Erection Plan Support Calculations
BRF-030-2(26)

Johnson, Vermont

CEE 38-mi-15

Prepared for:
A.L. St Onge Contractor, Inc

By:
Calderwood Engineering
May 27th, 2015

Rev 1 Notes:
Crane specs modified to show exact set up including: boom length, boom angle, and counterweight set up.
(Pages 8, 15)

CALDERWOOD ENGINEERING
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Johnson, Vermont
Erection Plan

Calculations by: TEPA
Checked by: GM

VT 15 Bridge 32
Fairfield BRF 030-2(26)

Location:
Town of Johnson in Lamoille County on VT 15 over the Smith Brook.
Approximately 1.75 miles easterly of the Cambridge/Johnson town line.

References:
-Standard Specifications for Highway Bridges (SSHB)
-Manual of Steel Construction: Allowable Stress Design, Ninth Ed. (ASD)
-National Design Specifications for Wood Construction (NDS)

Check crane mat capacity for HSP 8050 loaded at max radius

Use crane mats to distrubte load
Assume (2) 4'x20'x1' crane mats stacked
Place crane mats on fill

Most Loaded outrigger: $P := 91\ kip$ from BeamBoy, conservative

$D := 2\ ft$

$B := 4\ ft$

$L := 20\ ft$

$\gamma_{wood} := 50\ pcf$ dense hardwood

$P_{dead} := D \cdot B \cdot L \cdot \gamma_{wood} = 8\ kip$

$w := \frac{\langle P + P_{dead} \rangle}{(L \cdot B)} = 1.238\ ksf$

$w_{allow} := 5\ ksf$ from Table 4.11.4.1.4-1, SSHB

From available Borings: Soils are Sands, Gravel, with fines. If unacceptable soils present at crane mat positions, excavate 5 feet, fill and compact with coarse fill.

$FS := \frac{w_{allow}}{w} = 4.04$

$check = \text{“Okay for construction”}$

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Now check crane mat moment capacity:

-Model as a canteliever support @ center of crane mat

-Analyze on a per foot basis

$$M_B := \frac{w \cdot \left(\frac{L}{2}\right)^2}{2} \cdot 1\ ft = 742.5\ in \cdot kip$$

Calculate capacity:

$F_b := 1150\ psi$ Mixed oak No. 1, NDS

$C_D := 1.25$ for construction loads

$C_M := 1.0$

$C_t := 1.0$

$C_L := 1.0$

$C_V := 1.0$

$C_r := 1.0$

$F'_b := F_b \cdot C_D \cdot C_M \cdot C_t \cdot C_L \cdot C_V \cdot C_r$ Table 4.3.1, NDS

$B := 1\ ft$

$H := 1\ ft$

$S_x := 2 \cdot \left(\frac{B \cdot H^2}{6}\right)$ (2) mats stacked on top of each other.

$M_y := S_x \cdot F'_b$

$M_y = 828\ in \cdot kip$

$$FS := \frac{M_y}{M_B} = 1.115$$

$check =$ "Okay for construction"

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Crane Mat Set-up for HC-125

-Use 20'x4'x1' crane mats
-7 mats long x 1 mat wide x 2 mats deep

$B := 20\ ft$
$L := 28\ ft$
$D := 2\ ft$

$P_{dead} := B \cdot L \cdot D \cdot \gamma_{wood} = 56\ kip$

$W_{crane} := 213.03\ kip$ Total, from Manual

$P_{beam} := 29.78\ kip$

$L_{track} := 24.63\ ft$ From Manual

$w := \frac{\left(P_{dead} + W_{crane} + P_{beam}\right)}{(B \cdot L)} = 0.534\ ksf$ Assume crane mats distribute load evenly to soil

Check soil capcity: $FS := \frac{w_{allow}}{w} = 9.371$

$check =$ "Okay for construction"

Now check crane mat moment capacity:

-Model as a continuous beam supported at ends (conservative)
-Analyze on a per foot basis

$M_B := \frac{w \cdot L^2}{8} \cdot 1\ ft = 627.501\ in \cdot kip$

Calculate capacity:

$F_b := 1150\ psi$ Mixed oak No. 1, NDS
$C_D := 1.25$ for construction loads
$C_M := 1.0$
$C_t := 1.0$
$C_L := 1.0$
$C_V := 1.0$
$C_r := 1.0$
$F'_b := F_b \cdot C_D \cdot C_M \cdot C_t \cdot C_L \cdot C_V \cdot C_r$ Table 4.3.1 NDS
$B := 1\ ft$

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$H := 1\ ft$

$S_x := 2 \cdot \frac{B \cdot H^2}{6}$ (2) mats stacked on top of each other.

$M_y := S_x \cdot F'_b$

$M_y = 828\ in \cdot kip$

$M_y = 828\ in \cdot kip$

$FS := \frac{M_y}{M_B} = 1.32$

$check =$ "Okay for construction"

BEAMBOY V2.2 REPORT

HSP-8050 LOADING

LOAD CONFIGURATION

Based on boom loaded at maximum radius located directly over one of the front outriggers.

Point Loads

Beam Load: 29800 lb., x=50.7 ft.
Counterweight: 12500 lb., x=4.45 ft.

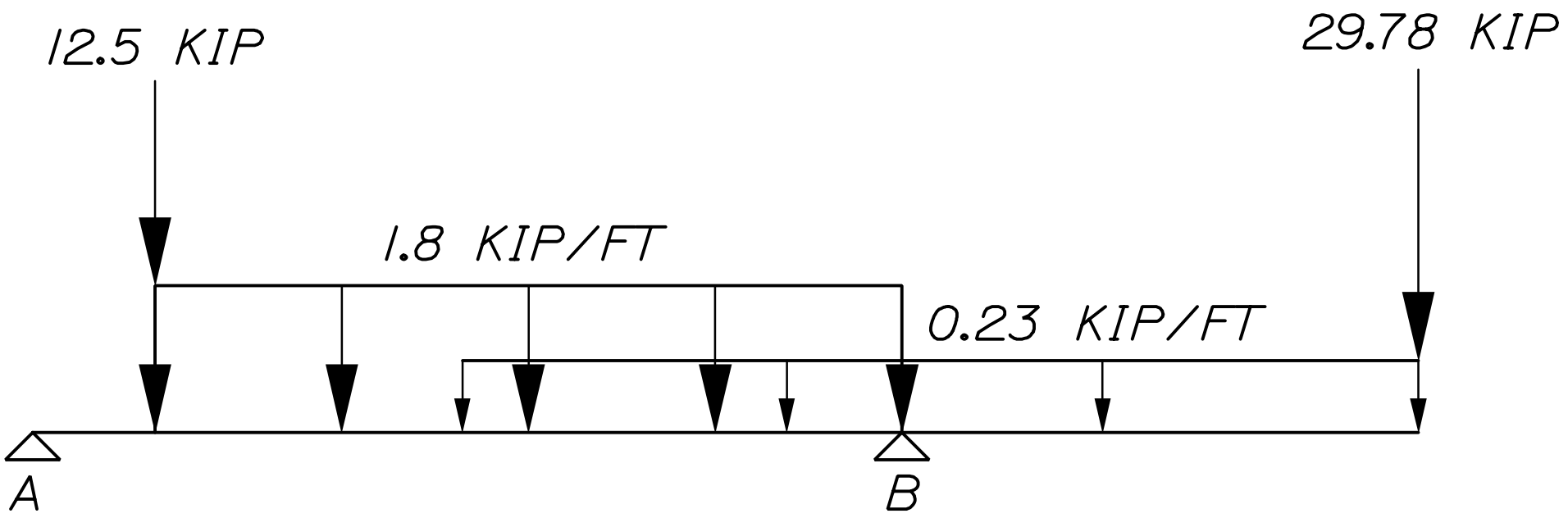
Distributed Loads

GVW: Start=1800 lb./ft., x=4.45 ft.; End=1800 lb./ft., x=27.4 ft.
Boom Self Weight: Start=229 lb./ft., x=15.7 ft.; End=229 lb./ft., x=50.7 ft.

