

# Wheel Shop Inspection

**Presenter:**

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## **Wheel Shop Required Specifications**

- **AAR MS&RP's Sections G (new) & G-II Wheel & Axle Reconditioning**
- **AAR MS&RP's Sections H (new) & H-II Roller Bearing Reconditioning**
- **AAR MS&RP's Section J, Specification M-1003**
- **Field Manual of the AAR Interchanges Rules**
- **Customer specifications & requirements**
- **Internal specifications & requirements**

## Wheel Shop Process Overview

- **Inbound inspection physical/visual Inspection**
- **Product line determination based on inspections**
- **Bearing demount**
- **Wheel set and axle cleaning and inspections**
- **Wheel lathe (reprofiled/turned)**
- **UT inspection for wheels**
- **Wheel demount**
- **Loose axle cleaning and inspections**
- **Axle lathe**
- **Magnaflux axle inspection**
- **Wheel mounting**
- **Bearing mounting**
- **Final inspection**
- **Shipping inspection**

## **Inbound Wheel Set Inspection**

**Wheels and axles are inspected for the following:**

- ❖ **To determine reconditioning criteria (scrap or reprofile)**
  
- ❖ **Wheel conditions ( i.e. shelling, slid flats, high & thin flanges etc.) and all defects as described in Section 2.8 of the MS&RP Section G-II. Severity of some defects may influence whether or not wheels can be machined.**
  
- ❖ **Axles are visually inspected for defects that may scrap the axle however, all axles are 100% inspected “In-Process”.**

