INTERMODAL *ADAPTS*

IANA
INTERMODAL ASSOCIATION
OF NORTH AMERICA

You Picked a Fine Time to Leave Me Loose Wheels:

Optimizing Safety with RMPs for Drums, Hub Piloted & Spoke Wheels on Your Intermodal Chassis

June 10th, 2021, 2:00 PM ET

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Housekeeping

- Audience will be muted
- A question & answer session will follow the presentation
- Submit questions by clicking the Q&A icon at the bottom of your screen
- A recording of this webinar, including the slides, will be available in the near future

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Today's Presenters

From Webb Wheel

- Ed Smith,
  Senior Manager, National Accounts

- Dallas Garrison,
  Application Technician

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Wheel-End Installation Training

Ed Smith – Sr. Manager National Accounts
Dallas Garrison – Application Technician

2019 CVSA Road Check Violations

In 2019, almost two-thirds or 64.4% of the vehicles taken out of service had violations related to brake systems, tires and wheels, and brake adjustment.

Proper Rim/Wheel Installation

Intermodal Association of North America

- Established IRP Manual in 2015
- 300 Page Manual
- Focusing on Nine Critical Areas
- Recommended Maintenance
- Guidelines/ Recommended Practices for Intermodal Industry

Hubs vs. Spoke Wheels

Disc Hub

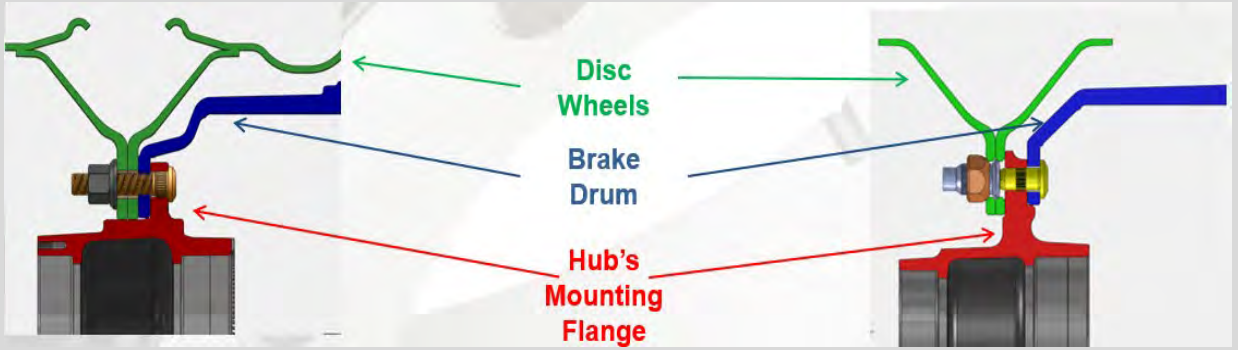
Both accomplish the same function; however, they use different hardware

Spoke Wheel

Wheels/Rims
Hub-Piloted or
Stud-Piloted Disc Wheels

Wheels/Rims
Demountable Rims

Brake Drums
Can use Inboard or
Outboard drum



Brake Drums
Inboard Only

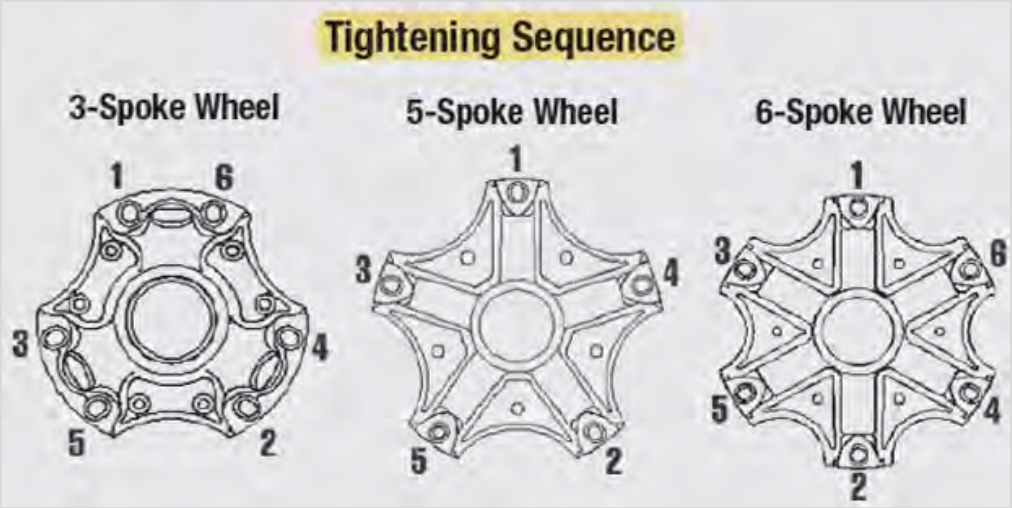
Spoke Wheel Setup

Spoke Wheel Installation Procedures

- **Clean** all components before installation
- Inflate the tires and align the inner wheel with the valve stem between two spokes
- Slide the inner wheel onto the spoke until it is against the 28°degree ramp
- Install the correct size rim spacer – Different spoke wheels may use different size clamps/rim spacers
- Install the outer rim until it is firmly seated against the rim spacer
- Install the rim clamps and hand tighten the wheel nuts
- Torque the wheel nuts to 50-100 ft. lbs in the sequence shown to the right
- Next, place a straight edged object next to the outer tire and rotate the assembly. If run-out is greater than 1/8”, loosen the nuts and re-adjust clamps until assembly is true.
- Use a calibrated torque wrench to torque each wheel nut to 200-260 ft. lbs. **Do Not use Oil**

KEEP COMPONENTS CLEAN!

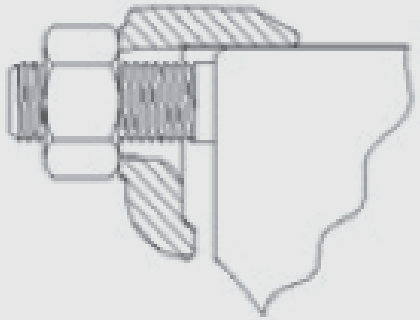
TORQUE MATTERS!



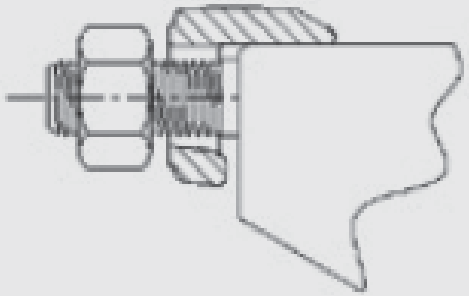
Heel-Less vs. Heel-Type Rim Clamps

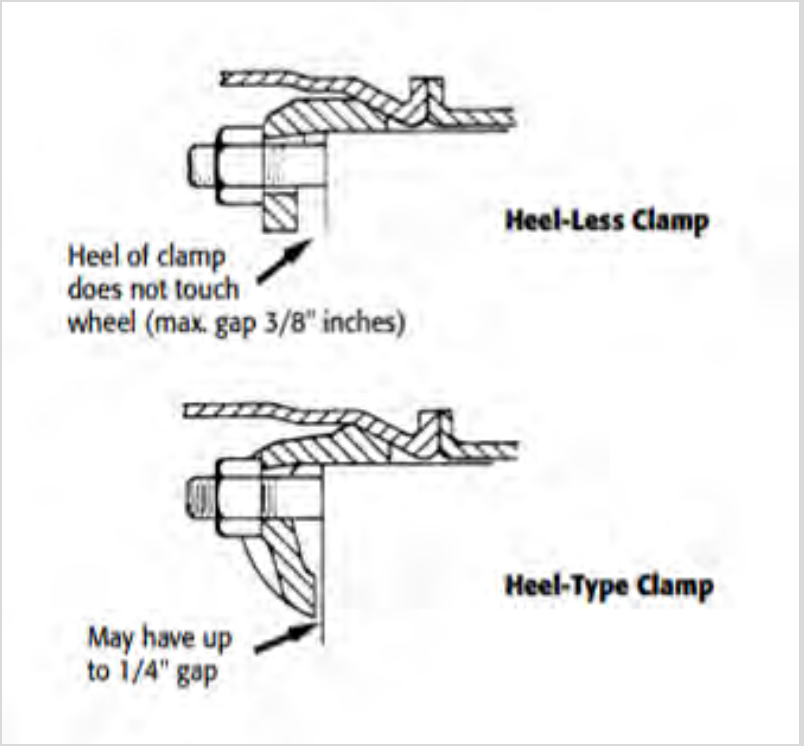
IMPORTANT:
Do not over torque! Rim clamp does not have to heel against the spoke wheel!

Heel-Less Clamps: Do not depend on a fulcrum at the bottom of the clamp to produce the force to wedge the rims. Heel of clamp does not touch wheel.