Supports

Rear Outrigger A: 0 ft., Reaction=582 lb.
Front Outrigger B: 27.4 ft., Reaction=91000 lb.

5/15/2015



HSP 8050 Loading

TEREX LIFTING

AMERICAN HC 125

Hydraulic Crawler Crane

WORKHORSE

LIFT RATINGS IN POUNDS

With 59H Open Throat Boom, 24' Floating Mast and 51,000 Pound Counterweight Fully Extended

Boom & Mast Length	Radius Feet	Boom Angle Degrees	Side Frames Retracted Pounds	Side Frames Extended Pounds	From Boom Pt. to Ground Feet
50' Boom	12	81.0	250,000*	250,000*	56
	15	77.5	220,620*	220,620*	55
	20	71.5	143,290	165,480*	54
	25	65.3	104,260	127,420	52
	30	58.8	81,610	97,880	49
	35	51.7	66,760	79,210	46
	40	43.9	56,340	66,280	41
	50	22.3	42,510	49,600	25
60' Boom	14	80.6	236,210*	236,210*	66
	15	79.6	220,500*	220,500*	66
	20	74.7	143,310	165,390*	65
	25	69.6	104,240	127,440	63
	30	64.4	81,570	97,880	61
	35	59.0	66,710	79,190	58
	40	53.2	56,310	66,260	54
	50	39.8	42,510	49,620	45
	60	20.3	33,800	39,280	27
70' Boom	16	80.3	203,170	206,570*	76
	20	76.9	143,320	165,300*	75
	25	72.7	104,220	127,460	73
	30	68.3	81,550	97,880	72
	35	63.8	66,680	79,190	69
	40	59.1	56,290	66,240	67
	50	48.9	42,500	49,630	59
	60	36.7	33,810	39,310	48
	70	18.8	27,850	32,280	29
80' Boom	17	80.8	183,940	194,360*	86
	20	78.6	143,220	165,220*	85
	25	74.9	104,090	127,360	84
	30	71.1	81,410	97,750	82
	35	67.3	66,530	79,070	80
	40	63.3	56,130	66,110	78
	50	54.9	42,330	49,480	72
	60	45.5	33,640	39,150	63
	70	34.2	27,740	32,140	51
	80	17.5	23,340	27,090	30
90' Boom	19	80.5	154,580	173,850*	95
	20	79.9	143,180	165,130*	95
	25	76.6	104,030	127,320	94
	30	73.3	81,350	97,700	93
	35	69.9	66,460	79,020	91
	40	66.5	56,080	66,050	89
	50	59.3	42,280	49,440	84
	60	51.5	33,600	39,110	77
	70	42.8	27,710	32,100	67
	80	32.2	23,340	27,090	54
	90	16.5	19,990	23,220	32
100' Boom	20	80.9	143,060	165,040*	105
	25	78.0	103,870	127,190	104
	30	75.0	81,180	97,560	103
	35	72.0	66,270	78,850	102
	40	69.0	55,890	65,860	100
	50	62.7	42,070	49,240	95
	60	56.0	33,380	38,910	89
	70	48.7	27,510	31,890	81
	80	40.5	23,150	26,920	71
	90	30.5	19,820	23,060	57
	100	15.6	17,170	20,020	33

Boom & Mast Length	Radius Feet	Boom Angle Degrees	Side Frames Retracted Pounds	Side Frames Extended Pounds	From Boom Pt. to Ground Feet
110' Boom	22	80.7	124,190	149,880*	115
	25	79.1	103,710	127,050	115
	30	76.4	81,020	97,410	114
	35	73.7	66,100	78,700	112
	40	71.0	55,730	65,710	111
	50	65.3	41,900	49,090	107
	60	59.4	33,210	38,750	101
	70	53.2	27,360	31,730	94
	80	46.3	22,990	26,770	86
	90	38.5	19,660	22,910	75
	100	29.0	17,040	19,890	60
	110	14.8	14,910	17,450	34
120' Boom	23	81.0	116,490	136,390*	125
	25	80.0	103,530	126,910	125
	30	77.6	80,830	97,230	124
	35	75.1	65,900	78,520	123
	40	72.6	55,520	65,500	121
	50	67.5	41,680	48,980	117
	60	62.2	32,970	38,520	113
	70	56.7	27,130	31,500	107
	80	50.7	22,770	26,550	99
	90	44.2	19,440	22,690	90
	100	36.8	16,820	19,680	78
	110	27.8	14,700	17,240	62
	120	14.2	12,950	15,240	36
130' Boom	25	80.8	103,370	122,990*	135
	30	78.5	80,670	97,070	134
	35	76.3	65,720	78,360	133
	40	74.0	55,370	65,350	132
	50	69.3	41,520	48,730	128
	60	64.5	32,810	38,370	124
	70	59.5	26,990	31,350	119
	80	54.2	22,620	26,410	112
	90	48.6	19,300	22,560	104
	100	42.4	16,690	19,550	94
	110	35.3	14,560	17,110	81
	120	26.6	12,830	15,120	65
	130	13.6	11,360	13,450	37
140' Boom	27	80.6	92,710	110,670*	145
	30	79.4	80,470	96,900	144
	35	77.3	65,510	78,180	143
	40	75.2	55,160	65,140	142
	50	70.9	41,290	48,520	139
	60	66.5	32,570	38,150	135
	70	61.9	26,760	31,110	130
	80	57.2	22,390	26,180	124
	90	52.1	19,060	22,330	117
	100	46.7	16,450	19,320	108
	110	40.8	14,330	16,880	98
	120	34.0	12,590	14,890	84
	130	25.6	11,120	13,210	67
	140	13.1	9,880	11,800	38
150' Boom	28	80.8	87,970	97,490*	155
	30	80.1	80,270	96,700	154
	35	78.1	65,300	77,980	153
	40	76.2	54,960	64,940	152
	50	72.2	41,080	48,320	149
	60	68.1	32,360	37,940	146