## Examples of Wheel Defects Found During Inbound Inspection



**Thin Flange**



**Grooved Tread**



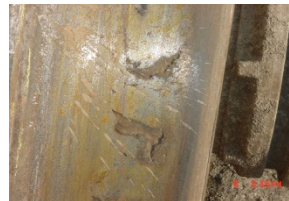
**Wheel Slid Flat**



**Spread Rim**



**Thin & High Flange**



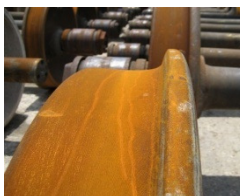
**Shelled Tread**



**Broken Flange**



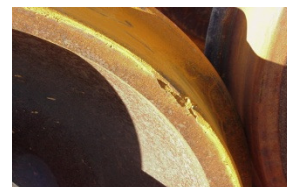
**Cracked Wheel Plate**



**High Flange**



**Tread Build Up**



**Gouged / Broken Rim**



**Tread Thermal Cracks**

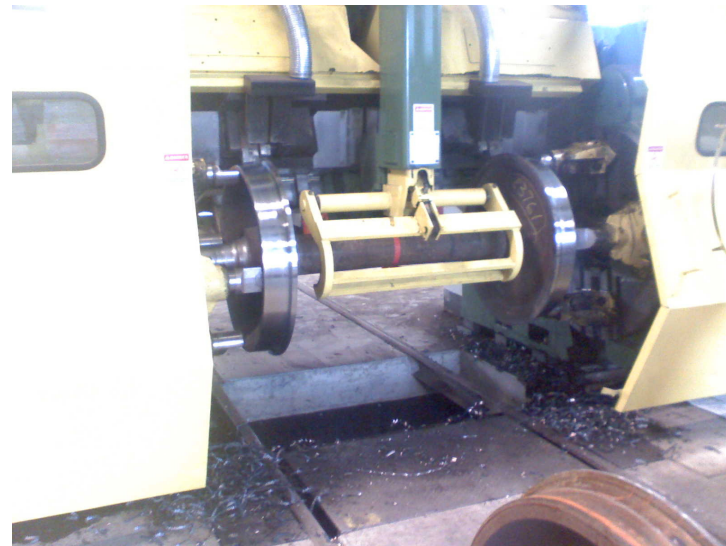
# Wheel Turning Process

**Before**



**&**

**After**





## Witness Groove Requirements

- AAR MS&RP's Section G-II Rule -1.5.4, 2.4.3, Fig. 4.46



Chamfer may be used to eliminate interference with drive dogs

- AAR MS&RP's Section G-II Rule – 2.4.3, Figure 4.47



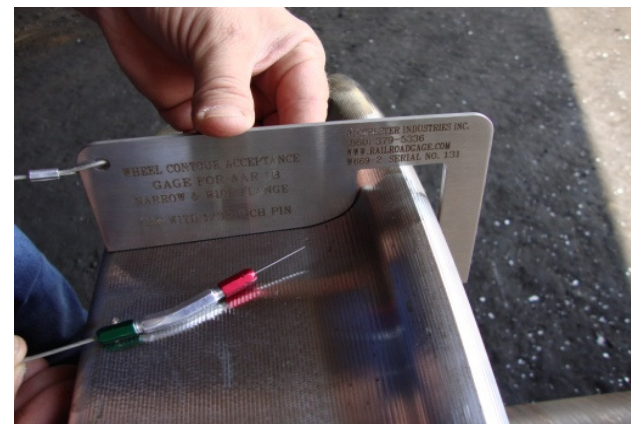
Not less than 3/8"



Not more than 3/64" Deep

## Rim Thickness & Tread Contour Measurements

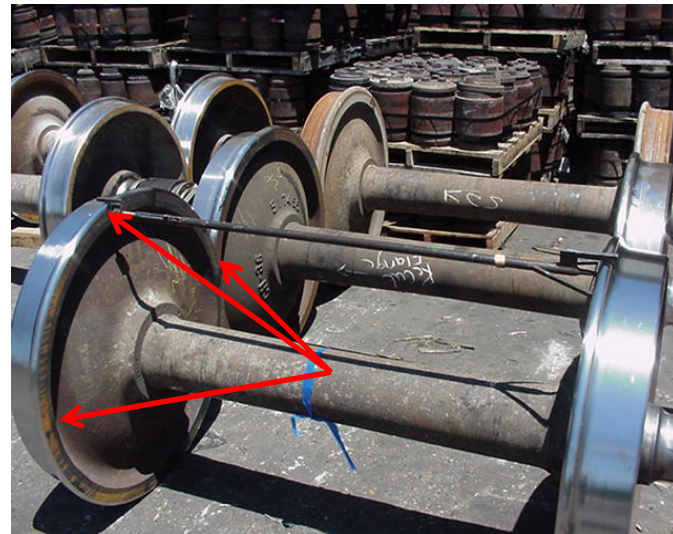
- Gauge wheels for rim thickness
- Wheel profile/contour is measured using a wheel contour gauge.





## Reprofiled Wheel Set Back to Back Measurement

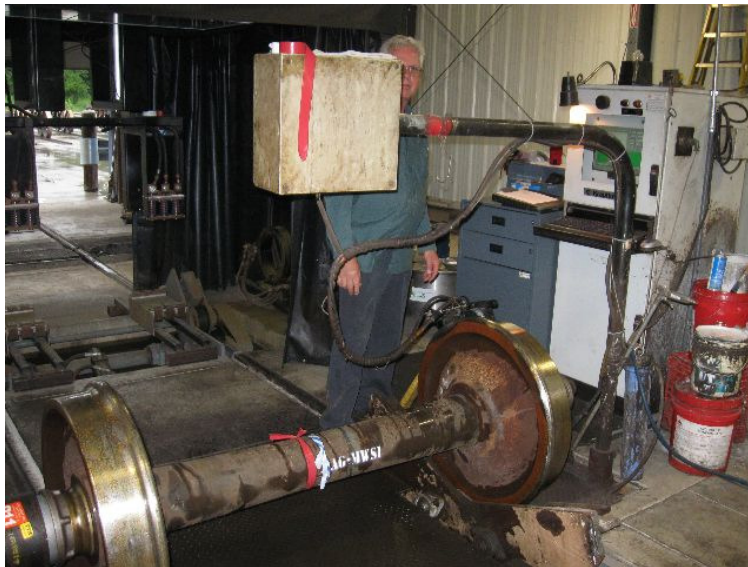
- **AAR Section G-II, Rule 1.5.3, Fig. 5.27**
- **Back to Back tolerances for second hand sets are 52 5/16" to 53 3\32nds" and flange thickness cannot vary more than 2/16"**



