# TECHNICAL PROCEDURE

## RT™ • RTE™ Steel Leaf Spring Rear Suspension

**SUBJECT:** Service Instructions  
**LIT NO:** 17730-070  
**DATE:** December 2017  
**REVISION:** H

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[Image]

**HENDRICKSON**  
The World Rides On Us®
SECTION 1
Introduction

This publication is intended to acquaint and assist maintenance personnel in the preventive maintenance, service, repair and rebuild of the RT™ • RTE™ walking beam rear suspension systems.

NOTE

Use only Genuine Hendrickson parts for servicing this suspension system.

It is important to read and understand the entire Technical Procedure publication prior to performing any maintenance, service, repair, or rebuild of this product. The information in this publication contains parts lists, safety information, product specifications, features, proper maintenance, service, repair and rebuild instructions for the RT • RTE Suspensions.

Hendrickson reserves the right to make changes and improvements to its products and publications at any time. Contact Hendrickson Tech Services for information on the latest version of this manual at 1-866-755-5968 (toll-free U.S. and Canada), 630-910-2800 (outside U.S. and Canada) or e-mail: techservices@hendrickson-intl.com.

The latest revision of this publication is also available online at www.hendrickson-intl.com

SECTION 2
Product Description

FIGURE 2-1
RT•RTE 34K • 40K • 46K

RT•RTE 48K • 50K • 52K

RT 65K • 70K
Heavy-duty
The RT•RTE steel leaf spring suspension systems are versatile suspensions known for durability in demanding on- and off-highway applications. The enhanced design gives the suspension superior durability, stability and off-highway maneuverability.

- **Hendrickson Rods** — Heavy-duty forgings reduce weight, yet improve durability over conventional rods. Optional transverse rods improve cornering by controlling lateral forces.

- **Spring pack** — Genuine Hendrickson springs are made from high-strength steel and are heat treated and shot peened for exceptional fatigue life.

- **Extended Leaf Springs** — Extended leaf spring design of the RTE provides a smooth, comfortable ride when empty or lightly loaded.

- **No. 1 Spring Hanger** — Helps absorb the forces of braking and acceleration, while providing longer hanger and spring eye bushing life.

- **No. 2 Spring Hanger** — Cam and leg areas receive a special flame hardening treatment that increases durability and extends life.

- **No. 3 Spring Hanger** — Serves as the primary load point for the lengthened RTE spring pack in unloaded conditions.

- **Equalizing beam** — Distributes load equally between both axles for improved traction and lowers the center of gravity to increase stability plus establishes a solid axle connection for improved handling.

- **Bar pin end connection** — Rugged axle connection extends bushing life and allows easy axle alignment.

- **Saddle** — Engineered to increase durability without adding weight. High stress concentration areas such as chair back and legs are fortified for strength and durability.

- **Shock Absorbers** — Provide additional driver comfort. Available as production or aftermarket options.

**The RT suspension** — uses leaf springs to cushion road shocks. The springs are mounted on saddle assemblies above the equalizing beams and are connected at the front ends to spring hangers with spring eye pins through the spring eyes. The rear ends of the springs have no rigid attachment to the spring hangers and they are free to move forward and backward to accommodate spring deflection.

**The RTE suspension** — The extended leaf spring design of the RTE suspension provides a smoother, more comfortable ride when empty or lightly loaded and uncompromised stability when fully loaded. The upper leaves of the RTE extend past the No. 2 spring hanger to the No. 3 hanger. In the empty or lightly loaded condition, the extended spring leaves do not make contact with the No. 2 hanger. The resulting longer effective spring length produces a softer ride for greater driver comfort and equipment protection. When load is added, the extended leaves deflect and make contact with the No. 2 hanger. This shortens the effective spring length to match that of the RT spring assembly for a more stable ride.
## SPECIFICATIONS

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<td></td>
</tr>
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1. Contact Hendrickson for availability of additional capacities and axle spacing.
2. Installed weight includes complete suspension, torque rods, axle brackets and frame brackets at 54 inch axle spacing. Capacities over 65K vary, contact Hendrickson engineering for more information.
3. Contact Hendrickson for applications that may exceed Gross Vehicle Weight approval rating.
4. Site Travel Rating – operations using vehicles equipped with liftable pusher or tag axles must not exceed published ratings. Ratings are limited to no more than five percent of vehicle operation at a speed not to exceed five mph. Liftable pusher or tag axles should only be raised (or unloaded) to improve vehicle maneuverability in off-road use or when vehicle is empty. Site ratings are consistent with published axle manufacturer’s limitations. Axle and suspension site travel specifications must not be exceeded.
5. Transverse rods are standard with axle spacing of 60 inches or more and on 46,000 to 70,000 pound capacity suspensions with rubber center bushings, refer to Hendrickson publication 59310-004 and 59310-058 for more information.
6. Heavy-duty equalizing beam option available at 46,000 pound capacity.

Aftermarket shock absorbers available, contact Hendrickson for details.
SECTION 3
Important Safety Notice

Proper maintenance, service, and repair are important for the reliable operation of the suspension. The procedures recommended by Hendrickson and described in this technical publication are methods of performing such maintenance, service and repair.

This technical publication should be read carefully to help prevent personal injury and to assure that proper methods are used. Improper maintenance, service or repair may damage the vehicle, cause personal injury, render it unsafe in operation, or void manufacturer’s warranty.

Failure to follow the safety precautions in this manual can result in personal injury and/or property damage. Carefully read and understand all safety related information within this publication, on all decals and in all such materials provided by the vehicle manufacturer before conducting any maintenance, service or repair.

EXPLANATION OF SIGNAL WORDS

Hazard “Signal Words” (Danger-Warning-Caution) appear in various locations throughout this publication. Information accented by one of these signal words must be observed to help minimize the risk of personal injury to service personnel, or possibility of improper service methods which may damage the vehicle or render it unsafe.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

Additional Notes or Service Hints are utilized to emphasize areas of procedural importance and provide suggestions for ease of repair. The following definitions indicate the use of these signal words as they appear throughout the publication.

DANGER
INDICATES AN IMMINENTLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN SERIOUS INJURY OR DEATH.

WARNING
INDICATES A POTENTIAL HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY.

CAUTION
INDICATES A POTENTIAL HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, MAY RESULT IN MINOR OR MODERATE INJURY.

NOTE
An operating procedure, practice condition, etc. which is essential to emphasize.

SERVICE HINT
A helpful suggestion, which will make the servicing being performed a little easier and/or faster. Also note that particular service operations may require the use of special tools designed for specific purposes. These special tools can be found in the Special Tools Section of this publication.

The torque symbol alerts you to tighten fasteners to a specified torque value. Refer to Torque Specifications Section of this publication.
# SAFETY PRECAUTIONS

## FASTENERS

**WARNING**

Discard used fasteners. Always use new fasteners to complete a repair. Failure to do so could result in failure of the part or mating parts, adverse vehicle handling, personal injury, or property damage.

Loose or over torqued fasteners can cause component damage, adverse vehicle handling, property damage, or severe personal injury. Maintain correct torque value at all times. Check torque values on a regular basis as specified, using a regularly calibrated torque wrench. Torque values specified in this technical publication are for Hendrickson supplied fasteners only. If non-Hendrickson fasteners are used, follow torque specification listed in the vehicle manufacturer’s service manual.

## LOAD CAPACITY

**WARNING**

Adhere to the published capacity ratings for the suspension. Add-on axle attachments and other load transferring devices can increase the suspension load above its rated and approved capacities, which can result in component damage and adverse vehicle handling, possibly causing personal injury or property damage.

## ALUMINUM COMPONENTS (IF EQUIPPED)

**WARNING**

Aluminum components are designed to be lightweight options where weight reduction is desirable. Their use are to be confined to applications where the rated capacity of the suspension will not be exceeded. Failure to limit aluminum component applications to rated capacity could result in catastrophic failure of the component and adverse vehicle handling, possibly causing personal injury or property damage.

Aluminum components such as equalizing beams can be damaged by prolonged exposure to salt, or to acid which is sometimes used to remove concrete. Continued exposure could result in a failure of these parts and adverse vehicle handling, possibly causing personal injury or property damage.

Aluminum components can also be damaged by contact with hard objects which gouge these parts. These conditions could result in a failure of these parts which may result in adverse vehicle handling and possible personal injury or property damage.