Boom & Mast Length	Radius Feet	Boom Angle Degrees	Side Frames Retracted Pounds	Side Frames Extended Pounds	From Boom Pt. to Ground Feet
150' Boom (cont.)	70	63.9	26,560	30,900	141
	80	59.6	22,190	25,990	136
	90	55.0	18,860	22,140	129
	100	50.2	16,240	19,120	122
	110	45.0	14,130	16,680	112
	120	39.3	12,390	14,690	101
	130	32.8	10,930	13,020	87
	140	24.8	9,680	11,600	69
	150	12.7	8,610	10,380	39
160' Boom	30	80.7	80,080	84,040*	165
	35	78.9	65,090	77,800	164
	40	77.1	54,740	64,740	163
	50	73.3	40,850	48,100	160
	60	69.6	32,120	37,710	157
	70	65.7	26,320	30,660	152
	80	61.7	21,950	25,760	147
	90	57.5	18,620	21,900	141
	100	53.2	15,990	18,870	134
	110	48.5	13,880	16,440	126
	120	43.5	12,130	14,440	116
	130	38.0	10,670	12,770	105
	140	31.7	9,430	11,350	90
	150	24.0	8,360	10,140	71
	160	12.3	7,430	8,870*	40
170' Boom	31	80.9	73,340*	73,340*	175
	35	79.6	64,880	72,400*	174
	40	77.8	54,540	64,520	173
	50	74.3	40,650	47,910	170
	60	70.8	31,920	37,510	167
	70	67.2	26,140	30,460	163
	80	63.5	21,760	25,570	159
	90	59.6	18,430	21,710	153
	100	55.6	15,810	18,690	147
	110	51.4	13,690	16,260	139
	120	47.0	11,950	14,260	131
	130	42.1	10,490	12,590	120
	140	36.8	9,250	11,180	108
	150	30.7	8,180	9,960	93
	160	23.2	7,260	8,780*	73
	170	11.9	6,440	7,530*	41
180' Boom	33	80.8	64,040*	64,040*	184
	35	80.1	63,580*	63,580*	184
	40	78.5	54,330	62,550*	183
	50	75.2	40,420	47,690	181
	60	71.9	31,670	37,280	178
	70	68.5	25,900	30,220	174
	80	65.1	21,520	25,350	170
	90	61.5	18,190	21,480	165
	100	57.8	15,560	18,450	159
	110	53.9	13,440	16,010	152
	120	49.9	11,690	14,010	144
	130	45.6	10,240	12,350	135
	140	40.9	8,990	10,920	124
	150	35.7	7,920	9,710	111
	160	29.8	6,990	8,430*	96
	170	22.5	6,180	7,270*	75
	180	11.5	5,470	6,210*	42

LOAD HOISTING INFORMATION

Maximum Lifting Capacity in Pounds	Minimum Parts of Line	Maximum Hoisting Distance in Feet	
		Main (Front)	Aux. (rear)
250,000	9	160	160
236,000	8	180	180
206,500	7	200	200
177,000	6	240	240
147,500	5	290	290
118,000	4	360	360
88,500	3	480	480
59,000	2	730	730
29,500	1	1,460	1,460

Maximum Lifting Capacity in Kilograms	Minimum Parts of Line	Maximum Hoisting Distance in Meters	
		Main (Front)	Aux. (rear)
113,400	9	49	49
107,049	8	55	55
93,668	7	61	61
80,287	6	73	73
66,906	5	88	88
53,524	4	110	110
40,143	3	146	146
26,762	2	223	223
13,381	1	445	445

BOOM COMPOSITION CHART

Boom Length		25' (7.6 M) 59H	10' (3.0 M) 59H	20' (6.1 M) 59H	40' (12.2 M) 59H	25' (7.6 M) 59H
Feet	Meters	Inner	Center	Center	Center	Outer
50	15.2	1	0	0	0	1
60	18.3	1	1	0	0	1
70	21.3	1	0	1	0	1
80	24.4	1	1	1	0	1
90	27.4	1	0	0	1	1
100	30.5	1	1	0	1	1
110	33.5	1	0	1	1	1
120	36.6	1	1	1	1	1
130	39.6	1	0	0	2	1
140	42.7	1	1	0	2	1

Boom Length		25' (7.6 M) 59H	10' (3.0 M) 59H	20' (6.1 M) 59H	40' (12.2 M) 59H	25' (7.6 M) 59H
Feet	Meters	Inner	Center	Center	Center	Outer
150	45.7	1	0	1	2	1
160	48.8	1	1	1	2	1
170	51.8	1	0	0	3	1
180	54.9	1	1	0	3	1
190	57.9	1	0	1	3	1
200	61.0	1	1	1	3	1
210	64.0	1	0	0	4	1
220	67.1	1	1	0	4	1
230	70.1	1	0	1	4	1
240	73.2	1	1	1	4	1

MAXIMUM BOOM & JIB SELF-ERECTION DATA

Jib	Over the End				Over the Side			
	Boom Length		Jib Length		Boom Length		Jib Length	
	Feet	Meters	Feet	Meters	Feet	Meters	Feet	Meters
#9HL	240	73.2	0	0.0	230	70.1	0	0.0
	230	70.1	40	12.2	220	67.1	0	0.0
	220	67.1	80	24.4	210	64.0	40	12.2
	–	–	–	–	200	61.0	50	15.2
	–	–	–	–	190	57.9	60	18.3
	–	–	–	–	180	54.9	70	21.3

WEIGHTS

	LBS.	KG
Lifting Crane with standard counterweight, 50' (15.2 mm) boom with offset tip, transport package, 3rd drum and 38" (965 mm) shoes	209,740	95,137
Lifting crane equipped as above and 44" (1,117 mm) shoes	213,030	96,629
Counterweight Including:	52,150	23,655
Basic	31,000	14,061
Overlay	20,000	9,072
2 Removal Cylinders	1,150	522
Crane boom outer (six sheave)	3,260	1,480
Crane boom inner (and misc.)	4,345	1,971
Crawler side frames 38" (965 mm) shoes	70,590	32,020
Crawler Side Frames 44" (1,117 mm) shoes	73,880	33,500
Travel weight includes upper, carbody, transportation package, boom inner, counterweight handling sheaves and third drum	83,740	37,985
Second swing motor	580	263

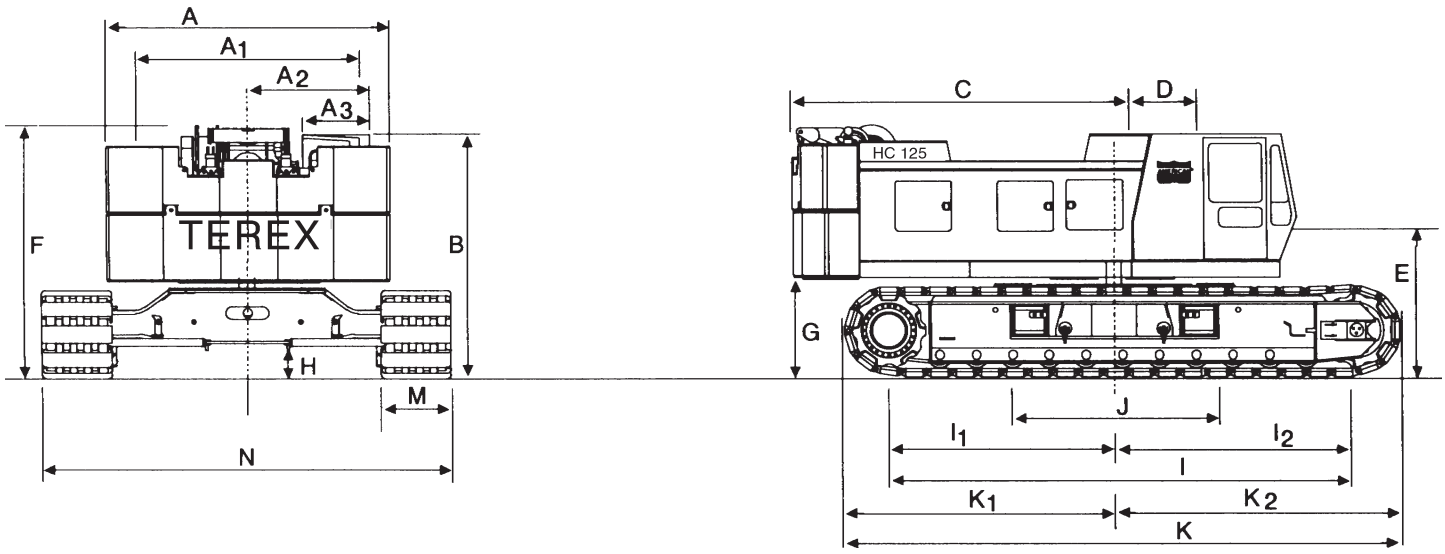
GROUND PRESSURES

Lifting crane with 50 ft. (15.2 mm) boom with offset tip and standard counterweight.

