Rectangular (4 Plate) Boom Inspection Procedure

This form was designed to establish a standard field procedure to check and inspect Rectangular (4 Plate) style booms for squareness, sweep, twist, camber and flatness or convex / concave conditions.

This procedure pertains to Grove and National built Rectangular (4 Plate) style booms.

This boom inspection data form will be used to record all measurements taken while performing the inspection.

Note: All calculations will be done by Manitowoc CraneCARE.

Note: Anytime you are using gauge blocks, record the thickness of the block used in the appropriate space on the form. Always use gauge blocks large enough to ensure the string does not touch the boom section. All dimensions recorded must include the gauge block thickness.

Tools Required

- Quantity 1 - 4 Foot Level
- Quantity 1 - Large Square (3’ x 4’)
- Quantity 2 - Small Squares (24" x 16")
- Quantity 2 - Vise Grip Clamps
- Quantity 1 - 6" scale
- Quantity 1 - 12’ Tape Measure
- Quantity 2 - Gauge Blocks or Rods (Same Thickness and magnetic)
  Mason String
Definitions

Rectangular (4 Plate) Boom – A four sided boom having edges, surfaces or faces that are at right angles.

Sweep - To curve to the right or left, a deviation from being parallel. The measured dimension is larger than the gauge block on one side and smaller then the gauge block on the other side.

Camber - To arch slightly, to curve upward or downward.

Squareness - To test for a deviation from a right angle.

Twist - To rotate while taking a curving path or direction.

Convex - Arched up or bulging out condition.

Concave - Arched inward or bulging in condition.

Distortion - To be deformed from the original shape.

Check Dimension - The actual measurements taken at various places on boom.

Gauge Blocks - Blocks, being the same size, from which measurements are being taken.

O.D. – Outer Dimension or Outer Diameter
Serial Number and Part Number Locations on Rectangular (4 Plate) Booms

Machine component serial numbers and part numbers are required for us to supply repair procedures for major weldments. Please be sure to record these numbers where specified on the inspections sheets.

The numbers are steel stamped into the boom section weldments in the approximate location shown.
Rectangular (4 Plate) Squareness

Checked By ___________________   Crane Model _________________
Date ______________________   Crane Serial # ________________________
Distributor ____________________ In Service Date __________ Hourmeter ________

Boom Section Being Checked (i.e. Base, I/mid) ________________________________
Record Part Number of Boom Section ___________________
Record Serial Number of Boom Section ___________________

LEFT SIDE

Sta 1 ________________     Sta 1 ___________________
Sta 2 ________________     Sta 2 ___________________
Sta 3 ________________     Sta 3 ___________________
Sta 4 ________________     Sta 4 ___________________
Sta 5 ________________     Sta 5 ___________________

Left Set Dimension ____________                                  Right Set Dimension _____________

1. With the boom lying on the top side, select 5 stations or intervals along the length of the boom. These will be where check dimensions are taken.
2. Starting at the rear (Sta 1) place the square across the bottom plate (section flipped over) and protruding downward along side of the boom utilizing (2) gauge blocks as shown
3. Using a tape measure, set the square about ½” to 1” away from the side plate at the top of the section as shown on the attached sketch. Record this distance as the Set Dimension on this sheet. Utilize the same set dimension on each side and at each station.
4. Measure the distance between the square and the side of the boom at the bottom as shown on the attached sketch.
5. Record the check dimension on this form for each station.
6. Repeat procedure for the other side, taking check dimensions at the same distance from the rear of the section where the dimensions were taken on the first side.
Rectangular (4 Plate) Sweep

Checked By __________________  Crane Model _________________
Date ________________  Crane Serial # __________________
Distributor ____________________

Boom Section Being Checked ______________________________
Record Part Number of Boom Section ________________________
Record Serial Number of Boom Section _______________________
Record Length of Boom Section ____________________________