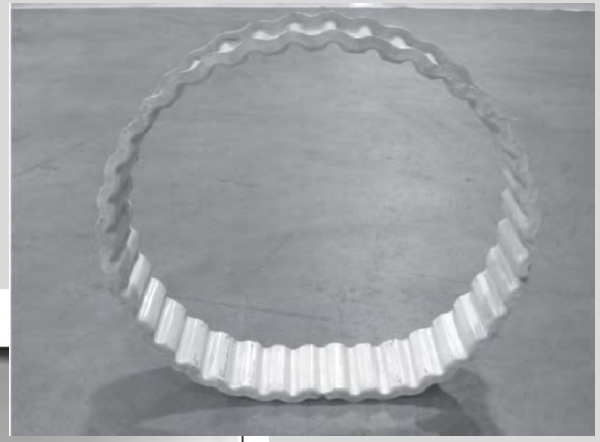


Heel-Type Clamps: Gap permissible but not required. If gap exceeds 1/4" or if clamp bottoms out before reaching 80% of recommended torque, check to insure that the proper clamps and spacers are being used.





Spoke/28° Ramp Inspection



This condition is defined as an obvious crack, failure or separation in the 28° bevel area of the spoke. It's caused usually by overload or improper rim nut installation.

IMPORTANT:
Do not over torque!
Over torqueing can deform the rim spacer and damage the 28° flange.

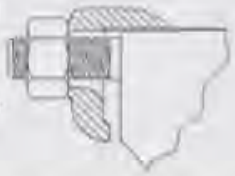
Spoke Wheel Torque Specifications

3, 5 and 6 Spoke Wheels

Recommended torque dry: 200 to 260 ft-lbs (Applies to ¾-10 fastener sizes)

Tighten clamps evenly in the sequence shown at right.

Heel-Less Clamps: Do not depend on a fulcrum at the bottom of the clamp to produce the force to wedge the rims. Heel of clamp does not touch wheel.



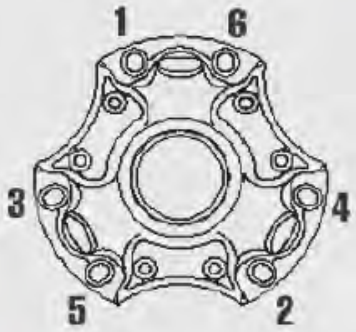
Heel-Type Clamps: Gap permissible but not required. If gap exceeds 1/4" or if clamp bottoms out before reaching 80% of recommended torque, check to insure that the proper clamps and spacers are being used.

Recheck torque after first 50 to 100 miles of service or reference TMC RP 237A, "Torque Checking Guidelines For Disc Wheels" for individual fleet maintenance alternatives.

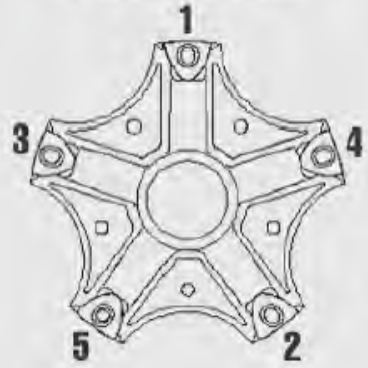
IMPORTANT: Do not overtorque! Rim clamp does not have to heel. Overtorquing can deform rim spacer and damage back flange.