38" (965 mm) shoes	44" (1,117 mm) shoes
10.5 PSI	9.03 PSI

AMERICAN®

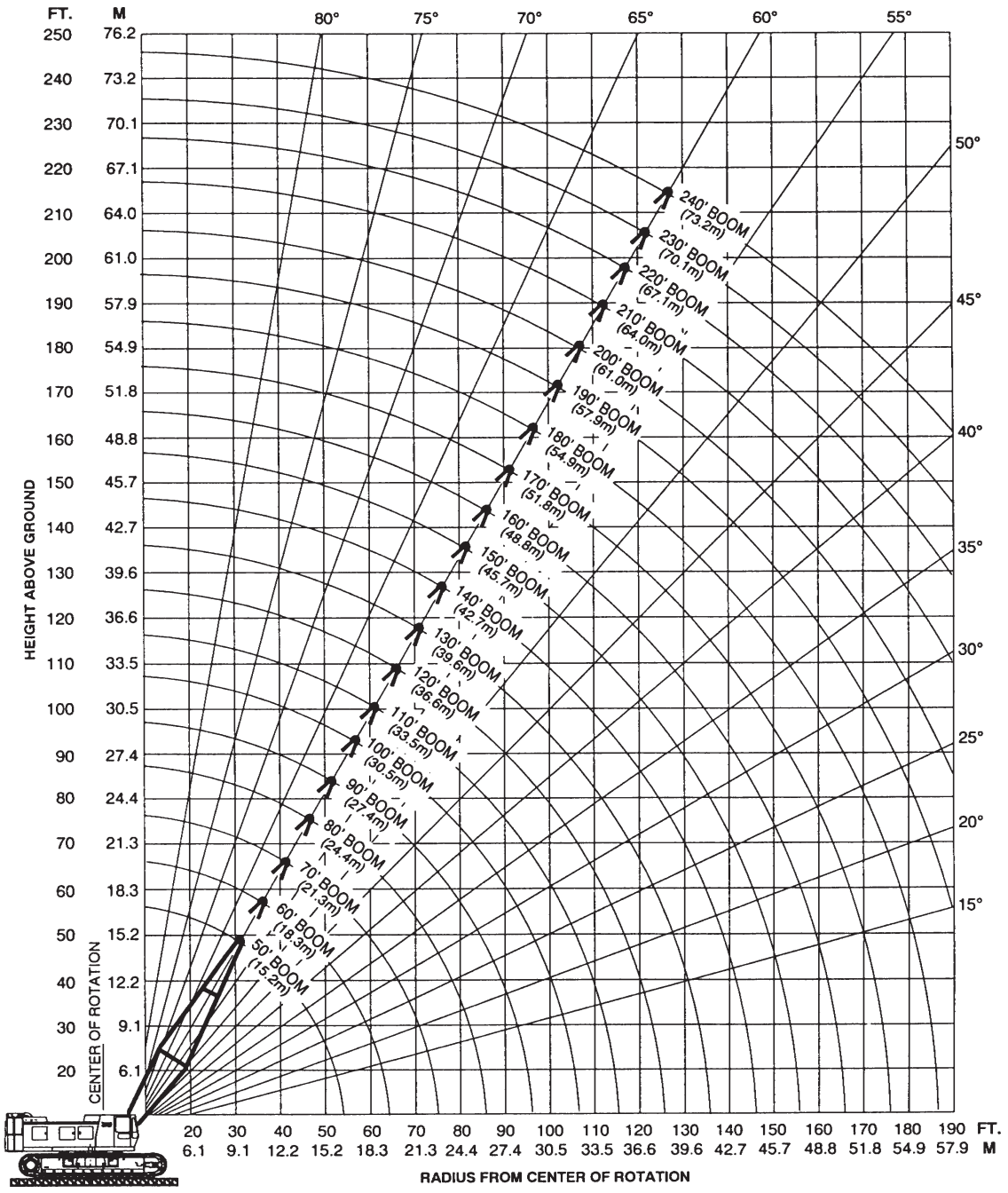
HC 125 HYDRAULIC CRAWLER CRANE
GENERAL DIMENSIONS



		FEET	MM
A	Width of counterweight	14’-0”	4,267
A_1	Width of machinery cab	11’-5”	3,480
A_2	Centerline of machine to outside of operator’s cab	6’-0”	1,829
A_3	Width of operator’s cab	3’-4”	1,016
B	Height over operator’s cab	12’-0”	3,658
C	Tail swing w/WorkHorse retracted	16’-3”	4,953
D	Center rotation to boom feet	3’-6”	1,066
E	Ground to center of boom foot	6’-8”	2,032
F	Height over boom hoist	12’ 3-9/16”	3,748
G	Ground to bottom of counterweight	4’ 6-3/4”	1,391
H	Minimum ground clearance	1’ 7-1/2”	495
I	Center to center of crawler tumblers	20’ 10-5/16”	6,358
I_1	Center of drive tumbler to center of rotation	9’ 10-3/4”	3,016
I_2	Center of idler tumbler to center of rotation	10’ 11-5/8”	3,342
J	Width of carbody (including vertical jacks)	10’-10”	3,300
K	Overall length of crawlers	24’ 7-9/16”	7,507
K_1	Over drive tumbler to center of rotation	12’ 0-1/2”	3,670
K_2	Over idler tumbler to center of rotation	12’ 7-1/16”	3,836
M	Width of tread shoe (standard)	38”	965
	(optional)	44"	1,118
N	Overall width of crawlers		
	38” (966 mm) shoes retracted	15’-2”	4,623
	38” (966 mm) shoes extended	18’-5”	5,613
	44” (1,118 mm) shoes retracted	15’-8”	4,775
	44” (1,118 mm) shoes extended	18’-11”	5,766
N_1	Length over crawler axles	15’-2”	4,623

AMERICAN MODEL HC 125 WORKING RANGES

BOOM ANGLE DIAGRAM



For more information, product demonstration, or details on sales, lease and rental plans, please contact your local Terex American Crane Distributor.

We reserve the right to amend these specifications at any time without notice. The only warranty applicable is our standard written warranty applicable to the particular product and sale. We make no other warranty, expressed or implied.