1. Place the gauge blocks against the side plate of the section, as close to the bottom plate as possible, as shown on the sketch.
2. Draw the string tightly over the gauge blocks.
3. Measure the thickness of the gauge blocks and record.
   Gauge Block Thickness ___________________________________
4. Measure the distance between the string and the side of the boom at various points along the string and record the maximum check dimension.
   Left Side Max Check Dimension ____________________________
5. Now measure the distance from the rear of the boom section to where the maximum check dimension was found and record below.
   Left Side Dimension Location from Rear of Section ___________
6. Repeat this procedure for the other side of the boom section and record the dimensions below.
   Right Side Max Check Dimension ____________________________
   Right Side Dimension Location from Rear of Section ___________
7. To obtain a true sweep measurement, one side will be greater than the gauge block thickness and the other side will be less than the gauge block thickness.
8. The sweep must be uniform throughout the entire length of the boom section and free of any kinks or deviations.
Rectangular (4 Plate) Camber

Checked By ___________________   Crane Model _________________
Date ______________________    Crane Serial # ________________
Distributor ____________________

Boom Section Being Checked ______________________________
Record Part Number of Boom Section ______________________
Record Serial Number of Boom Section ____________________

Record Camber Dimension Left Side _______________________
Record Camber Dimension Right Side _______________________
Record Distance from Rear to Max. Check Dimension Left Side _____________
Record Distance from Rear to Max. Check Dimension Right Side _____________
Record Thickness of Gauge Blocks _________________________

1. Lay boom on its side.
2. Place gauge blocks on the bottom plate as close to the edge as possible at each end and pull string tightly over them.
3. Measure the distance between string and bottom plate at various points between both gauge blocks.
4. Record maximum check dimension.
Rectangular (4 Plate) Twist

Checked By ___________________   Crane Model _________________
Date ______________________    Crane Serial # ________________
Distributor ____________________

Boom Section Being Checked __________________________
Record Part Number of Boom Section___________________
Record Serial Number of Boom Section__________________
Record Width of Boom Section________________________

1. Place the boom bottom up.
2. Place gauge block on the bottom plate as close to the edge as possible. Then place a level across the gauge blocks at the rear and level the boom.
3. Once the rear is level, take the 4’ level to the front of the boom and place it across the bottom plate utilizing the same gauge blocks used in the rear.
4. Lift either end of the level, one way or the other until the bubble is level.
5. Now measure the distance between the level and the gauge block and record that dimension on this form as twist.
6. To determine the direction of twist, stand at the rear looking toward the front. If you measured the distance between the level and the bottom rail on the left side of the boom, then record LEFT. If the check dimension was taken on the right side, then record RIGHT.
7. Record the direction of twist on this form.
**Rectangular (4 Plate) Concave/Convex**

Checked By ___________________   Crane Model _________________
Date ______________________    Crane Serial # ________________
Distributor ____________________

Boom Section Being Checked __________________________
Record Part Number of Boom Section ___________________
Record Serial Number of Boom Section ________________

1. To check for concavity and convexity start at the rear of the section.
2. Select (5) stations or intervals along the length of the section. These will be where the check dimensions are taken.
3. To measure, place the gauge blocks and string or straight edge perpendicular to the length of the section, the gauge blocks must be located 3” (76mm) from top and bottom of the side plate.
4. If using a string, ensure that the string is pulled tight between the gauge blocks before measuring.
5. Measure the distance between the straight edge or string and the plate being measured at the top, center and bottom regions as shown on the sketch.
6. Record the dimension on this form.
7. If any dings, dents, creases or surface imperfections are noted during this inspection, please note them below.

### Left Side

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<tr>
<th>Sta</th>
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### Right Side

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*Record Gauge Block Thickness__________*

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1. Clamp (2) squares together making sure squares are square with each other.

2. Make the distance between the squares about ½” to 1” larger than the width or height, whichever one is being measured. Record the distance between squares as the set dimension on this form.

3. To check the O.D. width, place the squares across the tops of the side plates and against one side of the boom utilizing gauge blocks.

4. Measure the distance between the square and boom side plate at various places to find the widest point. Record this check dimension on this form for this station.

5. Repeat procedure for all stations the entire length of the boom.

6. To check O.D. Height, measure from top and bottom plate instead of side to side plate.

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<th>O.D Width</th>
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Record Set Dimension to O.D. Width
Record Set Dimension to O.D. Height