## SUPPORT THE VEHICLE PRIOR TO SERVICING

**WARNING**

Place the vehicle on a level floor and chock the wheels to prevent the vehicle from moving or rolling. Do not work around or under a raised vehicle supported by only a floor jack or other lifting device. Always support a raised vehicle with rigid safety stands. Failure to do so can cause serious personal injury or damage to equipment.

## PROCEDURE AND TOOLS

**CAUTION**

A technician using a service procedure or tool which has not been recommended by Hendrickson must first satisfy himself that neither his safety nor the vehicle’s safety will be jeopardized by the method or tool selected. Individuals deviating in any manner from the instructions provided will assume all risks of consequential personal injury or damage to equipment involved.

## LONGITUDINAL TORQUE RODS AND/OR TRANSVERSE TORQUE RODS (IF EQUIPPED)

**WARNING**

RT•RTE suspensions incorporate torque rods for vehicle stability. If these components are disconnected or are non-functional, the vehicle should not be operated. Failure to do so can result in adverse vehicle handling, possible tire contact with the frame, premature component damage, or severe personal injury.

## PERSONAL PROTECTIVE EQUIPMENT

**WARNING**

Always wear proper eye protection and other required personal protective equipment to help prevent personal injury when performing vehicle maintenance, repair or service.
MODIFYING COMPONENTS

**WARNING**

DO NOT MODIFY OR REWORK PARTS WITHOUT AUTHORIZATION FROM HENDRICKSON. DO NOT SUBSTITUTE REPLACEMENT COMPONENTS NOT AUTHORIZED BY HENDRICKSON. USE OF MODIFIED, REWORKED, SUBSTITUTE OR REPLACEMENT PARTS NOT AUTHORIZED BY HENDRICKSON MAY NOT MEET HENDRICKSON’S SPECIFICATIONS, AND CAN RESULT IN FAILURE OF THE PART, ADVERSE VEHICLE HANDLING, POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE, AND WILL VOID ANY APPLICABLE WARRANTIES. USE ONLY HENDRICKSON AUTHORIZED REPLACEMENT PARTS.

LEAF SPRING ASSEMBLY

**WARNING**

A LEAF SPRING ASSEMBLY THAT HAS A MISSING, CRACKED OR DAMAGED LEAF OR SPRING CLIP WILL REQUIRE COMPLETE LEAF SPRING ASSEMBLY REPLACEMENT AND A THOROUGH INSPECTION OF THE ENTIRE SUSPENSION. IF ANY SUSPENSION COMPONENT APPEARS DAMAGED, REPLACEMENT IS REQUIRED. FAILURE TO REPLACE ANY DAMAGED COMPONENTS CAN CAUSE ADVERSE VEHICLE HANDLING, POSSIBLE PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE AND WILL VOID ANY APPLICABLE WARRANTIES.

SADDLE CONNECTION

**CAUTION**

A SADDLE IS ATTACHED TO THE CENTER BUSHINGS OF EACH EQUALIZING BEAM WITH TWO (2) SADDLE CAPS. EACH SADDLE CAP USES TWO (2) STUDS TO CLAMP THE CENTER BUSHING INNER METAL TO THE SADDLE. A SADDLE CAP MUST BE INSTALLED SO THAT THERE IS AN EVEN GAP BETWEEN THE SADDLE CAPS AND THE BASE OF THE SADDLE LEGS, AS SHOWN IN FIGURE 3-1. IF EACH SADDLE CAP IS NOT INSTALLED EVENLY THE SADDLE LEGS COULD BECOME DEFORMED, RESULTING IN BENT BOLTS OR DAMAGED SADDLE LEGS.

**FIGURE 3-1**

![Saddle Diagram](image)

Maintain an even gap between the base of the saddle and the saddle cap.

EXCHANGING SUSPENSION COMPONENTS

**WARNING**

DO NOT EXCHANGE OR SWAP COMPONENTS (SUCH AS EQUALIZING BEAMS, SPRINGS, FRAME HANGERS, ETC.) FROM ONE HENDRICKSON SUSPENSION ASSEMBLY TO ANOTHER, ESPECIALLY WHEN THE ORIGIN, APPLICATION, OPERATION, LOADING, SERVICE, MAINTENANCE AND/OR REPAIR HISTORIES OF SUCH COMPONENTS ARE NOT KNOWN. EXCHANGING OR SWAPPING SUCH COMPONENTS CAN CAUSE PREMATURE COMPONENT FAILURE, POSSIBLY RESULTING IN ADVERSE VEHICLE HANDLING, PERSONAL INJURY OR PROPERTY DAMAGE, AND WILL VOID ANY APPLICABLE WARRANTIES.

EQUALIZING BEAM END CONNECTION AND SADDLE CAP FASTENERS

**WARNING**

DO NOT ASSEMBLE BEAM END CONNECTION WITHOUT PROPER FASTENERS. HENDRICKSON RECOMMENDS THE USE OF HENDRICKSON FASTENERS TO SUSTAIN PROPER CLAMP FORCE. FAILURE TO DO SO CAN CAUSE ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE OR PERSONAL INJURY.

ENSURE THAT BEAM END CONNECTION AND SADDLE CAP FASTENER TORQUE VALUES ARE SUSTAINED AS RECOMMENDED IN THE TORQUE SPECIFICATIONS SECTION OF THIS PUBLICATION. FAILURE TO SO CAN CAUSE ADVERSE VEHICLE HANDLING RESULTING IN PERSONAL INJURY OR PROPERTY DAMAGE.

IF BEAM END BUSHING MOVEMENT OR LOOSENESS IS NOTED IN THE EQUALIZING BEAM END HUB, DO NOT OPERATE THE VEHICLE. REPLACE THE END BUSHINGS AND ALL CONNECTING PARTS. THE ABOVE CONDITION CAN RESULT IN COSTLY REPAIR, DOWNTIME, POSSIBLE SEPARATION OF COMPONENTS, ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE, OR PERSONAL INJURY.
**WARNING**

**IMPROPER JACKING METHOD**

IMPROPER JACKING METHODS CAN CAUSE STRUCTURAL DAMAGE WHICH CAN CAUSE ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE OR SEVERE PERSONAL INJURY AND WILL VOID HENDRICKSON’S WARRANTY.

**FIGURE 3-2**

- DO NOT USE THE SUSPENSION CROSS TUBE, BAR PIN AXLE BRACKETS AS A JACKING POINT, REFER TO VEHICLE MANUFACTURER FOR PROPER JACKING INSTRUCTIONS.
- ACCEPTABLE LIFTING POINTS FOR A VEHICLE AT THE RATED LOAD INCLUDE BUT ARE NOT LIMITED TO: THE AXLE, EQUALIZING BEAM AND THE VEHICLE FRAME RAIL. REFER TO THE VEHICLE MANUFACTURER FOR PROPER JACKING INSTRUCTIONS.

**WARNING**

**PARTS CLEANING**

SOLVENT CLEANERS CAN BE FLAMMABLE, POISONOUS, AND CAUSE BURNS. TO HELP AVOID SERIOUS PERSONAL INJURY CAREFULLY FOLLOW THE MANUFACTURER’S PRODUCT INSTRUCTIONS AND GUIDELINES AND THE FOLLOWING PROCEDURES:

1. WEAR PROPER EYE PROTECTION.
2. WEAR CLOTHING THAT PROTECTS YOUR SKIN.
3. WORK IN A WELL-VENTILATED AREA.
4. DO NOT USE GASOLINE OR FLAMMABLE SOLVENTS THAT CAN EXPLODE.
5. HOT SOLUTION TANKS OR ALKALINE SOLUTIONS MUST BE USED CORRECTLY. FOLLOW THE MANUFACTURER’S RECOMMENDED INSTRUCTIONS AND GUIDELINES CAREFULLY TO HELP PREVENT PERSONAL ACCIDENT OR INJURY.

DO NOT USE HOT SOLUTION TANKS OR WATER AND ALKALINE SOLUTIONS TO CLEAN GROUND OR POLISHED PARTS. DOING SO WILL CAUSE DAMAGE TO THE PARTS AND VOID WARRANTY.