TEREX CRANES

AMERICAN CRANE CORPORATION
202 Raleigh Street • Wilmington, NC 28412 USA
(910) 395-8500 • FAX: (910) 395-8538

Terex Cranes, Inc. 1999

Litho in U.S.A.
2.5J899S50

CRANE RATING DATA

⚠ WARNING

These lift ratings are invalid if the crane has been modified or altered by use of other than GENUINE AMERICAN PARTS as such modifications or alterations may affect its capacity or safe operation. See American Crane Corporation Service Bulletin #259.

The ratings in this chart are for planning purposes only. Only those ratings specifically assigned to a crane and mounted in the operator's cab or in the Operator's Manual should be used for actual operation.

Ratings in this chart are in POUNDS (Kgs) and do not exceed the percentage of tipping specified for this crane by ANSI B30.5. All ratings require that the crane be standing level on a firm uniformly supporting surface.

Do not lift loads in excess of those shown on this chart. Lifting loads in excess of those shown or operation not in accordance with good operating practice, including limitations shown on page 3499 of Operator's Manual, can cause tipping, structural damage or catastrophic failure.

Asterisk (*) areas on this chart indicate ratings which are limited by strength of material or factors other than stability (tipping).

"RADIUS IN FEET" is the horizontal distance at ground level from the crane centerline of rotation to a vertical line through the center of gravity of the suspended load.

When using the main boom fall with jib in place, the main fall ratings must be reduced by the jib effective weight shown on the jib rating chart plus twice the weight of all suspended blocks, slings, rope, etc., at the jib fall.

When using the main boom fall with boom tip extension in place, the main fall ratings must be reduced by the weight of the boom tip extension plus twice the weight of all suspended blocks, slings, rope, etc., at the boom tip extension fall.

Blocks, slings, buckets and other load carrying devices are considered part of the load. The weight of standard hoisting ropes for the rating at a given radius has been calculated as part of the boom point load and need not be considered in determining net allowable loads.

This chart was developed exclusively for use with a boom only. Under no circumstances are these ratings to be interpreted for use with a jib.

Ratings shown on this chart make no allowance for such factors as out of plumb loads, wind, poor soil conditions, improper inflation of rubber tires and dynamic effects due to excessive operating speeds. The user (operator) must exercise judgement to make allowance for these conditions. See page 3499 of Operator's Manual for detailed information.

No account is taken of the wind force on the load. This effect, which can be substantial for loads with large surface areas, must be considered by the user. In any wind it is strongly recommended that taglines be used to control the load.

MAST HOIST LINE is 17 parts of .75 inch (19 mm) diameter 6 x 26, WS, FW, RAL, IWRC, EIPS wire rope with a minimum breaking strength of 58,800 pounds (26,672 Kg).

PENDANT SUSPENSION LINE is 2 parts of 1.375 inch (35 mm) diameter EEIPS wire rope with a minimum breaking strength of 211,000 pounds (95,710 Kg).

MAIN LOAD LINE is 1 inch (25 mm) diameter 6 x 25, RRL, IWRCP, EIPS wire rope with a minimum breaking strength of 103,400 pounds (46,901 Kg).

Erection "OVER THE END" is with the boom over the idler end with idler tumblers blocked (See Operator's Manual for blocking instructions). Erection "OVER THE SIDE" is with the boom 90° to the side frames and with the side frames extended. Blocks, slings and other load carrying devices must be on the ground during erection.

FMC

Lifting Capacities

PCSA Class 10-213

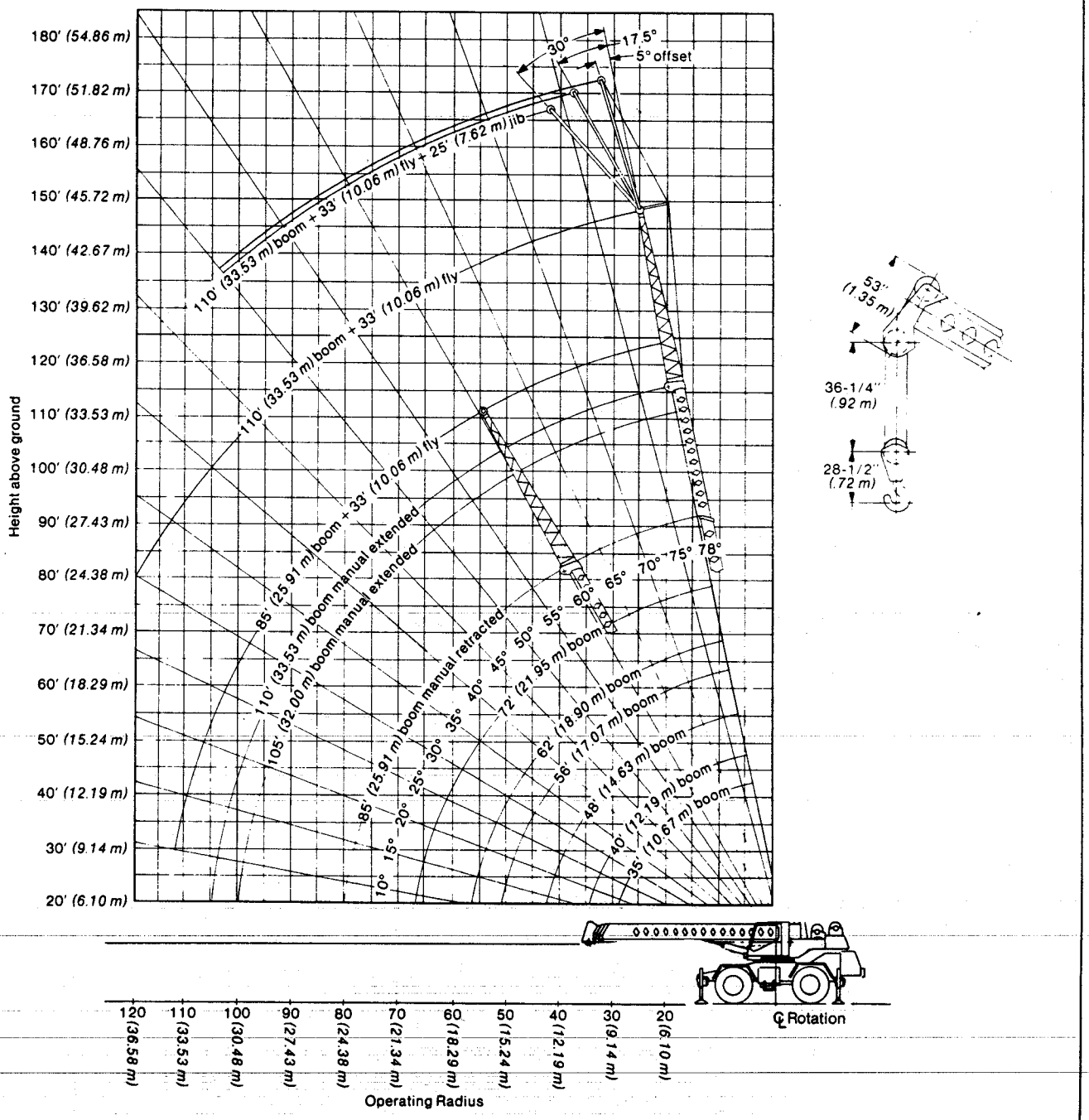
GENERAL INFORMATION ONLY

Link-Belt®

Eighty Series Hydraulic Rough Terrain Crane

HSP-8050 50-ton *(45.36 metric ton)*

4-Section Boom



Note: Boom and fly and jib geometry shown are for unloaded condition and machine standing level on firm supporting surface. Boom deflection and subsequent radius and angle change must be accounted for when applying load to hook.

