

| ITEM NO. | DESCRIPTION | QTY | UNIT | MATERIAL | DATE |
|----------|---------------------------------|-----|------|----------|------|
| 169 | DRUM SHAFT ASSEMBLY - AUXILIARY | 1 | | 17725525 | |
| 170 | WIRE ROPE GUIDE ASSEMBLY | 1 | | 17734925 | |
| 171 | BOOM ASSEMBLY LADDER STORAGE | 1 | | 177969 | |
| 172 | BOOM BUTT SUPPORT ASSEMBLY | 1 | | 177055 | |

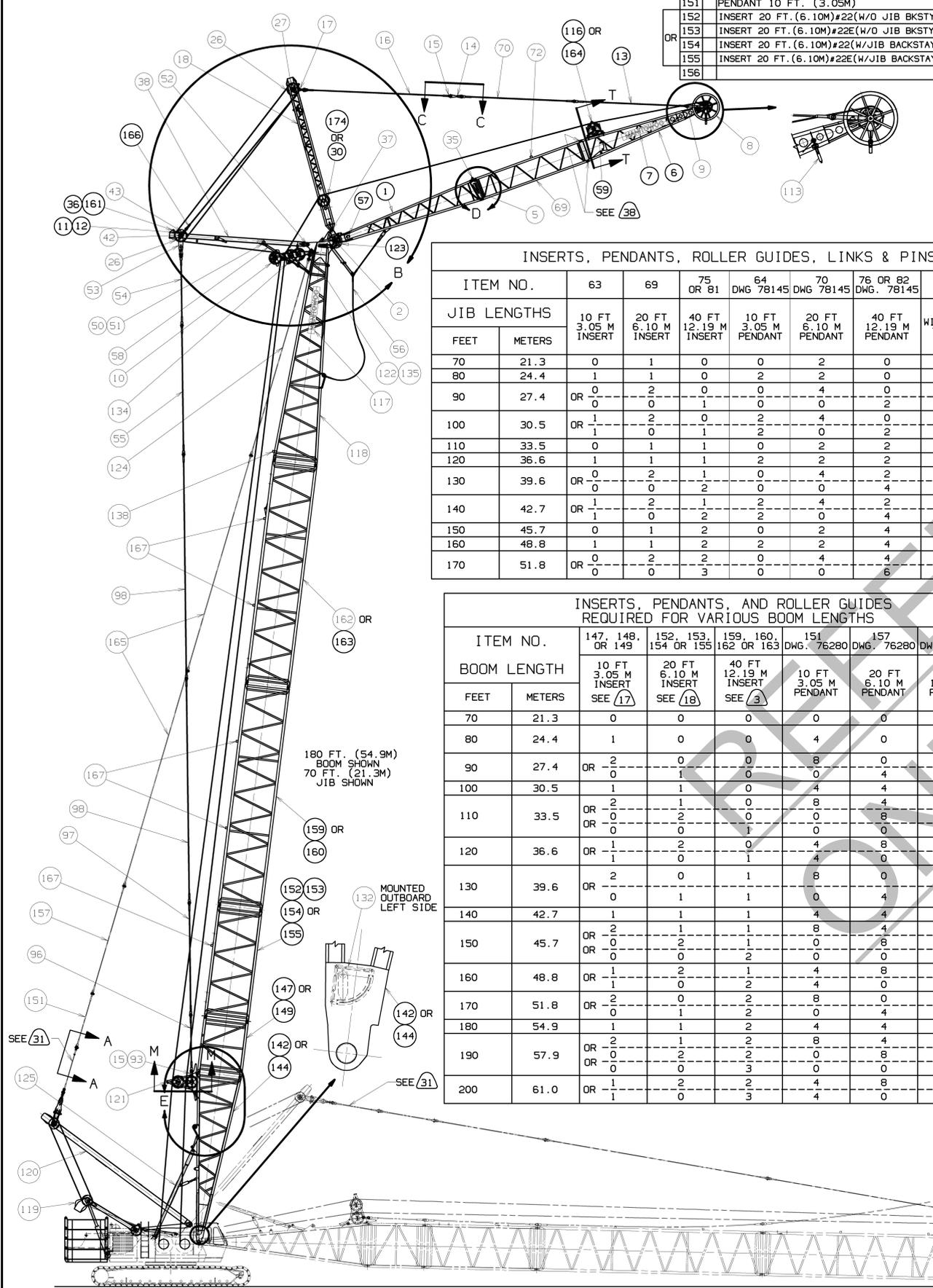
| ITEM NO. | DESCRIPTION | QTY | UNIT | MATERIAL | DATE |
|----------|---|-----|------|-----------|------|
| 157 | PENDANT 20 FT. (6.10M) | 1 | | 27686211 | |
| 158 | | | | | |
| 159 | INSERT 40 FT. (12.19M) #22(W/O JIB BKSTY) | 1 | | 50609-255 | |
| 160 | INSERT 40 FT. (12.19M) #22(W/O JIB BKSTY) | 1 | | 17875649 | |
| 162 | INSERT 40 FT. (12.19M) #22(W/JIB BKSTY) | 1 | | 62352655 | |
| 163 | INSERT 40 FT. (12.19M) #22(W/JIB BKSTY) | 1 | | 17879349 | |
| 165 | PENDANT 40 FT. (12.19M) | 1 | | 27686311 | |
| 167 | TIMBER | 1 | | 192013 | |
| 168 | TIMBER | 1 | | 1920148 | |

| ITEM NO. | DESCRIPTION | QTY | UNIT | MATERIAL | DATE |
|----------|---|-----|------|-----------|------|
| 142 | BOOM BUTT #22E | 1 | | 17696725 | |
| 143 | MOD. TO BOOM BUTT #22E (AUX. DRUM) | 1 | | 17729025 | |
| 144 | MOD. TO BOOM BUTT #22E (176967) | 1 | | 42126254 | |
| 145 | MOD. TO BOOM BUTT #22E (177290) | 1 | | 42126254 | |
| 146 | | | | | |
| 147 | INSERT 10 FT. (3.05M) #22 | 1 | | 33407-317 | |
| 148 | INSERT 10 FT. (3.05M) #22E (AUX. DRUM) | 1 | | 17729125 | |
| 149 | INSERT 10 FT. (3.05M) #22E | 1 | | 17875849 | |
| 150 | | | | | |
| 151 | PENDANT 10 FT. (3.05M) | 1 | | 27686111 | |
| 152 | INSERT 20 FT. (6.10M) #22(W/O JIB BKSTY) | 1 | | 33426-317 | |
| 153 | INSERT 20 FT. (6.10M) #22(W/O JIB BKSTY) | 1 | | 17875749 | |
| 154 | INSERT 20 FT. (6.10M) #22(W/JIB BACKSTAY) | 1 | | 62358011 | |
| 155 | INSERT 20 FT. (6.10M) #22(W/JIB BACKSTAY) | 1 | | 17879449 | |
| 156 | | | | | |

| ITEM NO. | DESCRIPTION | QTY | UNIT | MATERIAL | DATE |
|----------|-------------------------------------|-----|------|-----------|------|
| 117 | BOOM SIGN | 1 | | 22656 | |
| 118 | BOOM TOP 40 FT. #22L | 1 | | 196142 6 | |
| 119 | GANTRY ASSEMBLY | 1 | | 176396 | |
| 120 | MAST ASSEMBLY | 1 | | 176397 | |
| 121 | WIRE ROPE GUIDE ASSEMBLY | 1 | | 176985 | |
| 122 | PENDANT LINK | 1 | | 177209 | |
| 123 | LOWER BOOM POINT SHAFT ASSEMBLY | 1 | | 177042 7 | |
| 124 | PENDANT BASIC 36 FT. -6.00 (11.1 M) | 1 | | 277425 12 | |
| 125 | BOOM STOP ASSEMBLY | 1 | | 176601 | |
| 126 | CLAMP | 1 | | 345678 | |
| 127 | TIMBER | 1 | | 176831 | |
| 128 | | | | | |
| 129 | | | | | |
| 130 | SCREW CAP HEX .50-13UNC X 5.50 LG. | 1 | | 612583 | |
| 131 | WASHER FLAT .50 | 1 | | 709460 | |
| 132 | BOOM ANGLE INDICATOR ASSEMBLY | 1 | | 168779 | |
| 133 | | | | | |
| 134 | WIRE ROPE GUIDE ASSEMBLY | 1 | | 177191 | |
| 135 | PIN | 1 | | 177242 | |
| 136 | LINK | 1 | | 17760940 | |
| 137 | PIN | 1 | | 17761340 | |
| 138 | TIMBER (TOP) | 1 | | 177236 | |
| 139 | | | | | |
| 140 | | | | | |
| 141 | | | | | |

| ITEM NO. | DESCRIPTION | QTY | UNIT | MATERIAL | DATE |
|----------|-------------|-----|------|----------|------|
| 88 | 2 PIN | 1 | | 17069022 | |
| 89 | | | | | |

| ITEM NO. | DESCRIPTION | QTY | UNIT | MATERIAL | DATE |
|---|--------------------------|-----|------|----------|------|
| 1610-0000 | BASIC JIB 70 FT. (21.3M) | 1 | | | |
| SEE TABLE OF COMPONENTS FOR VARIOUS JIB LENGTHS | | | | | |



