Tech Info Americas

Trapezoidal Boom Inspection Procedure

This program was designed to establish a standard field procedure to check and inspect booms for squareness, sweep, twist, camber, flatness or convex / concave conditions.
This procedure pertains to Grove and GMK built booms: fabricated trapezoidal booms, formed trapezoidal booms, rectangular booms, rectangular swingaways, triangular swingaways and A-Frame jibs.

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 Product Support.

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 check dimensions recorded will include the gauge block thickness.

Note: All measurements are taken from the rear of the section to the front, with the exception of checking for a twist in an A-Frame jib or a swingaway. You must check A-Frame jibs and swingaways by leveling the front of the section and taking the check dimension at the rear. Because of the angle of inclination of the main chords, the front end is narrower than the width at the rear of the section.

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)
Mason String

Definitions

Trapezoidal Boom - A four sided boom with only 2 sides being parallel

Rectangular Boom - A four sided boom having edges, surfaces, or faces that are right angles

GMK Style / Megaform - A six sided boom made from two formed channels. The top half has 90° bends and the bottom half has multiple bends.

A-Frane Jib - A boom extension suspended by cables

Swingaway - A boom extension that is pinned directly to the main boom nose

Sweep - To curve to the right or left, a deviation from being parallel. 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 curving in condition

O. D. Width - Outside dimension measured from outside of left side plate to outside of right side plate

O. D. Height - Outside dimension measured from outside edge of top plate to outside edge of bottom plate

Distortion - To twist out of normal or original shape

Maximum Deviation - The difference between a fixed number (gauge block) and the check dimension

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

Strut - Tubing that is welded between main chords of A-Frame jibs

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

Main Chord - Main support tube that runs the full length of jibs and swingaways

Lacing - Tubing that is welded between the main chords of swingaways

Serial Number and Part Number Locations On Booms, Swingaways and Jib Booms

Machine component serial numbers and part numbers are required for us to supply repair procedures for major weldments.

Below a list of major components with serial number locations.

Note: Part number is on opposite side of the serial number.

The numbers are steel stamped into the major components in the approximate locations shown.

