Freight Railcars
# Table of Contents

Introduction .........................................................................................4  
Safety .................................................................................................5  
Training classes offered ......................................................................6  
Articulated Connector .........................................................................7  
Axles ...................................................................................................8  
Brake Rigging .....................................................................................9  
Constant Contact Side Bearing (CCSB) ............................................10  
Coupler / Knuckle ...............................................................................12  
Draft system – Striker Contact / “Free Slack” ..................................14  
EOC (Hydraulic Cushioning Unit) .....................................................16  
Hatch Covers (vented / non-vented) ...............................................18  
Pellet Gates .......................................................................................20  
Roller Bearings ................................................................................22  
Trucks – Amsted Rail Truck Types ...................................................24  
Trucks – Motion Control (MC) .........................................................25  
Trucks – Friction Shoe Height ........................................................26
Trucks – Friction Shoe Height – Visual Indicators.............27
Trucks – Friction Shoe Height – Gauges (SSRM and RIM).28
Trucks – Friction Shoe Height – Gauges (SSRC and RC).29
Trucks – Friction Shoe Height – Gauges (SM)...................30
Trucks – Friction Shoe – Face Wear...............................31
Trucks – Springs.........................................................32
Trucks – Column Wear Plates and Bolts..........................33
Trucks – Bolster Gibs / Side Frame Columns....................34
Trucks – Adapter Plus Pads / Pedestal Roof Wear Liner....35
Trucks – Top of Bolster Bowl to Car Body Clearance......36
Trucks – Cracks in Side Frame or Bolster.........................37
Trucks – Bolster Offset Longitudinally............................38
Trucks – Swing Motion.....................................................39
Twin-Pack........................................................................40
Wear Eliminators............................................................42
Wheels............................................................................43
This Amsted Rail pocket guide is intended as a quick reference to assist those who need to perform field inspections on railcars with Amsted Rail products. It is NOT intended as a guide for shop repairs.

For a complete listing of condemnable field conditions and proper repairs, please refer to the following:

- AAR Field Manual
- AAR MSRP
- Applicable Amsted Rail maintenance manuals

Before beginning an inspection, make sure you know what product and pattern/part/model number you are inspecting so that you have the correct (if applicable):

- Gauges
- Tools
- Manuals
Safety

It is the responsibility of the person performing the inspection and their employer to be trained on, know, understand, and follow all applicable industry rules and regulations, including AAR, FRA, OSHA, and the railroad.

Key safety rules include:

- If you need to break the theoretical plane of the car or step in between the rails to perform the inspection:
  - The car and/or track **MUST** be protected by a blue flag or signal
  - Ensure the car is secured from rolling (i.e. hand brake is set or wheel chocks are in place)
- If crossing live tracks, keep a safe distance to the end of the nearest car (typically 25’)
- Do not stand or step on top of the rail
- Do not use cellular phone within 6’ of rail
Amsted Rail offers the following types of training:

Class Room:

- Articulated Connector Inspection and Maintenance
- Brakes – Changes to AAR S-2044 Hand Brakes
- Brakes – Slack Adjuster Safety Training
- Couplers – Introduction
- Cushioning Unit – Introduction and Safety
- Cushioning Unit – Discharge Kit
- Field Manual – Rule 1 Gauges
- Field Manual – Running Repair Inspection
- Roller Bearing – Introduction
- Roller Bearing – FPM (Hot Bearing Inspection Failure Progression Mode)
- Trucks – Introduction
- Trucks – Reconditioning (AAR M-214)
- TwinPack – Inspection and Removal

Online Training:*

- Castings – Finishing Standards
- IONX – Installation
- Trucks – Inspecting Trucks in the Field
- Trucks – Motion Control Truck Assembly
- Wheels – Inspecting Wheel Sets in the Field

* Subject to change. Please contact Amsted Rail customer service for an up-to-date list.
Check the following to determine if maintenance is needed:

a) Wedge height – look through the “access holes” in the female connector, the wedge should not be bottomed out
b) Cracks – in either male or female casting
c) Main pin – tipped, broken, or cracked
d) Retaining pin – broken, bent, or missing
e) Retaining pin cotter key – missing
f) Distance – from nose of female to support box of male (< 2.25” <OR> > 3.625”)
g) Clearance – between male and female at center plate (< 0.75”)