Warning and Operating Instructions HSP-8050

General:

1. Rated lifting capacities in pounds as shown on lift chart pertain to this machine as originally manufactured and normally equipped by FMC Corporation, Construction Equipment Group. Modifications to the machine or use of optional equipment other than that specified can result in a reduction of capacity.
2. Construction equipment can be dangerous if improperly operated or maintained. Operation and maintenance of this machine must be in compliance with the information in the operator's parts and safety manuals supplied with this machine. If these manuals are missing, order replacements through the distributor.
3. The operator and other personnel associated with this machine shall fully acquaint themselves with the latest applicable American National Standards Institute (ANSI) Safety Standards for cranes.
4. All capacities are in pounds with metric equivalent in italic.

Set-Up:

1. Capacities included in this chart are the maximum allowable crane capacities and are based on the machine standing level on firm supporting surface under ideal job conditions. Depending on the nature of the supporting surface, it may be necessary to have structural supports under the outrigger floats or tires to spread the load to a larger bearing surface.
2. When making lifts on outriggers, outrigger beams must be fully extended with tires free of supporting surface.
3. Eight parts of ¾" *(19 mm)* diameter Type "N" wire rope required to lift maximum 100,000 lbs. *(45 360 kg)* rated load.
4. Crane Capacities on tires depend on tire capacity, condition of tires, and tire pressure. On-tire picks require lifting from main boom head only on a smooth and level surface. Pick and carry operations (creep), are restricted to 1.0 m.p.h. *(1.61 km/h)* with the boom centered over front, the travel swing lock engaged and the load restrained from swinging. Lifts with the manual extended, fly or fly/jib combination erected are prohibited.
5. When making lifts on rubber, tires must be inflated to the recommended pressure and power sections must be equally extended.

Operation:

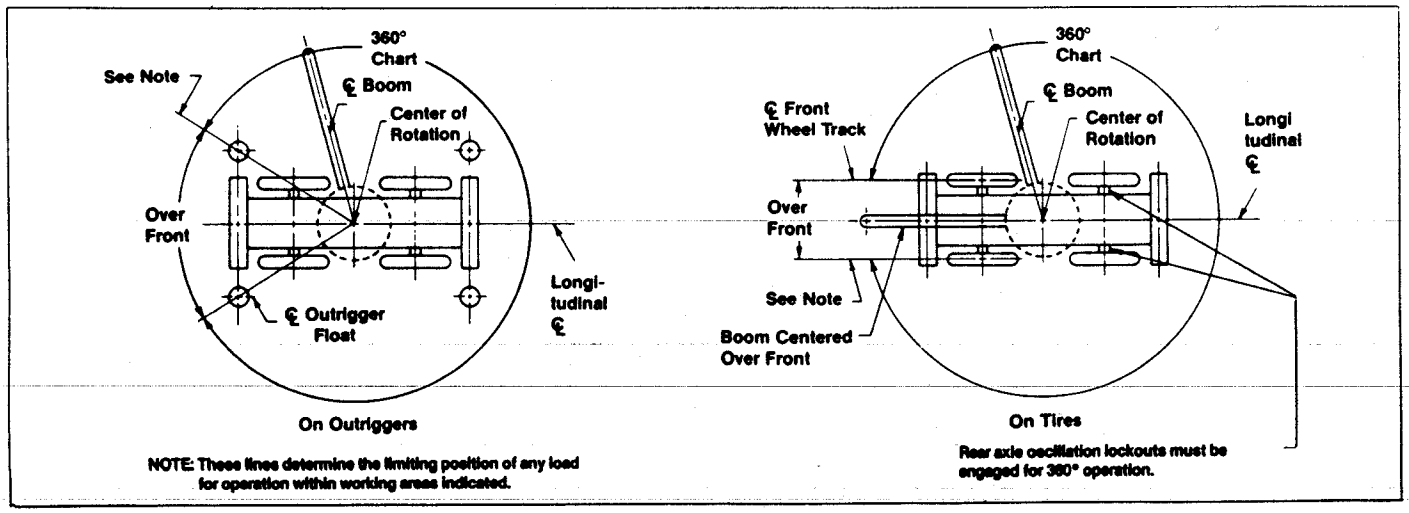
1. Rated lifting capacities at rated radius shall not be exceeded. Do not tip the machine to determine allowable loads. For clamshell and concrete bucket operation, weight of bucket and load shall not exceed 80% of rated lifting capacities. Clamshell bucket weight including bucket content is restricted to a maximum of 7,000 pounds *(3175 kg)* with a maximum boom length of 56 feet *(17.07 m)* and a minimum boom angle of 35°. Manual extended, fly or fly/jib combinations are prohibited for clam work.
2. The crane capacities shown on outriggers do not exceed 85% of the tipping loads and crane capacities shown on tires do not exceed 75% of the tipping loads as determined by SAE crane stability test code J-765a. Those capacities above the heavy bold line indicate capacities based on factors other than those which would cause a tipping condition.
3. Do not operate at boom lengths or beyond radii where no capacities are shown. Machine may overturn without any load on the hook.
4. To determine capacities in-between those shown on charts, refer to the rated lifting capacity of the next longer and next shorter booms for the same radius. The lesser of the two capacities will apply.
5. When making lifts at a load radius not shown on charts, use the next longer radius to determine allowable capacity.
6. Crane capacities are based on freely suspended loads and make no allowance for such factors as the effect of wind, sudden stopping of loads, supporting surface conditions, inflation of tires, and operating speeds. Operator must reduce load ratings to take such conditions into account. Deductions from rated capacities must be made for weight of hook block, weighted ball/hook, sling, spreader bar, fly or other suspended gear.
7. Rated lifting capacities are based on correct reeving. Deduction must be made for excessive reeving. Any reeving over minimum required is considered excessive and must be taken into account. Use working range plate to estimate the extra feet of rope and then deduct 1 lb. *(.4536 kg)* for each foot of wire rope before attempting to lift a load.
8. The following deductions from rated main boom capacities must be made if the machine is equipped with the following:
   a. auxiliary lifting sheave - 200 lbs. *(91 kg.)*
   b. 33' *(10.06 m)* one-piece fly stowed on boom — 700 lbs. *(318 kg)*.
   c. 33' *(10.06 m)* one-piece fly in working position — 1,800 lbs. *(816 kg)*
   d. 33' *(10.06 m)* fly plus 25' *(7.62 m)* jib stowed on boom — 1,100 lbs. *(499 kg)*
   e. 33' *(10.06 m)* fly plus 25' *(7.62 m)* jib in working position — 4,400 lbs. *(1 996 kg)*
   f. 25' *(7.62 m)* jib in working position and picking from fly tip — 1,900 lbs. *(862 kg)*
9. Powered boom length is from 35' *(10.67 m)* to 85' *(25.91 m)*.
10. Extension or retraction of the boom with loads within the limits of the applicable rating chart may be attempted. The ability to telescope loads is limited by hydraulic pressure, boom angle, boom length, boom lubrication, etc.
11. Do not move load to radii or boom lengths greater than those specified on applicable chart.
12. Effective length of boom with auxiliary lifting sheave is length shown on boom length indicator plus 2' *(0.61 m)*.
13. The rated loads for the manual extended are determined by boom angle only for boom lengths other than 105' *(32.00 m)* and 110' *(33.53 m)* as follows: For boom lengths less than 105' *(32.00 m)*, the rated loads are determined by boom angle only in the column headed 105' *(32.00 m)*. For boom lengths between 105' *(32.00 m)* and 110' *(33.53 m)*, the rated loads are determined by boom angle only in the column headed 110' *(33.53 m)* manual extended. For angles not shown, use next lower boom angle to determine allowable capacity.
14. The rated loads for the manual retracted with 33' *(10.06 m)* fly are determined by boom angle only for boom lengths other than 110' *(33.53 m)* and 118' *(35.97 m)* as follows: For boom lengths with fly and manual retracted less than 110' *(33.53 m)*, the rated loads are determined by boom angle only in the column headed 110' *(33.53 m)* manual retracted with fly. For boom lengths with fly and manual retracted between 110' *(33.53 m)* and 118' *(35.97 m)*, the rated loads are determined by boom angle only in the column headed 118' *(35.97 m)*. For angles not shown, use the next lower boom angle to determine allowable capacity.
15. For boom lengths with fly less than 143' *(44 m)* with manual extended, the rated loads are determined by boom angle only in the column headed 143' *(44 m)*. For angles not shown, use the next lower boom angle to determine allowable capacity.
16. The 25' *(8 m)* jib capacities are based on main boom angle, regardless of main boom length. For angles not shown, use next lower boom angle to determine allowable capacity. Capacity values are for 360 degree operation. Warning: Do not lower 25' *(8 m)* jib in working position below 50 degrees unless boom is fully retracted.
17. The 35' *(10.67 m)* boom length capacities are based on boom fully retracted. If not fully retracted, do not exceed ratings for the 40' *(12.19 m)* boom length.

