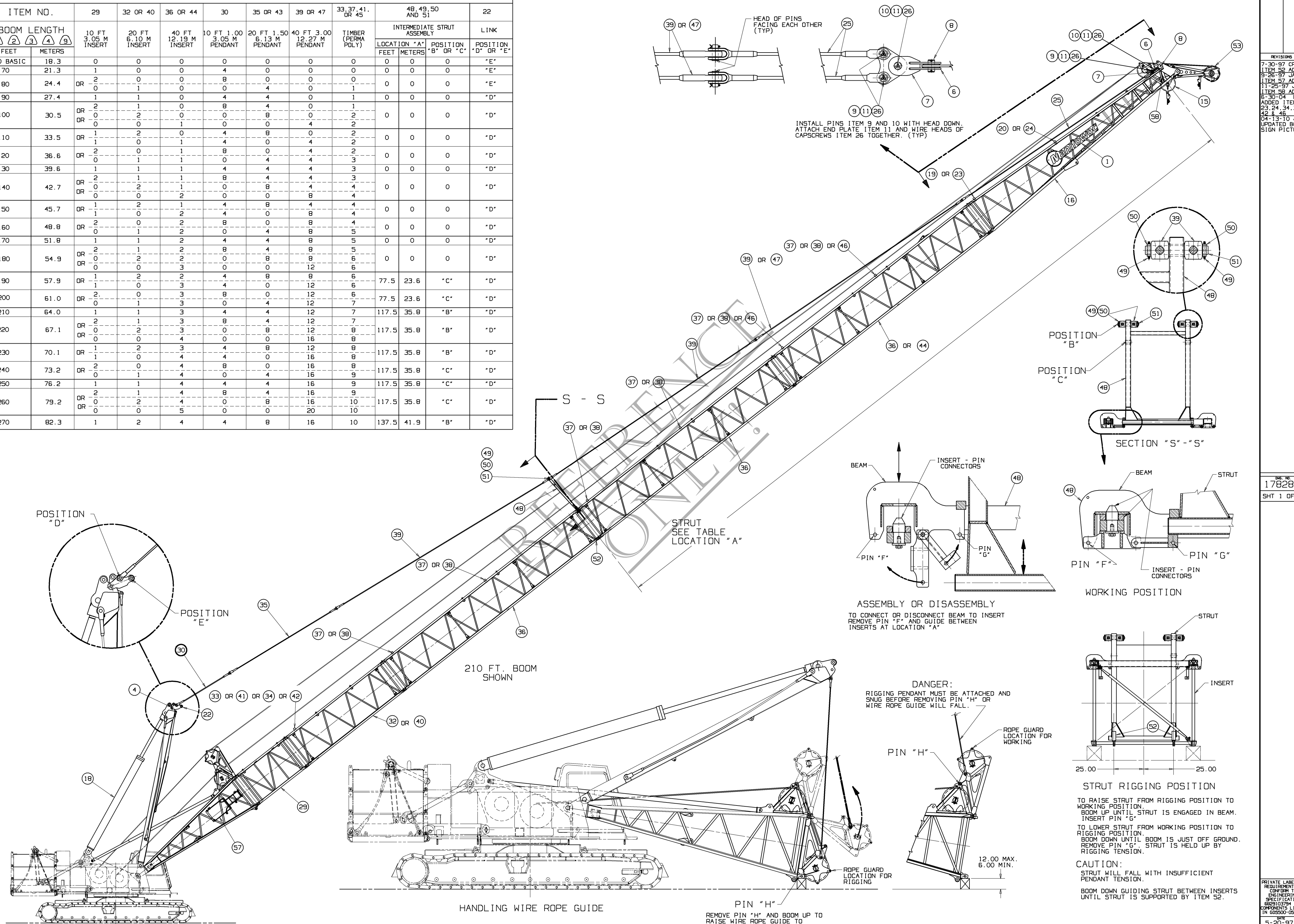


REQUIRED FOR VARIOUS BOOM LENGTHS

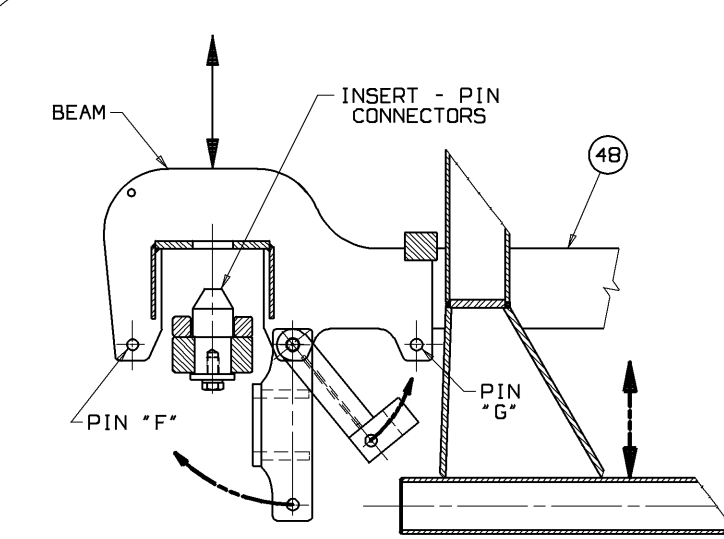
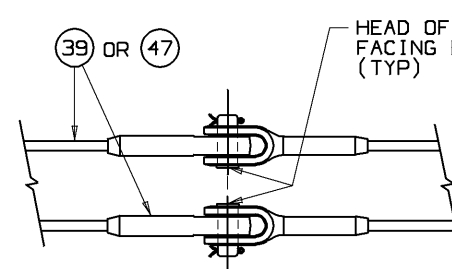
ITEM NO.	29		32 OR 40		36 OR 44		30		35 OR 43		39 OR 47		33, 37, 41, OR 45		48, 49, 50 AND 51		22	
	BOOM LENGTH ① ② ③ ④ ⑤	10 FT 3.05 M INSERT	20 FT 6.10 M INSERT	40 FT 12.19 M INSERT	10 FT 1.00 3.05 M PENDANT	20 FT 1.50 6.13 M PENDANT	40 FT 3.00 12.27 M PENDANT	TIMBER (PERMA POLY)	LOCATION "A" FEET METERS	POSITION "B" OR "C"	POSITION "D" OR "E"							
60 BASIC	18.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	"E"	
70	21.3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	"E"	
80	24.4	OR 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	"E"	
90	27.4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	"D"	
100	30.5	OR 2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	"D"	
110	33.5	OR 1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	"D"	
120	36.6	OR 2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	"D"	
130	39.6	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	"D"	
140	42.7	OR 2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	"D"	
150	45.7	OR 1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	"D"	
160	48.8	OR 2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	"D"	
