31333	11100
	100	33923	15085
	120	36245	18377
220	80	34760	8732
	100	36883	13183
	120	38888	16794
240	80	36531	7418
	100	38395	12129
	120	40224	15915
260 to 380	80	40483	4524
	100	41775	9807
	120	43217	13981

NO. 63 BOOM WEIGHTS		
BOOM LENGTH	WBB	WBT
140	29288	56417
160	33922	61241
180	37409	65045
200	41340	68802
220	45515	72490
240	49327	76370
260	53481	80082
280	56803	84141
300	61080	88358
320	64621	91887
340	68879	96125
360	72395	99680
380	76693	103933
400	80138	107507

60 Ft. Diameter Ring Support Requirement

The support load distribution is a summation of the loads due to R_1, R_2, the dead weight of the 60 foot diameter ring and the dead weight of the ring support pedestals. Load distribution on the ring supports from R_1 and R_2 is calculated as follows:

Boom Carrier Reaction: (R_1)
The boom carrier reaction on the 60 ft. diameter ring can be determined for a given boom length and jib combination with loads up to and including rated loads by the following method:

$$R_1 = 46{,}200 + WBB + \left[\frac{r_{Boom}}{58} + .5\right]\ (WBT + WJB + L_{boom}) + \left[\ \frac{r_{Jib}}{58}\ + .5\right] (WJT + L_{jib})$$

When any of the above terms are not required for a particular lifting condition, they become equal to 0.

Note- To find r_{Boom} when lifting on the jib assume jib to be in-line with boom rather than offset 6° to simplify calculations.

R_1 – Reaction under centerline of boom carrier on 60 ft. diameter ring in pounds.

WBB & WBT – Equivalent weight of boom and rigging in pounds at boom hinge pin and boom top respectively.

WJB & WJT - Equivalent weight of jib and rigging in pounds at jib hinge pin and jib top respectively.

r_{Boom} & r_{Jib} – Horizontal distance from centerline of rotation in feet to boom point and jib point respectively.

L_{Boom} & L_{Jib} – Lifted load in pounds at boom point and jib point respectively (include weight of load blocks, slings, rope, etc.)

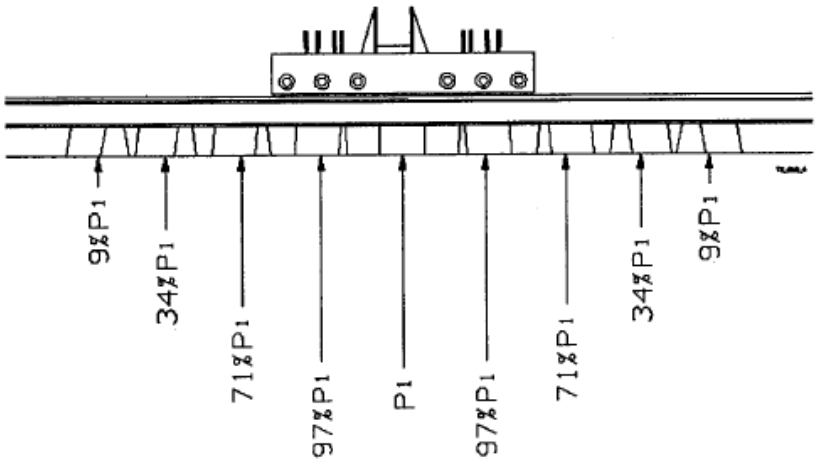
R_2 - Reaction under centerline of counterweight carrier on 60 ft. diameter ring in pounds. R_2 is maximum when the machine is not lifting a load.

RING SUPPORT LOAD DISTRIBUTION

RING PEDESTAL SUPPORT LOAD DISTRIBUTION DUE TO R_1

36 SUPPORT PEDESTALS (5' 1-1/4" pedestal spacing, center to center)

$$P_1 = 15{,}000 + 0.193\ R_1$$



BOOM CARRIER W/RING ON 36 PADS

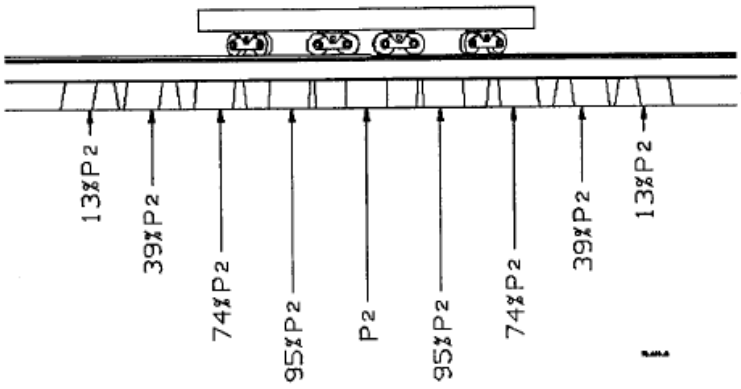
60 foot diameter roller ring supported by 36 equally spaced ring pedestal supports each having a base dimension of 36" x 36" (1,296 sq. in.).