SEE TABLE OF COMPONENTS FOR VARIOUS BOOM LENGTHS

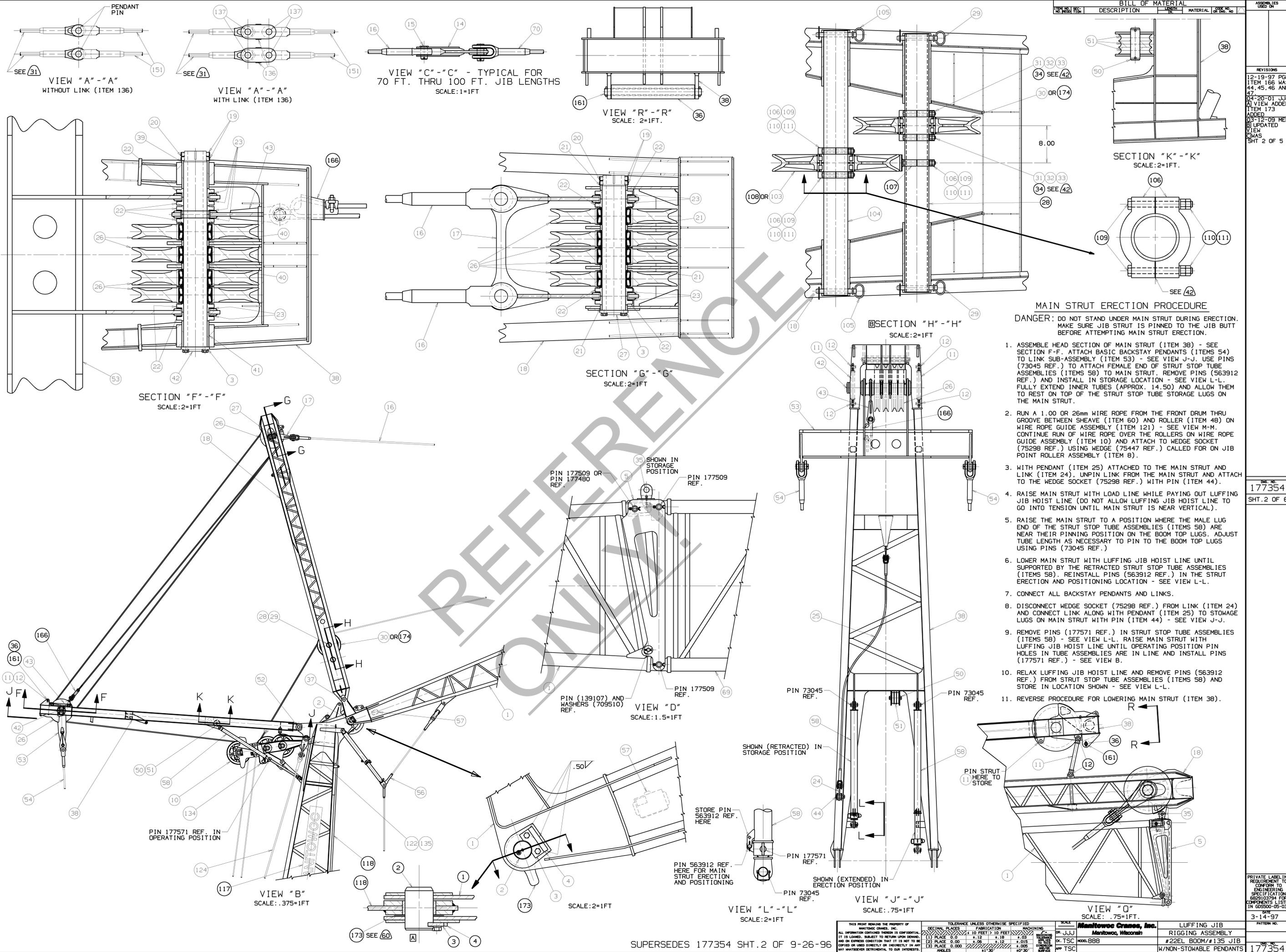
| ITEM NO. | DESCRIPTION | QTY | UNIT | MATERIAL | DATE |
|----------|-------------------------------------|-----|------|-----------|------|
| 117 | BOOM SIGN | 1 | | 22656 | |
| 118 | BOOM TOP 40 FT. #22L | 1 | | 196142 6 | |
| 119 | GANTRY ASSEMBLY | 1 | | 176396 | |
| 120 | MAST ASSEMBLY | 1 | | 176397 | |
| 121 | WIRE ROPE GUIDE ASSEMBLY | 1 | | 176985 | |
| 122 | PENDANT LINK | 1 | | 177209 | |
| 123 | LOWER BOOM POINT SHAFT ASSEMBLY | 1 | | 177042 7 | |
| 124 | PENDANT BASIC 36 FT. -6.00 (11.1 M) | 1 | | 277425 12 | |
| 125 | BOOM STOP ASSEMBLY | 1 | | 176601 | |
| 126 | CLAMP | 1 | | 345678 | |
| 127 | TIMBER | 1 | | 176831 | |
| 128 | | | | | |
| 129 | | | | | |
| 130 | SCREW CAP HEX .50-13UNC X 5.50 LG. | 1 | | 612583 | |
| 131 | WASHER FLAT .50 | 1 | | 709460 | |
| 132 | BOOM ANGLE INDICATOR ASSEMBLY | 1 | | 168779 | |
| 133 | | | | | |
| 134 | WIRE ROPE GUIDE ASSEMBLY | 1 | | 177191 | |
| 135 | PIN | 1 | | 177242 | |
| 136 | LINK | 1 | | 17760940 | |
| 137 | PIN | 1 | | 17761340 | |
| 138 | TIMBER (TOP) | 1 | | 177236 | |
| 139 | | | | | |
| 140 | | | | | |
| 141 | | | | | |

INSERTS, PENDANTS, ROLLER GUIDES, LINKS & PINS REQ'D. FOR VARIOUS JIB LENGTHS

| ITEM NO. | JIB LENGTHS | | 63 | | 69 | | 75 OR 81 | | 64 DWG 78145 | | 70 DWG 78145 | | 76 OR 82 DWG. 78145 | | 66 | | 175 | | 176 | | 177 | | 67 | | 14 | | 15 | |
|----------|-------------|--------|---------------------|---------------------|----------------------|----------------------|----------------------|-----------------------|----------------------|----------------------|-----------------------|------------------|---------------------|-----------------|------------------|----------------|----------------------------|-----|-----|--|-----|--|----|--|----|--|----|--|
| | FEET | METERS | 10 FT 3.05 M INSERT | 20 FT 6.10 M INSERT | 40 FT 12.19 M INSERT | 10 FT 3.05 M PENDANT | 20 FT 6.10 M PENDANT | 40 FT 12.19 M PENDANT | 10 FT 3.05 M PENDANT | 20 FT 6.10 M PENDANT | 40 FT 12.19 M PENDANT | WIRE ROPE TIMBER | HHCS | AK HEX LOCK NUT | AL F WASHER SHIM | BOOM JOINT PIN | PENDANT LINK 24.00 (610mm) | PIN | | | | | | | | | | |
| 70 | 21.3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 4 | 4 | 4 | 2 | 2 | | | | | | | | | | | |
| 80 | 24.4 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 8 | 8 | 8 | 8 | 2 | 2 | | | | | | | | | | | |
| 90 | 27.4 | OR 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 8 | 8 | 8 | 8 | 2 | 2 | | | | | | | | | | | |
| 100 | 30.5 | OR 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 12 | 12 | 12 | 12 | 2 | 2 | | | | | | | | | | | |
| 110 | 33.5 | OR 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 12 | 12 | 12 | 8 | 0 | 0 | | | | | | | | | | | |
| 120 | 36.6 | OR 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 4 | 16 | 16 | 16 | 12 | 0 | 0 | | | | | | | | | | | |
| 130 | 39.6 | OR 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 16 | 16 | 16 | 12 | 0 | 0 | | | | | | | | | | | |
| 140 | 42.7 | OR 1 | 2 | 1 | 2 | 4 | 4 | 4 | 4 | 4 | 5 | 20 | 20 | 20 | 16 | 0 | 0 | | | | | | | | | | | |
| 150 | 45.7 | OR 1 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 5 | 20 | 20 | 20 | 12 | 0 | 0 | | | | | | | | | | | |
| 160 | 48.8 | OR 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 6 | 24 | 24 | 24 | 16 | 0 | 0 | | | | | | | | | | | |
| 170 | 51.8 | OR 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 24 | 24 | 24 | 16 | 0 | 0 | | | | | | | | | | | |

INSERTS, PENDANTS, AND ROLLER GUIDES REQUIRED FOR VARIOUS BOOM LENGTHS

| ITEM NO. | BOOM LENGTH | | 147, 148, 149 | | 152, 153, 154 OR 155 | | 159, 160, 162 OR 163 | | 151 DWG. 76280 | | 157 DWG. 76280 | | 165 DWG. 76280 | | 167 OR 168 | | 136 | | 137 | | 91 & 96 | | 97 | | 98 | | 90 | | 93 | | 87 | | 15 & 88 | |
|----------|-------------|--------|------------------------------|------------------------------|------------------------------|----------------------|----------------------|-----------------------|------------------|------------------|----------------|-------------------------------|-------------------------------|--------------------------------|----------------------------|----------------------------|----------------------------|-----|-----|---|---------|---|----|---|----|---|----|---|----|---|----|---|---------|--|
| | FEET | METERS | 10 FT 3.05 M INSERT SEE (17) | 20 FT 6.10 M INSERT SEE (18) | 40 FT 12.19 M INSERT SEE (3) | 10 FT 3.05 M PENDANT | 20 FT 6.10 M PENDANT | 40 FT 12.19 M PENDANT | WIRE ROPE TIMBER | 9.00 0.23 M LINK | PIN | 10 FT 3.05 M PENDANT SEE (39) | 20 FT 6.10 M PENDANT SEE (39) | 40 FT 12.19 M PENDANT SEE (39) | PENDANT LINK 39.00 (991mm) | PENDANT LINK 11.00 (279mm) | PENDANT LINK 24.00 (610mm) | PIN | | | | | | | | | | | | | | | | |
| 70 | 21.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | | | |
| 80 | 24.4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | OR 4 | 0 | 0 | 0 | OR 2 | 0 | 0 | 0 | 0 | 0 | OR 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | | | |
| 90 | 27.4 | OR 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | OR 2 | 0 | 0 | 0 | OR 2 | 0 | 0 | 0 | 0 | 0 | OR 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | | |
| 100 | 30.5 | OR 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | OR 2 | 0 | 0 | 0 | OR 2 | 0 | 0 | 0 | 0 | 0 | OR 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | | |
| 110 | 33.5 | OR 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | OR 4 | 0 | 0 | 0 | OR 4 | 0 | 0 | 0 | 0 | 0 | OR 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | | |
| 120 | 36.6 | OR 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | OR 2 | 0 | 0 | 0 | OR 2 | 0 | 0 | 0 | 0 | 0 | OR 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | | |
| 130 | 39.6 | OR 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | OR 4 | 0 | 0 | 0 | OR 4 | 0 | 0 | 0 | 0 | 0 | OR 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | | |
| 140 | 42.7 | OR 1 | 1 | 1 | 1 | 4 | 4 | 4 | 4 | 4 | OR 3 | 0 | 0 | 0 | OR 6 | 0 | 0 | 0 | 0 | 0 | OR 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | | |
| 150 | 45.7 | OR 2 | 1 | 1 | 1 | 8 | 4 | 4 | 4 | 4 | OR 3 | 0 | 0 | 0 | OR 4 | 0 | 0 | 0 | 0 | 0 | OR 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | | |
| 160 | 48.8 | OR 1 | 2 | 1 | 1 | 4 | 8 | 4 | 4 | 4 | OR 4 | 0 | 0 | 0 | OR 4 | 0 | 0 | 0 | 0 | 0 | OR 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | | |
| 170 | 51.8 | OR 2 | 0 | 0 | 0 | 8 | 0 | 8 | 4 | 4 | OR 4 | 0 | 0 | 0 | OR 4 | 0 | 0 | 0 | 0 | 0 | OR 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | | |
| 180 | 54.9 | OR 1 | 1 | 1 | 2 | 4 | 4 | 4 | 4 | 4 | OR 5 | 0 | 0 | 0 | OR 4 | 0 | 0 | 0 | 0 | 0 | OR 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | | |
| 190 | 57.9 | OR 2 | 1 | 2 | 2 | 8 | 0 | 8 | 4 | 4 | OR 5 | 0 | 0 | 0 | OR 4 | 0 | 0 | 0 | 0 | 0 | OR 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | | |
| 200 | 61.0 | OR 1 | 2 | 2 | 3 | 0</ | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



| BILL OF MATERIAL | | | | ASSEMBLIES USED ON |
|------------------|----------|-------------|----------|--------------------|
| QTY | ITEM NO. | DESCRIPTION | MATERIAL | DATE |
| | | | | |

| REV | DATE | DESCRIPTION |
|----------|------|------------------------------|
| 12-19-97 | PGD | ITEM 166 WAS 44-45-46 AND 47 |
| 04-20-01 | JJU | ADDED ITEM 173 |
| 03-12-09 | MER | UPDATED |
| | | VIEW WAS |
| | | SHT 2 OF 5 |