**WARNING**

**TORCH/WELDING**

DO NOT USE A CUTTING TORCH TO REMOVE ANY FASTENERS. THE USE OF HEAT ON SUSPENSION COMPONENTS WILL ADVERSELY AFFECT THE STRENGTH OF THESE PARTS. A COMPONENT DAMAGED IN THIS MANNER CAN RESULT IN ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

EXERCISE EXTREME CARE WHEN HANDLING OR PERFORMING MAINTENANCE IN THE AREA OF THE EQUALIZING BEAM. DO NOT CONNECT ARC WELDING GROUND LINE TO THE EQUALIZING BEAM. DO NOT STRIKE AN ARC WITH THE ELECTRODE ON THE EQUALIZING BEAM AND AXLE. DO NOT USE HEAT NEAR THE EQUALIZING BEAM ASSEMBLY. DO NOT NICK OR GOUGE THE EQUALIZING BEAM. SUCH IMPROPER ACTIONS CAN DAMAGE THE EqualizIng beam ASSEMBLY, AND CAN CAUSE ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.
SECTION 4
Special Tools

BAR PIN STYLE END BUSHING TOOLS

INSTALLATION TOOLS
Hendrickson Part No. 66086-103
OTC Part No. 1757
Visit otctools.com

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<td>2. Cap</td>
<td>219554</td>
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<td>3. Cap screw</td>
<td>520563</td>
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<tr>
<td>4. Washer</td>
<td>11253</td>
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<tr>
<td>5. Hex nut</td>
<td>10221</td>
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<td>6. Shims</td>
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REMOVAL TOOLS
Hendrickson Part No. 66086-104
OTC Part No. 206457
Visit otctools.com

Hendrickson Part No. 66086-105
OTC Part No. 302030
Visit otctools.com

ADAPTER STYLE END BUSHING TOOL SET PLUS RUBBER CENTER BUSHING TOOLS

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28K-52K lb. Capacity Bushings
Hendrickson Part No. 66086-102
OTC Part No. 1764
Visit otctools.com

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RUBBER CENTER BUSHING TOOLS

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40K lb. Capacity Bushings
Hendrickson Part No. 66086-100
OTC Part No. 1746
Visit otctools.com

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CENTER AND END BUSHING TOOLS

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### BRONZE CENTER BUSHING TOOLS

OTC Part No. 1744 Visit otctools.com

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### TORQUE ROD BUSHING FUNNEL TOOLS

ULTRA ROD
Hendrickson Part No. 66086-001L

ULTRA ROD PLUS
Hendrickson Part No. 66086-000L

### TORQUE ROD BUSHING TOOLS

These shop made tools are designed for the torque rod bushings. Bushing tools are to be made from cold rolled steel or equivalent. Drawing is for reference only. Hendrickson does not supply these tools.

#### ULTRA ROD BUSHING

- **Receiving Tool**
  - 8.25” (210 mm)
  - Ø 2.125” (54 mm)

- **Installation / Removal Tool**
  - 3.00” (76 mm)
  - Ø 1.25” (32 mm)

#### ULTRA ROD PLUS AND XTRB BUSHING

- **Receiving Tool**
  - 9.25” (235 mm)
  - Ø 3.0” (76 mm)

- **Installation / Removal Tool**
  - 65K - 70K lb. Capacity Bushings

#### XTRB BUSHING

- **Installation / Removal Tool**
  - 2.20” (56 mm)
  - Ø 2.68” (68 mm)
  - Ø 2.31” (59 mm)
### SECTION 5
### Parts Lists

#### Selection Guide

**KEY NO. 2**

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**KEY NO. 3, Pages 12 and 14**

*Corresponding Center Bushing End Plug for Cross Tube Replacement – 34K through 52K Only*

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* Hendrickson recommends for high capacity walking beam suspensions, removal of the equalizing beam to replace the cross tube. Refer to the Cross Tube Equipped with Rubber Bushings section in this publication for 65K cross tube replacement.

**End Plugs are not needed if equipped with bronze center bushings.**
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**See Selection Guide 45745-038**

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### Two-Piece Torque Rod Assembly with Bushings Service Kit

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**See Selection Guide 45745-038**

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### Two-Piece Torque Rod Assembly with Bushings Service Kit

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**NOTES**

* Not supplied by Hendrickson, used for reference only. Hendrickson is not responsible for components supplied by the vehicle manufacturer. For assistance with maintenance and rebuild instructions on these components see vehicle manufacturer.

** Item included in kit/assembly only, part not sold separately.

*** Hendrickson’s part number is stamped on the torque rod for identification. Be sure to include the suffix number when ordering, this number indicates rod length. Hendrickson’s two-piece ULTRA ROD • ULTRA ROD PLUS can be used to create the desired length, refer to Hendrickson Lit. No. 45745-148.

**** Transverse torque rods are mandatory for the RT™•RTE rear suspension regardless of axle spacing, refer to Hendrickson Literature No. 59310-004 and 59310-058.
SECTION 6
Preventive Maintenance

Following appropriate inspection procedures are important to help ensure the proper maintenance and operation of the suspension system and component parts. Hendrickson recommends the RT•RTE walking beam suspensions be inspected at pre-delivery, the first 1,000 miles or 100 hours and at the regular preventive maintenance intervals. Off-highway and severe service operating conditions require more frequent inspections than on-highway service operation. Inspection must include the following items and other components referenced in this section.

NOTE
Torque values shown in this publication apply only if Hendrickson supplied fasteners are used. If non Hendrickson fasteners are used, follow the torque specification listed in the vehicle manufacturer’s service manual.

HENDRICKSON RECOMMENDED INSPECTION INTERVALS

<table>
<thead>
<tr>
<th></th>
<th>PRE-DELIVERY / POST CONVERSION INSPECTION</th>
<th>FIRST INSPECTION</th>
<th>PREVENTIVE MAINTENANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual inspection for proper assembly and function. Check for all of the following and replace components as necessary:</td>
<td>Within the first 100 Miles</td>
<td>Within the first 1,000 Miles or 100 Hours</td>
<td>Every 6 Months, 1,200 Hours, 25,000 Miles, whichever comes first</td>
</tr>
<tr>
<td>• Signs of unusual movement, loose or missing components</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Signs of abrasive or adverse contact with other components</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Damaged, or cracked parts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inspection of fasteners for proper torque as recommended in the Torque Specification Section of this publication with special attention to the following suspension connections:</td>
<td></td>
<td></td>
<td>Every 12 Months</td>
</tr>
<tr>
<td>• Frame hanger assembly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Equalizing beam end connection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Torque rods</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Saddle connection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verify the lateral alignment of axles are within the vehicle manufacturer’s tolerances</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lubrication interval</td>
<td>Application dependent not to exceed 3 Months</td>
<td></td>
<td>For severe service increase frequency</td>
</tr>
<tr>
<td>• Bronze center bushing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Spring eye pin</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

COMPONENT INSPECTION

NOTE
Hendrickson recommends the use of Grade 8 bolts, Grade C locknuts and hardened washers for all suspension component attachments.

- **Cross tube** — Clean the cross tube and inspect it for cracks or excessive wear 8" to 10" from each end where it enters into the equalizing beam center bushings. Use a straight edge to check the straightness of the cross tube. If there is a doubt as to fracture, wear or straightness, replacement is necessary.
- Equalizing beam assembly, end connection and saddle cap fasteners — Check the overall condition of the equalizing beam for dents, dings, or other damage. Inspect the equalizing beam end connection and saddle cap fasteners for proper torque. The beam end connection must sustain proper clamp force of the axle bracket legs to the bushing inner casting to prevent any movement of the beam end connection. See Equalizing Beam End Connection in this section.

- Fasteners — Look for any loose or damaged fasteners on the entire suspension. Ensure all fasteners are tightened to a torque value within the specified torque range. See recommended torque specifications for Hendrickson supplied fasteners in Torque Specification Section of this publication. For fasteners not supplied by Hendrickson, see vehicle manufacturer. Use a calibrated torque wrench to check torque in the tightening direction. As soon as the fastener starts to move, record the torque. Correct the torque if necessary.

- Leaf spring assembly — Inspect all leaves and spring clips for cracks or damage. Refer to Leaf Spring Assembly in this section.

- Spring Hangers — Refer to Spring Hangers in this section.

- Torque rods — Check all torque rods for looseness, or torn or shredded rubber. Refer to Longitudinal and Transverse Torque Rods in this section.

- Tire wear — Inspect the tires for wear patterns that may indicate suspension damage or misalignment. Replace all worn or damaged parts per the vehicle manufacturer’s specifications.