170	51.8	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	"D"	
180	54.9	OR 2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	"D"	
190	57.9	OR 1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	"D"	
200	61.0	OR 2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	"D"	
210	64.0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	"D"	
220	67.1	OR 2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	"D"	
230	70.1	OR 1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	"D"	
240	73.2	OR 2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	"D"	
250	76.2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	"D"	
260	79.2	OR 2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	"D"	
270	82.3	OR 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	"D"	

REV. NO.	DATE	DESCRIPTION	MATERIAL	QTY	BY	CHKD	APP'D
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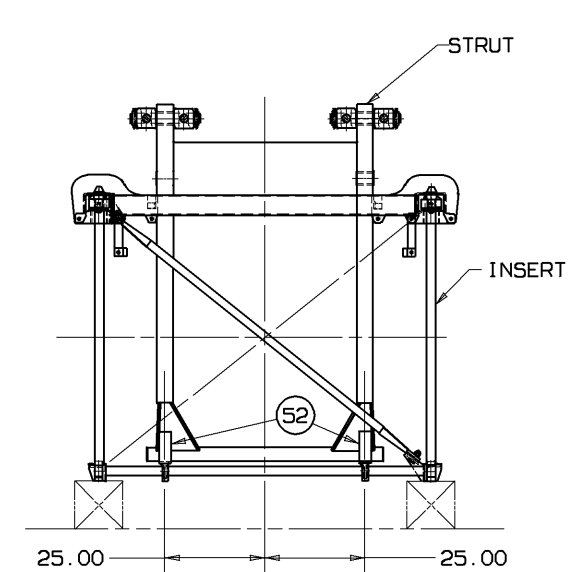
REVISIONS
 7-30-97 CRP
 ITEM 52 ADDED
 9-26-97 JAZ
 ITEM 57 ADDED
 11-25-97 JAZ
 ITEM 58 ADDED
 6-30-04 EDB
 ADDED ITEMS
 23, 24, 34, 38,
 42 & 46
 04-13-10 JAS
 UPDATED BOOM
 SIGN PICTURE



INSTALL PINS ITEM 9 AND 10 WITH HEAD DOWN. ATTACH END PLATE ITEM 11 AND WIRE HEADS OF CAPSCREWS ITEM 26 TOGETHER. (TYP)



DANGER:
 RIGGING PENDANT MUST BE ATTACHED AND SNUG BEFORE REMOVING PIN "H" OR WIRE ROPE GUIDE WILL FALL.