MAIN STRUT ERECTION PROCEDURE
DANGER: DO NOT STAND UNDER MAIN STRUT DURING ERECTION. MAKE SURE JIB STRUT IS PINNED TO THE JIB BUTT BEFORE ATTEMPTING MAIN STRUT ERECTION.

- ASSEMBLE HEAD SECTION OF MAIN STRUT (ITEM 38) - SEE SECTION F-F ATTACH BASIC BACKSTAY PENDANTS (ITEMS 54) TO LINK SUB-ASSEMBLY (ITEM 53) - SEE VIEW J-J. USE PINS (73045 REF.) TO ATTACH FEMALE END OF STRUT STOP TUBE ASSEMBLIES (ITEMS 58) TO MAIN STRUT. REMOVE PINS (563912 REF.) AND INSTALL IN STORAGE LOCATION - SEE VIEW L-L. FULLY EXTEND INNER TUBES (APPROX. 14.50) AND ALLOW THEM TO REST ON TOP OF THE STRUT STOP TUBE STORAGE LUGS ON THE MAIN STRUT.
- RUN A 1.00 OR 26mm WIRE ROPE FROM THE FRONT DRUM THRU GROOVE BETWEEN SHEAVE (ITEM 60) AND ROLLER (ITEM 48) ON WIRE ROPE GUIDE ASSEMBLY (ITEM 121) - SEE VIEW M-M. CONTINUE RUN OF WIRE ROPE OVER THE ROLLERS ON WIRE ROPE GUIDE ASSEMBLY (ITEM 10) AND ATTACH TO WEDGE SOCKET (75298 REF.) USING WEDGE (75447 REF.) CALLED FOR ON JIB POINT ROLLER ASSEMBLY (ITEM 8).
- WITH PENDANT (ITEM 25) ATTACHED TO THE MAIN STRUT AND LINK (ITEM 24), UNPIN LINK FROM THE MAIN STRUT AND ATTACH TO THE WEDGE SOCKET (75298 REF.) WITH PIN (ITEM 44).
- RAISE MAIN STRUT WITH LOAD LINE WHILE PAYING OUT LUFFING JIB HOIST LINE (DO NOT ALLOW LUFFING JIB HOIST LINE TO GO INTO TENSION UNTIL MAIN STRUT IS NEAR VERTICAL).
- RAISE THE MAIN STRUT TO A POSITION WHERE THE MALE LUG END OF THE STRUT STOP TUBE ASSEMBLIES (ITEMS 58) ARE NEAR THEIR PINNING POSITION ON THE BOOM TOP LUGS. ADJUST TUBE LENGTH AS NECESSARY TO PIN TO THE BOOM TOP LUGS USING PINS (73045 REF.)
- LOWER MAIN STRUT WITH LUFFING JIB HOIST LINE UNTIL SUPPORTED BY THE RETRACTED STRUT STOP TUBE ASSEMBLIES (ITEMS 58). REINSTALL PINS (563912 REF.) IN THE STRUT ERECTION AND POSITIONING LOCATION - SEE VIEW L-L.
- CONNECT ALL BACKSTAY PENDANTS AND LINKS.
- DISCONNECT WEDGE SOCKET (75298 REF.) FROM LINK (ITEM 24) AND CONNECT LINK WITH PENDANT (ITEM 25) TO STORAGE LUGS ON MAIN STRUT WITH PIN (ITEM 44) - SEE VIEW J-J.
- REMOVE PINS (177571 REF.) IN STRUT STOP TUBE ASSEMBLIES (ITEMS 58) - SEE VIEW L-L. RAISE MAIN STRUT WITH LUFFING JIB HOIST LINE UNTIL OPERATING POSITION PIN HOLES IN TUBE ASSEMBLIES ARE IN LINE AND INSTALL PINS (177571 REF.) - SEE VIEW B.
- RELAX LUFFING JIB HOIST LINE AND REMOVE PINS (563912 REF.) FROM STRUT STOP TUBE ASSEMBLIES (ITEMS 58) AND STORE IN LOCATION SHOWN - SEE VIEW L-L.
- REVERSE PROCEDURE FOR LOWERING MAIN STRUT (ITEM 38).

177354
SHT.2 OF 6

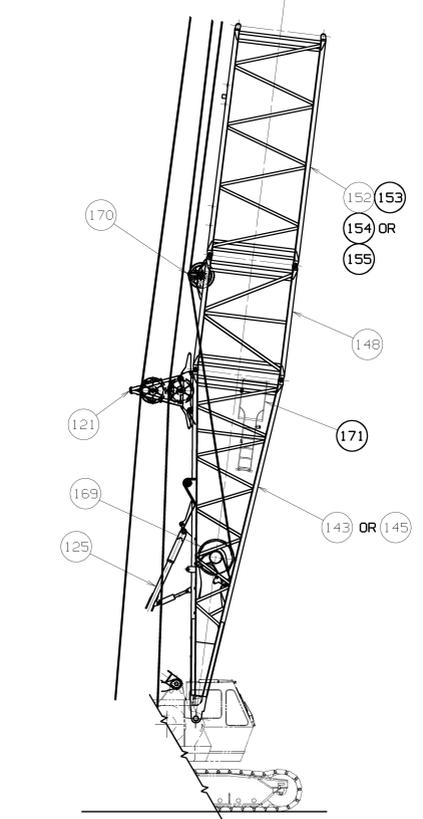
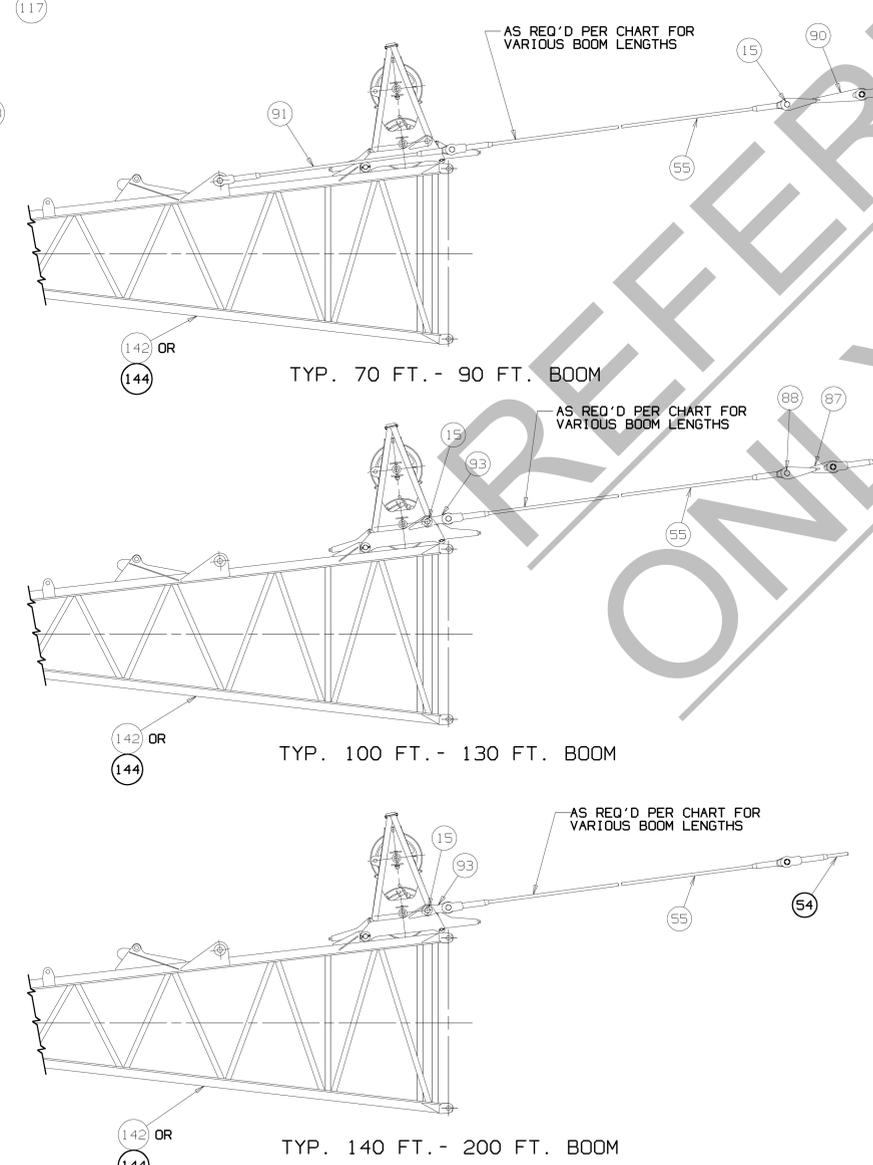
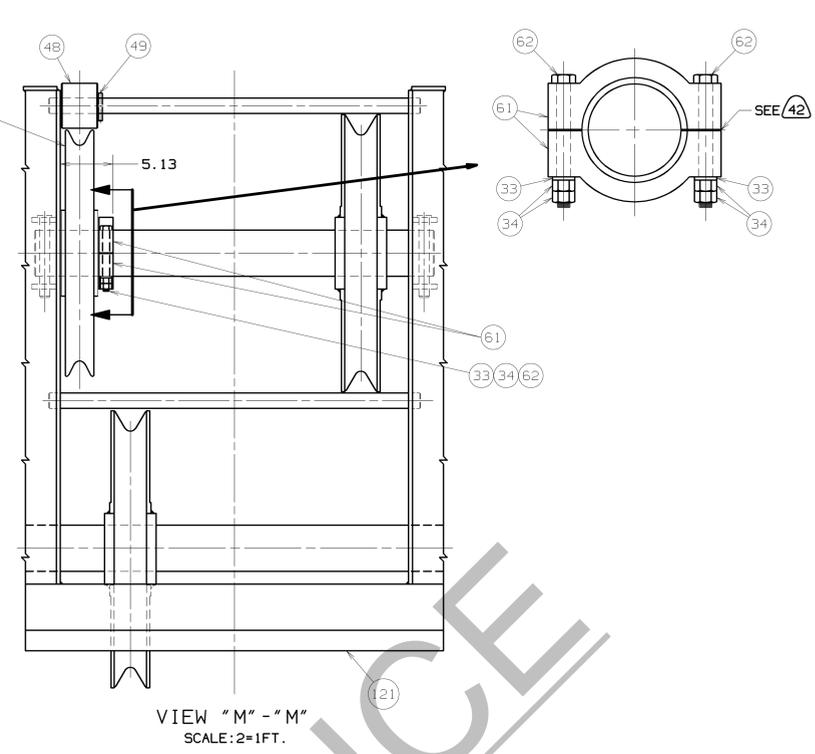
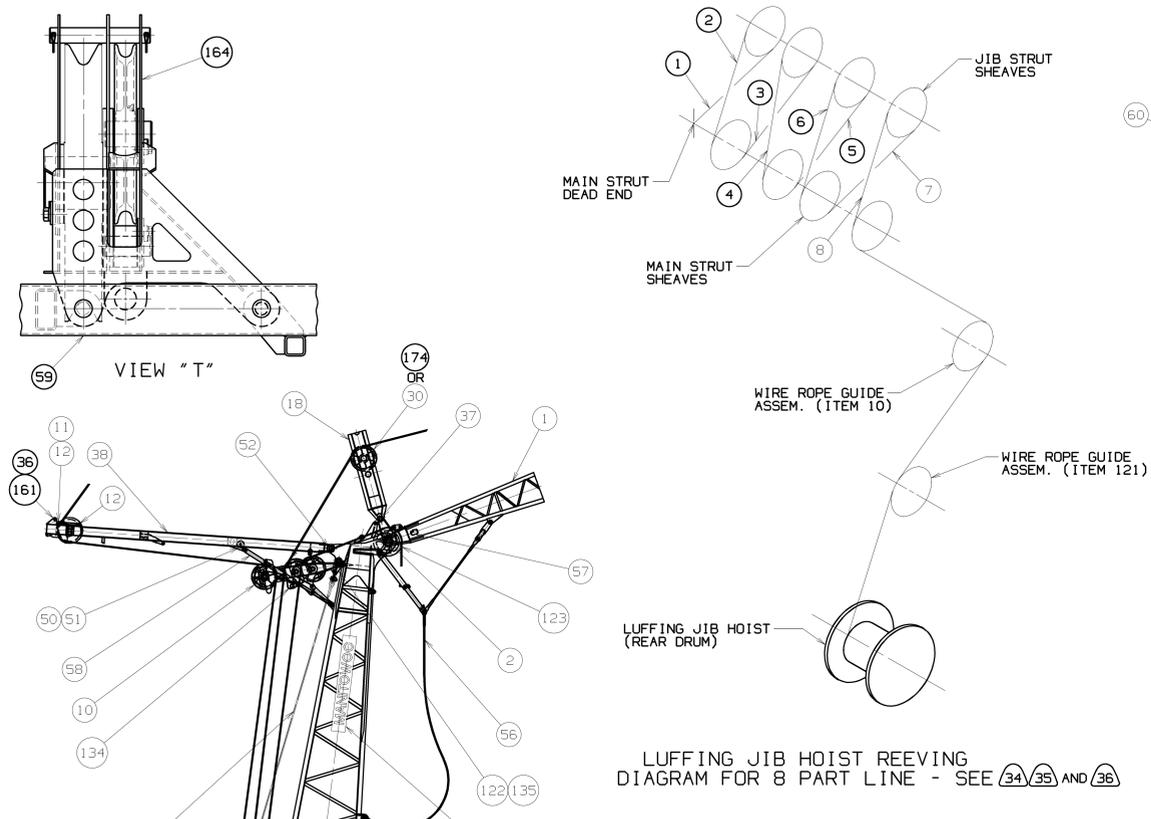
PRIVATE LABELING REQUIREMENT TO CONFORM TO ENGINEERING SPECIFICATION 6829103794 FOR COMPONENTS LISTED IN 025200-05-025
 DATE 3-14-97
 PATTERN NO.