- Wear and damage — Inspect all parts of suspension for wear and damage. Look for bent or cracked parts. Replace all worn or damaged parts.

- Spring eye bushing and pin — A visual inspection, refer to Spring Eye Bushing and Pin inspection in this section.

**LEAF SPRING ASSEMBLY**

**NOTE**

The spring assembly part number is stamped on the spring clip, see Figure 6-1.

Hendrickson recommends for high mileage springs that both leaf spring assemblies on the suspension be replaced at the same time to help ensure even spring deflection. All Hendrickson leaf springs are made to rigid specifications and each leaf is shot peened for long life. To assure compatibility and functionality as a suspension system, Hendrickson recommends genuine Hendrickson leaf springs be specified.

**FIGURE 6-1**

- Inspect the entire leaf spring assembly (see Figure 6-1), replacement of the entire assembly is required if any leaf spring or spring clip is damaged, cracked, or missing.

- In the unloaded condition, replacement is required if more than 50% of the first leaf is worn at the frame hanger contact area, regardless of mileage.
SPRING HANGERS

- **#1 Forward spring hanger (Double lock bolt design)** — Check tightening torque lock bolt locknuts. If looseness of this connection has resulted in pin hole wear, replace the hanger.

- **#2 Rear spring hanger** — Inspect the cam surface for wear due to high mileage. Also inspect the outside legs for wear which can be caused by worn spring eye bushings. Excessive wear at either point requires hanger replacement.

- **#3 Extended leaf spring hanger** — This hanger is used on the RTE extended leaf spring series only. Inspect the cam surface for wear. Excessive wear will reduce the gap available at the #2 rear spring hanger.

**NOTE**
The RTE suspension with extended leaf springs (Figure 6-2) requires a minimum gap of $\frac{3}{8}$” (10 mm) between the cam surface of the rear spring hanger and the top of the main leaf in the unloaded condition. If this gap is less than $\frac{3}{8}$” (10 mm), the extended leaf portion of the spring will not perform satisfactorily for empty ride.

See vehicle manufacturer’s applicable publications for other preventive maintenance requirements.

SPRING EYE BUSHING AND PIN

**PHYSICAL INSPECTION**
In the unloaded condition check for spring eye bushing and pin wear:

**METHOD A:** Place a block of wood on the spring and, with a pry bar, attempt to lift the spring hanger and frame as shown in Figure 6-3.

**METHOD B:** With the brakes applied, attempt to rock the chassis back and forth, have a second technician observe the spring eye for movement.

If $\frac{1}{8}$” (3.175 mm) or more movement is noted between the spring eye bushing and the pin, replacement is required.

**NOTE**
Such movement could also indicate a broken spring eye or leaf spring, see Figure 6-4. Component replacement is required.
SPRING EYE LUBRICATION

The RT•RTE suspensions use bronze, ball indented bushings in the leaf spring eyes. These bushings ride on hardened steel pins which have lubrication channels.

Lubrication should be performed during routine vehicle Preventive Maintenance schedules with a good quality chassis lubricant. For severe service operations, the frequency of lubrication should be increased.

The rear of the chassis should be raised to relieve load on the bushings and pins to allow the proper flow of lubricant around the pins and bushings. Continue to lubricate until lubricant comes out both ends of the bushing. If the pin will not accept lubricant, remove the pin and clean the lubrication channels where lubricant may have hardened.

BEAM END AXLE BRACKETS

NOTE

The axle brackets are furnished and welded into position by the vehicle manufacturer or axle manufacturer.

When an equalizing beam is removed for repair or inspected, check for signs of movement. Also inspect the axle brackets:

- For damage and/or cracks, see Figures 6-5 and 6-6.
- Measure the two dimensions on the axle bracket legs, see Figure 6-6.

An axle bracket outside of the measurement range, damaged or cracked must be repaired or replaced. Consult the vehicle manufacturer for inspection, component repair and replacement instructions.

PHYSICAL INSPECTION

- Bar Pin Style

1. Inspect the axle brackets for damage or cracks in the locations shown in Figures 6-5 and 6-6. Any axle bracket that is found damaged or cracked must be repaired or replaced.

2. Measure the distance between the axle bracket legs for correct width, refer to Figures 6-5 and 6-6 for measurement location and dimensions. An axle bracket outside of the measurement range must be repaired or replaced.

3. Consult the vehicle manufacturer for inspection, component repair and replacement instructions.

FIGURE 6-5

SIDEVIEW

Look for cracks in these locations

2.29° ± 0.025°
(58.11 mm ± 0.63 mm)

NOTE: Typical axle brackets shown

FIGURE 6-6

FRONT/REAR VIEW

Typical location of crack areas

8.5° ± 0.1°
(216 mm ± 2.6 mm)
Adapter Style

1. Inspect the 2½" (64 mm) diameter holes in each of the axle bracket legs as shown in Figure 6-7.

2. Remove any burrs or material left there by the old adapters.

3. Use a new adapter as a gauge for fit, being sure it enters the holes from the outside of each bracket leg.

The A dimension between the inside surfaces of the axle bracket legs for beam end adapter style, as shown in Figure 6-7 as dimension, must be as in determined in Table 6-1.

![Figure 6-7](image)

**TABLE 6-1**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>End Bushing Length</th>
<th>Dimension A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inches</td>
<td>Inches</td>
</tr>
<tr>
<td>34K</td>
<td>5¼&quot; (133.4 mm)</td>
<td>5.265&quot; ± .005&quot; (133.73 mm ± .13 mm)</td>
</tr>
<tr>
<td>34K • 38K - 52K</td>
<td>5¾&quot; (146.1 mm)</td>
<td>5.765&quot; ± .005&quot; (146.43 mm ± .13 mm)</td>
</tr>
<tr>
<td>48K - 52K</td>
<td>6&quot; (152.4 mm)</td>
<td>6.015&quot; ± .005&quot; (152.78 mm ± .13 mm)</td>
</tr>
</tbody>
</table>

**EQUALIZING BEAM END CONNECTION**

An inspection of the beam end connections are necessary when a vehicle is in the shop for major repair work or every six months, whichever comes first. Periodic visual inspection by the driver and service personnel is also recommended. Off-highway and severe service operating conditions require more frequent inspections than on-highway service operations.

**NOTE**

The equalizing beam end connection requires that the fasteners are tightened to torque specifications to maintain the clamp load of the axle bracket legs to the bar pin. All bushing motion is accommodated by rubber deflection.

**VISUAL INSPECTION**

- **Bar Pin Style**
  1. Chock the wheels.
  2. Visually inspect suspension components for signs of movement or excessive wear.
    - Inspect alignment shims in equalizing beam end for looseness. Lightly tap on the alignment shims to see if they can be moved. If movement is detected, tighten fasteners to the proper torque value, see Figure 6-10.
    - Inspect the equalizing beam end connection for signs of excessive wear or looseness.

**SERVICE HINT**

An the equalizing beam end connection, which is visibly cleaner than the other connections, may indicate a loose connection.

- Look for worn, frayed or distorted rubber in the bar pin beam end bushing, see Figure 6-8.
- Look for the equalizing beam to be lower in the beam hanger, see Figure 6-8.
- If the bar pin beam end bushing is visually offset a floor jack test should be performed. See Physical Inspection.
JACK TEST
1. Place a jack under each beam end as shown. Raise the jack to check for movement in the connection or rubber components, see Figure 6-9.

NOTE
The gap at each side of the visible rubber on the lower part of the bar pin end bushing is normal, see Figure 6-9, and is not an indication to replace the bushing. Because all rubber end bushings are in compression, with the load bearing on the top side, the lower side of the rubber is slightly relieved, allowing the rubber to move inward, and a gap appears.

PHYSICAL INSPECTION
- Bar Pin Style

WARNING
IF BAR PIN MOVEMENT OR LOoseness IS NOTED IN THE EQUALIZING BEAM END HUB, DO NOT OPERATE THE VEHICLE. REPLACE THE RUBBER END BUSHINGS AND ALL CONNECTING PARTS. THE ABOVE CONDITION CAN RESULT IN COSTLY REPAIR, DOWNTIME, POSSIBLE SEPARATION OF COMPONENTS, ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE, OR PERSONAL INJURY.

SERVICE HINT
An equalizing beam end connection that is visibly cleaner than the other connections may indicate a loose connection.