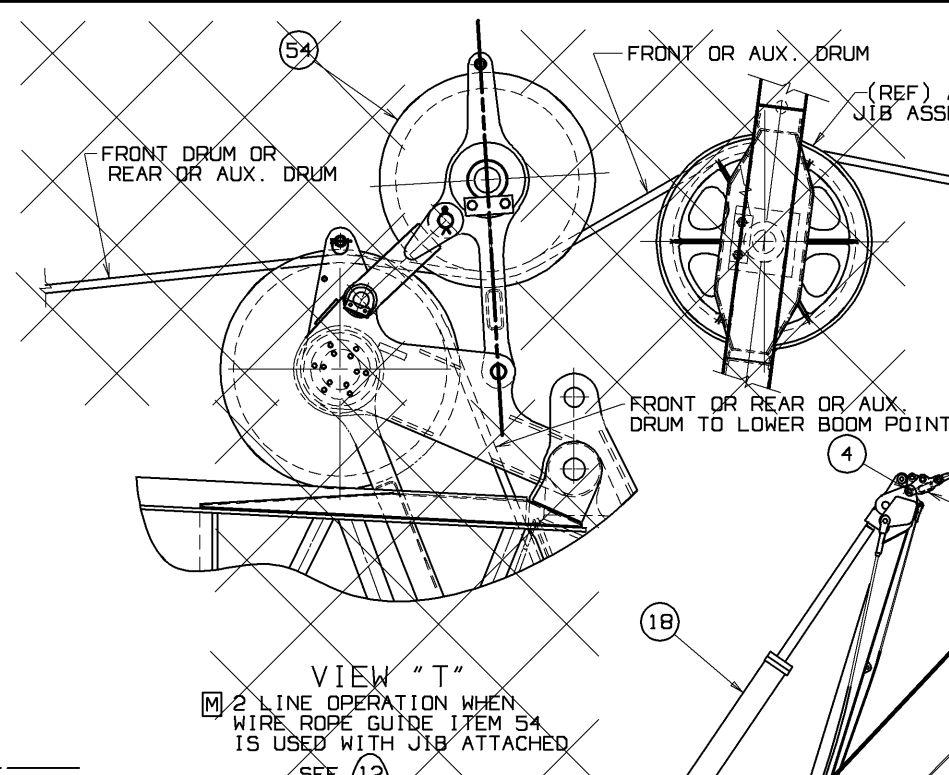
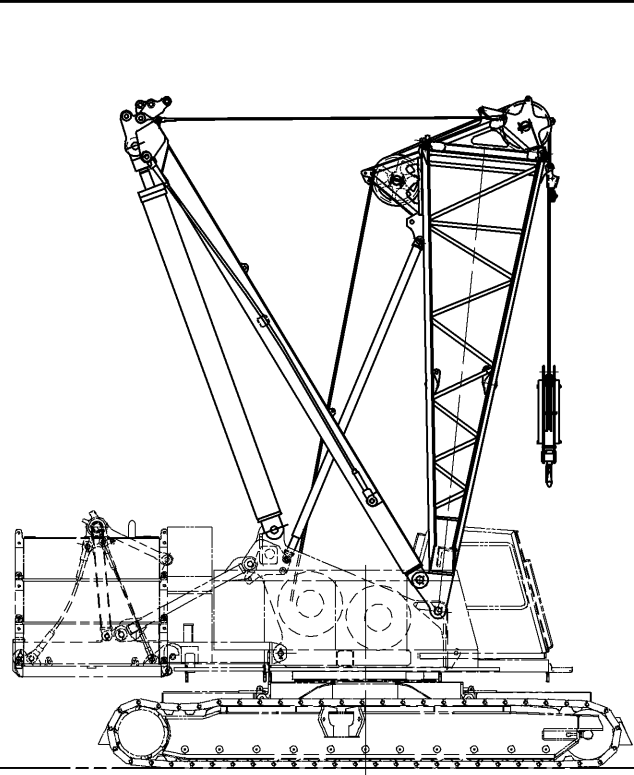
TO RAISE STRUT FROM RIGGING POSITION TO WORKING POSITION. BOOM UP UNTIL STRUT IS ENGAGED IN BEAM. INSERT PIN "G"
 TO LOWER STRUT FROM WORKING POSITION TO RIGGING POSITION. BOOM DOWN UNTIL BOOM IS JUST OFF GROUND. REMOVE PIN "G". STRUT IS HELD UP BY RIGGING TENSION.