Definitions:

1. Load Radius: Horizontal distance from a projection of the axis of rotation to the supporting surface before loading to the center of the vertical hoist line or tackle with load applied.
2. Loaded Boom Angle: The angle between the boom base section and the horizontal after lifting the load at the rated radius. The boom angle, before loading, should be greater to account for deflections.
3. Working Area: Area measured in a circular arc about 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 hoist line.
5. Side Load: Horizontal side force applied to the lifted load either on the ground or in the air.

GENERAL INFORMATION ONLY

Working Areas HSP-8050



We are constantly improving our products and therefore reserve the right to change designs and specifications.

Link-Belt
CONSTRUCTION EQUIPMENT

HSP-8050 maximum allowable lifting capacities

Carrier Mounted Hydraulic Crane
22 Ft. Outrigger Spread

Rated Lifting Capacities In Pounds
On Outriggers - Fully Extended

Counterweight:
11,050 Lbs. — 2 Drum Machine
12,000 Lbs. — 1 Drum Machine

Serial Number

35 - 85 Ft. Boom With Manual Section Retracted

35 Ft.				40 Ft.			48 Ft.			56 Ft.			62 Ft.			72 Ft.			85 Ft.		
Load Rad. In Feet	Loaded Boom Angle (Deg.)	360°	Over Front	Loaded Boom Angle (Deg.)	360°	Over Front	Loaded Boom Angle (Deg.)	360°	Over Front	Loaded Boom Angle (Deg.)	360°	Over Front	Loaded Boom Angle (Deg.)	360°	Over Front	Loaded Boom Angle (Deg.)	360°	Over Front	Loaded Boom Angle (Deg.)	360°	Over Front
10	68	100,000	100,000	71	72,100	72,100	75	70,800	70,800	77	68,100	68,100									
12	65	98,300	98,300	68	72,100	72,100	72	70,800	70,800	75	68,100	68,100	77	67,600	67,600						
15	59	84,000	84,000	63	71,500	71,500	68	70,800	70,800	72	68,100	68,100	74	59,400	59,400	77	51,800	51,800			
20	49	64,300	64,300	55	64,300	64,300	62	64,300	64,300	66	57,200	57,200	69	48,900	48,900	73	43,200	43,200	76	36,600	36,600
25	37	49,800	49,800	46	49,800	49,800	55	45,800	49,800	61	48,100	48,100	64	41,300	41,300	68	36,800	36,800	72	30,500	30,500
30				34	36,000	40,300	47	36,800	40,300	54	36,800	40,300	59	35,500	35,500	64	31,800	31,800	68	25,800	25,800
35	(See Warning Note 19)						38	27,500	32,400	48	27,500	32,400	53	27,500	32,400	59	27,500	27,800	65	22,200	22,200
40							26	21,300	25,200	40	21,300	25,300	47	21,3	25,400	54	21,300	24,500	61	19,400	19,400
45										31	17,100	20,400	40	17,100	20,400	49	17,100	20,400	57	17,100	17,100
50										18	13,900	16,600	31	13,900	16,600	43	13,900	16,600	53	13,900	15,400
55													20	11,500	13,900	37	11,500	13,900	48	11,500	13,800
60																29	9,600	11,700	43	9,600	11,700
65																19	7,900	9,900	38	7,900	9,900
70																			32	6,700	8,400
80																			12	4,500	6,000
90																					
100																					
110																					
120																					
Minimum Boom Angle (Deg.) For Indicated Length With No Load. See Warning Note 20.																				0°	

25 Ft. Manual Extended

105 Ft.			110 Ft.		
Loaded Boom Angle (Deg.)	360°	Over Front	Loaded Boom Angle (Deg.)	360°	Over Front
(See Note 15)			(See Note 15)		
78	20,200	20,200	77	19,000	19,000
73	20,200	20,200	74	18,500	18,500
71	20,200	20,200	72	17,600	17,600
68	18,200	18,200	69	15,500	15,500
65	16,400	16,400	66	13,700	13,700
62	15,000	15,000	63	12,100	12,100
59	13,100	13,800	60	10,700	10,700
55	11,100	12,700	57	9,700	9,700
52	9,500	11,500	54	8,700	8,700
48	8,200	9,900	50	7,800	7,800
39	6,100	7,500	43	6,000	6,400
29	4,500	5,800	34	4,400	5,500
12	3,200	4,400	22	3,200	4,300
				0°	

33 Ft. Fly With Manual Retracted

110 Ft.			118 Ft.		
Loaded Boom Angle (Deg.)	360°	Over Front	Loaded Boom Angle (Deg.)	360°	Over Front
(See Note 16)			(See Note 16)		
76	22,200	22,200	77	18,500	18,500
74	22,200	22,200	75	17,500	17,500
71	20,200	20,200	72	15,500	15,500
68	18,900	18,900	70	13,900	13,900
66	17,300	17,300	67	12,400	12,400
63	15,400	15,400	64	10,900	10,900
60	13,600	14,300	62	9,600	9,600
56	11,600	13,200	59	8,600	8,600
53	9,900	11,900	56	7,700	7,700
50	8,600	10,400	53	6,900	6,900
42	6,500	8,000	46	5,600	5,600
33	4,900	6,200	39	4,400	4,600
21	3,400	4,800	30	3,400	3,900
			17	2,500	3,400
	0°			0°	

WARNING AND OPERATING INSTRUCTIONS

READ AND UNDERSTAND THESE OPERATING INSTRUCTIONS AND THE CHART VALUES BEFORE OPERATING CRANE. OPERATION WHICH DOES NOT FOLLOW THESE INSTRUCTIONS MAY RESULT IN AN ACCIDENT.