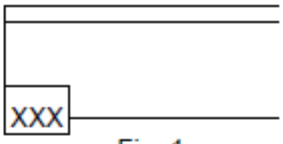


Fig. 1
Rectangular Boom
Left Forward
Bottom Corner

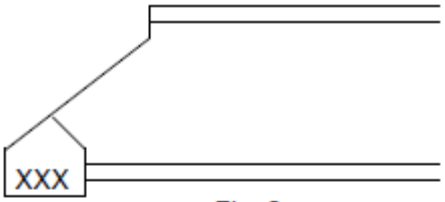


Fig. 2
Trapezoidal Boom
Bottom Left
Forward Bottom Corner

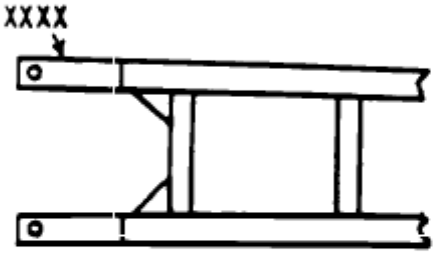


Fig. 3
A-Frame Jib

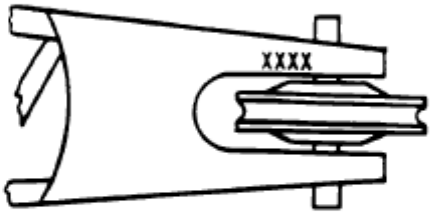


Fig. 4
Lattice Swingaways
and Fixed Lattice
Boom Extensions

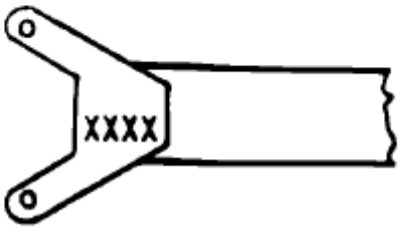


Fig. 6
Stevedore, IND 24, AP 308 and AP 206
Jib-Top Side of Trunnion Block

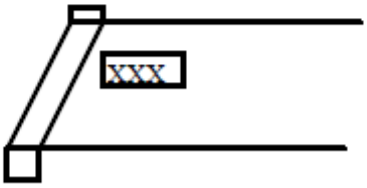
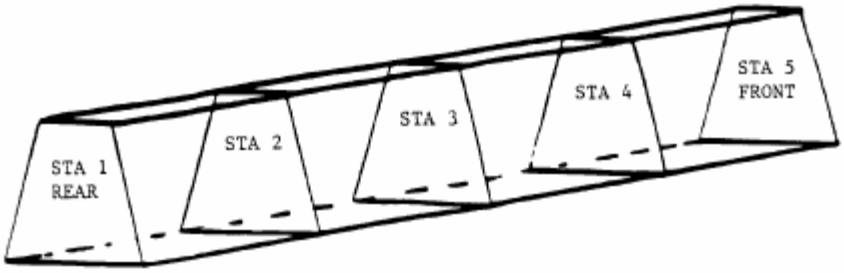


Fig. 5
GMK Style / Megaform

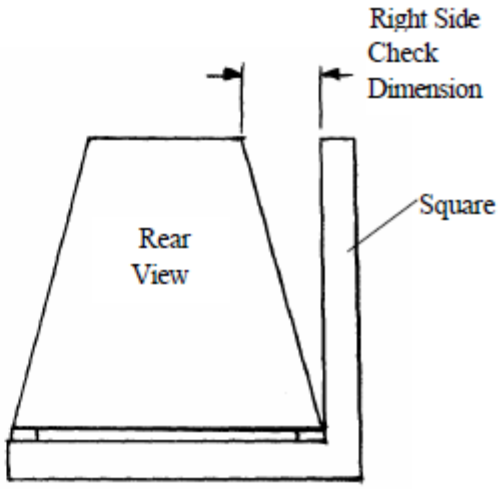
Trapezoidal Boom Squareness

Checked By _____ Model _____
Date _____ Serial # _____
Distributor _____ In Service Date _____ Hourmeter _____
Application _____
Boom Section Being Checked _____
Record Part Number of Boom Section _____
Record Serial Number of Boom Section _____

	Left Side	Right Side
Sta 1	_____	_____
Sta 2	_____	_____
Sta 3	_____	_____
Sta 4	_____	_____
Sta 5	_____	_____



1. 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 flush across bottom rails and protruding upward along side of the boom.
3. Measure the distance between the square and the top plate.
4. Record the check dimension on this form.
5. Repeat procedure for the other side. Taking check dimensions at the same distance from the rear to where the other dimensions were taken on the other side.

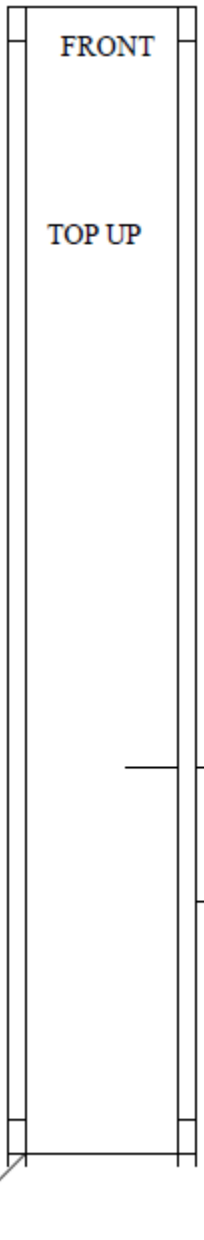


Trapezoidal Boom Sweep

Checked By _____ Model _____
Date _____ 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 outer edge of the bottom rail, one at each end.
2. Draw the string tightly over the blocks.
3. Measure the thickness of the gauge blocks used and record on this form.
4. Measure the distance between the string and the side of the bottom rail at various points along the string.
5. Record the maximum check dimension on the form.
6. Now measure the distance from the rear of the boom section to where the maximum check dimension was found. Record that dimension on this form.
7. Repeat this procedure for the other rail and record the minimum dimension on this form.
8. To obtain a true sweep measurement, one side will be greater than the gauge blocks and the other side will be smaller than the gauge blocks. The sweep must be uniform throughout the entire length of the boom section and free of any kinks or deviations.