CAUTION:
 STRUT WILL FALL WITH INSUFFICIENT PENDANT TENSION.
 BOOM DOWN GUIDING STRUT BETWEEN INSERTS UNTIL STRUT IS SUPPORTED BY ITEM 52.

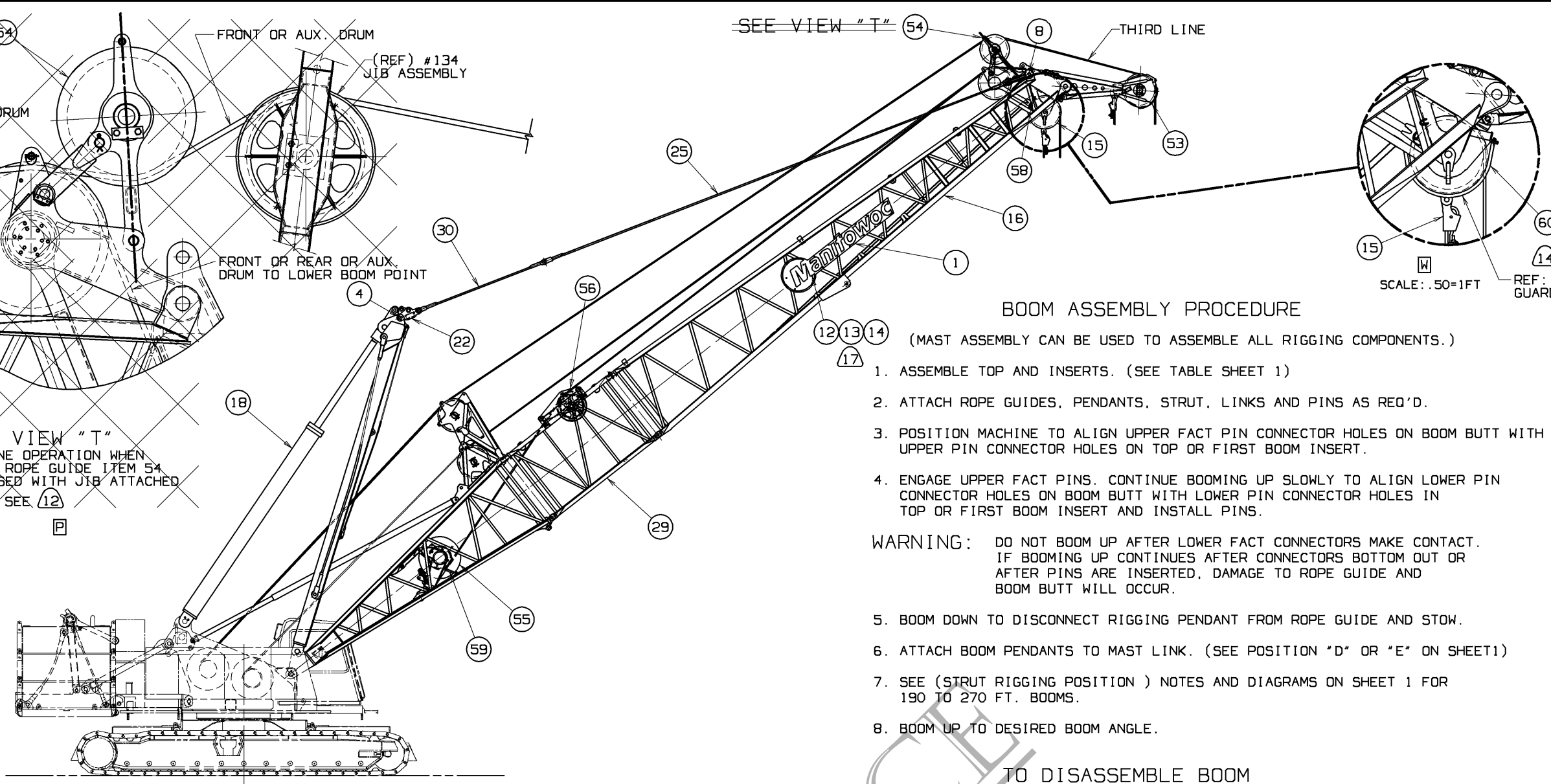
REMOVE PIN "H" AND BOOM UP TO RAISE WIRE ROPE GUIDE TO WORKING POSITION.