| TOLERANCE UNLESS OTHERWISE SPECIFIED | | FABRICATION | | MACHINING | | SCALE | | DRAWN BY | | CHECKED BY | | APPROVED BY | | DATE | |
|--------------------------------------|-----------|-------------|-----------|-----------|-----------|-----------|-----------|----------|------|------------|---------|-------------|---------|---------|---------|
| DECIMAL PLACES | FRACTIONS | ± 10 FEET | ± 10 FEET | ± 10 FEET | ± 10 FEET | ± 10 FEET | ± 10 FEET | DR. | CHK. | APP. | DATE | DATE | DATE | DATE | DATE |
| (1) PLACE 0.0 | ± .12 | ± .18 | ± .12 | ± .18 | ± .015 | ± .015 | 1:1 | JJU | TSC | MODEL 888 | 3-14-97 | 3-14-97 | 3-14-97 | 3-14-97 | 3-14-97 |
| (2) PLACE 0.00 | ± .06 | ± .09 | ± .06 | ± .09 | ± .005 | ± .005 | 1:1 | | | | | | | | |
| (3) PLACE 0.000 | ± .003 | ± .004 | ± .003 | ± .004 | ± .0005 | ± .0005 | 1:1 | | | | | | | | |

SUPERSEDES 177354 SHT.2 OF 9-26-96

DO NOT SCALE THIS DRAWING

SHT.2 OF 6



#22EL BOOM/#135 JIB ASSEMBLY WITH AUX. DRUM SHAFT ASSEMBLY

- 41 REQUIRED FOR FOLD UNDER LUFFING JIB - MUST BE REMOVED FOR RAISING MAXIMUM BOOM/JIB COMBINATIONS. REFER TO LUFFING JIB RAISING PROCEDURE (7826A).
- 42 TIGHTEN EACH SIDE EQUALLY TO PROVIDE AN EQUAL GAP. TORQUE (ITEMS 32, 62 AND 109) TO 120 FT.LBS. AND ADD SECOND (ITEM 34 OR 111) AS A LOCKNUT. SEE VIEW M-M AND SECTION H-H.
- 43 ATTACHES TO BACKSTAY LUG ON BOOM BUTT.
- 44 MATERIAL- A-514
- 45 WHEN (ITEM 149) INSERT 10 FT. (3.05M) #22E IS USED, (2) TIMBERS (ITEM 168) ARE REQUIRED FOR STORAGE DURING SHIPPING BUT MUST BE REMOVED FOR CRANE OPERATION.
- 46 WHEN (ITEM 153 OR 155) INSERT 20 FT. (6.10M) #22E IS USED, (2) TIMBERS (ITEM 168) ARE REQUIRED FOR STORAGE DURING SHIPPING BUT MUST BE REMOVED FOR CRANE OPERATION. REINSTALL (1) TIMBER ON TOP OF INSERT CHORDS FOR CRANE OPERATION.
- 47 WHEN (ITEM 160 OR 163) INSERT 40 FT. (12.19M) #22E IS USED, (3) TIMBERS (ITEM 168) ARE REQUIRED FOR STORAGE DURING SHIPPING BUT MUST BE REMOVED FOR CRANE OPERATION. REINSTALL (2) TIMBERS ON TOP OF INSERT CHORDS FOR CRANE OPERATION.
- 48 SEE (45), (46) OR (47)
- 49 EQUIPPED WITH REMOVABLE DIAGONAL LACINGS.
- 50 INSERT (33407) 10 FT. (3.05M) CAN BE EQUIPPED WITH REMOVABLE DIAGONAL LACINGS PER MODIFICATION (421257).
- 51 INSERT (33426) 20 FT. (6.10M) CAN BE EQUIPPED WITH REMOVABLE DIAGONAL LACINGS PER MODIFICATION (421258).
- 52 INSERT (50609) 40 FT. (12.19M) CAN BE EQUIPPED WITH REMOVABLE DIAGONAL LACINGS PER MODIFICATION (421259).
- 53 FOR USE WITH FOLD UNDER LUFFING JIB WHEN BLOCK IS ATTACHED TO LOWER BOOM POINT (ITEM 123).
- 54 (421256) AND (421262) ARE #22E BOOM BUTT MODIFICATIONS FOR USE AS #22EL JIB BUTTS.
- 55 SEE (3), (19) AND (52)
- 56 BOLT TORQUE: (WITH LOCTITE #271) APPLY LOCTITE #271 (MCC CODE NO. 622292) TO THREADS OF CAPSCREWS WITH (ITEM 59) - SEE VIEW "S" AND TORQUE TO 180 FT. LBS.
- 57 WIRE ROPE WINCH ASSEMBLY (ITEM 112) IS REQUIRED FOR FOLD-UNDER LUFFING JIB AND CAN ONLY BE USED WITH WIRE ROPE GUIDE SINGLE SHEAVE BRACKET ASSEMBLY (ITEM 116).
- 58 WIRE ROPE GUIDE SINGLE SHEAVE BRACKET ASSEMBLY (ITEM 116) IS OPTIONAL FOR LAYOUT OR FOLD-UNDER LUFFING JIB.
- 59 WIRE ROPE GUIDE DOUBLE SHEAVE BRACKET ASSEMBLY (ITEM 164) IS OPTIONAL FOR LAYOUT LUFFING JIB BUT IS REQUIRED FOR USE WITH THE #138 JIB.
- 60 ADD SHIMS (ITEM 173) AS REQUIRED (IN AREA SHOWN) TO LIMIT LATERAL MOVEMENT OF JIB BUTT. USE AN EQUAL AMOUNT OF SHIMS ON BOTH SIDES TO CENTER JIB BUTT WITH BOOM TOP.