2. If bar pin end bushing movement or looseness is detected in the equalizing beam end hub, replace the end bushings and all connecting parts. Refer to the Component Replacement Section of this publication.

3. Check and record torque values for each 1" (25.4 mm) bar pin fastener, see Figure 6-10. Ensure all fasteners are tightened to the following:
   - At the locknuts tighten to $525 \pm 75$ foot pounds torque.
   - At the bolt head tighten to $575 \pm 75$ foot pounds torque.

4. Recheck equalizing beam end connections for signs of looseness.
   - Inspect alignment shims in equalizing beam end for looseness. Lightly tap on the alignment shims to see if they can be moved. If movement is detected, tighten fasteners to the proper torque value, see Figure 6-10.
   - Inspect equalizing beam end connection for signs of excessive wear or looseness.
5. If bar pin looseness is still detected in the equalizing beam end hub, **DO NOT** operate the vehicle. One or more components will require replacement, see Component Replacement Section of this publication.

**FIGURE 6-10**

**VISUAL INSPECTION**

- **Adapter Style**

  1. Chock the wheels.

  2. Visually inspect suspension components for signs of movement or excessive wear.

     - Inspect equalizing beam end connection for signs of excessive wear or looseness.
     - Look for worn, frayed or distorted rubber in the beam, see Figure 6-8.
     - Look for the equalizing beam to be lower in the axle bracket, see Figure 6-8.
     - If it is visually offset a jack test should be performed. Place a jack under each beam end as shown. Raise the jack to check for movement in the connection or rubber components, see Figure 6-9.

  3. The beam end adapter style connections have the flange of the adapter cut off for assembly clearance with the axle housing bowl.

     - The flat must be positioned vertically as shown in Figure 6-11. If the flat of the adapter position is incorrect, removal of the fasteners will be necessary to correct position, refer to the Adapter Style End bushings in the Component Replacement Section.
PHYSICAL INSPECTION

- Adapter Style

**WARNING**
IF BUSHING MOVEMENT OR LOOSENESS IS NOTED IN THE EQUALIZING BEAM END HUB, DO NOT OPERATE THE VEHICLE. REPLACE THE RUBBER END BUSHINGS AND ALL CONNECTING PARTS. THE ABOVE CONDITION CAN RESULT IN COSTLY REPAIR, DOWNTIME, POSSIBLE SEPARATION OF COMPONENTS, ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE, OR PERSONAL INJURY.

**SERVICE HINT**
An equalizing beam end connection that is visibly cleaner than the other connections may indicate a loose connection.

1. If bushing movement or looseness is detected in the equalizing beam end hub, **DO NOT** operate vehicle. Replace the equalizing beam end bushings and all connecting parts. Refer to the Component Replacement Section of this publication.

2. Check and record torque values, see Figure 6-12. Ensure all fasteners are tightened to the following:
   - **RT 34K-40K** – $225 \pm 15$ foot pounds torque.
   - **RT 46K-52K** – $470 \pm 25$ foot pounds torque.

3. Recheck equalizing beam end connections for signs of looseness.

**FIGURE 6-12**

**BAR PIN END BUSHING**

An indication that the bar pin end bushing requires replacement is when one or more of the following conditions apply:

Visual inspection of:
- Contact areas (the flat face areas where bar pin contacts the axle bracket) on the bar pin reveals signs of excessive wear.
- The bolt holes in the bar pin reveal signs of elongation or wear, see Figure 6-13.

Bar pin replacement is required if the thickness between bar pin contact areas measures less than (see Figure 6-13):
- **With shims** – $1.874" (47.59 \text{ mm})$
- **Without shims** – $2.252" (57.2 \text{ mm})$
BAR PIN SHIMS
An indication that the bar pin shims require replacement is when one or more of the following conditions apply:

- Visual inspection of contact areas on the shim reveals signs of excessive wear.
- The thickness of any single leg on the shim is less than the measurement shown in Figure 6-14, replacement is required.

![Figure 6-14](image)

<table>
<thead>
<tr>
<th>Leg Thickness</th>
<th>Part Number</th>
<th>Minimum Thickness Required</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8&quot; (3.2 mm)</td>
<td>0.123&quot; (3.1 mm)</td>
<td>50131-000</td>
<td></td>
</tr>
<tr>
<td>3/16&quot; (4.8 mm)</td>
<td>0.186&quot; (4.7 mm)</td>
<td>50130-000</td>
<td></td>
</tr>
<tr>
<td>1/4&quot; (6.4 mm)</td>
<td>0.248&quot; (6.3 mm)</td>
<td>50131-000</td>
<td></td>
</tr>
<tr>
<td>3/8&quot; (9.5 mm)</td>
<td>0.371&quot; (9.4 mm)</td>
<td>57026-000</td>
<td></td>
</tr>
</tbody>
</table>

RUBBER CENTER BUSHING
An inspection of the center bushing is necessary when a vehicle is in the shop for major repair work or every twelve months. Look for:

- Any metal to metal contact.
- Worn, frayed, or distorted rubber in the center bushing.
- The bushing inner metal that is not centered in the bushing.
- Any equalizing beam to saddle contact.

BRONZE CENTER BUSHING

LUBRICATION
1. The grease zerk fitting is located near the center hub area of the equalizing beam.
2. The rear of the chassis should be raised to relieve load on the bushings to allow the proper flow of lubricant around the bushings.
3. Lubricate bronze center bushings with NLGI#2 - EP (Extreme Pressure) lithium base grease until clean grease exits on both sides of the beam center hub. If the grease zerk will not accept lubricant, remove the grease zerk fitting and clean the lubrication channels where lubricant may have hardened, see Figure 6-15.
4. Refer to the Hendrickson recommended inspection intervals table at the beginning of the Preventive Maintenance section for more information on lubrication intervals.

PHYSICAL INSPECTION
1. Inspect the bronze center bushing for wear.
2. Raise the saddle with a jack.
3. If there is saddle movement of 0.125" (3.175 mm) or more before the equalizing beam raises this indicates excessive wear, and the bushing should be replaced.

**CAUTION**

OPERATING A VEHICLE WITH AN INSUFFICIENT NUMBER OF THRUST WASHERS MAY ALLOW SIDE MOVEMENT BETWEEN THE SADDLES AND THE EQUALIZING BEAM THAT CAN AFFECT VEHICLE HANDLING AND STEERING BY THE OPERATOR AND CAN CAUSE PREMATURE COMPONENT WEAR.

4. Original factory installations of bronze center bushings may have only one thrust washer on each side of each beam center hub. Often there is room for additional thrust washers.

5. Hendrickson recommends that in all cases additional washers be installed until the gap is less than the thickness of one thrust washer, i.e., install as many thrust washers as will fit.

**LONGITUDINAL AND TRANSVERSE TORQUE RODS**

**WARNING**

RT•RTE SUSPENSION MAY INCORPORATE LONGITUDINAL AND TRANSVERSE RODS FOR VEHICLE STABILITY. IF THESE COMPONENTS ARE DISCONNECTED OR ARE NON-FUNCTIONAL, THE VEHICLE SHOULD NOT BE OPERATED. FAILURE TO DO SO CAN RESULT IN ADVERSE VEHICLE HANDLING, POSSIBLE TIRE CONTACT WITH THE FRAME, PREMATURE COMPONENT DAMAGE, OR SEVERE PERSONAL INJURY.

All torque rods need to be inspected for looseness by one of the following methods.

- **Method 1** — For Tractor applications only with brakes applied, slowly rock the empty vehicle with power while a mechanic visually checks the action at both ends.

- **Method 2** — with the vehicle shut down, a lever check can be made with a long pry bar placed under each rod end and pressure applied.

Visually inspect torque rod bushings for torn or shredded rubber, inspect for bent, cracked, or broken torque rods and also for end hubs that have an elongated “oval” shape. Any of these conditions require component replacement. If there is metal-to-metal contact, this is a sign of excessive bushing wear and the bushing needs to be replaced.

**NOTE**

The lengths of the torque rods are determined by the vehicle manufacturer. Refer to vehicle manufacturer’s service instructions for the proper torque rod length.

The lengths of these torque rods may be fine tuned by adding or removing shims at the straddle mount end of the torque rods in order to correct drive line angles or axle centering under the frame. The transverse torque rods center the axles under the frame and control axle walk-out during cornering.