DECIMAL PLACES	FRACTIONS	MACHINING	WELDING	CASTING	FORMING	OTHER
(1) PLACE 0.0	1/16	±0.015	±0.015	±0.015	±0.015	±0.015
(2) PLACE 0.00	1/32	±0.010	±0.010	±0.010	±0.010	±0.010
(3) PLACE 0.000	1/64	±0.005	±0.005	±0.005	±0.005	±0.005

Manitowoc Cranes, Inc.
 BOOM RIGGING ASSEMBLY #78 BOOM
 DATE: 5-20-97
 DRAWING NO.: 178288
 SHEET NO.: SHT 1 OF 2



MAST ASSEMBLY RIGGED FOR HANDLING BOOM PARTS



BOOM ASSEMBLY PROCEDURE

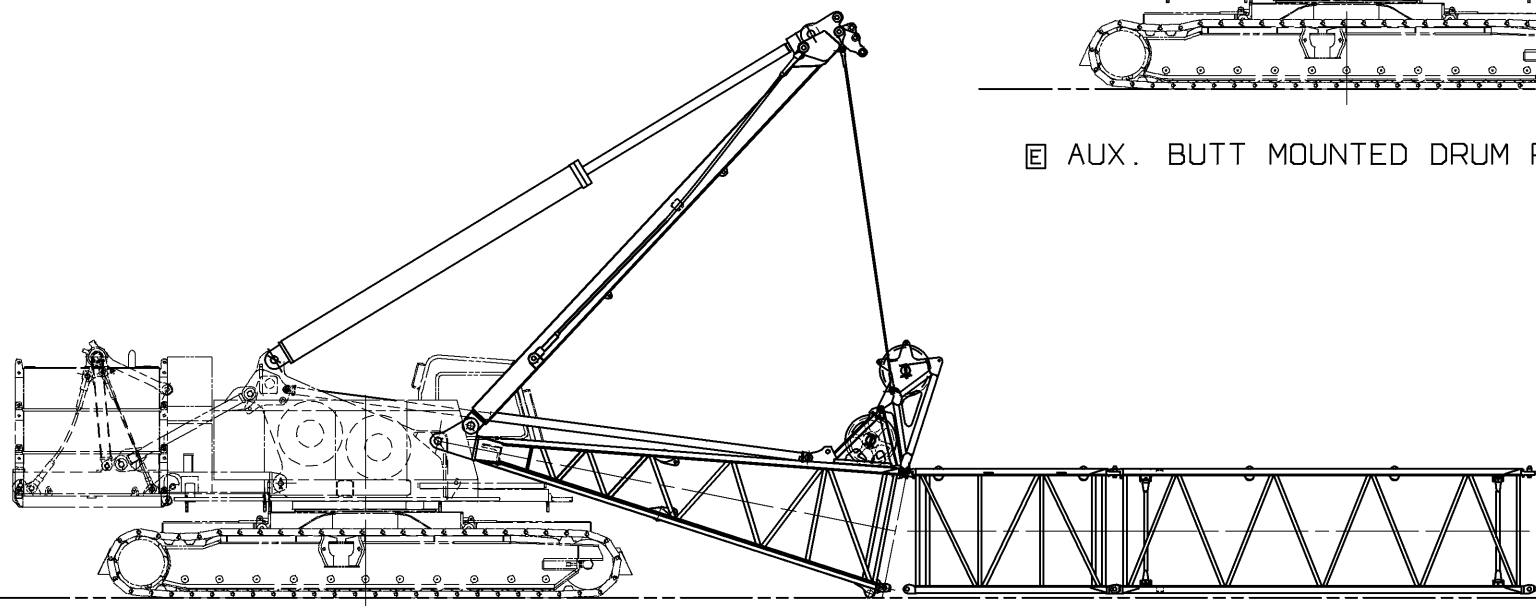
(MAST ASSEMBLY CAN BE USED TO ASSEMBLE ALL RIGGING COMPONENTS.)

1. ASSEMBLE TOP AND INSERTS. (SEE TABLE SHEET 1)
 2. ATTACH ROPE GUIDES, PENDANTS, STRUT, LINKS AND PINS AS REQ'D.
 3. POSITION MACHINE TO ALIGN UPPER FACT PIN CONNECTOR HOLES ON BOOM BUTT WITH UPPER PIN CONNECTOR HOLES ON TOP OR FIRST BOOM INSERT.
 4. ENGAGE UPPER FACT PINS. CONTINUE BOOMING UP SLOWLY TO ALIGN LOWER PIN CONNECTOR HOLES ON BOOM BUTT WITH LOWER PIN CONNECTOR HOLES IN TOP OR FIRST BOOM INSERT AND INSTALL PINS.
- WARNING:** DO NOT BOOM UP AFTER LOWER FACT CONNECTORS MAKE CONTACT. IF BOOMING UP CONTINUES AFTER CONNECTORS BOTTOM OUT OR AFTER PINS ARE INSERTED, DAMAGE TO ROPE GUIDE AND BOOM BUTT WILL OCCUR.
5. BOOM DOWN TO DISCONNECT RIGGING PENDANT FROM ROPE GUIDE AND STOW.
 6. ATTACH BOOM PENDANTS TO MAST LINK. (SEE POSITION "D" OR "E" ON SHEET 1)
 7. SEE (STRUT RIGGING POSITION) NOTES AND DIAGRAMS ON SHEET 1 FOR 190 TO 270 FT. BOOMS.
 8. BOOM UP TO DESIRED BOOM ANGLE.