Articulated Connector
Axles (Field Manual Rule 43)

Check for:

- Broken or visually cracked
- Damaged (such as gouges) between the wheel seats – condemnable when $\geq 0.125$” deep
- Bent
- Evidence of welding
Check the brake rigging, levers, rods, pins, and support brackets for:

- Bent, broken, or missing components (including cotter keys)
- Binding or fouling:
  - Levers
  - Rods
  - Hand brake chain
  - Bell crank or sheave wheel
  - Evidence of contact with the bolster
    - Around brake rod opening holes
    - Top, front, or back sides
- Worn brake shoes – condemnable when <0.375”
- Worn hand brake chain
- Signs of sticking brakes, such as:
  - Overheated wheels
  - Brake beams against the wheels when brakes not set

NOTE: Before removing a slack adjuster from a car, properly install the shipping bolt to prevent it from actuating during handling and shipping.
Check the CCSB for:

- Bent parts
- Broken parts
- Missing parts
- Loose cage
- Metal caps worn (see indicators, if applicable)
- Worn body bolster wear plate
- Roller or solid block type clearance – condemnable when:
  - < 0.188”
  - > 0.313”
Body wear plate

Bottom side of body bolster wear plate
Drooping coupler – is an indication of worn, broken, or missing components – such as:

- Coupler shank
- Coupler carrier
- Coupler carrier wear plate
- Coupler support plate
- Draft key / Yoke pin
- Coupler key slot / Pin hole
- Yoke key slot / Pin hole
- Striker key slot
- Yoke wear plate (welded to inside roof of type “F” sill)
Check coupler for:

- Cracks (see AAR Field Manual for criteria)
- Broken out sections
- Worn contour

Check knuckles for:

- Cracked (in any area)
- Worn nose
NOTE: The cause could be a stuck draft gear. ALWAYS check for a stuck gear BEFORE checking free slack.

If there is evidence of striker contact, measure the “free slack”:

- Push the coupler in by hand towards the striker as far as it will go
  - Measure and record the coupler horn-to-striker distance
- Pull the coupler out by hand away from the striker as far as it will go
  - Measure and record the coupler horn-to-striker distance
- Subtract the 2 measurements to get the “free slack”
**Recommended maximum limits:**

- AAR type E, EF, and F coupler – 1.00” (AAR RP-101)
- FR304 rotary dump coupler – 1.50” (Amsted Rail maintenance manual)

*If the “free slack” exceeds the recommended limits, the entire draft system should be inspected for worn, broken, or missing components such as:*

- Draft key / vertical pin
- Coupler key slot / coupler pin hole
- Yoke key slot / yoke pin hole
- Coupler butt
- Follower block
- Draft gear friction components
- Draft gear housing
- Sill front and rear draft lugs
EOC (Hydraulic Cushioning Unit)
(Field Manual Rule 59)

Check the unit for:

- Leaking – if hydraulic oil is observed on the unit, under the car, or on the wheel sets – check the UCI function (unit condition indicator) by:
  - Push the UCI button in
  - If the button pops out, then the unit has a sufficient operating pressure to return the piston
  - If the button does not pop back out, then the unit should be replaced
- **NOTE:** “Clearly formed droplets” is **NOT** a “cause for renewal” **UNLESS** the unit is not equipped with a UCI
- Cracked, broken, or missing components
- Not fully extended (check UCI function if not fully extended)
- Check for clearance for travel on all moving parts such as the train line brackets

![UCI (unit condition indicator)](image-url)
NOTE: DISCHARGE all cushion units BEFORE removing from the car
Hatch Covers (vented / non-vented)

Check hatch covers for:

- Broken or missing latch components (especially the latch spring)
- Broken or missing hinge components
- Broken or cracked hatch cover
- Torn or missing screen (vented hatch cover)
- Torn or damaged gasket
• Ensure that stickers are on both hatch cover and above outlet gate