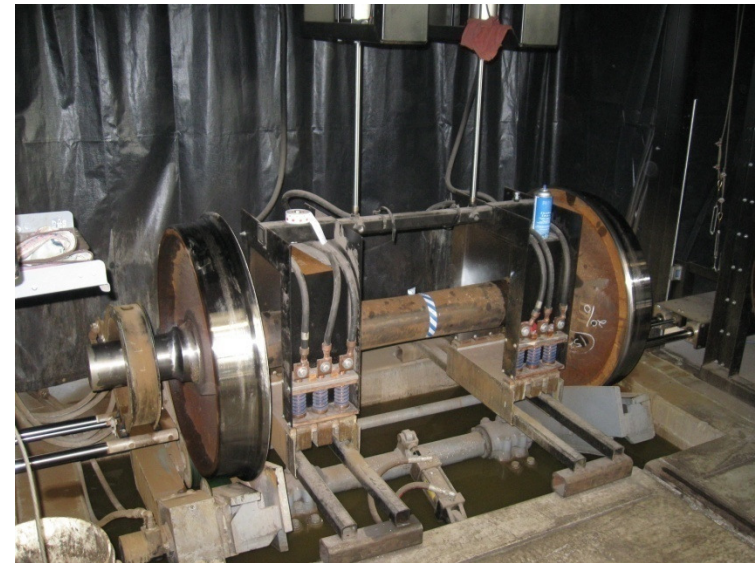
Measurements taken at 3 equidistant points around Circumference of the wheel set

## Special Process Equipment

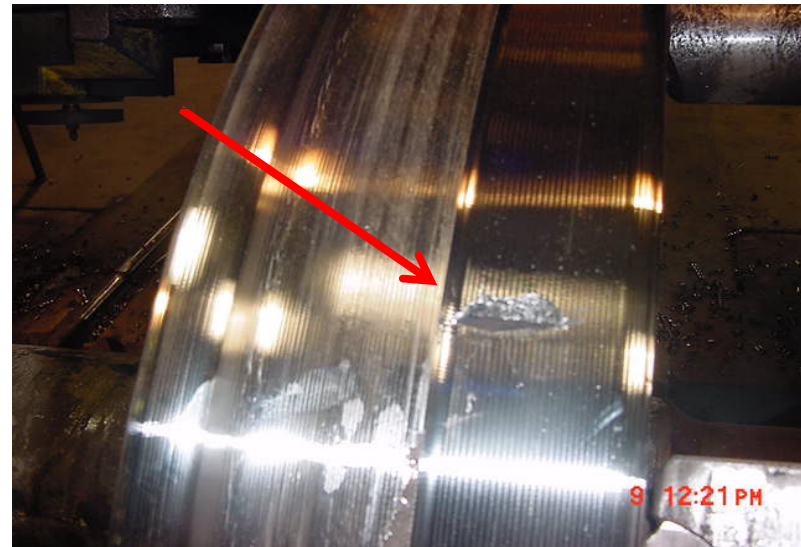
**Wheel Set Ultrasonic Inspection**



**Wheel set Magnaflux Inspection**



- **Sub Surface Shelling found during profiling process.**
- **Ultrasonic Inspections performed to detect this type of defect**



## Axle Inspection



**U-Dimension**



**Wheel Seat Measurement**



**Journal Diameter**



**Journal Length**



**Journal Fillet**



**Axle Surface Finish**



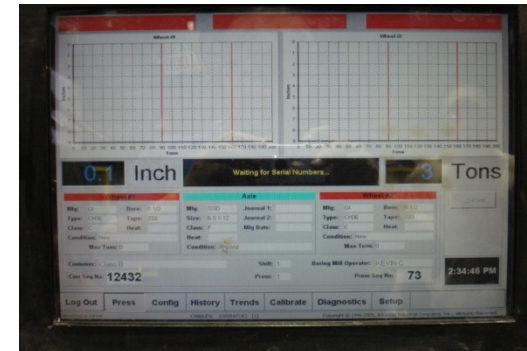
## Wheel Mounting Process



Locating Centerline



New mount back to back  
53" to 53 3/32nds"



AIC - Electronic Press Recorder

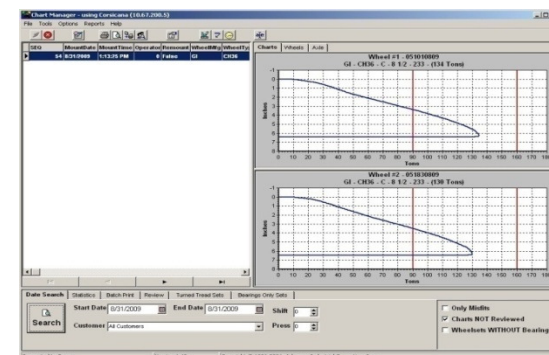
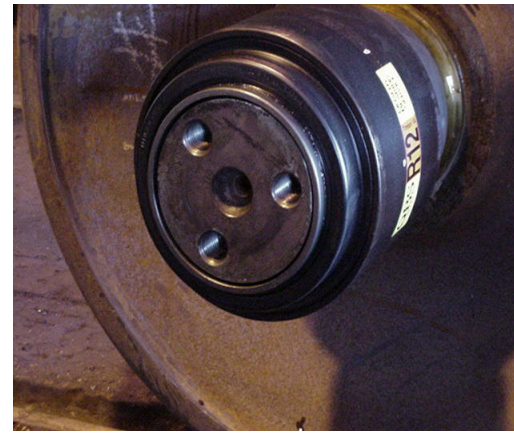