Record thickness of round or square gauge blocks _____



Record Maximum and Minimum Check Dimensions

Left Side Bottom Rail
_____
Right Side Bottom Rail
_____

Distance From Rear to Maximum and Minimum Check Dimensions

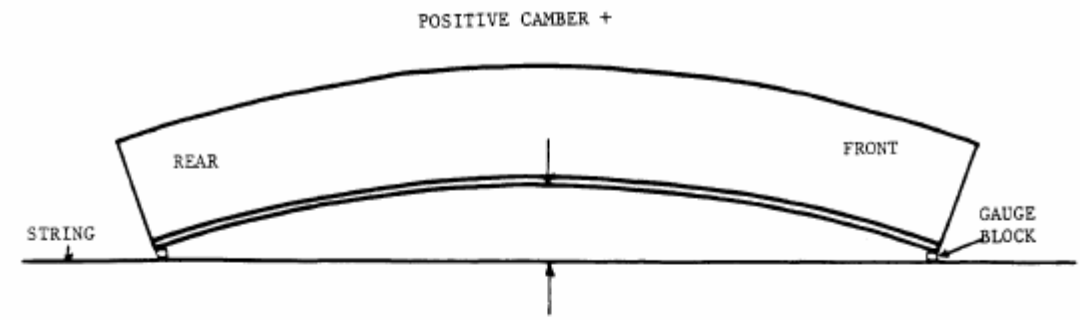
Left Side Bottom Rail
_____
Right Side Bottom Rail
_____

Check Dimension

Tightly Stretched Masons String Over Blocks

Trapezoidal Boom Camber

Checked By _____ Model _____
Date _____ Serial # _____
Distributor _____
Boom Section Being Checked _____
Record Part Number of Boom Section _____
Record Serial Number of Boom Section _____



Check Dimension

Record Camber Dimension Left Side _____

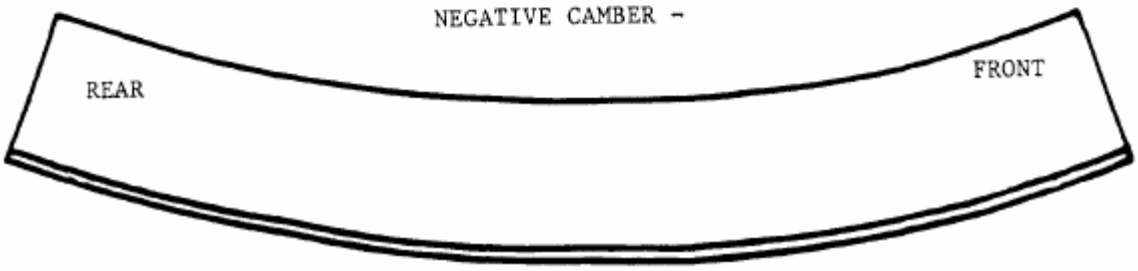
Record Camber Dimension Right Side _____

Record Distance from Rear to Max. Check Dimension Left Side _____

Record Distance from Rear to Max. Check Dimension Right Side _____

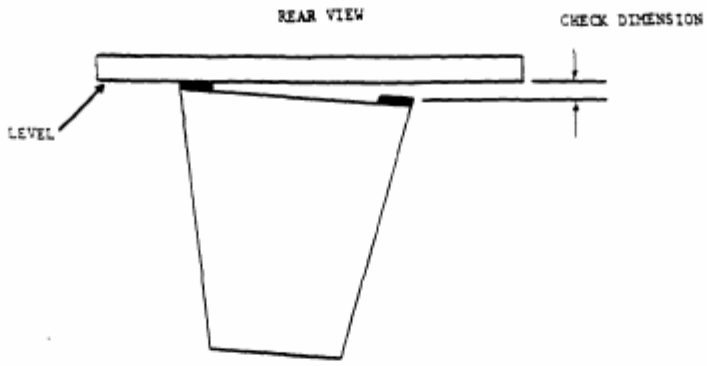
Record Thickness of Round or Square Gauge Blocks _____

1. Lay boom on it's side.
2. Place gauge blocks on bottom rail at each end and pull string tightly over them.
3. Measure the distance between string and bottom rail at various points between both gauge blocks.
4. Record maximum check dimension.