A two-piece torque rod is also available to cut and weld to the desired length, see Hendrickson publication No. 45745-148.

The mounting brackets at the axle ends of the torque rods are furnished and welded into position on the axle housings by vehicle manufacturer or the axle manufacturer.

Both types of rods may have torque rod bushings designated “straddle mount” or “tapered stud” as shown in Figure 6-16. Whether the bushings are straddle mount or taper pin stud (see Figure 6-16), they can be replaced by pressing out the worn bushing and installing a new genuine Hendrickson bushing. For proper replacement instructions, refer to the Component Replacement Section in this publication.

It is important to check the torque rod fasteners for proper torque values, refer to the Torque Specifications Section in this publication.

**NOTE**

Hendrickson recommends Grade 8 bolts, hardened flat washers and Grade C locknuts be used for all straddle mount torque rods.
AXLE STOP INSPECTION

The axle stops are supplied by the vehicle manufacturer.

- Check the axle stop to frame fasteners for proper torque. Follow the vehicle manufacturer’s specifications.
- Visually inspect for damage or excessive wear. Replace as necessary per the vehicle manufacturer’s specifications.

SADDLE CONNECTION

Visually inspect for any signs of movement or looseness. Ensure:

- Each saddle is centered on each equalizing beam center bushing.
- The center bushing inner metal is full seated to the saddle.
- The saddle cap fasteners are tightened to the proper torque, see Figure 6-17. Saddle cap fasteners have a phosphate oil coating.

THE SADDLE ASSEMBLY IS ATTACHED TO THE CENTER BUSHINGS OF EACH EQUALIZING BEAM WITH TWO (2) SADDLE CAPS. EACH SADDLE CAP USES TWO (2) STUDS TO CLAMP THE CENTER BUSHING INNER METAL TO THE SADDLE. THE SADDLE CAPS MUST BE INSTALLED SO THAT THERE IS AN EVEN GAP BETWEEN THE SADDLE CAPS AND THE BASE OF THE SADDLE ASSEMBLY AS SHOWN IN FIGURE 6-17. IF THEY ARE NOT INSTALLED EVENLY THE SADDLE ASSEMBLY COULD BECOME DEFORMED, RESULTING IN BENT BOLTS OR DAMAGED SADDLE ASSEMBLY.

LOOSE OR OVER TORQUED FASTENERS CAN CAUSE COMPONENT DAMAGE, ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE, OR SEVERE PERSONAL INJURY. MAINTAIN CORRECT TORQUE VALUES AT ALL TIMES. CHECK TORQUE VALUES ON A REGULAR INSPECTION INTERVAL.

![Figure 6-17](image)

1. While tightening the saddle cap stud fasteners maintain an even gap between the base of the saddle and the saddle cap, see Figure 6-17.
2. Center the saddle on the equalizing beam center bushing.
3. Tighten the **saddle cap fasteners** evenly in 50 foot pounds increments in the proper sequence to achieve uniform bolt tension as shown in Figure 6-18 until the final torque value is achieved. **DO NOT** exceed specified torque on saddle cap fasteners.
   - **RT•RTE 34K•52K** – Tighten ¾” to 250 ± 25 foot pounds torque.
   - **RT 65K•70K** – Tighten 1” to 290 ± 12 foot pounds torque.

![Figure 6-18](image)
CROSS TUBE

The RT•RTE cross tube connects the two (2) equalizing beams through the equalizing beam’s center bushings, see Figure 6-19. The cross tube has clearance to float side-to-side in the center bushings.

The length of the cross tube will allow side-to-side movement of approximately 1.9685" (50 mm). For this reason, the cross tube may appear polished or have missing paint at each end where it enters into the center bushings, this is normal.

DO NOT grease or lubricate the cross tube or the center bushing and DO NOT use the cross tube as a jacking point, see Figure 6-19.

VISUAL INSPECTION

- Clean the cross tube and inspect it for cracks or excessive wear 8" to 10" from each end where it enters into the equalizing beam center bushings.
- Visually inspect the overall condition of the cross tube for dents, dings, or bent condition, replace as necessary.

NOTE

A bent cross tube may cause misalignment of the axles, which may cause abnormal tire wear.

- Use a straight edge to inspect the straightness of the cross tube, replace as necessary.

FIGURE 6-19

WARNING

IMPROPER JACKING METHODS CAN CAUSE STRUCTURAL DAMAGE WHICH CAN CAUSE ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE OR SEVERE PERSONAL INJURY AND WILL VOID HENDRICKSON’S WARRANTY.

- DO NOT USE THE SUSPENSION CROSS TUBE, BAR PIN AXLE BRACKETS AS A JACKING POINT, SEE FIGURE 6-19, REFER TO VEHICLE MANUFACTURER FOR PROPER JACKING INSTRUCTIONS.

- ACCEPTABLE LIFTING POINTS FOR A VEHICLE AT THE RATED LOAD INCLUDE BUT NOT LIMITED TO: THE AXLE, EQUALIZING BEAM, AND THE VEHICLE FRAME RAIL. REFER TO THE VEHICLE MANUFACTURER FOR PROPER JACKING INSTRUCTIONS.
SECTION 7
Alignment & Adjustments

The points on the suspension that control alignment are determined by the vehicle manufacturer, these locations are: the frame hangers on the frame and the equalizing beam hangers on the axles.

AXLE PINION ANGLE

Drive axle pinion angles are established by the vehicle manufacturer. If pinion angle adjustment is required, check for proper angles with the vehicle manufacturer. Pinion angle is set by the longitudinal torque rod length.

TO CHECK THE PINION ANGLE

1. Use a work bay with a level floor.
2. Relax the suspension by slowly moving the vehicle back and forth several times in a straight line without using the brakes. This will slacken or loosen the suspension as the vehicle is positioned. End with all wheels positioned straight ahead. Roll to a stop without the brakes being applied. DO NOT set the parking brake.
3. Chock the front wheels of the vehicle.
4. Place a digital protractor on the axle housing as shown in Figure 7-1.
5. Check to see if the pinion angle is correct per the vehicle manufacturer’s specified range.
6. If necessary, add/remove shims at the longitudinal torque rod connections as required to achieve the proper pinion angle.
7. When the pinion angle is correct tighten all fasteners to the proper torque specifications per the vehicle manufacturer and recheck the pinion angles.
8. Remove wheel chocks.

DRIVE AXLE ALIGNMENT

NOTE

Drive axle alignment with suspensions equipped with adapter style beam or non-shim style end connections ARE NOT adjustable.

Computerized alignment equipment is the preferred method of measuring alignment. To calculate the shim thickness required, the target offset must be converted to thrust angle, see alignment equipment manufacturer for procedures. If, however, computerized axle alignment equipment is not available refer to the following Inspection in this section.

Proper alignment is essential for maximum ride quality, performance, and tire service life. The following recommended alignment procedure as described below, should be performed if excessive or irregular tire wear is observed.

NOTE

Proper vehicle alignment can only be achieved when all axles are aligned to the vehicle’s centerline and the steering axle’s caster, camber and toe-in settings are within specifications.
**INSPECTION**

1. Use a work bay with a level, flat surface.
2. Relax the suspension by slowly moving the vehicle back and forth several times in a straight line. This will slacken or loosen the suspension as the vehicle is positioned. End with all wheels positioned straight ahead.
3. **DO NOT** set the parking brake. Chock the front wheels of the vehicle.
4. Verify the vehicle system air is at full operating pressure.
5. Verify all suspension components are in good condition. Repair or replace any worn or damaged suspension components before proceeding with the alignment process.

6. Ensure all drive axle tires are at the same size.
7. Securely clamp a six-foot piece of **STRAIGHT** bar stock or angle iron across the lower frame flange as shown in Figure 7-2. Select a location for the bar stock or angle iron as far forward of the drive axle as possible where components will not interfere.
8. Accurately square the bar stock or angle iron to the frame using a carpenter’s square.
9. Using a measuring tape, measure from the straight edge to the forward face of the front drive axle arms on both sides of the vehicle as shown in Figure 7-2, dimensions A and B.
10. Calculate the difference between measurements A and B.
   a. If the **front** drive axle is within vehicle manufacturer’s specifications, proceed to check the rear drive axle (Step 11).
   b. If alignment of the **front** drive axle **IS NOT** within the vehicle manufacturer’s specifications, then the alignment of this axle **MUST** be corrected **BEFORE** measuring the rear drive axle alignment (Step 11).
   c. If the suspension is equipped with bar pin end bushings, correct the alignment of this axle by following the bar pin alignment instructions in this section.