- 1 EXISTING 10 FT. (3.05M) BOOM INSERT (33407-2) CAN ALSO BE USED.
- 2 (33426-3) IS WITHOUT JIB BACKSTAY LUGS. (623580) IS WITH JIB BACKSTAY LUGS. EXISTING 20 FT. (6.10M) BOOM INSERT (623564) WITHOUT JIB BACKSTAY LUGS CAN ALSO BE USED.
- 3 (50609-2) IS WITHOUT JIB BACKSTAY LUGS. (623526) IS WITH JIB BACKSTAY LUGS. THE FOLLOWING EXISTING 40 FT. (12.19M) BOOM INSERTS CAN ALSO BE USED: (623532), (623533), (623534), (623535), (623536) AND (623537) ARE WITHOUT BACKSTAY LUGS. (623527), (623530) AND (623579) ARE WITH BACKSTAY LUGS.
- 4 IF #23 BOOM TOP (191029) IS TO BE USED AS THE #135 LUFFING JIB TOP, MODIFY PER (421224).
- 5 IF #22E BOOM BUTT (ITEM 142) IS NOT EQUIPPED WITH LUFFING JIB BACKSTAY LUGS, MODIFY PER (421226).
- 6 IF #22L BOOM TOP (ITEM 118) IS NOT EQUIPPED WITH LUFFING JIB STOP LUGS, MODIFY PER (421225).
- 7 (7) - 30.00 DIA. SHEAVES
- 8 ON DRAWING (78145).
- 9 ON DRAWING (147109).
- 10 ON DRAWING (79335).
- 11 ON DRAWING (76280).
- 12 ON DRAWING (140773).
- 13 TIGHTEN BEARING LOCKNUT (ITEM 19) SUFFICIENTLY TO CLAMP BEARING INNER RACE.
- 14 MAXIMUM NO. OF 10 FT. (3.05M) BOOM INSERTS = (2)
- 15 MAXIMUM NO. OF 20 FT. (6.10M) BOOM INSERTS = (2)
- 16 COMBINATIONS OF 10 FT. (3.05M) AND 20 FT. (6.10M) BOOM 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).
- 17 SEE (1), (4), (6) AND (50)
- 18 SEE (2), (15), (16) AND (51)
- 19 STARTING WITH THE BOOM OR JIB BUTT, INSERTS AND PENDANTS MUST BE ASSEMBLED IN ORDER OF ASCENDING LENGTH. THE SHORTER INSERTS AND PENDANTS MUST BE CLOSEST TO THE BOOM OR JIB BUTT.
- 20 REQUIRED FOR BASIC BACKSTAY PENDANT. ATTACHES TO LINK SUB-ASSEMBLY (ITEM 53).
- 21 REQUIRED FOR BASIC JIB PENDANT. ATTACHES TO THE JIB TOP (ITEM 6) LINK.
- 22 (ITEMS 67, 73, 79 & 85) ARE THE SAME PART NO. (70366). (ITEMS 66, 72, 78 & 84) ARE THE SAME PART NO. (192022). (ITEMS 15 & 88) ARE THE SAME PART NO. (170690). (ITEMS 14 & 87) ARE THE SAME PART NO. (177553). (ITEMS 64, 91 & 96) ARE THE SAME PART NO. (276823). (ITEMS 13, 70 & 97) ARE THE SAME PART NO. (276825). (ITEMS 76, 82 & 98) ARE THE SAME PART NO. (276892).
- 23 SEE (8), (21) AND (22)
- 24 SEE (8), (19) AND (22)
- 25 WHEN AUXILIARY DRUM SHAFT ASSEMBLY (ITEM 169) IS USED, #22E BOOM BUTT (ITEM 143 OR 145), WIRE ROPE GUIDE ASSEMBLY (ITEM 170) AND 10 FT. (3.05M) #22E INSERT (ITEM 148) ARE REQUIRED. THE 10 FT. INSERT MUST BE ADJACENT TO THE BOOM BUTT AT ALL TIMES. MINIMUM BOOM LENGTH USING THESE COMPONENTS IS 80 FT. (24.38M).
- 26 IF BOOM BUTT (ITEM 142) IS TO BE USED WITH AUXILIARY DRUM SHAFT ASSEMBLY (ITEM 169), MODIFY PER (421218).
- 27 ATTACHES TO BASIC PENDANT (ITEM 16) 25 FT.-11 (7.90M).
- 28 ATTACHES TO JIB STRUT LINK SUB-ASSEMBLY (ITEM 17).
- 29 INSTALL WITH HEAD OF PENDANT PIN (ITEM 9) TO THE INSIDE.
- 30 SEE VIEW "E" FOR VARIOUS JIB BACKSTAY PENDANT (ITEM 55) AND PENDANT LINK (ITEMS 87, 90 AND 93) ARRANGEMENTS.
- 31 PENDANTS SHOWN - SEE VIEW A-A ARE CALLED FOR ON MAST ASSEMBLY (ITEM 120).
- 32 REFER TO SPECIFIC CAPACITY CHART FOR APPROPRIATE BOOM AND JIB COMBINATIONS.
- 33 REFER TO LUFFING JIB RAISING PROCEDURE (7826A) FOR RAISING AND LOWERING BOOM AND JIB.
- 34 WIRE ROPE - 1.00 INCH X 850 FT. CONSTRUCTED. BREAKING STRENGTH OF 125,000 LBS. FOR USE WITH LAGGING (502382) ON REAR HOIST DRUM.
- 35 WIRE ROPE - 1.00 INCH X 850 FT. PYTHON 8F7KV RIGHT HAND REGULAR LAY. BREAKING STRENGTH OF 120,600 LBS. FOR USE WITH LAGGING (502382) ON REAR HOIST DRUM.
- 36 WIRE ROPE - 26MM X 850 FT. PYTHON 8F7KV RIGHT HAND REGULAR LAY. BREAKING STRENGTH OF 126,400 LBS. FOR USE WITH LAGGING (502372) ON REAR HOIST DRUM.
- 37 REAR DRUM MUST BE EQUIPPED WITH A LAGGING WHEN USED AS THE LUFFING HOIST. THE RECOMMENDED LAGGING FOR SPECIFIC WIRE ROPE DIA. MUST BE USED.
- 38 USE (4) PINS (70366) FROM INSERT ADJACENT TO ADAPTER ASSEMBLY (ITEM 5) FOR JIB TOP CONNECTION.
- 39 10 FT.-1.00 (3.07M) PENDANT (277382), 20 FT.-1.50 (6.13M) PENDANT (277383) AND 40 FT.-3.00 (12.27M) PENDANT (277384) MAY BE USED IN PLACE OF 10 FT. (3.05M) PENDANT (276823), 20 FT. (6.10M) PENDANT (276825) AND 40 FT. (12.19M) PENDANT (276892) FOR JIB/JIB BACKSTAY. DO NOT MIX PENDANTS OF DIFFERENT LENGTHS. PENDANTS MUST BE INSTALLED IN MATCHED SETS (PENDANTS ON ONE SIDE OF BOOM MUST MATCH LENGTH OF PENDANTS ON OTHER SIDE OF BOOM). FAILING TO OBSERVE THIS PRECAUTION WILL CAUSE MAST TO TWIST EXCESSIVELY WHEN BOOM IS RAISED. STRUCTURAL DAMAGE TO MAST OR BOOM WILL OCCUR.
- 40 LINKS (ITEM 136) AND PINS (ITEM 137) ARE REQUIRED FOR BOOM LENGTHS OF 190 FT. (57.91M) AND LONGER - SEE VIEWS A-A.

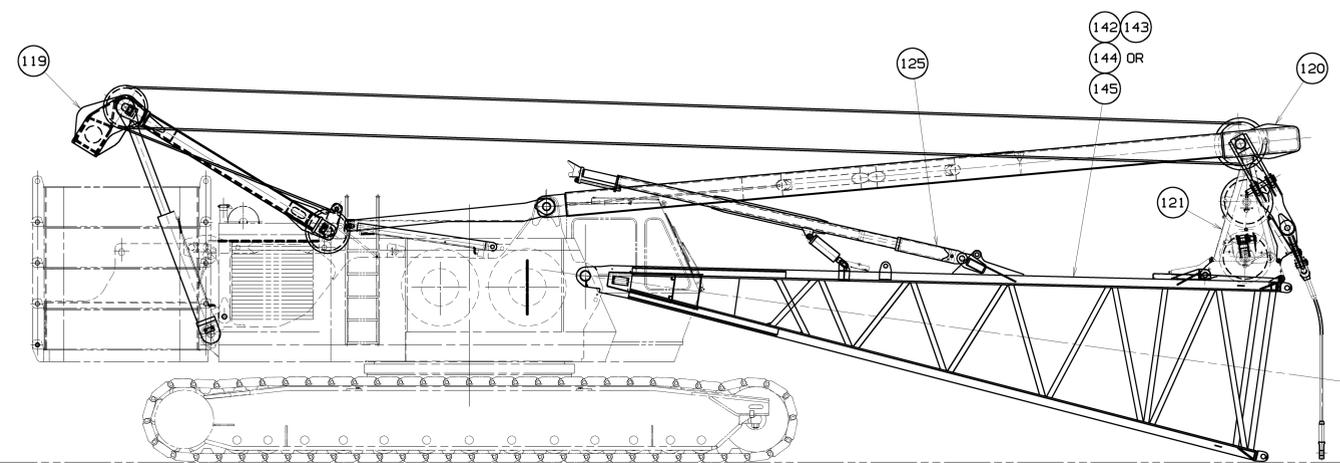
REVISIONS

| | | |
|----------|-----|--|
| 6-13-97 | JJU | ADDED VIEW 7 |
| 11-19-98 | KLW | REPLAS 79324 WITH TIMBERS (ITEM 168) WERE ROLLERS (ITEM 167) |
| 04-20-01 | JJU | ADDED VIEW 1 |
| 03-12-09 | MER | UPDATED VIEW 1 |
| | | WAS SHT 3 OF 5 |