GENERAL:

1. Rated lifting capacities in pounds as shown on lift chart pertain to this machine as originally manufactured and normally equipped. Modifications to the machine or use of optional equipment other than that specified can result in a reduction of capacity.
2. Construction equipment can be dangerous if improperly operated or maintained. Operation and maintenance of this machine must be in compliance with the information in the operator's, parts and safety manuals supplied with this machine. If these manuals are missing, order replacements through the distributor.
3. The operator and other personnel associated with this machine shall fully acquaint themselves with the latest applicable American National Standards Institute (ANSI) safety standards for cranes.
4. The maximum allowable lifting capacities are based on machine standing level on firm supporting surface.

SET UP:

1. The machine shall be leveled on a firm supporting surface. Depending on the nature of the supporting surface, it may be necessary to have structural supports under the outrigger floats or tires to spread the load to a larger bearing surface.
2. When making lifts on outriggers, outrigger beams must be fully extended with tires free of supporting surface.
3. Crane capacities on tires depend on tire capacity, condition of tires, and tire air pressure. On tire picks require lifting from main boom head only on a smooth and level surface. Boom sections must be extended equally. Pick and carry operations (creep) are restricted to a maximum speed of 1 MPH and not exceeding 200 ft. in a 30 minute period, the boom must be centered over front with swinglock engaged and the load must be restrained from swinging. Lifts with manual extended, fly or fly-jib combination erected are prohibited on tires.
4. When making lifts on rubber, tires must be inflated to the recommended pressure.
5. For required parts of line see wire rope strength plate.

OPERATION:

1. Rated lifting capacities at rated radius shall not be exceeded. Do not tip machine to determine allowable load. For concrete bucket operation, weight of bucket and load shall not exceed 80% of rated lifting capacity. For clamshell bucket operation, weight of bucket and bucket content is restricted to a maximum weight of 7,000 pounds or 80% of rated lifting capacity, whichever is less. For magnet operation, weight of magnet and load is restricted to a maximum weight of 7,000 pounds or 80% of rated lifting capacity, whichever is less. For clamshell and magnet operation, maximum boom length is restricted to 56 feet and the boom angle is restricted to a minimum of 35°. Manual extended, fly or fly-jib combinations are prohibited for both clam and magnet operation.
2. The crane capacities shown on outriggers do not exceed 85% of the tipping loads and crane capacities shown on tires do not exceed 75% of the tipping loads as determined by SAE Crane Stability Test Code J-765a.
3. The crane capacities above the bold lines are based on structural strength or hydraulic limitations.
4. Rated lifting capacities include the weight of hook block, slings, bucket, magnet and auxiliary lifting devices. Their weights must be subtracted from the listed rated load to obtain the net load to be lifted. See also deductions for auxiliary head, fly and jib.
5. Rated lifting capacities are based on freely suspended loads. No attempt shall be made to move a load horizontally on the ground in any direction.
6. Rated lifting capacities are for lift crane service only.
7. Do not operate at radii or boom lengths where capacities are not listed. At these positions the machine can overturn without any load on the hook.
8. The maximum loads which can be telescoped are not definable because of variation in loadings and crane maintenance, but it is permissible to attempt retraction and extension within the limits of the load rating chart.
9. When either boom length or radius or both are between values listed, the smallest load shown at either the next larger radius or boom length shall be used.
10. The user shall operate at reduced ratings to allow for adverse job conditions such as: soft or uneven ground, out of level conditions, wind, side loads, pendulum action, jerking or sudden stopping of loads, hazardous conditions, experience of personnel, two machine lifts, traveling with loads, electrical wires, etc. Side load on boom, fly or jib is extremely dangerous.
11. When making lifts with auxiliary head machinery, the effective length of the boom increases by 2 feet.
12. Power sections must be extended equally.
13. For definition of working area, see plate no. 47P0052. The least stable rated working area on outriggers is over the rear. The least stable rated working area on tires is over the side.
14. Rated lifting capacities are based on correct reeving. Deduction must be made for excessive reeving. Any reeving over minimum required (see wire rope strength plate) is considered excessive and must be accounted for. Use working range plate to estimate the extra feet of rope then deduct 1 lb. for each foot of wire rope before attempting to lift a load.
15. The rated loads for the manual extended are determined by boom angle only for boom lengths other than 105 ft. and 110 ft. as follows: For boom lengths less than 105 ft., the rated loads are determined by boom angle only in the column headed by 105 ft. For boom lengths between 105 ft. and 110 ft., the rated loads are determined by boom angle only in the column headed by manual extended 110 ft. For angles not shown, use the next lower boom angle to determine allowable capacity.
16. The rated loads for the manual retracted with 33 ft. fly are determined by boom angle only for boom lengths other than 110 ft. and 118 ft. as follows: For boom lengths with fly and manual retracted less than 110 ft., the rated loads are determined by boom angle only in the column headed by manual retracted with fly 110 ft. For boom lengths with fly and manual retracted between 110 ft. and 118 ft., the rated loads are determined by boom angle only in the column headed by 118 ft. For angles not shown, use the next lower boom angle to determine allowable capacity.
17. For boom lengths with fly and manual extended less than 143 ft., the rated loads are determined by boom angle only in the column headed by 143 ft. For angles not shown, use the next lower boom angle to determine allowable capacity.
18. The 25-foot jib capacities are based on main boom angle regardless of main boom length. For angles not shown, use next lower boom angle to determine allowable capacity. Capacity values are for 360 degrees operation. Warning: Do not lower 25-foot jib in working position below 50 degrees unless boom is fully retracted.
19. The 35-foot boom length capacities are based on boom fully retracted. If not fully retracted, do not exceed ratings for the 40-foot boom length.
20. Do not lower 110 ft. boom with manual extended and 33 ft. fly below 15 degrees. Failure to follow note 20 will result in a tipping condition.

DEFINITIONS:

1. Load Radius: Horizontal distance from a projection of the axis of rotation to the supporting surface before loading to the center of the vertical hoist line or tackle with load applied.
2. Loaded Boom Angle: The angle between the boom base section and the horizontal after lifting the 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 about the centerline of rotation as shown on the working area plate no. 47P0052.
4. Freely Suspended Load: Load hanging free with no direct external force applied except by the hoist line.
5. Side Load: Horizontal side force applied to the lifted load either on the ground or in the air.

Hydraulic Circuit Pressure Sett		
Circuit	Function	Pres
Main	Boom Hoist	290
	Wire Rope Hoist	275
Secondary	Steering Inner Mid-Telescope	250
	Swing	1500 Port
	Outrigger Outer Mid-Telescope	270
Constant Pressure	Winch Brake And Clutch	150

Jib Capacities 25 Ft. Jib and 33 Ft. Fly Combination (See Note 18)			
Min. Main Boom Angle	Jib Offset Angle		
	5°	17.5°	30°
78°	5,100	5,100	4,200
75°	5,100	5,100	4,000
70°	5,100	4,900	3,600
65°	4,500	4,100	3,400
60°	3,700	3,300	2,800
55°	3,000	2,700	2,400
50°	2,500	2,300	2,000

Link-Belt is a registered trademark.