Trapezoidal Boom Twist

Checked By _____ Model _____
Date _____ Serial # _____
Distributor _____
Boom Section Being Checked _____
Record Part Number of Boom Section _____
Record Serial Number of Boom Section _____
Record Width of Boom Section _____

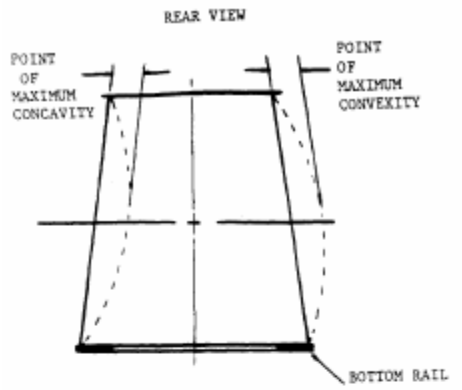


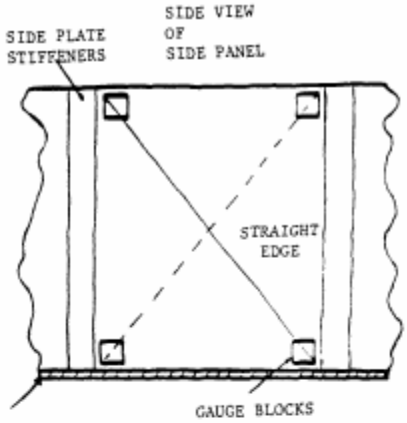
Record Check Dimensions as Twist _____
Record Direction of Twist _____
Twist Shown Above is to the Right

1. Place the boom bottom up.
2. Place a level across the bottom rails 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 rails.
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 bottom rail 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 it twists to the left. If the check dimension was taken on the right side then the boom will twist to the right.
7. Record the direction of twist on this form.

Trapezoidal Boom Concave / Convex

Checked By _____ Model _____
Date _____ Serial # _____
Distributor _____
Boom Section Being Checked _____
Record Part Number of Boom Section _____
Record Serial Number of Boom Section _____





Side Panels

1	2	3	4	5	6	7	8	9	10	11	12

Rear Record Gauge Block Thickness_____ Front

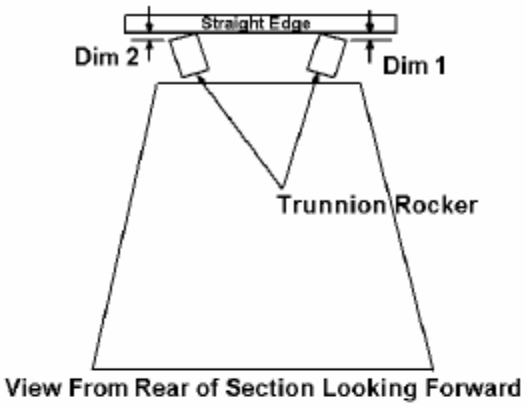
Left Side	Right Side	Bottom Plate
1_____	1_____	1_____
2_____	2_____	2_____
3_____	3_____	3_____
4_____	4_____	4_____
5_____	5_____	5_____
6_____	6_____	6_____
7_____	7_____	7_____
8_____	8_____	8_____
9_____	9_____	9_____
10_____	10_____	10_____
11_____	11_____	11_____
12_____	12_____	12_____

1. To check for concavity and convexity start at the rear with the first side panel. The side panel is between the vertical stiffeners welded to the side plate.
2. Place the gauge blocks diagonally across from each other as close to the top plate and bottom plate weld as possible.
3. Place a string or straight edge across the blocks.
4. Measure the distance between the straight edge and the boom side plate. Measuring at various points along the straight edge.
5. Record this dimension on this form.
6. Repeat this procedure for all side and bottom panels.
7. If checking a formed trapezoidal, check the side plate every 2 or 3 feet.
8. If the stiffeners are to be checked, place the gauge blocks directly on top of the stiffeners, pull the string tightly over them and measure the distance between the string and the stiffeners. Record the max. dimension