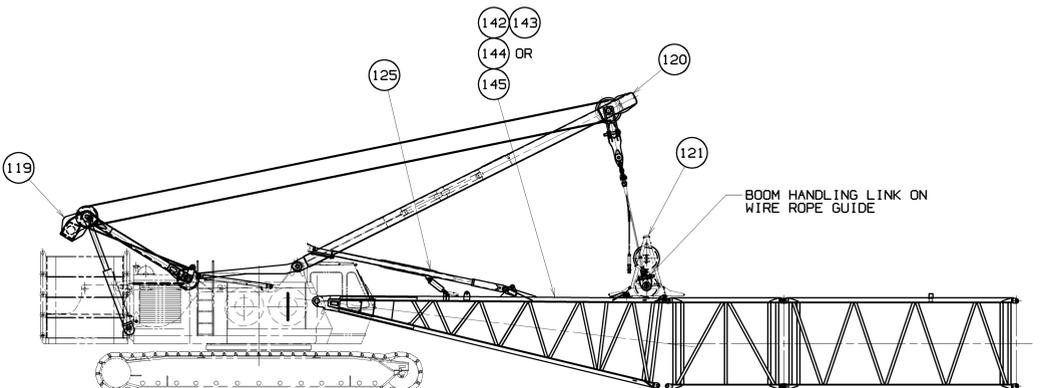
177354
SHT 3 OF 6

SUPERSEDES 177354 SHT.3 OF 9-26-96

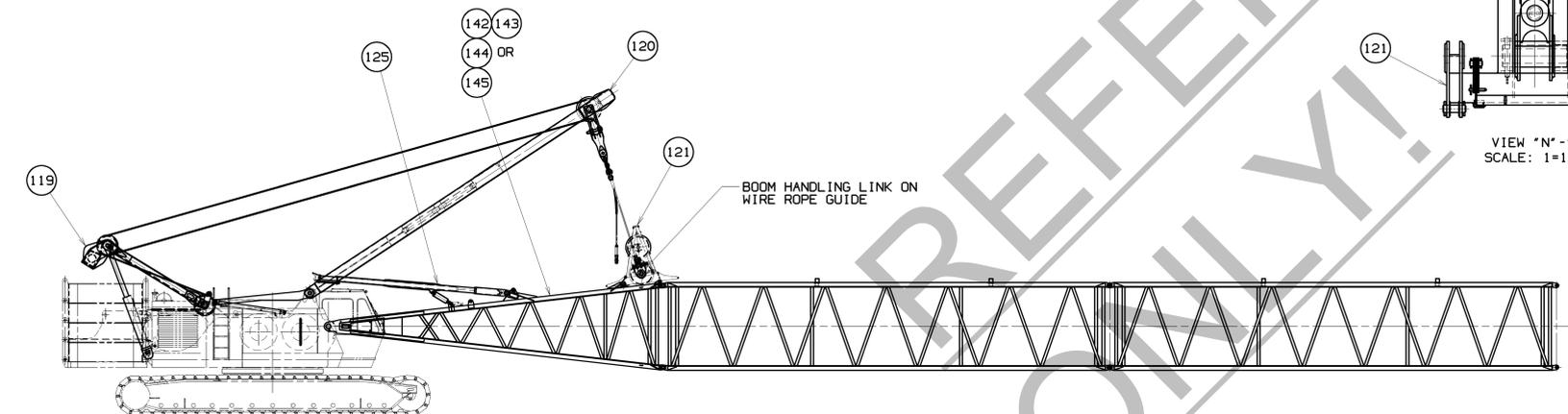
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|---|-----------|--------------------------------------|--------|---------------------|--------|-------------------------|--------|-------------|--------|
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| DECIMAL PLACES | FRACTIONS | ANGLE | ± .12 | ± .18 | ± .015 | ± .015 | ± .015 | ± .015 | ± .015 |
| (1) PLACE | 0.00 | ± .06 | ± .12 | ± .18 | ± .015 | ± .015 | ± .015 | ± .015 | ± .015 |
| (2) PLACE | 0.00 | ± .06 | ± .12 | ± .18 | ± .015 | ± .015 | ± .015 | ± .015 | ± .015 |
| (3) PLACE | 0.000 | ± .006 | ± .012 | ± .018 | ± .005 | ± .005 | ± .005 | ± .005 | ± .005 |
| ANGLE | | ± 30' | ± 30' | ± 30' | ± 30' | ± 30' | ± 30' | ± 30' | ± 30' |
| DR: JJU | | FABRICATION | | SCALE | | DATE | | PATTERN NO. | |
| CK: TSC | | MANTOVOC CRANES, INC. | | 177354 | | 9-26-96 | | 177354 | |
| APP: TSC | | RIGGING ASSEMBLY | | #22EL BOOM/#135 JIB | | W/NON-STOWABLE PENDANTS | | 177354 | |



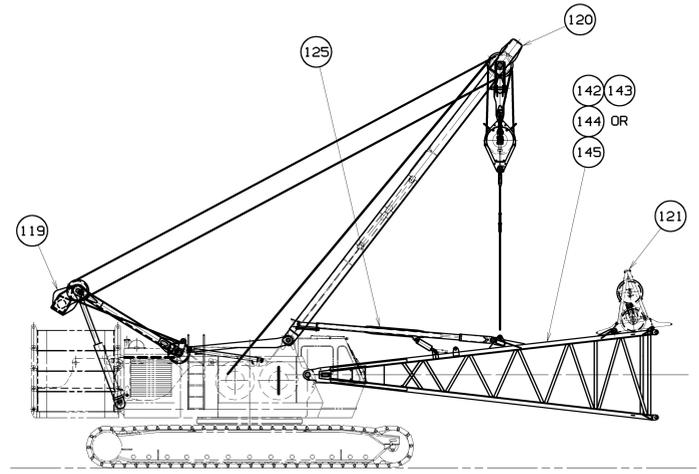
MAST RESTING ON BOOM BUTT WIRE ROPE GUIDE



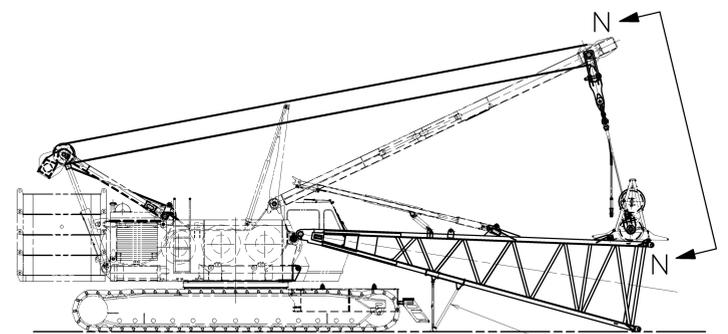
BOOM ASSEMBLY WITH MAST



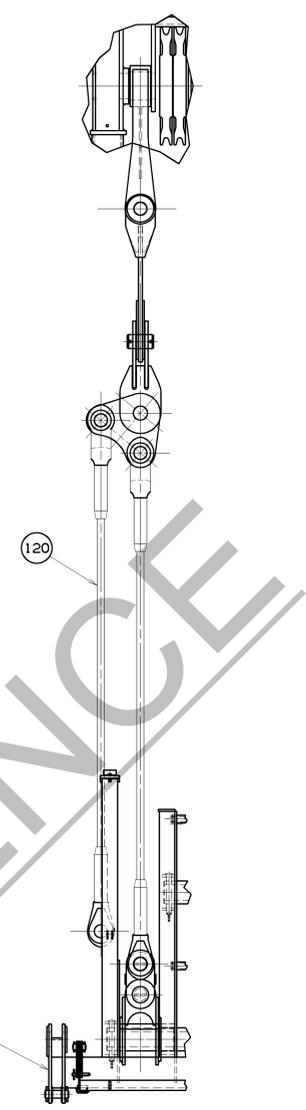
BOOM HANDLING WITH MAST



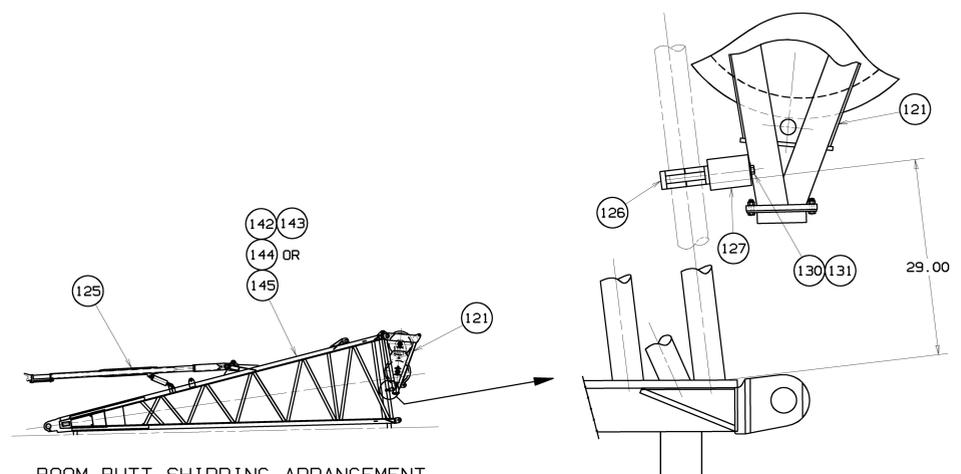
ATTACHING BOOM BUTT TO ROTATING BED USING AUXILIARY BLOCK IN MAST.



ATTACHING BOOM BUTT TO ROTATING BED USING OPTIONAL BUTT ATTACHING ASSEMBLY.



VIEW "N"-"N"
SCALE: 1=1FT.



BOOM BUTT SHIPPING ARRANGEMENT

- ### BOOM ASSEMBLY PROCEDURE
- (MAST CAN BE USED TO ASSEMBLE ALL RIGGING COMPONENTS.)
- ASSEMBLE BOOM COMPLETE, WITHOUT BUTT.
 - ATTACH ROPE GUIDES, PENDANTS, LINKS AND PINS AS REQ'D.
 - USING THE MAST WITH AUXILIARY BLOCK OR THE OPTIONAL BOOM BUTT SUPPORT, INSTALL THE BOOM BUTT WITH ROPE GUIDE AND BOOM STOPS TO ROTATING BED. (BOOM STOPS MUST BE IN SHIPPING (LOWER) POSITION.)
 - BOOM DOWN AND ATTACH INSIDE MAST PENDANT TO BOOM HANDLING LINK ON ROPE GUIDE (ITEM 121) - SEE VIEW "N"-"N"
 - BOOM UP TO CLEAR GROUND WITH BUTT.
 - POSITION MACHINE TO ALIGN UPPER PIN CONNECTOR HOLES ON BOOM BUTT WITH UPPER PIN CONNECTOR HOLES ON FIRST BOOM INSERT AND INSERT PINS.
 - SLOWLY BOOM UP TO ALIGN LOWER PIN CONNECTOR HOLES ON BOOM BUTT WITH LOWER PIN CONNECTOR HOLES IN FIRST BOOM INSERT AND INSERT PINS.