TO DISASSEMBLE BOOM

1. BOOM DOWN AND SUPPORT BOOM ON BLOCKING.
 2. SEE (STRUT RIGGING POSITION) NOTES AND DIAGRAMS ON SHEET 1 FOR 190 TO 270 FT. BOOMS.
 3. DISCONNECT BOOM PENDANTS FROM MAST LINKS.
 4. CONNECT RIGGING PENDANTS TO ROPE GUIDE. SEE (HANDLING WIRE ROPE GUIDE ON SHEET 1)
 5. BOOM UP SLOWLY TO SUPPORT WEIGHT OF BOOM BUTT WITH RIGGING PENDANTS.
- WARNING:** BOOMING UP TO SUPPORT FULL WEIGHT OF BOOM WILL DAMAGE ROPE GUIDE AND BOOM BUTT.
6. REMOVE LOWER PIN CONNECTING BUTT TO TOP OR FIRST INSERT.
- WARNING:** BOOM MUST BE PROPERLY BLOCKED TO PREVENT SHIFTING DURING PIN REMOVAL.
7. SLOWLY BOOM DOWN TO DISENGAGE UPPER FACT CONNECTOR PINS AND BACK AWAY.
 8. SEE (HANDLING WIRE ROPE GUIDE ON SHEET 1)

AUX. BUTT MOUNTED DRUM RIGGING



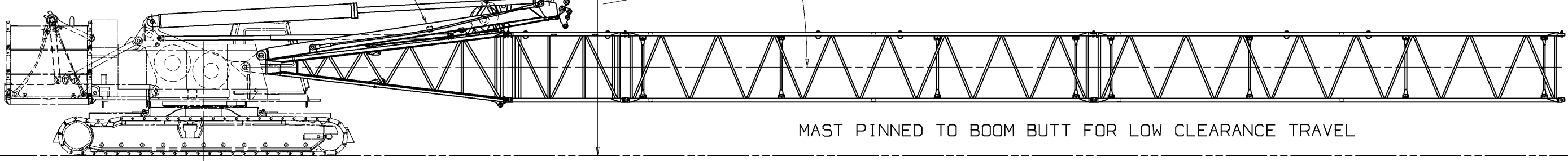
BOOM ASSEMBLY WITH MAST

MAST PINNED TO BOOM BUTT FOR LOW CLEARANCE TRAVEL
MAXIMUM BOOM THAT CAN BE CANTILEVERED IS AS FOLLOWS:

LENGTH	10 FT (3.1M) INSERT	20 FT (6.1M) INSERT	40 FT (12.2M) INSERT	37.5 FT (11.4M) TOP
37.5 FT (11.4M) NO BLOCK	0	0	0	1
90 FT (27.4M)	1	2	1	0
	1	0	2	0

WARNING!
DO NOT EXCEED 10° BOOM ANGLE WITH MAST PINNED TO BOOM BUTT. DAMAGE TO MAST OR BOOM STOP WILL RESULT.