Tightening Sequence

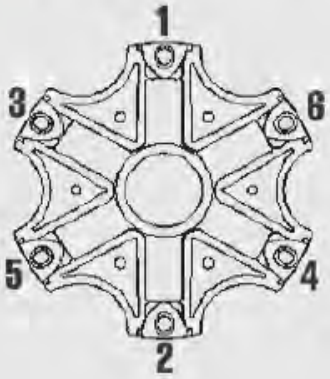
3-Spoke Wheel



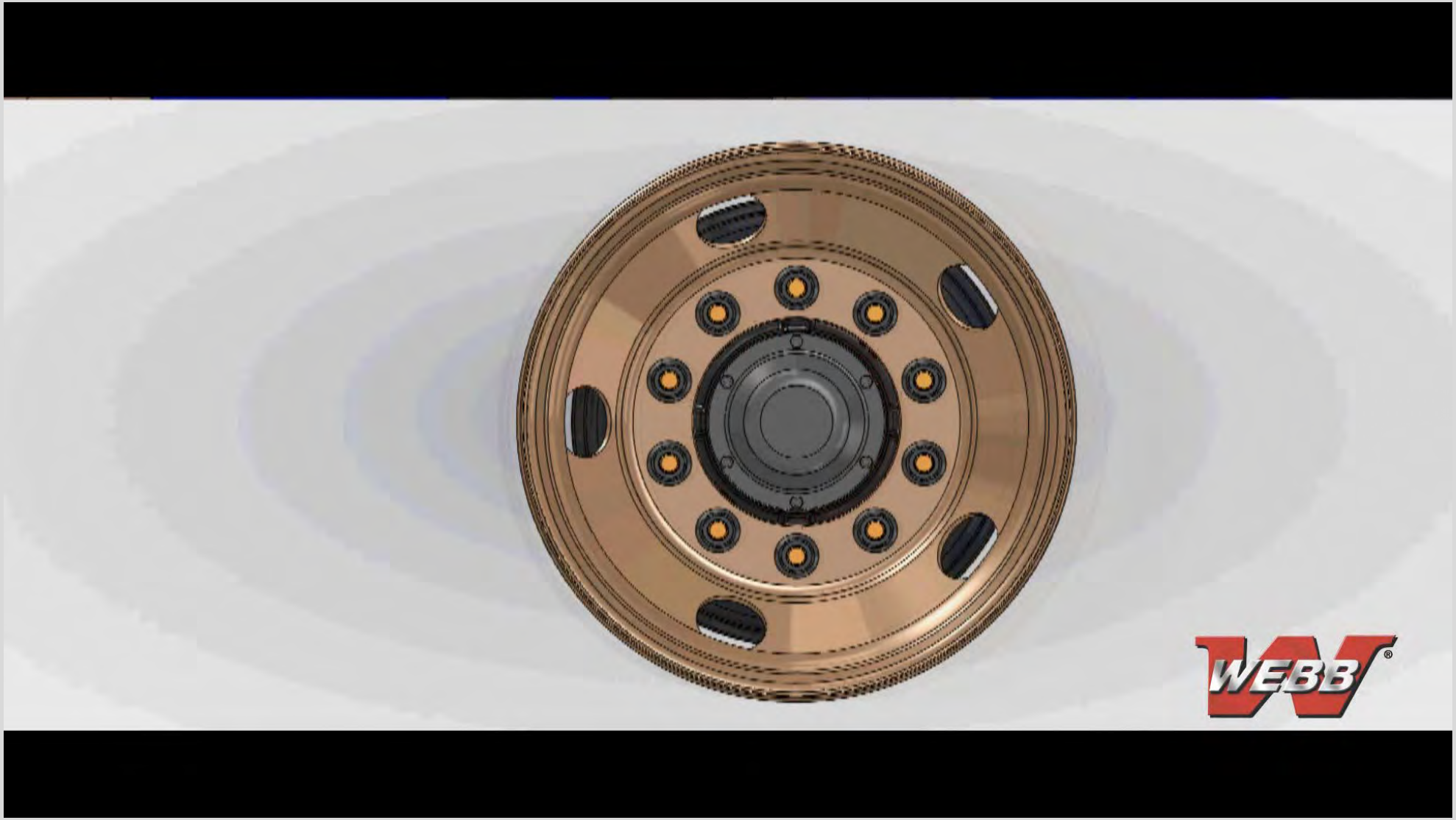
5-Spoke Wheel



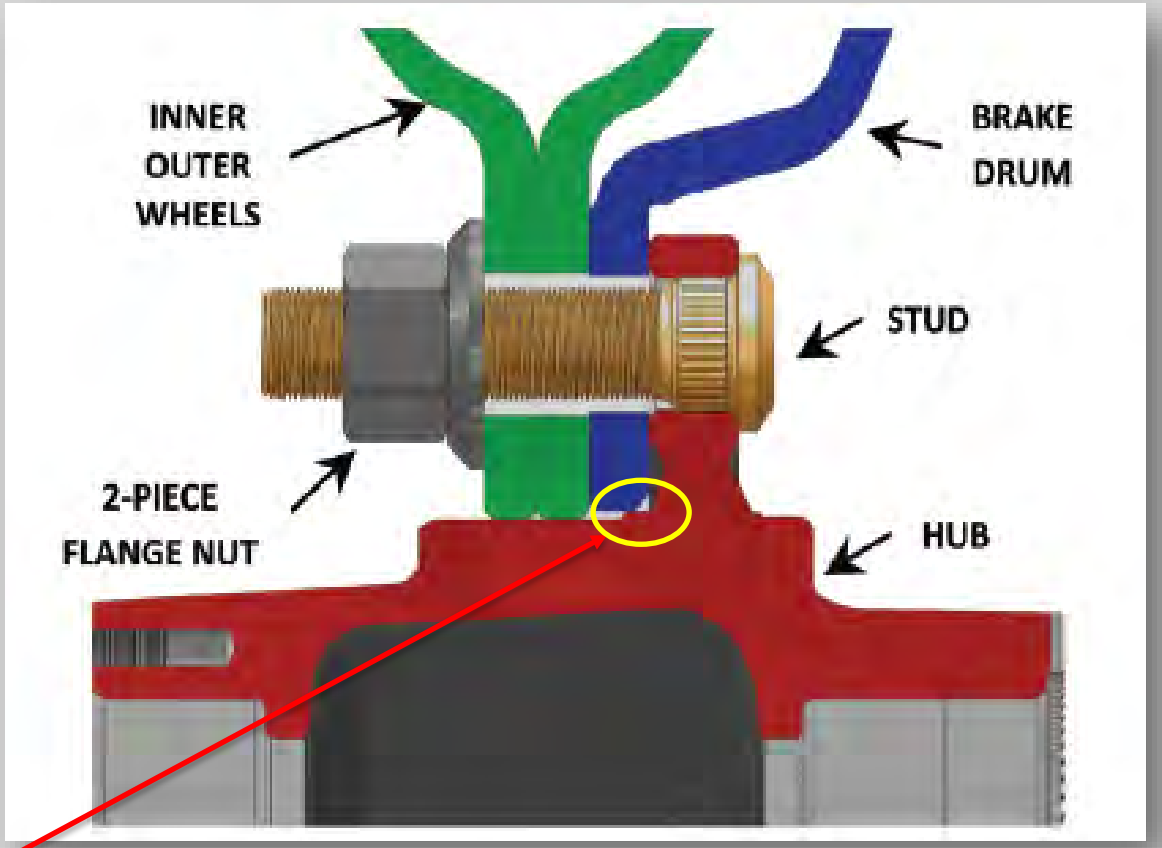
6-Spoke Wheel



Hub Piloted Brake Drum Installation



Hub Piloted Brake Drum Installation



The brake drum sits on 1/8“ tall pilot located on the wheel hub

This allows the drum to center around the axle centerline & brake shoes. If the brake drum does not seat on the 1/8” tall hub pilot, then one side of the drum braking surface is 1/8” closer to the brake shoes. Each time the brakes are applied, the side of the braking surface that is closer to the brake shoes is receiving ALL the brake energy!!! This can lead to a vibration or out of round drum complaint due to a mis-installed brake drum. If the mis-installed drum is left in service, it will lead to localized heat check on the braking surface which can ultimately lead to a cracked drum!

Hub Piloted Installation - Attaching Hardware

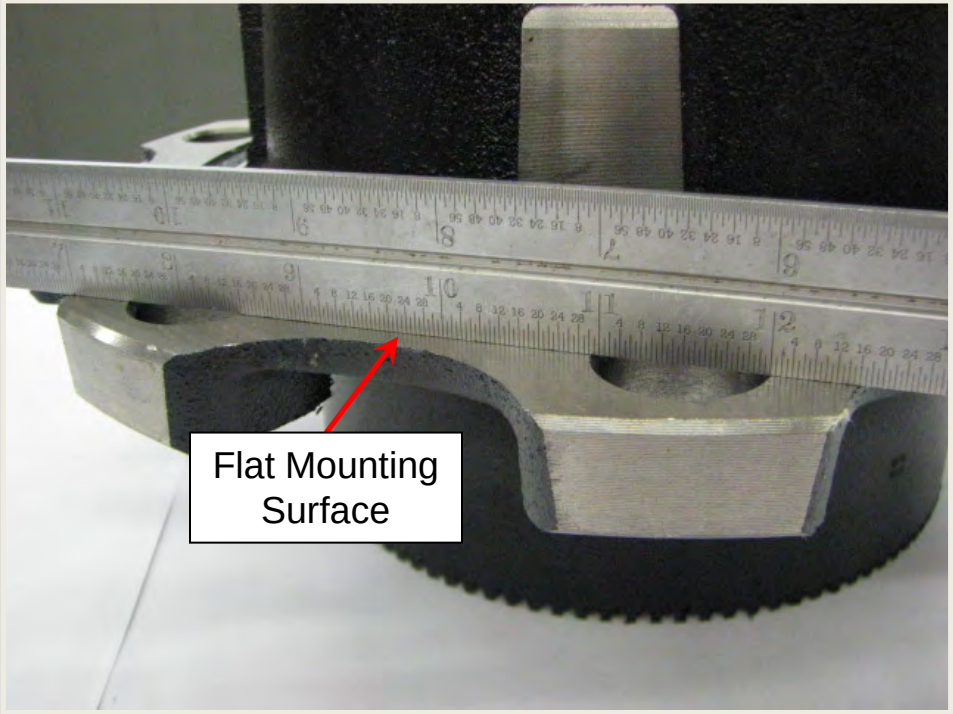
- **Ensure that nuts and studs are clean and clear of any paint, dirt, or grease.**
- **If stud or nut threads are found to be damaged or worn, replace with like hardware.**
    - **Use only the correct, matched components when mounting disc wheels.**
- **Hub-Piloted (FN) wheels use two-piece flange nuts as seen below.**

Inner and Outer Cap nuts for Ball-Seat (BSN) Mounting Systems – **Do NOT use ball-seat nuts with Hub Piloted Wheels**

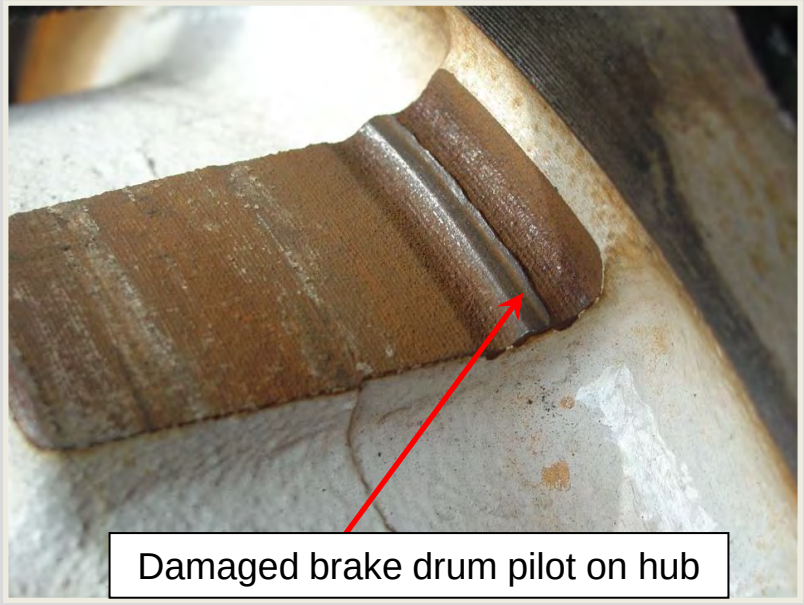
Two-Piece Flange Nut For (FN) Mounting Systems

Hub Inspection

- Use a straight edge to verify flatness of the hub flange
- Inspect for any gaps between straight edge and flange

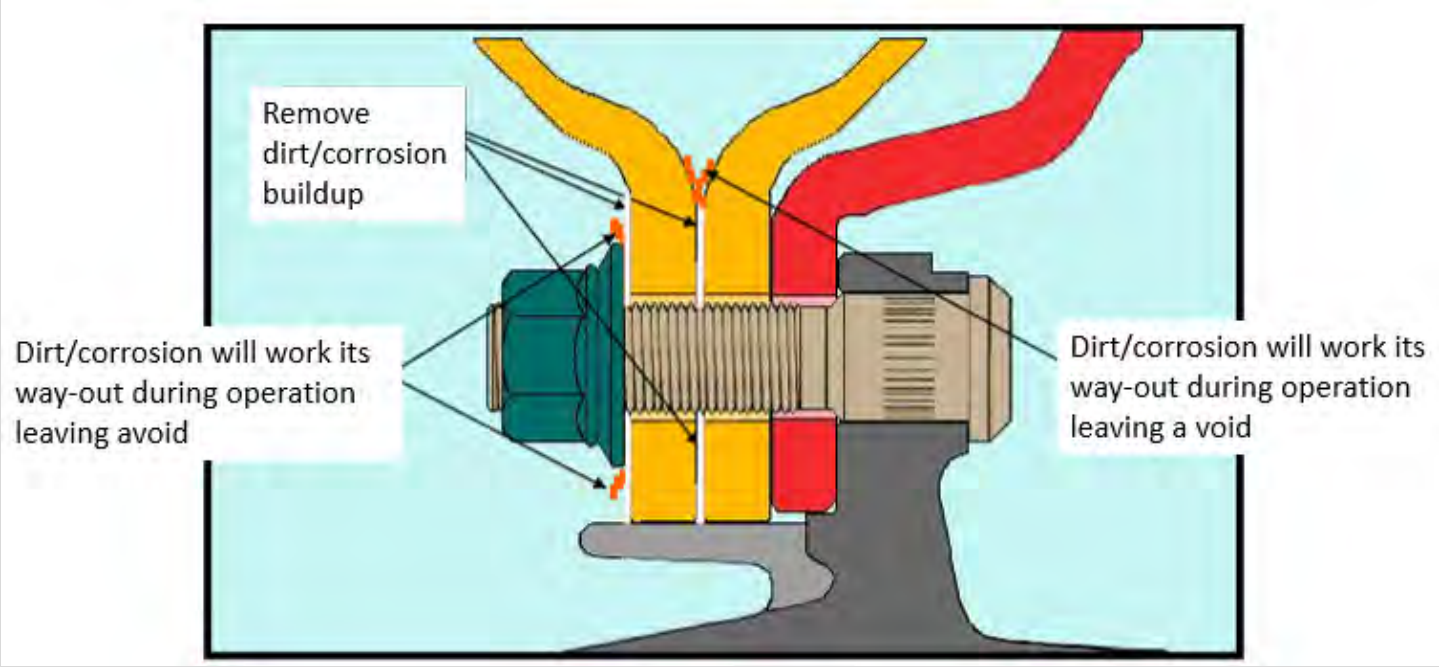


- Inspect each pilot pad for signs of damage
- If damage is seen, the hub needs to be replaced as it prevents brake drums from centering correctly on the hub