• To ensure a proper seal:
  • Use a piece of paper (such as a dollar bill)
  • Insert paper between coaming and gasket
  • Close and latch the hatch cover
  • The paper should not be able to be pulled out using moderate force
Check the pellet gates for:

- In the closed and latched position
- Latch screws are tight
- Broken or missing components
- Evidence of commodity leaking past the gaskets

Shown in the closed and latched position
Shown in the open and unlatched position
Roller Bearings (Field Manual Rule 36)

Check the roller bearings for:

- Cracked, broken, or bent components
- Seal case cocked, loose, or damaged
- Loose or missing end cap bolts
- Missing locking plate
- Loose backing ring
- Displaced adapter

Cracked cup

Displaced seal
Missing end cap bolt

Missing locking plate

Check for loose backing ring

Dented seal
Amsted Rail produces a variety of truck designs (or suspension systems). The suspension system type can typically be found on one end of the bolster as shown.

**Abbreviations are as follows:**

- **SSRM** = Super Service Ridemaster®
- **RIM** = Ridemaster®
- **SSRC** = Super Service Ride Control®
- **RC** = Ride Control®
- **SM** = Swing Motion®

**NOTE:** **MC** = Motion Control, which is a truck “system” which uses the SSRM suspension system
Trucks – Motion Control (MC)

Motion Control® is a truck “system” which uses the SSRM suspension system.

*If the side frame is an ASF (Amsted Rail) pattern number 470A (or 22470A) marked with any of the following, then you need to look at the bolster end for the suspension type:*

- “Motion Control”
- “Family of Trucks”
- “FOT”

The 470A (or 22470A) side frame is designed to accept the following suspension systems:

- SSRM = Super Service Ridemaster
- RIM = Ridemaster
- SSRC = Super Service Ride Control

A “Motion Control” truck has the following four (4) items:

- SSRM suspension
- 7–D5O and 5-D5I load coils
- Long travel CCSB
- AdapterPlus pads <or> SCT S2-86 pads
Trucks – Friction Shoe Height
(Field Manual Rule 46)

Friction shoe height is a comprehensive measurement of total control element wear and therefore is a key indicator as to whether or not repairs are needed to one of the following control elements:

- Friction shoe
- Column wear plate
- Bolster slope surface

If the friction shoe height is within proper operating range, then no repair is needed to any of the above control elements unless a condemnable defect is found.

There are two (2) ways to check friction shoe height:

- Visual shoe height indicator
- Friction shoe mustache (or yoke) gauge
Trucks – Friction Shoe Height – Visual Indicators (Field Manual Rule 46)

No maintenance is required – when bottom edge of indicators are below top of bolster

Control remains but repair is indicated – when bottom edge of indicators are aligned with top of bolster

Repair is indicated – when bottom edge of indicators are above top of bolster
Trucks – Friction Shoe Height – Gauges (SSRM and RIM) (Field Manual Rule 46)

**Gauge criteria:**

**NO MAINTENANCE IS REQUIRED** – when gauge contacts top of bolster at “X” and does **not** contact both friction shoes at “Y” and “Z”.

**CONTROL REMAINS BUT REPAIR IS INDICATED** – when gauge contacts top of bolster at “X” and both friction shoes at “Y” and “Z”.

**REPAIR IS INDICATED** – when gauge contacts both friction shoes at “Y” and “Z” and does **not** contact top of bolster at “X”.

<table>
<thead>
<tr>
<th>Suspension Type</th>
<th>ASF Gauge #</th>
<th>Apply Gauge To Shoe At</th>
<th>Allowable Rise</th>
<th>Maintenance Manual</th>
</tr>
</thead>
<tbody>
<tr>
<td>RIM 100 Ton</td>
<td>1-9009</td>
<td>Top Center</td>
<td>1”</td>
<td>RIM</td>
</tr>
<tr>
<td>SSRM 100 Ton</td>
<td>1-9198</td>
<td>Top Center</td>
<td>1”</td>
<td>MC</td>
</tr>
</tbody>
</table>
Trucks – Friction Shoe Height – Gauges (SSRC and RC) (Field Manual Rule 46)

**Gauge criteria:**

- **No maintenance is required** – when gauge contacts top of bolster at “X” and does not contact both friction shoes at “Y” and “Z”.
- **Control remains but repair is indicated** – when gauge contacts top of bolster at “X” and both friction shoes at “Y” and “Z”.
- **Repair is indicated** – when gauge contacts both friction shoes at “Y” and “Z” and does not contact top of bolster at “X”.