RING SUPPORT LOAD DISTRIBUTION DUE TO R_2

Ctwt (Lbs)	174,100	442,300	889,300
R2 (Lbs)	214,500	482,700	929,700

36 SUPPORT PEDESTALS (5' 1-1/4" pedestal spacing, center to center)

$$P_2 = 20{,}000 + 0.17\ R_2$$



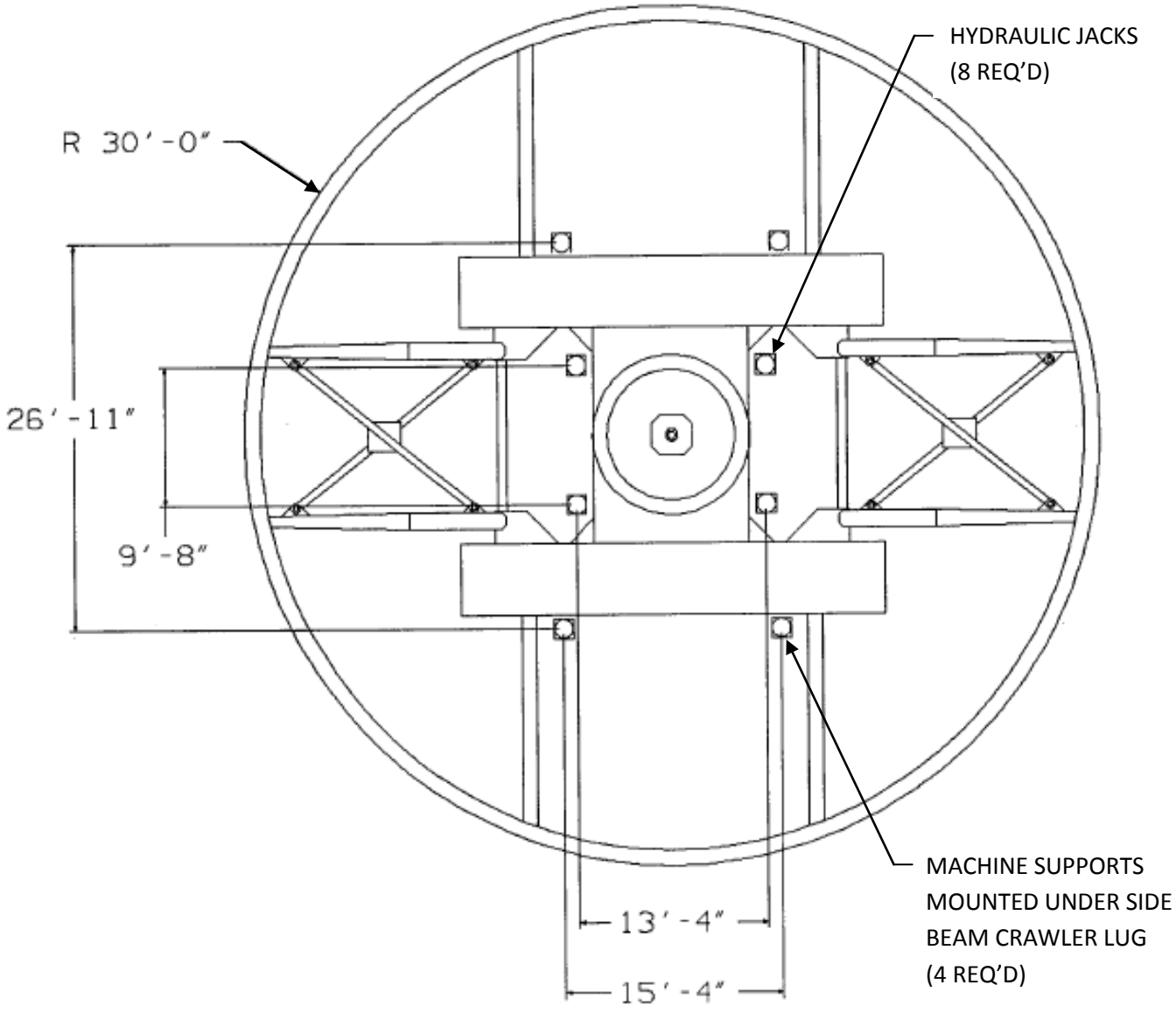
COUNTERWEIGHT CARRIER W/RING ON 36 PADS

Machine Support Requirement During Assembly

The 4600 Series 4 RINGER® Series 3 is supported during assembly/leveling at 4 locations under lugs on the sides of the crawler frames where the 4 side beams are attached. The optional Manitowoc pedestals for this purpose have a 8-1/4" x 11" base dimension (91 sq. in.). The working load on each of these 4 supports is 300,000-lbs.