Clean Components

- Inspect pilot for any corrosion
- Inspect wheel studs for any signs of corrosion
- Use wire brush to clean any surfaces needed



Lubrication –Hub Piloted Applications Only

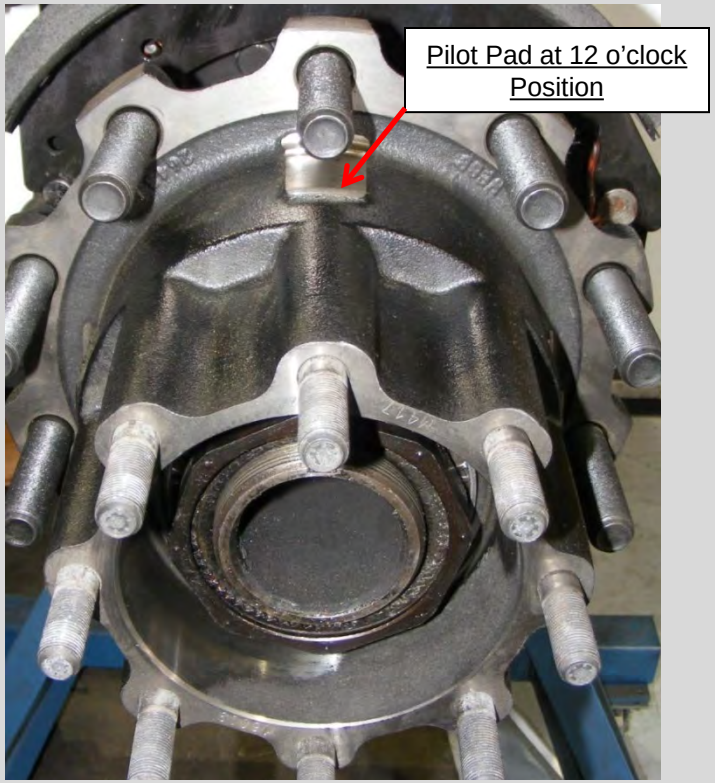
For Hub-Piloted flange nuts and studs, apply two drops of 30 weight oil to the following areas:

1. **Apply to the last 2 or 3 threads on each stud**
2. **Apply between the nut and washer**

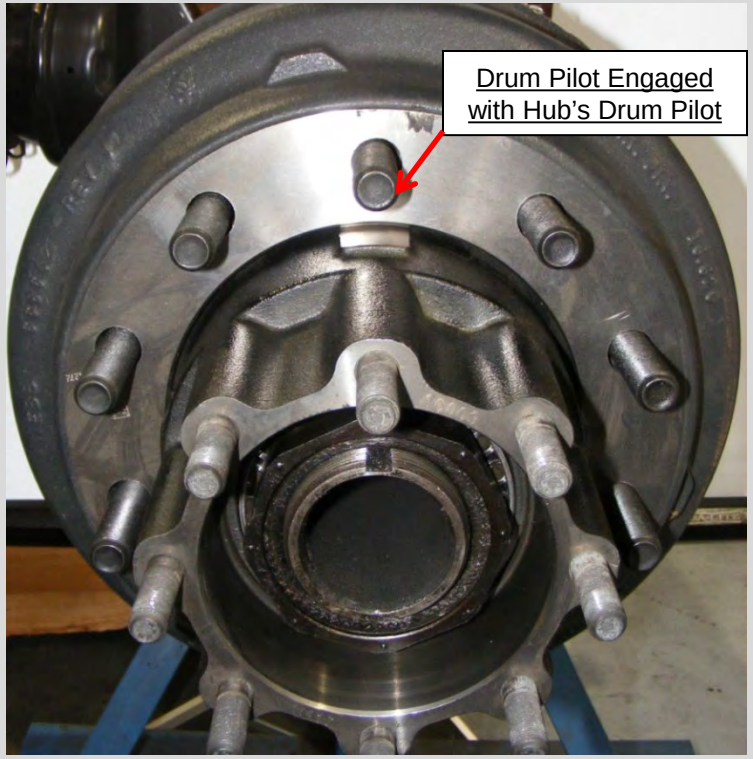
NOTE: the studs and cap nuts used in BSN or Stud-Piloted applications are NOT to be lubricated.

Hub Pilot Pad at 12 o’clock

- Rotate the hub so a mounting pilot pad is at the 12 o'clock position



- Install brake drum making sure not to damage the mounting studs
- Firmly push drum onto hub until it is seated over the mounting pilot with no interference



Install Wheels

- Install inner and outer disc wheels while keeping the drum pilot pad at the 12 o'clock position.

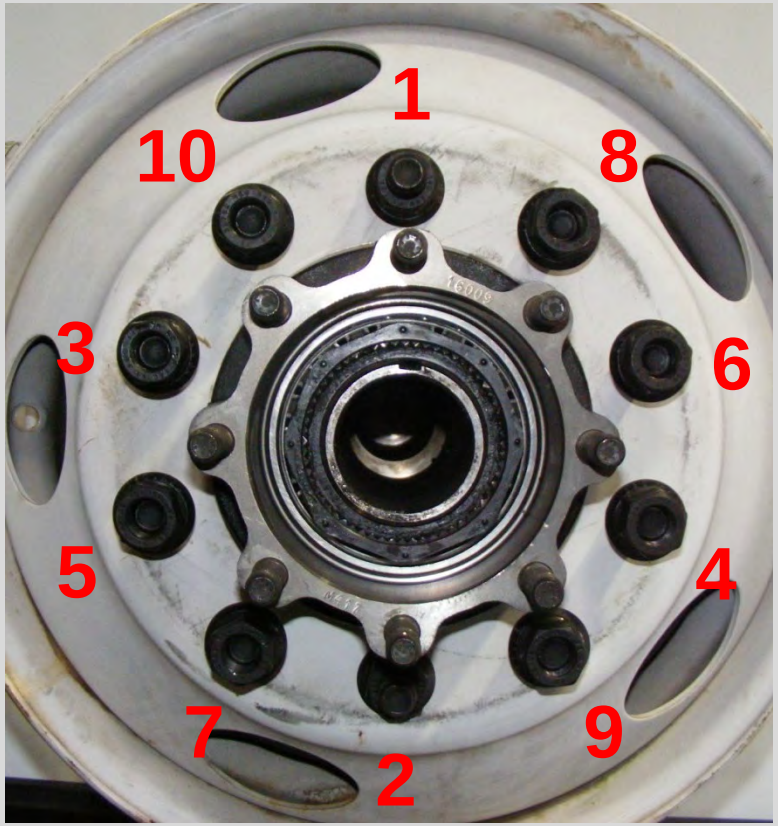
- Hand tighten all the flange nuts starting in the 12 o'clock then 6 o'clock position.

Proper Torque

Starting with the top nut, tighten all the flange nuts to 50 ft. lbs following the sequence shown below.

Then, following the same sequence, tighten all 10 flange nuts to 450 – 500 ft-lbs

Hub-Piloted Systems with Flange Nuts	
Nut Thread	Torque Level Ft-Lb (Oiled)
1 1/16"-16	300-400
M20 x 1.5	280-330
M22 x 1.5	**450-500**
7/8 - 14	350-400



Hub Piloted Torque Specifications

The purpose of this publication is to assist users with safe installation and maintenance practices while maintaining optimum performance of their wheel-end equipment. If additional information is required, please refer to TMC Recommended Practices: 217D, 222C, 237A, 656, and 662.

Hub Piloted with Flange Nut (8 & 10 Stud Hubs)

Applied to M22 x 1.5 studs with two-piece flange nuts • Recommended torque oiled: 450 to 500 ft-lbs

Step 1. Place a drum pilot pad at the 12:00 o'clock position. Apply two drops of 30 weight oil between the nut and the nut flange, and two drops to the outermost 2 or 3 threads of the wheel stud. For corrosive environments, apply a light coating of anti-seize to the mounting pads of the hub as well as the pilot diameter of the brake drum to ease installation and removal.
Note: Avoid getting any lubricant on the mating surfaces of the hub flange, drum flange, or disc wheel mounting flange areas.

Step 2. Starting with the top nut, tighten all flange nuts to 50 ft-lbs using the sequence shown at right.