Trapezoidal Boom Trunnion Alignment

Checked By _____ Model _____
Date _____ Serial # _____
Distributor _____
Boom Section Being Checked _____
Record Part Number of Boom Section _____
Record Serial Number of Boom Section _____
Record Width of Boom Section _____

Trunnion Rocker Flatness Measurement

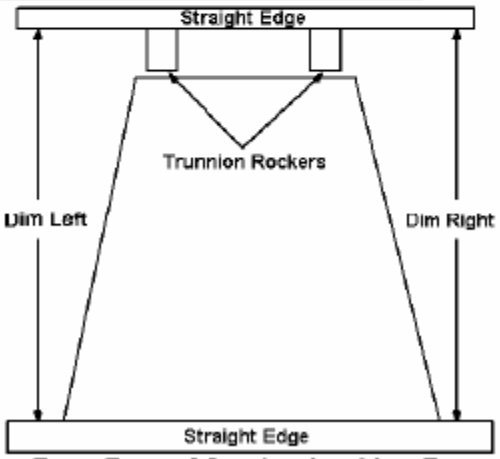


View From Rear of Section Looking Forward

1. Place straight edge/level across top surface of trunnion rockers.
2. Take measurement from bottom of straight edge to top of trunnion rocker (Dim 1 and Dim 2)
3. Record Dimensions

Record Dimension 1 _____
Record Dimension 2 _____

Trunnion Rocker Height Measurement



View From Rear of Section Looking Forward

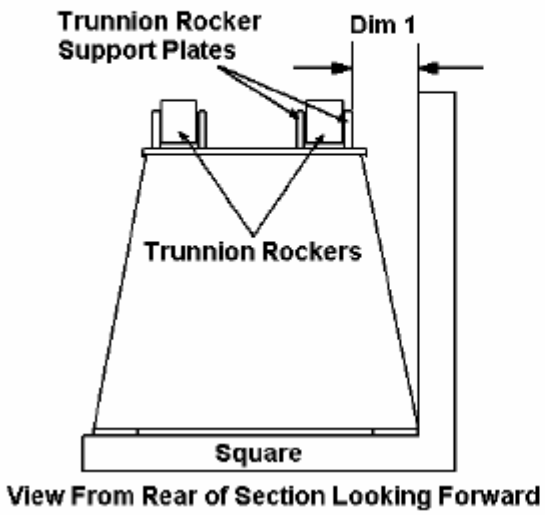
1. Place straight edge/level across surface of trunnion rockers.
2. Place straight edge/level across bottom rails or new skid plates.
3. Take measurements (Dim Left/Dim right) from bottom rail to top of trunnion rockers.
4. Record Dimensions

Record Dim. Left _____
Record Dim. Right _____

Trapezoidal Boom Trunnion Alignment

Checked By _____ Model _____
Date _____ Serial # _____
Distributor _____
Boom Section Being Checked _____
Record Part Number of Boom Section _____
Record Serial Number of Boom Section _____
Record Width of Boom Section _____

Trunnion Rocker Squareness Measurement

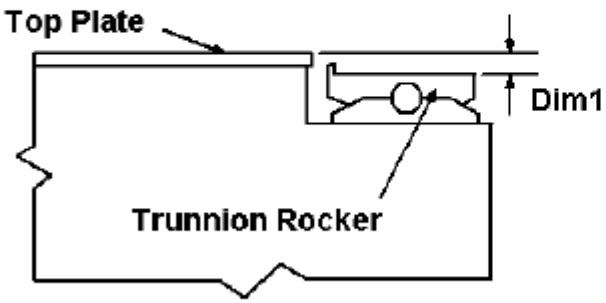


View From Rear of Section Looking Forward

1. Place square across bottom rails or new skid plates.
2. Take measurement from outside of trunnion rocker support plate to edge of square.
3. Repeat for opposite side.
4. Record Dimensions.

Record Dim 1 _____
Record Dim 2 _____

Top Plate to Top of Trunnion Dimensional Check



Top Rear of Boom

1. Place straight edge on top plate of boom section.
2. Position rockers level with top plate.
3. Take measurement from bottom of straight edge to top of trunnion rocker.
4. Repeat measurement for opposite side.
5. Record Dimensions.

Record Dim 1 _____
Record Dim 2 _____