**NOTE**
Since the remaining drive axle will be aligned relative to the front drive axle, it is essential that the front drive axle is aligned within the vehicle manufacturer’s specifications prior to the alignment of the remaining drive axle.

11. Using a trammel bar, measure the distance from the spindle center of the **front** drive axle to the spindle center of the rear drive axle on both sides of the vehicle; see Figure 7-2, C and D.
12. Calculate the difference between measurements C and D.
   a. If the measurements are within the vehicle manufacturer’s specifications, then the **rear** drive axle alignment is acceptable.
   b. If alignment of the **rear** drive axle **IS NOT** within the vehicle manufacturer’s specifications, then the alignment of this axle **MUST** be corrected.
   c. If the suspension is equipped with bar pin end bushings, correct the alignment of this axle by following the Bar Pin with Shims Alignment instructions in this section.
13. Recheck measurements to confirm adjustments. Repeat Steps 10 through 12 until the correct alignment is achieved.
14. After all drive axles are aligned, check the pinion angle of each drive, refer to the Axle Pinion Angle in this section.
LATERAL ALIGNMENT

NOTE
For RT•RTE suspensions equipped with bronze center bushings there is no lateral alignment.

1. Use a work bay with a level floor.
2. Drive the vehicle slowly, straight ahead. Try to slacken or loosen the suspension as the vehicle is positioned. End with all wheels positioned straight ahead. Try to roll to a stop without the brakes being used. DO NOT set the parking brake.
3. Chock the front wheels of the vehicle.
4. Measure from the outside of the frame rail to the rim flange of the inner tire. Record the measurement A and B, see Figure 7-3.
5. Measure the same distance on the opposite side of the same axle. Record the measurement C and D, see Figure 7-3.
6. Verify the axle lateral alignment is within the vehicle manufacturer’s specifications. Adding or removing shims that are located between the transverse torque rod and the frame rail will normally correct the axle lateral alignment.
   ■ A general rule of thumb is to use a torque rod shim with a thickness that is half of the difference between the two measurements.

EXAMPLE
If the lateral alignment is out of specification by ¼" (6 mm), remove or install a ½" (3 mm) shim between the transverse torque rod and frame rail as needed.

NOTE
Hendrickson recommends the use of Grade 8 bolts and Grade C locknuts be used for all torque rod attachments.

BAR PIN WITH SHIMS ALIGNMENT
The alignment feature consists of specially designed, tight tolerance steel shims which fills the ⅜" (9.5 mm) total gap between the bushing’s bar pin and the axle bracket legs. The gap must be filled by placing the shims on the bushing assembly in one of the positions shown in Figures 7-4 or 7-6. Hendrickson has three shim design options for alignment, see Figure 7-7.

NOTE
Drive axle alignment with suspensions equipped with adapter style beam or non-shim style end connections ARE NOT adjustable.

WARNING
A BAR PIN SHIM MUST BE INSTALLED AT EACH BOLT LOCATION. THE SAME PART NUMBER SHIM IN THE SAME ORIENTATION MUST BE USED AT BOTH BOLT LOCATIONS ON ANY ONE END BUSHING. DO NOT INSTALL OR STACK MORE THAN ONE SHIM AT EACH BOLT LOCATION. USE GENUINE HENDRICKSON BAR PIN SHIMS, DO NOT USE STANDARD WASHERS. FAILURE TO FOLLOW THESE WARNINGS MAY RESULT IN IMPROPER VEHICLE ALIGNMENT, FRACTURE OF THE AXLE BRACKET OR BAR PIN WHICH COULD RESULT IN ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.
ALIGNMENT ADJUSTMENT PROCEDURE

Computerized alignment equipment is the preferred method of measuring alignment. To calculate the shim thickness required, the target offset must be converted to thrust angle, see alignment equipment manufacturer for procedures. If alignment of the drive axles is required, as determined by an alignment inspection procedure, the following Steps will need to be performed.

1. Determine the direction of axle thrust angle. Figure 7-5 illustrates the forward drive axle with a thrust angle to the left (-negative thrust).

2. To determine where to adjust shim thickness use measurement (A and B) for the front drive axle or (C and D) for the rear drive axle, see Figure 7-2.

AXLE MOVEMENT HINT

Axle movement will be on the side of the bar pin where shim thickness is increased. For example, to correct the axle thrust angle illustrated in Figure 7-5, shim thickness will need to be increased at the front of the bar pin (Location X) and/or the rear of the bar pin (Location Y).

3. Chock the wheels of the front axles to prevent vehicle movement during service.

4. Raise the frame of the vehicle to remove the load from the suspension. Support the frame at this height.

5. Support the equalizing beam and remove the fasteners from the end bushing where the bar pin alignment shim adjustment is being made.

6. Adjust shim thickness to move the axle in the desired direction, see Figure 7-6.
**FIGURE 7-6**

- **Nominal**
- **Axle Moves Toward Rear**
- **Axle Moves Toward Front**

**Alignment Shim**
Part No. 50130-000

$\frac{3}{16}"$ (4.8 mm)

- $\frac{3}{8}"$ (9.5 mm)

**NOTE:**
* Refer to Figure 7-7 for leg and back dimensions on shim Part Nos. 50131-000 and 57026-000

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**WARNING**

THE BAR PIN ALIGNMENT SHIM (PART NO. 50130-000) MUST BE INSTALLED WITH THE FOLDED EDGE FACING AWAY FROM THE CONFINEMENT WASHER, SEE FIGURE 7-7. FAILURE TO DO SO MAY RESULT IN SHIM DAMAGE, IMPROPER ALIGNMENT, DAMAGE OR FRACTURE OF THE AXLE BRACKET OR BAR PIN WHICH COULD RESULT IN ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

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**FIGURE 7-7**

**BAR PIN ALIGNMENT SHIMS**

The following service notes will help when performing Hendrickson equalizing beam bar pin alignment:

- The standard alignment shims supplied with each suspension (P/N 50130-000) have two $\frac{3}{16}"$ (4.8 mm) legs and a $\frac{3}{8}"$ (9.5 mm) back. Rotating the shim pairs 90° will change the axle alignment in ± $\frac{3}{16}"$ (4.8 mm) increments.
- If a finer adjustment is required use alignment shim (P/N 50131-000). This alignment shim has one $\frac{1}{4}"$ (3.2 mm) leg, one $\frac{3}{8}"$ (6.4 mm) leg, and a $\frac{3}{8}"$ (9.5 mm) back. A total of $\frac{3}{16}"$ (19 mm) adjustment is achievable to the axle. A $\frac{3}{8}"$ (9.5 mm) flat shim is also available (P/N 57026-000).

- $\frac{1}{6}"$ (1.5 mm) shim thickness increases thrust angle by 0.10°.
- To accomplish a thrust angle adjustment rotate the alignment shims on the bar pin of the end bushing. Axle movement will be in the direction of the shim thickness increase.
- Axle thrust angle may be adjusted at either wheel end on an axle. If insufficient adjustment is available at one wheel end, the opposing wheel end will also need to be adjusted, but in the opposite direction.

**Example:** The alignment equipment shows the front drive axle to have a 0.40° thrust angle to the left. This will require a $\frac{1}{4}"$ (6.4 mm) shim thickness increase to the front side of the left front equalizing beam end bushing. If there is less than $\frac{1}{4}"$ (6.4 mm) of adjustment available at this location then some of the adjustment will have to be made at the rear of the right front end bushing. In this case a $\frac{1}{6}"$ (3.2 mm) shim thickness increase at the front side of the left front bar pin AND a $\frac{3}{8}"$ (3.2 mm) shim thickness increase at the rear side of the right front bar pin will correct the 0.40° thrust angle.
7. Install the new end bushing fasteners and tighten to:
   - At the locknut to $525 \pm 75$ foot pounds.
   - At the bolt head to $575 \pm 75$ foot pounds torque.
8. Remove support and lower the vehicle.
9. Verify the axles' alignments are within the vehicle manufactures tolerance.
10. Set brakes and remove wheel chocks.
SECTION 8
Component Replacement

Experience in servicing the RT and RTE series suspensions indicates that when a major overhaul is required, the complete tandem unit should be removed from the frame. However, the torque rods, leaf spring assembly, equalizing beams and other components may be serviced separately.