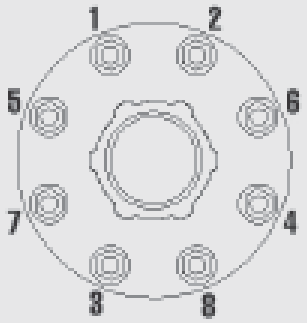
Step 3. Tighten all flange nuts to the recommended torque of 450-500 ft-lbs using the sequence shown at right.

Step 4. Check all disc wheels for proper positioning on pilots and proper seating against flange.

Recheck torque after first 50 to 100 miles of service or reference TMC RP 237A, "Torque Checking Guidelines For Disc Wheels" for individual fleet maintenance alternatives.

Tightening Sequence

8-Stud Hubs



10-Stud Hubs

Verify Torque

- Use a calibrated torque wrench to ensure proper torque
- Over torque can stress the studs and strip the threads

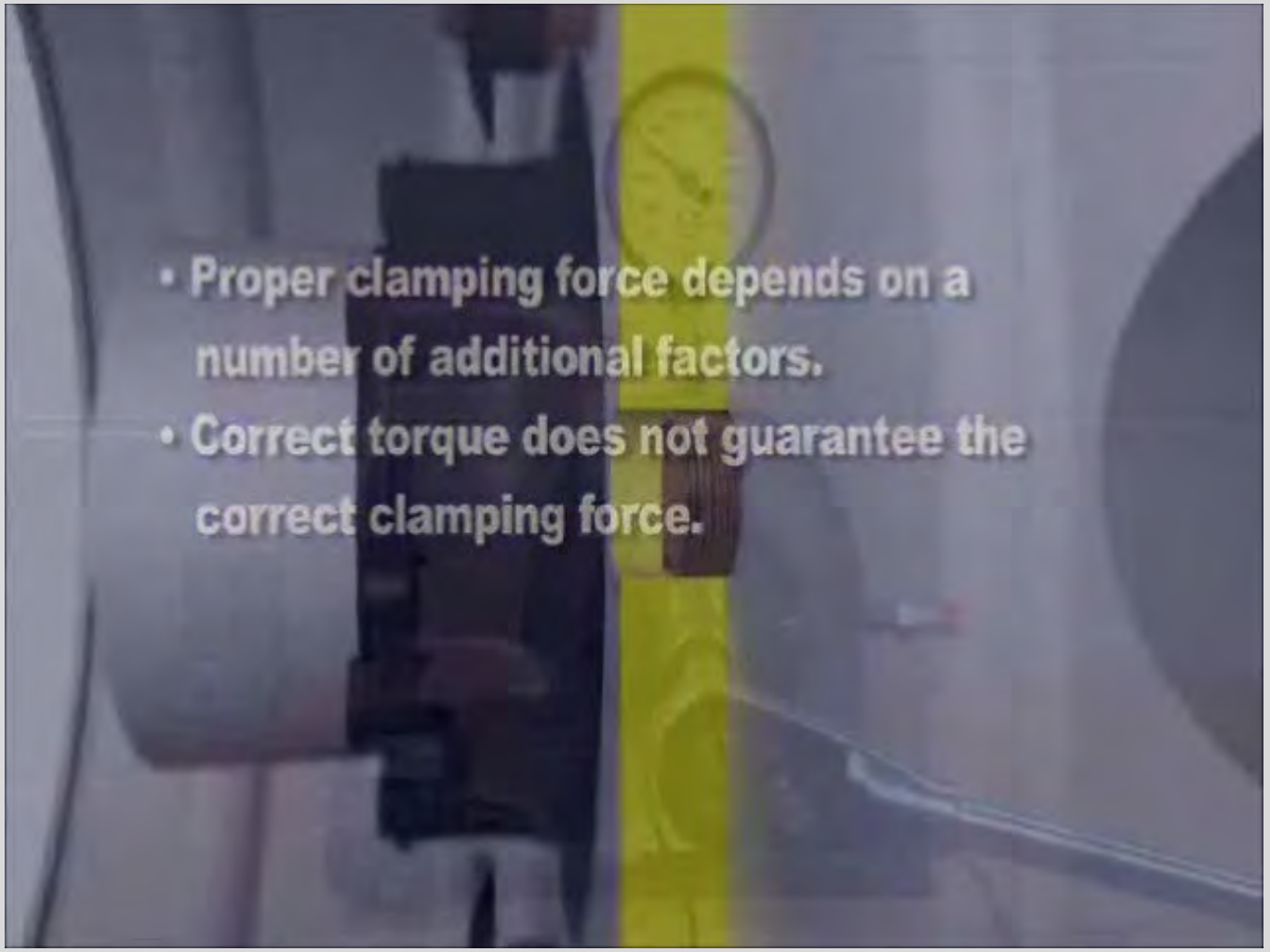
Setup Maintenance Intervals

For both new installations and reinstallations, the **assembly components will seat naturally, and torque may drop after the first fifty to one hundred miles** of operation. Check the flange nuts for proper torque after this 50–100 mile interval and retighten to specified value.

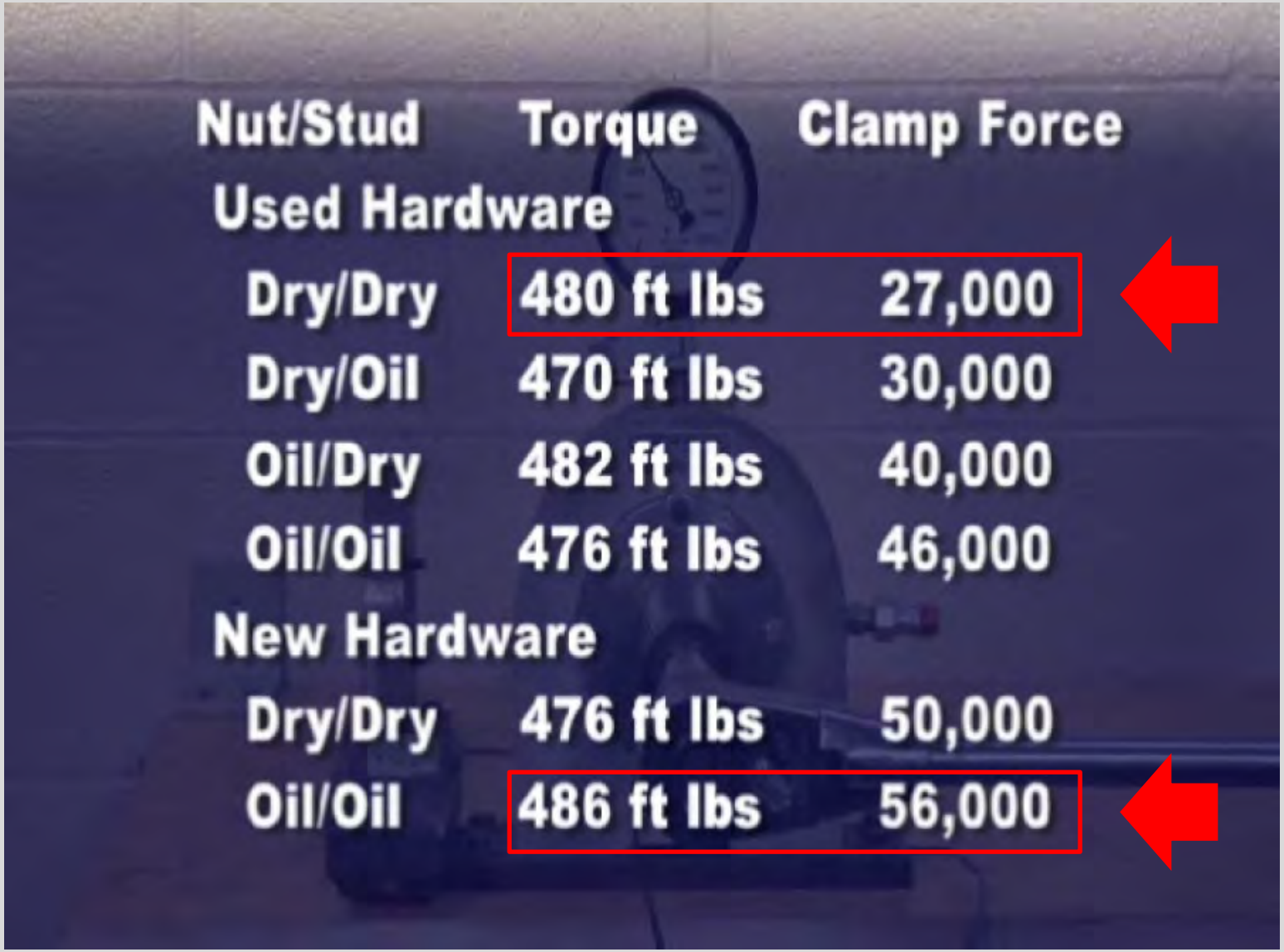
If this retightening schedule is found to be impractical, it is recommended that a preventative maintenance program be established within your fleet to periodically check for wear, damage, proper nut torque, wheel alignment, cracks, and leaks. Such a program will help ensure maximum performance, service life and safety from our product.

What affects clamping force??

Clamping Force Video



Importance of Clamping Force….