- WARNING:**
DO NOT BOOM UP PAST LOWER CONNECTOR HOLES. IF BOOMING UP CONTINUES AFTER CONNECTORS BOTTOM OUT OR AFTER PINS ARE INSERTED, DAMAGE TO ROPE GUIDE AND BOOM BUTT WILL OCCUR.
- BOOM DOWN TO DISCONNECT MAST PENDANT FROM ROPE GUIDE LINKS.
 - ATTACH MAST PENDANT TO BOOM PENDANTS.
 - BOOM UP TO REMOVE SOME SLACK FROM PENDANTS.
 - CONNECT AIR SUPPLY TO BOOM STOPS AND RAISE BOOM STOPS INTO POSITION. ROTATE CYLINDER BRACKET INTO POSITION AND PIN.
 - BOOM UP TO DESIRED BOOM ANGLE.

- ### TO DISASSEMBLE BOOM
- BOOM DOWN AND SUPPORT BOOM ON BLOCKING.
 - DISCONNECT BOOM STOP AIR LINES ETC.
 - DISCONNECT MAST PENDANT FROM BOOM PENDANTS
 - CONNECT INSIDE MAST PENDANTS TO HANDLING LINK ON ROPE GUIDE (ITEM 121) - SEE VIEW "N"-"N"
 - BOOM UP TO REMOVE SLACK FROM MAST PENDANT.
- WARNING:**
DO NOT BOOM UP TO PUT TENSION INTO MAST PENDANT. (REMOVE SLACK ONLY) TENSION IN MAST PENDANT WILL DAMAGE ROPE GUIDE AND BOOM BUTT.
- REMOVE LOWER AND THEN UPPER BOOM BUTT CONNECTOR TO BOOM INSERT CONNECTOR PINS.
 - SLOWLY BOOM UP TO SUPPORT BOOM BUTT WITH MAST PENDANT AND BACK AWAY FROM BOOM.
 - REMOVE BOOM BUTT FROM ROTATING BED WITH MAST.
 - DISASSEMBLE BOOM WITH MAST.

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. (12.2 M) | 2 | 1 | 0 |
| 50 FT. (15.2 M) | 1 | 2 | 0 |
| 60 FT. (18.3 M) | 2 | 0 | 1 |
| 60 FT. (18.3 M) | 0 | 1 | 1 |
| 80 FT. (24.4 M) | 0 | 0 | 2 |

REVISIONS
 1-19-98 DW
 A HAS ITEM 168
 03-12-05 MER
 81MAS
 SHT 4 OF 5

DWG. NO.
 177354
 SHT. 4 OF 6

PRIVATE LABELING
 REQUIREMENT TO
 CONFORM TO
 ENGINEERING
 SPECIFICATION
 6829103794 FOR
 COMPONENTS LISTED
 IN 682901-08-026
 DATE
 3-14-97
 PATTERN NO.

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| DECIMAL PLACES | FABRICATION | MACHINING |
|-----------------------------------|-------------------|-------------------|
| (1) PLACE 0.0 ±.12 ±.18 ±.03 | ±.12 ±.18 ±.03 | ±.015 ±.025 ±.015 |
| (2) PLACE 0.00 ±.06 ±.08 ±.015 | ±.06 ±.08 ±.015 | ±.005 ±.010 ±.005 |
| (3) PLACE 0.000 ±.006 ±.008 ±.005 | ±.006 ±.008 ±.005 | ±.000 ±.002 ±.000 |

SCALE: **Manitowoc Cranes, Inc.** LUFFING JIB
Manitowoc, Wisconsin RIGGING ASSEMBLY
 DR: JJJ
 CK: TSC MODEL 888
 APP: TSC

SUPERSEDES 177354 SHT. 4 OF 3-1-96

#22EL BOOM/#135 JIB
 W/NON-STOWABLE PENDANTS

DWG. NO.
 177354
 SHT. 4 OF 6

FOLD-UNDER LUFFING JIB RAISING CONDITIONS
 (SEE LUFFING JIB RAISING PROCEDURE 7826-A)

- NOTE: THE FOLLOWING IS REQUIRED FOR FOLD-UNDER OPERATION.
- A) WIRE ROPE GUIDE ASSEMBLY (ITEM 114) MUST BE INSTALLED.
 - B) ADAPTER ASSEMBLY (ITEM 5) MUST BE EQUIPPED WITH PIN PULLER COMPONENTS CALLED FOR ON (ITEM 5 REF.).
 - C) WIRE ROPE WINCH ASSEMBLY (ITEM 112) AND WIRE ROPE GUIDE SINGLE SHEAVE BRACKET ASSEMBLY (ITEM 116) MUST BE INSTALLED.

NOTE: WHEN JIB BUTT IS FOLDED UNDER BOOM TOP (JIB PENDANTS NOT ATTACHED) USE CAUTION DURING ASSEMBLY AND RAISING OR LOWERING OF JIB THAT JIB STRUT DOES NOT CRASH INTO WIRE ROPE GUIDE ON FRONT OF BOOM TOP OR DAMAGE WILL OCCUR (SEE VIEW "P").

BOOM UP UNTIL THERE IS ENOUGH CLEARANCE FOR WIRE ROPE GUIDE MOUNTED TO THE JIB TOP TO BE LOWERED WITH THE POSITIONING WINCH AND PINNED IN ITS WORKING POSITION. CONTINUE TO BOOM UP UNTIL JIB STRUT CAN HANG APPROXIMATELY VERTICAL. CONNECT JIB PENDANTS AND LINKS TO JIB POINT AND JIB STRUT TOP (EXCESS PENDANT SLACK SHOULD BE AT THE JIB STRUT END). LUFF UP TO REMOVE EXCESS JIB PENDANT SLACK ONLY (NEVER PUT JIB PENDANTS INTO TENSION). CONTINUE TO BOOM UP AND PERIODICALLY LUFF UP TO REMOVE EXCESS JIB PENDANT SLACK.

CAUTION: FAILURE TO MAINTAIN A MINIMUM ANGLE OF 74° BETWEEN JIB BUTT AND JIB STRUT WHILE RAISING MAY CAUSE JIB STRUT TO SNAP OVER CENTER AND CRASH THE JIB BUTT CAUSING DAMAGE.

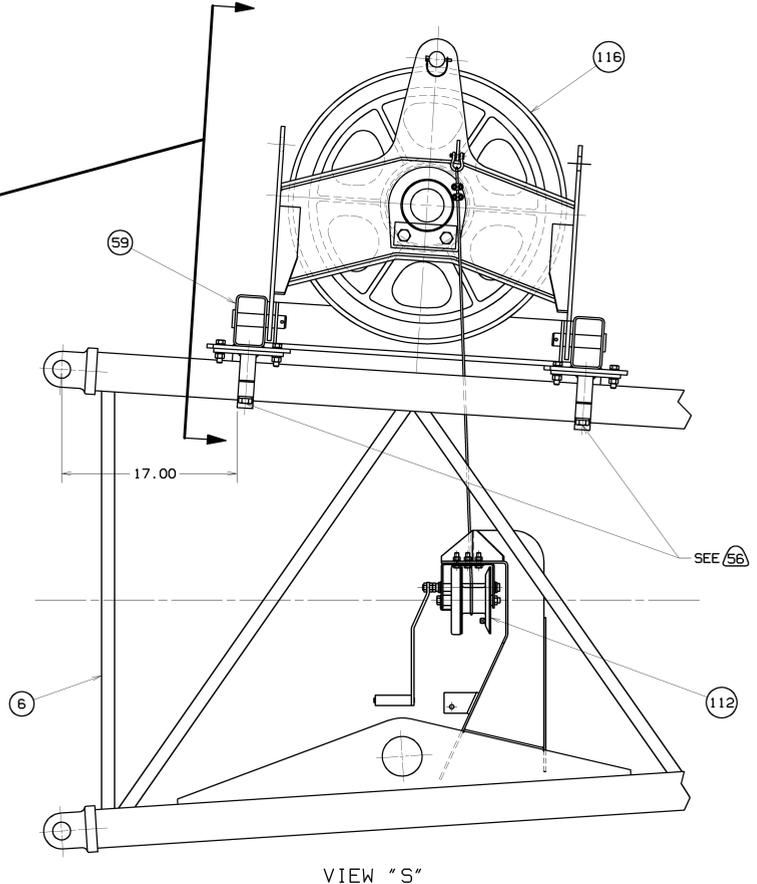
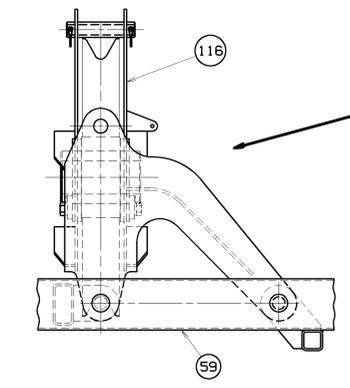
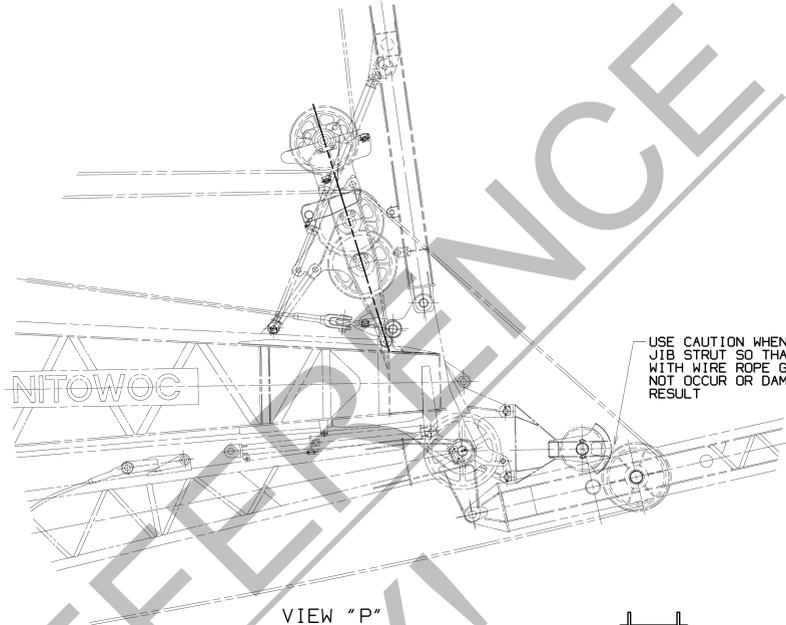
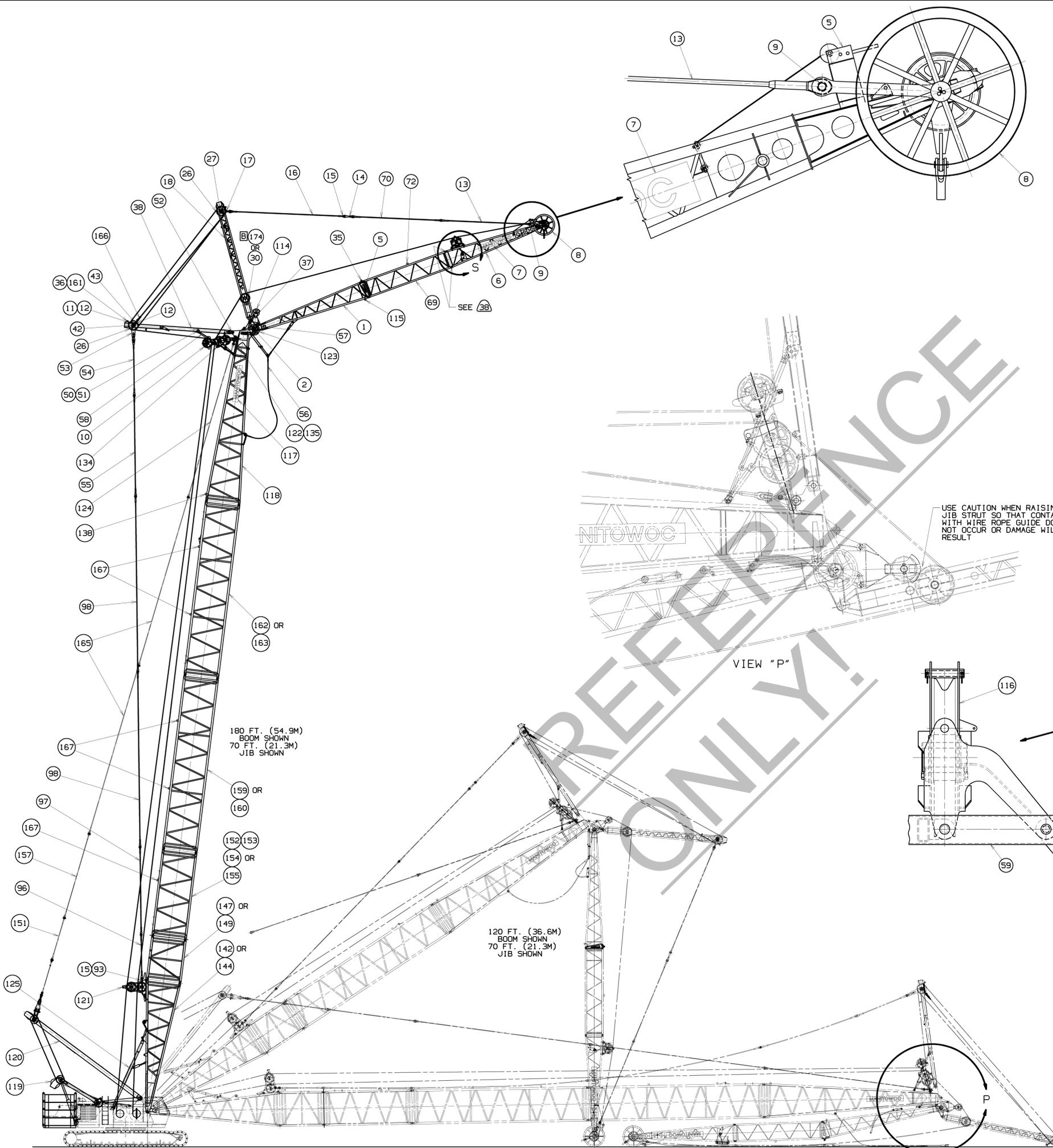
NOTE: MAXIMUM BOOM ANGLE ALLOWED WITH JIB HANGING VERTICAL IS 75°.