Chart Retention 10 yrs

## Bearing Mount Process

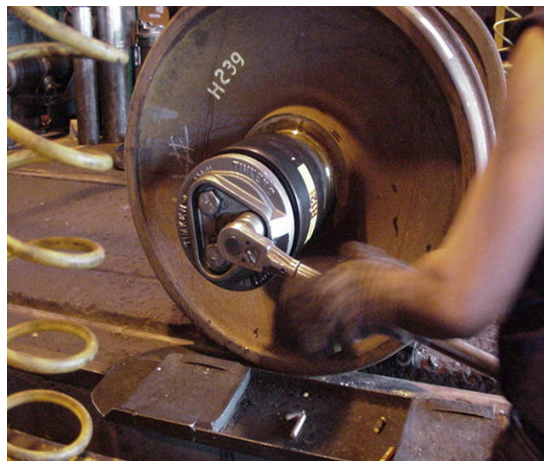
- ❑ **Ensure bolt holes and center holes are clean and free of dirt, grease and other foreign materials**
- ❑ **Ensure Threads are in good shape and not stripped prior to applying end cap** On re-application of end cap all information from existing locking plate must be transferred to new locking plate per AAR Rule 1.8.3 Section G-II of the MS&RP's
- ❑ **Specific Shop Identification must be applied to the locking plate to indicate mounting shop and location per AAR Rule 1.8.5.2.**





## Cap Screw Torque Requirements

- ❑ **Torque Cap screws in accordance with AAR Rule 1.8.3.2 and Fig. 4.65 Section G-II of the MS&RP's**
- ❑ **Torque wrenches should be checked daily for accuracy and records kept weekly of calibration status**
- ❑ **Torque devices other than click type must be approved by AAR**



AAR Manual of Standards and Recommended Practices  
Wheels and Axles

RP-633

SEGMENT 4.0

Class	Journal Size (in.)	Cap Screw	
		Size	Torque (ft lb) <sup>a1</sup>
<b>For Freight Cars</b>			
D	5 1/2 × 10	7/8-9	160
E	6 × 11	1-8	290
F	6 1/2 × 12	1 1/8-7	420
G	7 × 12	1 1/4-7	490
K	6 1/2 × 9	1 1/8-7	420
L	6 × 8	1-8	290
M	7 × 9	1 1/8-7	420
<b>For Amtrak Cars</b>			
G	6 1/2 diameter	7/8-9	315
		(High Strength) 7/8-9	145
EE	6 diameter	7/8-9	145
EE	5 1/2 diameter	3/4-10	115

<sup>a1</sup> Torque wrenches must be accurate within ± 4 %.  
Cap screw torque is in ft-lb. It is to be posted in the work area in roller bearing mounting shops.

**Cap screw torque values**  
Rules 1.8.3.1 and 1.8.3.2 and Paragraph 2.1.2.3

Fig. 4.65

## Locking Tabs & Mounted Lateral

- ❑ **Secure Locking plate tabs in accordance with AAR Rule 1.8.4.3 and Fig. 4.66 using standard channel lock pliers or ergonomically viable tools as shown in slide may be used to secure tabs.**
  
- ❑ **Check the mounted lateral in accordance with Rule 1.8.4.1 and Fig. 4.67 Section G-II MS&RP's**



## Shipping Inspection Criteria

- ✓ **Wheel stenciling requirements**
- ✓ **Tape sizes (match)**
- ✓ **Matching wheels/bearings**
- ✓ **Hub and locking plate stamp information**
- ✓ **Bearings inspected**
- ✓ **Axles inspected for damage prior to release**
- ✓ **Customer requirements for order shipped verified for accuracy**
- ✓ **Load inspected for metal to metal contact & secured to prevent same.**



**Presentation concluded**