Tools of The Trade

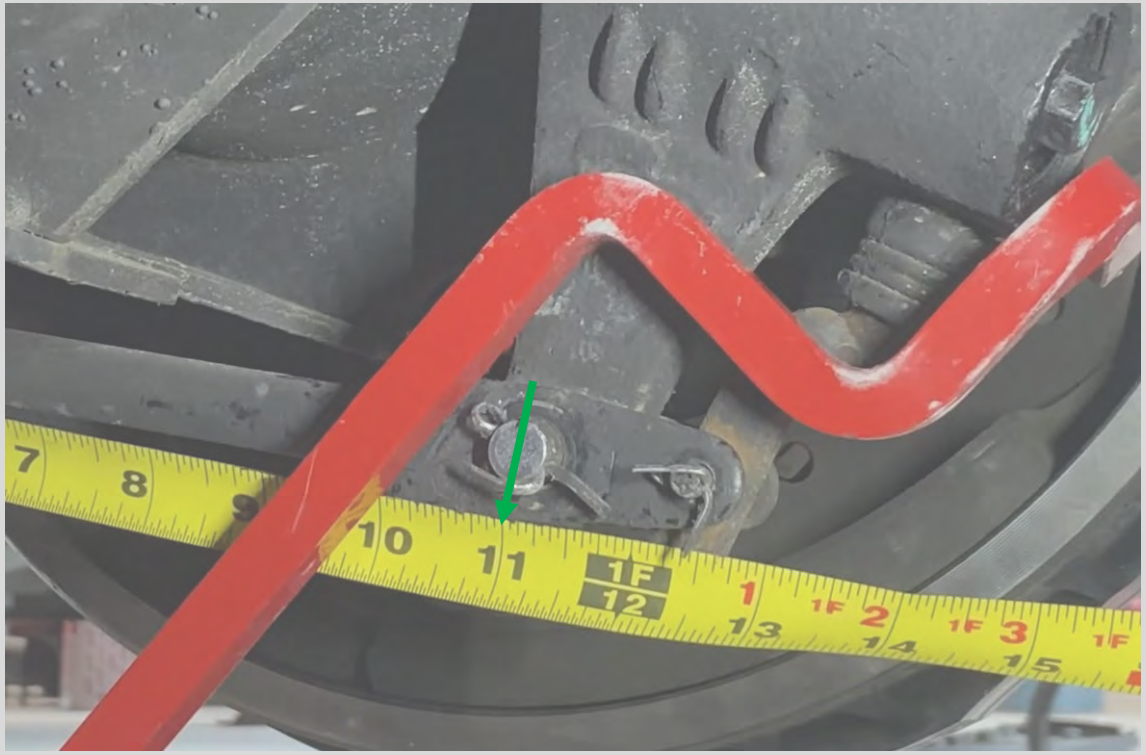
Wheel Stud Brush

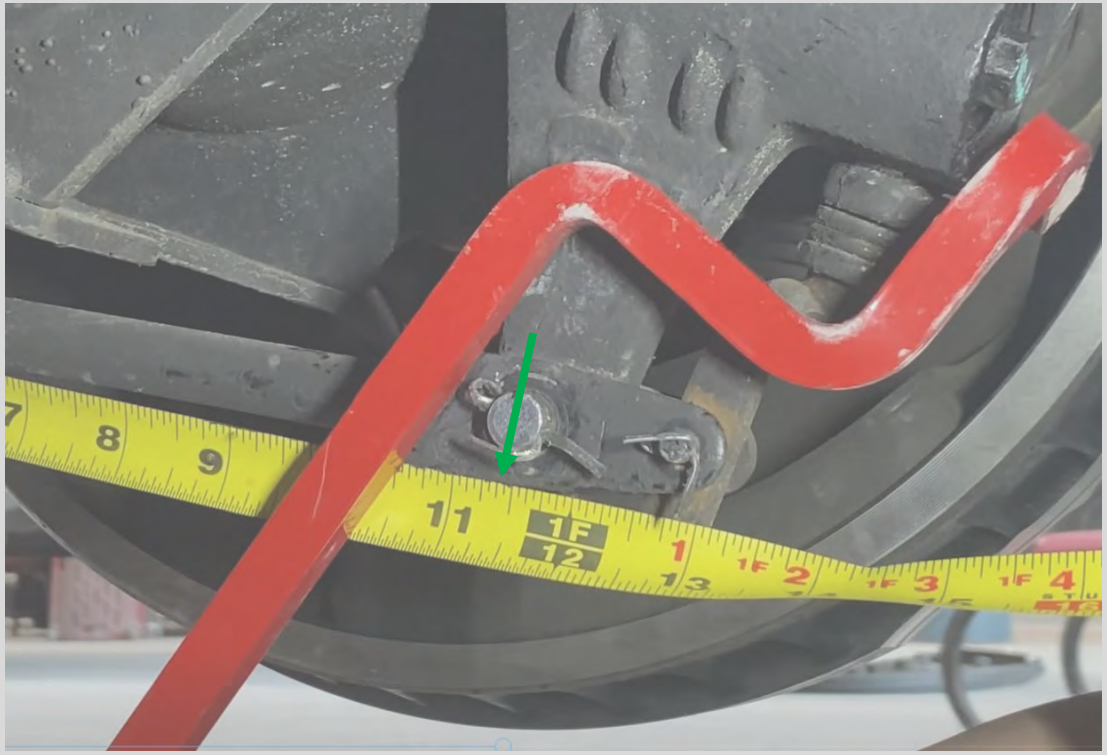
Flange Nut Gage

Hub Cleaning Tools

Foundation Brake Inspection – Free Stroke

Free stroke is the amount of movement of the adjuster arm required to move the **brake** shoes against the drum. The free stroke range should fall between 3/8"–5/8".

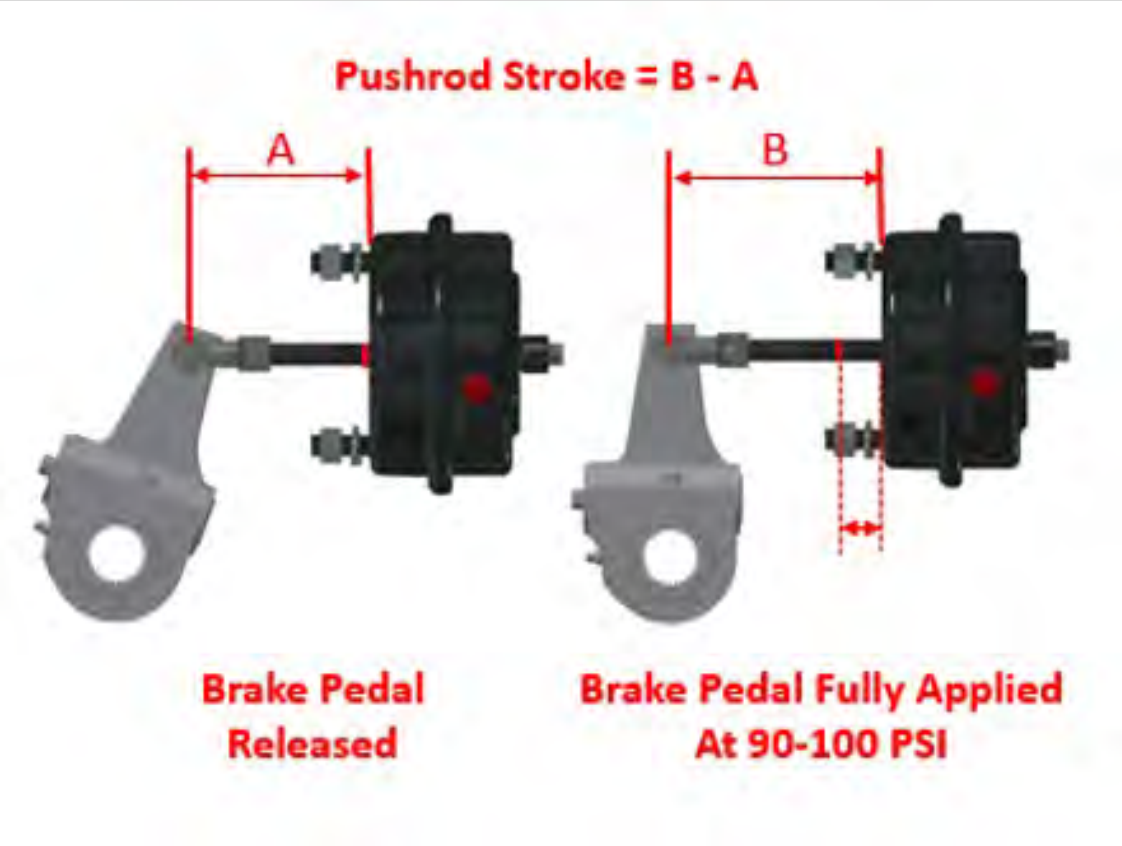




Foundation Brake Inspection – Free Stroke

Foundation Brake Inspection – Applied Stroke

The **applied stroke** of the brake should be checked per CVSA guidelines at 90-100 PSI. Applied stroke should be at or less than the specified adjustment limits as follows:



Standard Clamp Type Brake Chamber

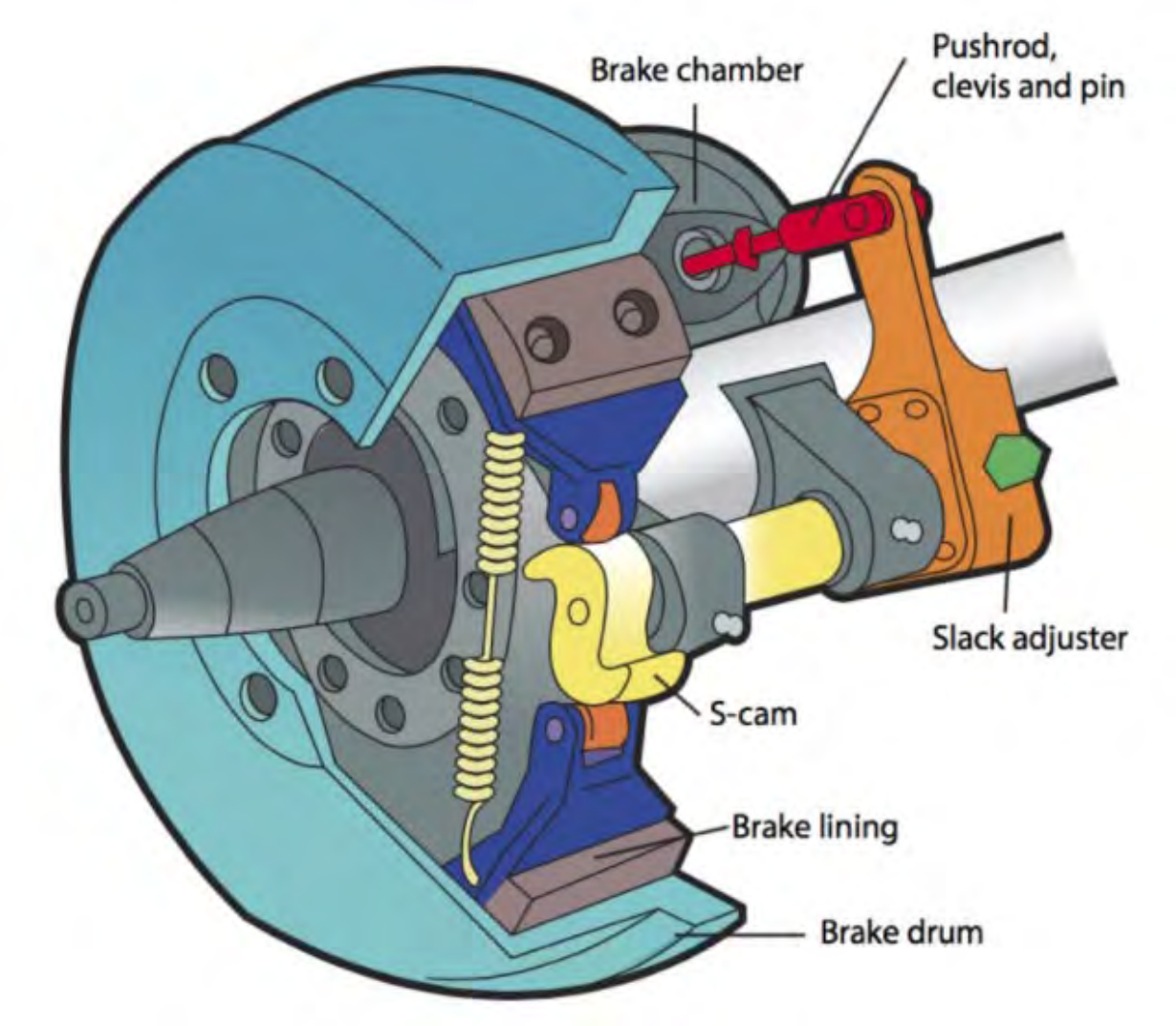
Type	Adjustment Limit	Type	Adjustment Limit
9	1-3/8"	24	1-3/4"
12	1-3/8"	30	2"
16	1-3/4"	36	2-1/4"
20	1-3/4"		

Long Stroke Type Brake Chamber

Type	Adjustment Limit	Type	Adjustment Limit
16L	2"	24LS	2-1/2"
20L	2"	30LS	2-1/2"
24L	2"		

NOTE: Long stroke chambers are identified with square air ports or port bosses and special trapezoid ID tags.

Foundation Brake Diagram

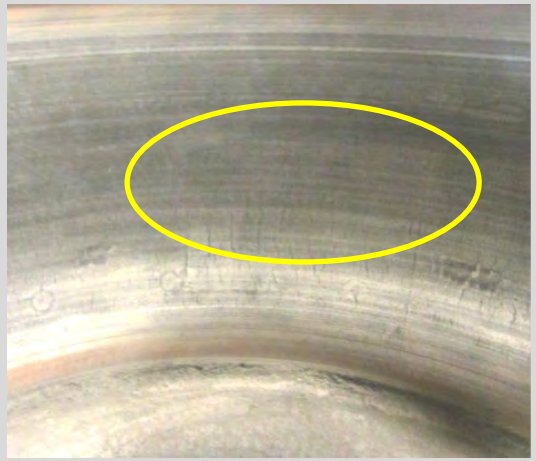


- **Many components make up a foundation brake system**
- **When evaluating a brake drum complaint, the entire foundation brake should be inspected to help determine the root cause of the issue.**

Brake Drum Replacement Guidelines

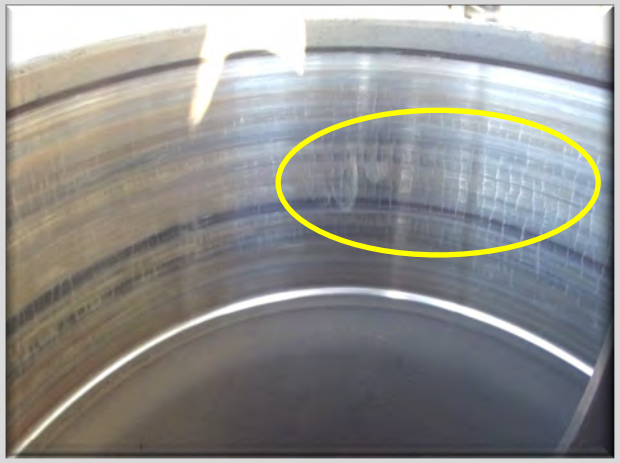
Heat Checking Guidelines

Light



Heat check is 1.5” or less in length. Heat check is sporadic across the braking surface. No crevices.

Medium



Heat check is 3" or less in length. Heat check is not apparent across the entire width of braking surface. Heat Checks are beginning to multiply. No crevices.

Heavy

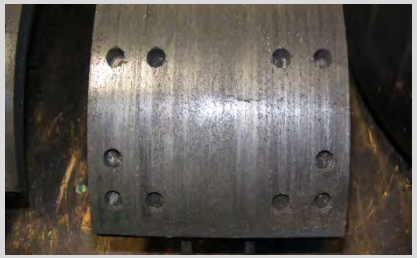
Heat check is 3" or greater in length. High frequency of repeated heat check. Crevices.

Localized Heat Checking

Affects of Brake Linings

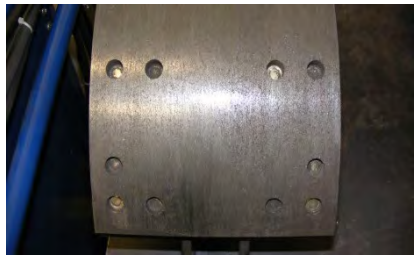
You think friction can affect brake drum performance??

OEM Friction Supplier A;
351 Stops
Light heat check;
No cracks noted



OEM Friction Supplier B;
260 Stops
Light heat check;
No cracks noted

Popular Aftermarket Supplier C;
217 Stops
Light heat check;
No cracks noted



Popular Aftermarket Supplier D;
60 Stops
Heavy heat check & hot spotting.
Drum catastrophically failed