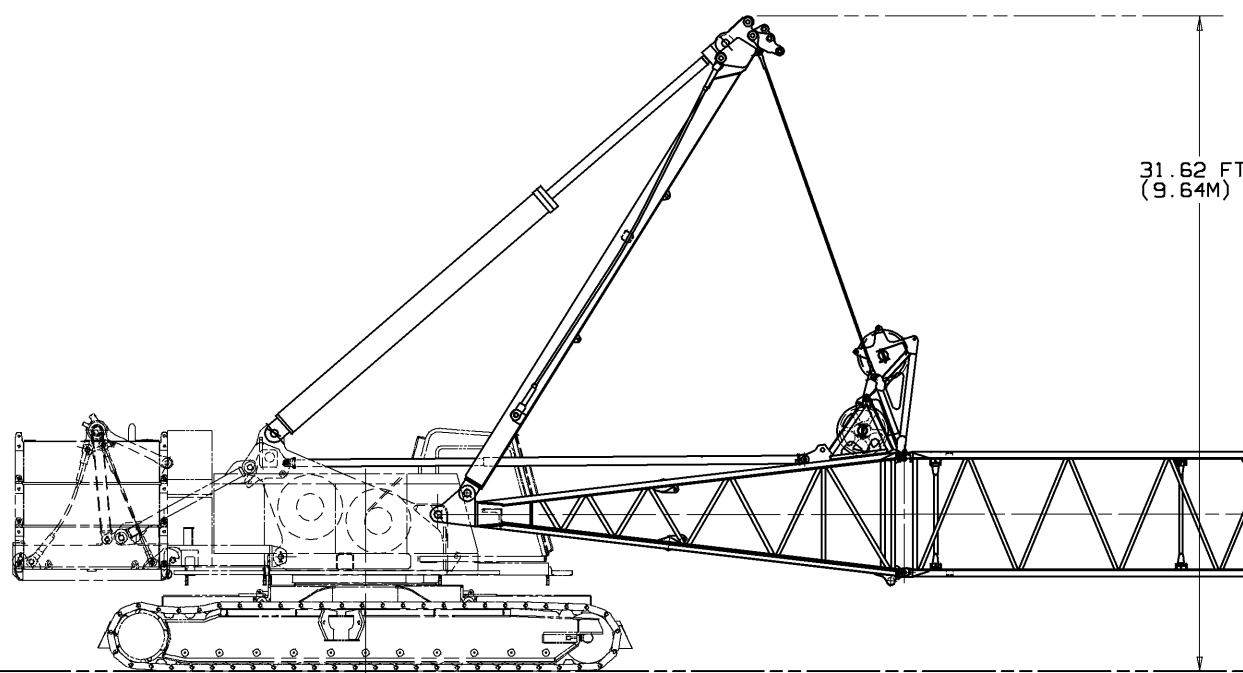
16.69 FT. (5.09M)
10° MAXIMUM BOOM ANGLE



MAST PINNED TO BOOM BUTT FOR LOW CLEARANCE TRAVEL

BOOM HANDLING WITH MAST
WITH MAST PENDANTS PINNED TO ROPE GUIDE LINKS: MAXIMUM BOOM THAT CAN BE CANTILEVERED IS AS FOLLOWS:

LENGTH	10 FT. (3.05 M) INSERT	20 FT. (6.10 M) INSERT	40 FT. (12.2 M) INSERT
40 FT (12.2M)	2	1	0
50 FT (15.2M)	1	2	0
60 FT (18.3M)	2	0	1
60 FT (18.3M)	0	1	1
80 FT (24.4M)	0	2	1
80 FT (24.4M)	0	0	2



BOOM HANDLING WITH MAST

- 13 REQUIRED FOR (3) LINE OPERATION WITH BOOM.
- 14 MULTI PART ROPE GUARD, REF. PART NO. A02745, JIB CANNOT BE USED WITH THIS ASSEMBLY.
- 15 WIRE ROPE GUIDE ROLLER ASSEMBLIES ARE TO BE USED IN PLACE OF TIMBERS FOR CLAM OPERATION. MAXIMUM NUMBER OF ROLLERS ALLOWED ARE TWO ON BOOM TOP AND ONE ON A 20FT INSERT AND TWO ON A 40FT INSERT LOCATED CLOSEST TO THE BOOM BUTT.
- 16 REQUIRED FOR CLAM OPERATION.
- 17 EACH ITEM 1 REQUIRES A MINIMUM OF 10 SETS OF ITEMS 12, 13 AND 14

- 1 MAXIMUM NO. OF 10 FT (3.05 M) INSERTS = 2
- 2 MAXIMUM NO. OF 20 FT (6.10 M) INSERTS = 2
- 3 COMBINATION OF 10 FT. (3.05M) AND 20 FT. (6.10M) INSERTS CANNOT EXCEED 2 - 10 FT. (3.05M) PLUS 1 - 20 FT. (6.10M) OR 1 - 10 FT. (3.05M) PLUS 2 - 20 FT. (6.10M).
- 4 STARTING WITH THE BOOM BUTT, INSERTS MUST BE INSTALLED IN ORDER OF ASCENDING LENGTH.
- 5 6 - 30.00 DIA SHEAVES
- 6 DWG. 161164
- 7 DWG. 77535
- 8 JIB CANNOT BE USED WITH THIS ASSEMBLY
- 9 FOR 270 FT (82.3M) BOOM, ASSEMBLE AS FOLLOWS FOR PROPER LOCATION OF STRUT: BUTT - 10 FT INSERT - 20 FT INSERT - 40 FT INSERT - 40 FT INSERT - 20 FT INSERT - 40 FT INSERT - 40 FT INSERT AND TOP.
- 10 WHEN AUX. BUTT MOUNTED DRUM SHAFT ASSEMBLY (ITEM 55) IS REQUIRED, WIRE ROPE GUIDE ASSEMBLY FOR AUX. DRUM (ITEM 56) IS ALSO REQUIRED.
- 11 REQUIRED FOR EUROPEAN CODE OR DUTY CYCLE MACHINES.
- 12 REAR DRUM CANNOT BE USED FOR JIB APPLICATION WHEN WIRE ROPE GUIDE ITEM 54 IS ATTACHED.