INSTALL BLOCK/HOOK AND WEIGHT BALL. CONTINUE TO BOOM UP TO DESIRED ANGLE AND LUFF UP TO DESIRED WORKING RADIUS (SEE LUFFING JIB RAISING PROCEDURE 7826-A FOR BOOM TO JIB ANGLE REQUIREMENTS).

NOTE: REVERSE SEQUENCE TO LOWER AND FOLD LUFFING JIB. BOOM TO JIB CLEARANCE WILL DETERMINE TO WHAT DEGREE BOOM AND JIB CAN BE LOWERED. CLEARANCE POINTS WILL VARY DEPENDING ON BOOM/JIB COMBINATION, GROUND CONDITIONS AND BLOCKING USED. CLEARANCE POINTS AT JIB STOP STRUT TO JIB BUTT AND BOOM TOP, JIB INSERT TO BOOM LACING, JIB POINT WHEEL TO BOOM LACING AND JIB TOP WIRE ROPE GUIDE ASSEMBLY TO GROUND SHOULD BE MONITORED AS BOOM/JIB IS LOWERED. A MEANS TO START JIB UNDER BOOM WHEN FOLDING MAY BE REQUIRED.

REVISIONS

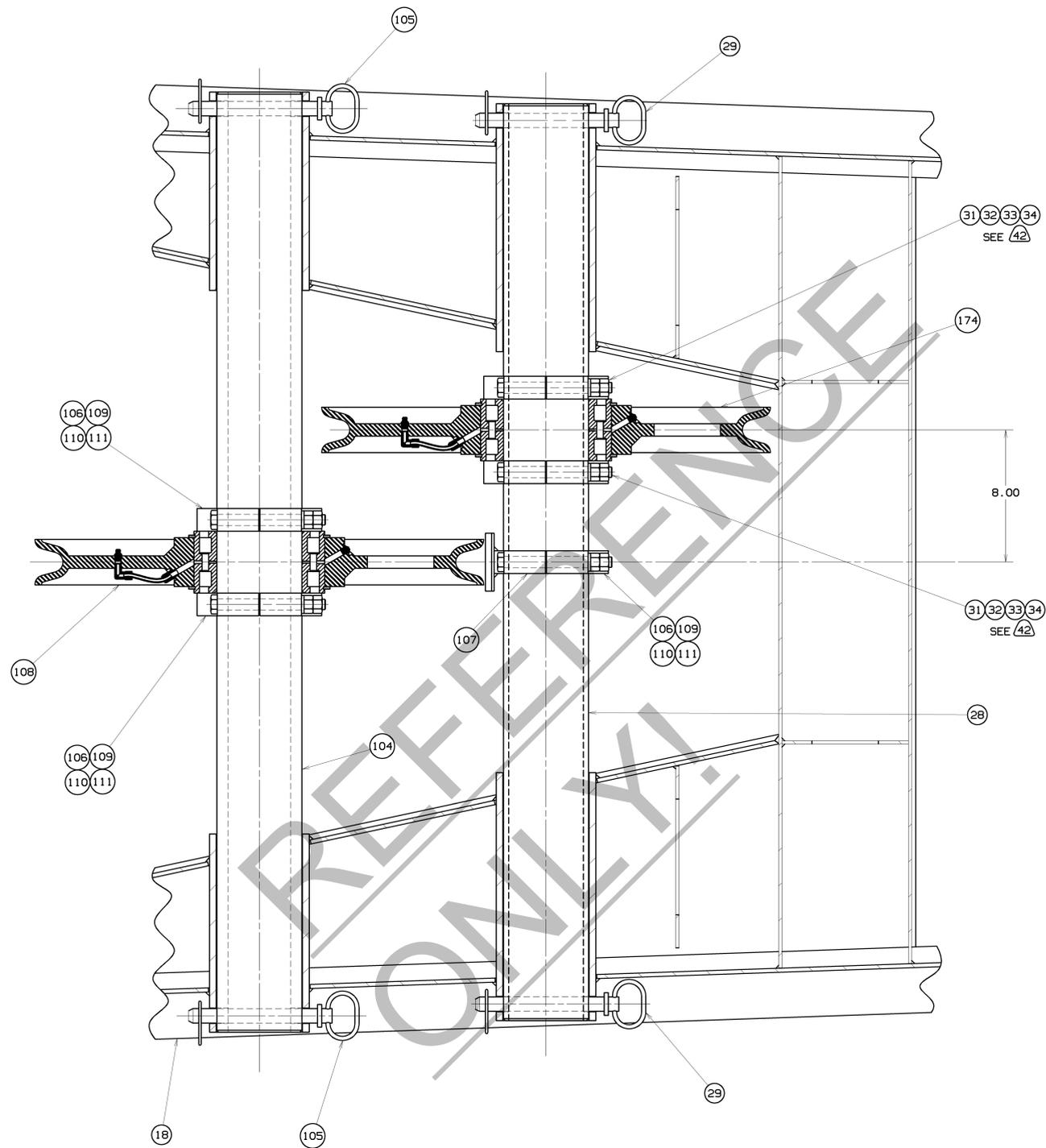
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|----------|-----|---------------|
| 6-13-97 | JJU | VIEW "S" |
| ADDED | | |
| 12-19-97 | PGD | ITEM 166 WAS |
| | | ITEMS 44, 45, |
| | | 46 AND 47. |
| 03-12-09 | MER | REVISION |
| | | VIEW |
| | | WAS |
| | | SHT 5 OF 5 |



#22EL BOOM/#135 JIB ASSEMBLY

SUPERSEDES 177354 SHT.5 OF 3-1-96

| | | | | | | | | | |
|---|-------------|--------------------------------------|---------|-------------------------|---------------------|-----------------------|-------------------------|---------------------|-------------|
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| DECIMAL PLACES | FABRICATION | MACHINING | DR. JJU | ASSEM. - FOLD UNDER JIB | Mantowoc, Wisconsin | | #22EL BOOM/#135 JIB | | DATE |
| (1) PLACE 0.0 | ± 0.12 | ± 0.12 | DR. TSC | MODEL 888 | | | W/NON-STOWABLE PENDANTS | | 3-14-97 |
| (2) PLACE 0.00 | ± 0.06 | ± 0.12 | APP TSC | | | | | | PATTERN NO. |
| (3) PLACE 0.000 | ± 0.005 | ± 0.005 | | | | | | | 177354 |
| ANGLES | ± 1.30 | ± 0.30 | | | | | | | SHT. 5 OF 6 |



SECTION "H" - "H"
 SHOWN ITEMS 108 & 174, FOR ORIENTATION OF GREASING ONLY
 SCALE: 2=1 FT

177354
 SHT. 6 OF 6

| | | | | | | |
|---|--|---|--|--|--|--------------------------------|
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|---|--|---|--|--|--|--------------------------------|