Product Photos Taken Post One Loop (117 stops) of Dynamometer Test

All Test Parameters Held Constant Except for Friction Material

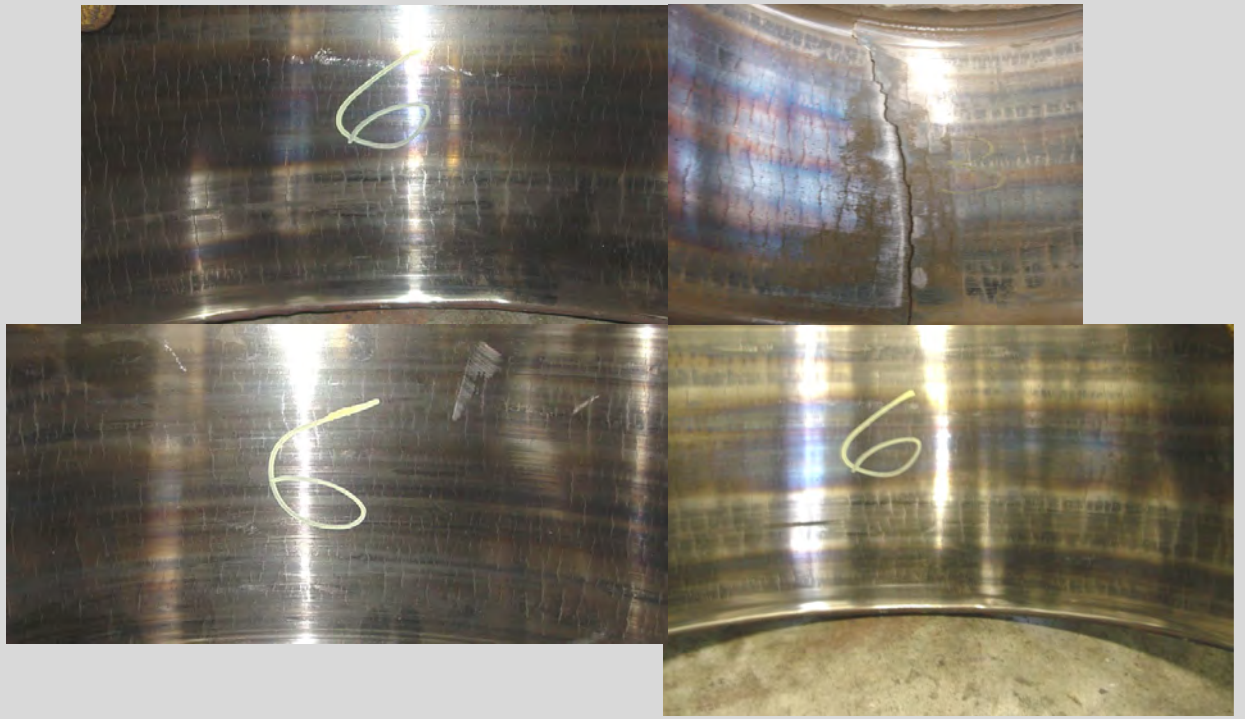
Hot Spotting on Brake Drum

CHECK FOR BRAKE IMBALANCE OR DRAGGING BRAKES

- Drum **must** reach 1400° F
- Indicates the drum has been subjected to extremely high temperatures for an extended amount of time
- Drum is more susceptible to cracking

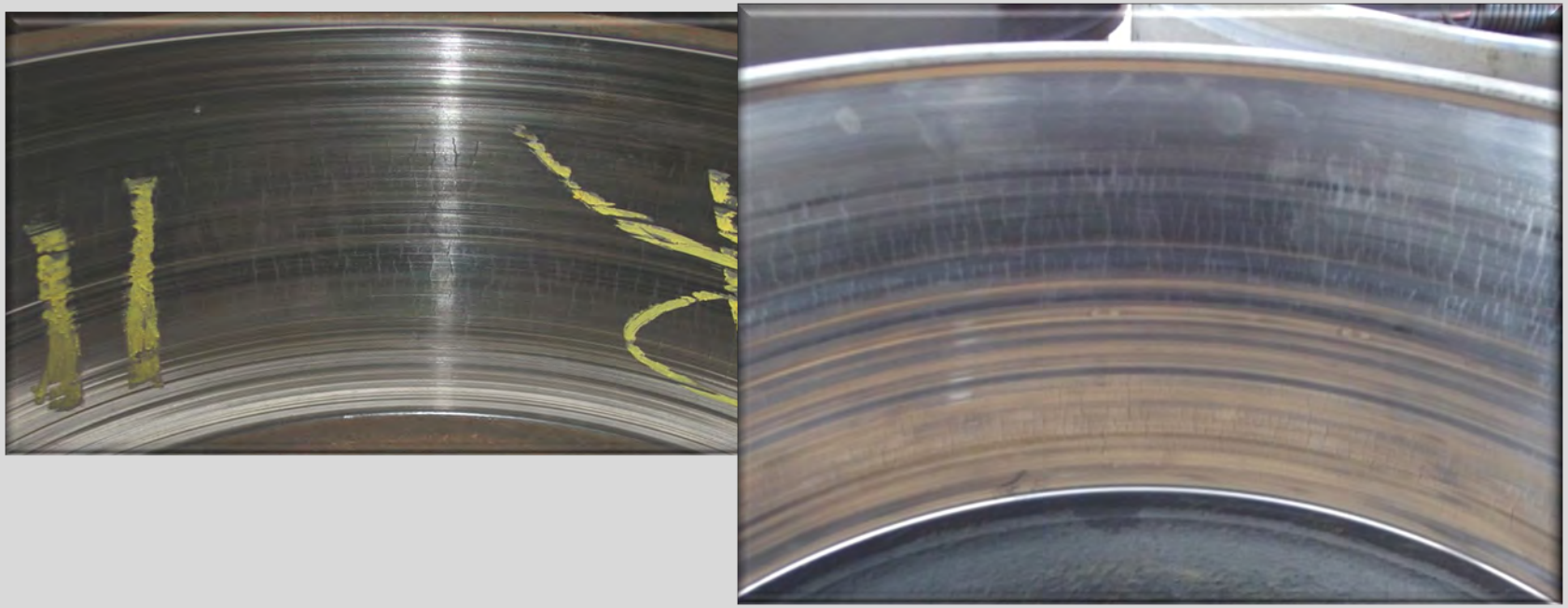
Discoloration/Bluing

CHECK FOR BRAKE IMBALANCE AND WEAK OR BROKEN RETURN SPRINGS



- **Some bluing can be considered normal**
- **Extreme cases indicate drum has been subjected to extremely high temperatures**

Grooving



- Usually due to foreign material between the drum and lining
- Install or remove the dust shield to see if the problem is fixed
- Deep grooves can cause a drum to measure beyond 0.120” max wear-out limit
- Weakens the drum and can cause cracks to progress more quickly

Risk of NOT Taking Action

Complete crack across braking surface !!!

Tools of The Trade

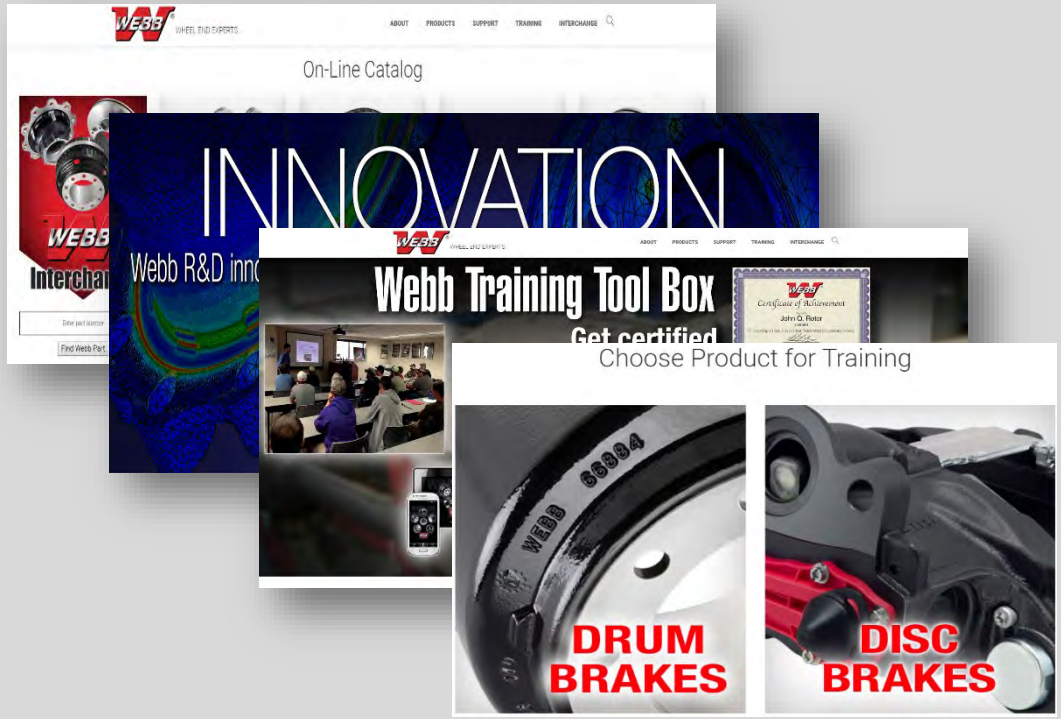
FRASER GAUGE

Y-Gauge

Wear Indicator

Training Resources

Webb Wheel offers an extensive amount of training resources. Click on the link below to visit Webb's "Training Toolbox" where you will find training videos, PDF's, and more!!
http://www.webbwheel.com/training_brakedrums.php



- *Webb's Training Toolbox*
  - *Updated PDF's*
  - *Training Videos*
- *Online Drum, Hub, Rotor, & Caliper Interchange*
- *Online Catalog*
- *Literature*
  - *New Product Bulletins*
  - *Service Bulletins*
  - *Order Literature*
- *Mobile App*

Thank You For Your Time!

Questions?

Ed Smith – Sr. Manager National Accounts
Dallas Garrison – Application Technician

Q&A

Enter your questions using
the Q&A button

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