<table>
<thead>
<tr>
<th>Suspension Type</th>
<th>ASF Gauge #</th>
<th>Apply Gauge To Shoe At</th>
<th>Allowable Rise</th>
<th>Maintenance Manual</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSRC 100 Ton</td>
<td>2-8510 Line 2</td>
<td>Top Center</td>
<td>7/8”</td>
<td>RC / SSRC</td>
</tr>
<tr>
<td>RC 70,100, &amp; 125 Ton</td>
<td>2-8510 Line 1</td>
<td>Top Center</td>
<td>7/8”</td>
<td>RC / SSRC</td>
</tr>
<tr>
<td>RC 70 Ton Low Level 5’-3” Wheel Base</td>
<td>2-8510 Line 3</td>
<td>Top Center</td>
<td>7/8”</td>
<td>RC / SSRC</td>
</tr>
<tr>
<td>RC 70 Ton Low Level 5’-1” Wheel Base</td>
<td>2-8510 Line 4</td>
<td>Top Center</td>
<td>7/8”</td>
<td>RC / SSRC</td>
</tr>
</tbody>
</table>
## Trucks – Friction Shoe Height – Gauges (SM) (Field Manual Rule 46)

<table>
<thead>
<tr>
<th>Suspension Type</th>
<th>ASF Gauge #</th>
<th>Apply Gauge To Shoe At</th>
<th>Allowable Rise</th>
<th>Maintenance Manual</th>
</tr>
</thead>
<tbody>
<tr>
<td>SM 70 Ton (5” bolster end height)</td>
<td>51555</td>
<td>Shoulder</td>
<td>11/16”</td>
<td>SM</td>
</tr>
<tr>
<td>SM 70 Ton (4.75” bolster end height)</td>
<td>51554</td>
<td>Shoulder</td>
<td>11/16”</td>
<td>SM</td>
</tr>
<tr>
<td>SM 70 Ton Low Deck</td>
<td>51554</td>
<td>Shoulder</td>
<td>11/16”</td>
<td>SM</td>
</tr>
<tr>
<td>SM 100 Ton</td>
<td>51555</td>
<td>Shoulder</td>
<td>11/16”</td>
<td>SM</td>
</tr>
<tr>
<td>SM 125 Ton</td>
<td>51554</td>
<td>Shoulder</td>
<td>11/16”</td>
<td>SM</td>
</tr>
</tbody>
</table>
Trucks – Friction Shoe – Face Wear
(Field Manual Rule 46)

All friction shoes have cast in visual face wear indicators (these are the same visual indicators used to check friction shoe height). If any of the indicators are worn away, then both friction shoes should be replaced in that bolster end.

No maintenance is required when all visual indicators are present

Friction shoe should be replaced when any of the visual indicators are no longer present
Trucks - Springs
(Field Manual Rule 50)

*Check both load and control coils for:*

- Broken
- Missing
- Displaced

*Control coil on a RC/SSRC truck*
Check column wear plates for:

- Cracked
- Broken
- Missing
- Loose
- Worn through

Check column wear plate bolts for:

- Loose
- Missing
Check bolster gibs and side frame columns for excessive wear. If worn, measure total gib clearance:

- Measure and add both inside and outside gib clearance at each position (i.e. R1 position has inside = .75” and outside = 1.00”, then total clearance = 1.75”)
- Repair when total clearance between gibs and columns exceed 1.50”
- NOTE – the SM truck does not have gibs by design
Check AdapterPlus® pads for:

- Minimum 1/16” clearance between any point of the pedestal roof / adapter rail interface
- Pad distortion
- Serious cracks or tears (all the way through the pad)