BILL OF MATERIAL				ASSEMBLIES USED IN
QTY	ITEM NO.	DESCRIPTION	UNIT	NO.
		7780-0000 BASIC BOOM 60 FT. (18.3M)		
1	2	BOOM SIGN		81008829
2	3			
4	2	PIN		172112
2	LINK			177607
2	LINK			177608
2	PIN			177611
4	PIN			177624
2	PIN			177625
1	BEND PLATE			177626
32	SCR MB X 30. 4.8 ZINC PLT			7121171301
32	NUT HEX MB-1.25 10 PLN			7661170004
32	WASHER LOCK MB			7951170210
1	BOOM POINT ASSEMBLY (LOWER)			178177
1	BOOM TOP (37.5 FT) (11.43M)			178283
1	MAST ASSEMBLY			178567
1	TIMBER (PERMA POLY)			178904
1	TIMBER (PERMA POLY)			178905
2	LINK			179073
1	ROLLER ASSEMBLY WIRE ROPE GUIDE			A10755
1	ROLLER ASSEMBLY WIRE ROPE GUIDE			A10757
4	PENDANT - BASIC (37.0 FT) (11.27M)			277447
1	SCR CAP HEX .50-13UNC X 1.00 LG			621725
1	INSERT 10 FT (3.05M)			178285
4	PENDANT (10FT-1.00) (3.07M)			277448
1	INSERT 20 FT (6.10M)			178286
1	TIMBER (PERMA POLY)			178904
1	ROLLER ASSEMBLY WIRE ROPE GUIDE			A10755
4	PENDANT (20FT-1.50) (6.13M)			277449
1	INSERT 40 FT (12.19M)			178287
2	TIMBER (PERMA POLY)			178904
3	ROLLER ASSEMBLY WIRE ROPE GUIDE			A10755
4	PENDANT (40FT-3.00) (12.27M)			277450
1	INSERT 20 FT (6.10M)			178384
1	TIMBER (PERMA POLY)			178904
1	ROLLER ASSEMBLY WIRE ROPE GUIDE			A10755
4	PENDANT (20FT-1.50) (6.13M)			277449
1	INSERT 40 FT (12.19M)			178385
2	TIMBER (PERMA POLY)			178904
2	ROLLER ASSEMBLY WIRE ROPE GUIDE			A10755
4	PENDANT (40FT-3.00) (12.27M)			277450
1	INTERMEDIATE STRUT ASSEMBLY			179193
4	PIN			179194
4	COLLAR			179195
2	PIN			179196
2	BRACKET			179579
1	UPPER BOOM POINT ASSEMBLY			170419
1	WIRE ROPE GUIDE ASSEMBLY			192312
1	DRUM SHAFT ASSEMBLY - AUX.			A08116
1	WIRE ROPE GUIDE ASSEMBLY - AUX. DRUM			179552
1	BOOM ASSEMBLY LADDER STORAGE			179678
1	MOD. TO ADD WIRE ROPE GUARD			179884
1	MOD. TO ADD WIRE ROPE GUARD - AUX DRUM			192459
1	BOOM POINT LOWER ASSEMBLY MOD			A02744
1	PILE DRIVER ADAPTER ASSEMBLY			179700
1	PILE DRIVER ADAPTER ASSEMBLY			A09693
1	LOWER BOOM POINT ROLLER GUIDE ASS'Y			A10739

OPTIONAL ASSEMBLY LIST

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(1) PLACE: 0.0	+0.012	+0.018	+0.015	MANITOWOC CRANES, INC.	BOOM RIGGING ASSEMBLY
(2) PLACE: 0.00	+0.008	+0.012	+0.010	MANITOWOC CRANES, INC.	#78 BOOM
(3) PLACE: 0.000	+0.005	+0.008	+0.005	MANITOWOC CRANES, INC.	
ANGLE: 1/32"	1/32"	1/32"	1/32"	MANITOWOC CRANES, INC.	
DRAWN BY: CRP				DATE: 5-20-97	
CHECKED BY: CRP				PATTERN NO.	
APPROVED BY: RJW				SHT 2 OF 2	