Hydraulic Jack Support Requirement

Maximum jacking load = 330,000-lbs



FOUNDATION RECOMMENDATIONS

Foundations may be prepared in a number of different ways. Several common forms are concrete pads and crushed stone foundations.

A competent engineer should design the foundations.

Operating Criteria:

1. 60 foot diameter ring must remain level within 1-1/4" (front to back and side to side), unless more stringent requirements are required on the machine's capacity chart. Please consult crane capacity chart for operating criteria.

2. Top surface of machine roller path should be set 24 inches higher than top surface of 60 foot diameter ring, and should not be allowed to become more then 25 inches due to ring settlement. (NOTE - this is measured from top of 60 foot diameter ring wear plate). Make sure hydraulic jacks have been fully retracted.

3. Minimize any gaps between boom carrier rollers and 60 foot diameter ring. Re-shim pedestals when space is present with load or no load conditions.

4. Rotate RINGER 360 degrees a number of times equipped with full RINGER® counterweight and boom to check foundation adequacy and to get an idea of the magnitude of pedestal settlement to expect.

5. Pedestal Settlement Guidelines
   a. 1/4" settlement over 8 pedestals
   b. 1/2" settlement over 10 pedestals
   c. 3/4" settlement over 12 pedestals

NOTE: The foundation should be checked with a test lift or with the RINGER® counterweight (which ever is greater) to determine whether settlement will be within the capacity chart limits. If not within these limits, a better foundation or more support area under the pedestals is needed.

Manitowoc Engineering Company designs and manufactures cranes. We are not experts in soil mechanics or foundation design. The preceding estimating method has been highly simplified and will provide good estimates for the 4600 Series 4 with RINGER® Series 3 lift attachment's specific lift conditions for most soil conditions (calculations based on soil stiffness factor of 400 psi per inch of soil deflection). The calculations will provide higher than actual values for very soft foundations and lower than actual values for very stiff foundations.

FOUNDATION REACTION ESTIMATE SUMMARY SHEET
4600 Series 4 RINGER® Series 3 No. 63 Boom

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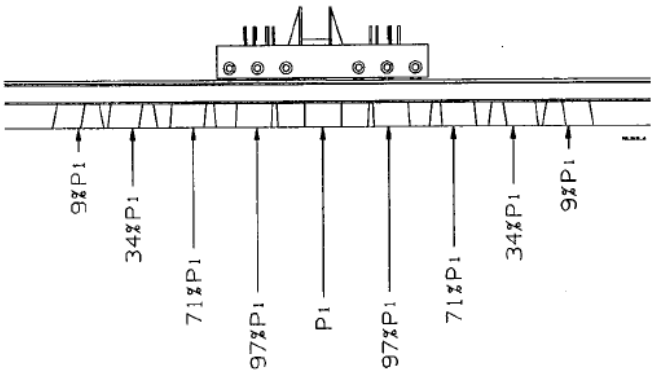
RING PEDESTAL SUPPORT LOAD DISTRIBUTION DUE TO R_1

Boom:_____
Jib:_____
Load:_____
Radius:_____
R1:_____

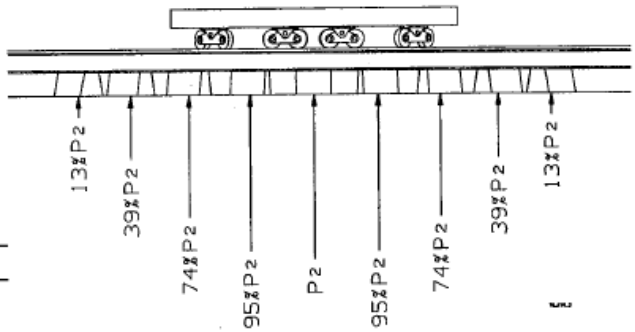


BOOM CARRIER W/RING ON 36 PADS

Load	9%P1	34%P1	71%P1	97%P1	P1
Pounds					
PSI					

RING SUPPORT LOAD DISTRIBUTION DUE TO R_2

Counterweight:_____
R2:_____



COUNTERWEIGHT CARRIER W/RING ON 36 PADS

Load	13%P2	39%P2	74%P2	95%P2	P2
Pounds					
PSI					