Check snap on pedestal roof wear liners for:

- Missing, broken, or cracked such that it no longer provides a full bearing surface for the adapter crown to rest against
Trucks – Top of Bolster Bowl to Car Body Clearance (Field Manual Rule 47)

Check the clearance between top of the bolster bowl and bottom of the car body. Clearance is condemnable when:

- If ≤ .063” at any time
- If > .063” and < .125” when in shop

No clearance
Trucks – Cracks in Side Frame or Bolster (Field Manual Rule 47 & 48)

Inspect the side frame and bolster for cracks or signs of rust bleed. Key areas to inspect are:

Side Frame:

- Inner pedestal radius
- Turn of spring seat
- Top corners of bolster opening window

Bolster:

- Around the brake rod opening holes
- Turn of the spring seat
- Center bowl rim
- Gibs
Trucks – Bolster Offset Longitudinally

It is fairly common to see the bolster offset longitudinally within the side frame (1 friction shoe higher than the other) – this is NOT a concern.

This happens when the car experiences a high longitudinal impact (such as slack action or during coupling), especially when empty. This high impact forces 1 friction shoe down allowing the bolster to offset within the side frame. During normal service, the control coil force will re-center the bolster (until another high impact).
In addition to checking the SM truck for other criteria listed above (except gib clearance):

- Check for clearance and signs of contact between the underside of the rocker seat and the raised pads on the side frame tension member
- A 3/32” thick feeler must pass through the rocker seat and the raised pad on the tension member when the side frames are in the neutral position (side frames are to be perpendicular to top of the rails)
Because of the unique design of the Twin-Pack, striker contact may occur under extremely high impacts. If striker contact is observed:

- Measure the “free slack”
- Check the Twin-Pack for damaged or missing components
- Check that the unit is tight in the draft gear pocket

If all 3 conditions above are satisfactory, then no further attention is required except repairing any damage to the striker face.
Note – the following are NOT a “cause for renewal” per Rule 21:

- A broken or missing guide rod. The guide rod is used to gag the gear
- Partial tearing of the pads or splitting/separation of rubber from metal plates

Normal partial tears

Guide rod  Gag nut  Retainer

Normal partial bond separation of elastomer pad and steel plate
Wear Eliminators

Check any plastic “wear eliminators”, such as:
- Bolster bowl liners
- Brake beam liners
- Coupler carriers
- Coupler carrier wear plates
- Brake rod protectors

Check for abnormal conditions that would affect operation, such as:
- Missing
- Cracked, torn, or broken out sections
- Heavy wear
- Deep gouges
- Obvious color changes (indicating distress)
There are numerous wheel defects to look for – here are some of the most common:

- Thin flange – condemnable when \( \leq 0.938'' \) when measured with approved gauge
- High flange – condemnable when \( \geq 1.5'' \)
- Cracked, chipped, or broken flange
- Cracked, broken, shattered, or spread rim
- Thin rim – condemnable when:
  - \( \leq 0.75'' \) for 30” and 33” wheels
  - \( \leq 0.875'' \) for 28”, 36”, and 38” wheels
There is numerous wheel damage to look for – here are some of the most common:

- **Shelled tread** – condemnable when:
  - $\geq 1.0''$ diameter with no islands
  - $\geq 2''$ in length
- **Built up tread** – condemnable when $\geq .125''$
- **Grooved tread** – condemnable when $\geq .125''$
- **Scrape, dent, or gouge** – condemnable when $\geq .125''$

**Thermal cracks:**

- Transverse cracks running parallel to the axle
- Not tightly grouped
Heat checks:
- Are NOT condemnable
- Run at an angle
- Appear in tight uniform groups

Out of round or flat spots:
- Out of round “run-out” – condemnable when > .070”
- High Impact Wheel
  - $\geq 90$ kip reading at any time
  - $\geq 80$ kip when in a shop
- Slid flat – condemnable when:
  - 2.0” in length
  - 2 or more adjoining spots each
    $\geq 1.5$” in length
- Hollow worn – condemnable when:
  - > 5 mm any time
  - > 4 mm when in a shop