FASTENERS
Hendrickson recommends that when servicing a vehicle, replace all the removed fasteners with new equivalent fasteners. Maintain correct torque values at all times. Check torque values as specified. See Hendrickson’s Torque Specifications Section of this publication. If non-Hendrickson fasteners are used follow torque specifications listed in the vehicle manufacturer’s service manual.

NOTE
Hendrickson recommends the use of Grade 8 bolts and Grade C locknuts. If flange head bolts and locknuts are not used then hardened structural washers must be used under bolt heads and locknuts.

LEAF SPRING ASSEMBLY
A LEAF SPRING ASSEMBLY THAT HAS A MISSING, CRACKED OR DAMAGED LEAF OR SPRING CLIP, WILL REQUIRE COMPLETE LEAF SPRING ASSEMBLY REPLACEMENT AND A THOROUGH INSPECTION OF THE ENTIRE SUSPENSION. IF ANY SUSPENSION COMPONENT APPEARS DAMAGED, REPLACEMENT IS REQUIRED. FAILURE TO REPLACE ANY DAMAGED COMPONENTS CAN CAUSE ADVERSE VEHICLE HANDLING, POSSIBLE PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE AND WILL VOID ANY APPLICABLE WARRANTIES.

DISASSEMBLY
1. Place the vehicle on a level floor.
2. Chock the wheels.
3. Raise the frame to remove the load from the suspension.
4. Support the frame.
5. Raise and support the axle.
6. Remove the tires.
7. Remove and discard the #1 forward hanger pinch bolt and fasteners, see Figure 8-1.
8. Drive out the pin in Figure 8-1.
9. Remove and discard the #2 rear spring hanger fasteners, see Figure 8-2.
10. Remove and discard the rebound bolt spacer from the leaf spring assembly.

FIGURE 8-1

![Figure 8-1](image-url)
11. Loosen, **DO NOT** remove the top pad set screw locknuts, see Figure 8-3.

12. Remove and discard the top pad fasteners.

13. Remove the top pad, see Figure 8-3.

**CAUTION**

THE WEIGHT OF THE LEAF SPRING ASSEMBLY IS APPROXIMATELY 165 POUNDS (75 KG). CARE SHOULD BE TAKEN AT REMOVAL AND INSTALLATION TO PREVENT PERSONAL INJURY OR DAMAGE TO COMPONENTS.

14. Lower the axle enough to allow clearance to remove the leaf spring assembly.

15. Remove the leaf spring assembly.

**ASSEMBLY**

1. Position the new leaf spring assembly on the saddle.

2. The alignment hole in the spring seat of the saddle is a clearance hole for the leaf spring center bolt and is used to align the leaf spring assembly to the saddle assembly, see Figure 8-3.

3. Assemble the top pad between the saddle chair back ears (see Figure 8-3), and on top of the main leaf of the leaf spring assembly.

**SERVICE HINT**

The main leaf has a center bolt that pilots into a cavity in the spring top pad. This feature helps to provide alignment of the leaf spring assembly in the saddle.

4. Lubricate the top pad fasteners with SAE 20 oil prior to installation to obtain the correct relationship of torque and fastener tension.

5. Assemble the four (4) top pad fasteners through the top pad and saddle, see Figure 8-3.

**NOTE**

Some RT•RTE suspension configurations require inverted top pad bolt installation. See vehicle manufacturer for specific top pad fastener configuration.

6. Snug the saddle cap fasteners (**DO NOT** tighten at this time) enough to secure the assembly.
7. Assemble the top pad set screws for the appropriate RT•RTE suspension capacity as follows, see Figure 8-4.

- **RT•RTE 34K-52K** — Lock washer, locknut, and square head bolt. Tighten the square head bolt to 125 ± 25 foot pounds torque, then tighten the set screw locknut to 125 ± 25 foot pounds torque.

- **RT 65K•70K** — Internal hex head set screw and tighten to 160 ± 40 foot pounds torque.

8. Apply final torque, evenly tighten the top pad fasteners in 100 foot pounds increments in the proper sequence to achieve uniform bolt tension as shown in Figure 8-6 until the final torque value is achieved. **DO NOT** exceed specified torque on top pad fasteners.

- **RT•RTE 34K-52K** — Tighten 1" to 300 ± 25 foot pounds torque.

- **RT 65K•70K** — Tighten 1" to 385 ± 25 foot pounds torque.

**NOTE**
Top pad bolt fasteners must be re-tightened after the first 500 miles of service, and at regular preventive maintenance intervals, not to exceed one year or 50,000 miles, whichever comes first. **DO NOT** exceed specified torque value on RT•RTE top pad fasteners.
9. Tighten the **saddle cap fasteners** evenly in 50 foot pounds increments in the proper sequence to achieve uniform bolt tension as shown in Figure 8-6 until the final torque value is achieved. **DO NOT** exceed specified torque on saddle cap fasteners.
   - **RT•RTE 34K-52K** – Tighten \( \frac{7}{8} \)" to \( \approx \) 250 ± 25 foot pounds torque.
   - **RT 65K•70K** – Tighten 1" to \( \approx \) 290 ± 12 foot pounds torque.

10. Lubricate the inner diameter of the spring eye bushing with NLGI#2 – EP (Extreme Pressure) lithium base grease.

11. Raise both axles and position the leaf spring and saddle assembly into the #1 and #2 spring hangers.

12. Align the spring eye with the pin hole in the #1 spring hanger.

13. Lubricate the spring hanger pin with NLGI#2 – EP (Extreme Pressure) lithium base grease and with the slotted end facing outboard, pilot the pin into the outside spring hanger leg, through the spring eye, and into the spring hanger inboard leg.

14. For the double lock pin on the #1 spring hanger, use the slot to rotate and align the key ways and assemble the fasteners as shown in Figure 8-1.

15. Tighten the front lock locknuts to \( \approx \) 54 ± 9 foot pounds torque, see Figure 8-1.

16. Assemble the rebound bolt with spacer and locknut through the legs of the #2 rear spring hanger as shown in Figure 8-2.

17. Tighten the rebound locknuts to \( \approx \) 42 ± 3 foot pounds torque, see Figure 8-2.

18. Remove axle support and install tires.

19. Raise the vehicle and remove the frame stands.

20. Lower the vehicle.

21. Remove the wheel chocks.

**SPRING EYE BUSHING**

**YOU WILL NEED:**

- Hammer
- Driver or knock out punch O.D. 1.628"

**DISASSEMBLY**

1. Place the vehicle on a level floor.

2. Chock the wheels.

3. Raise the frame to remove the load from the suspension.

4. Support the frame.

5. Raise and support the axle.

6. Remove the tires.

7. Remove and discard the #1 forward hanger pinch bolt and fasteners.

8. Mark the position of the spring eye bushing split, see Figure 8-9 with a paint stick on the leaf spring bore to ease in installation.

9. Drive out the pin in Figure 8-7.

**WARNING**

DO NOT USE HEAT OR A CUTTING TORCH TO REMOVE THE SPRING EYE BUSHING FROM THE STEEL SPRING. THE USE OF SUCH HEAT CAN ADVERSELY AFFECT THE STRENGTH OF THE SPRING. A COMPONENT DAMAGED IN THIS MANNER CAN RESULT IN ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.
10. Drive out the spring eye bushing. Strike directly on the punch until the bushing clears the steel leaf spring eye bore, see Figure 8-8.

11. Inspect the spring eye for any cracks or burrs. If cracks are present replacement of the leaf spring assembly is required.

12. Remove any nicks or burrs with an emery cloth to provide a smooth surface for bushing installation.

**ASSEMBLY**

1. Lubricate the inner diameter of the spring eye bore and the outer diameter of the spring eye bushing with NLGI#2 – EP (Extreme Pressure) lithium base grease.

2. Position the split of the spring eye bushing at the top (within 30 degrees of either side of the centerline), as marked with a paint stick prior to disassembly, see Figure 8-9.

3. Use a hammer and driver to install the bushing into the spring eye until flush with the leaf spring, see Figure 8-10.

4. Lower the vehicle and align the spring eye with the pin opening of the frame hanger.

5. On the #1 forward hanger, lubricate the spring hanger pin and the inner diameter of the spring eye bushing with NLGI#2 – EP (Extreme Pressure) lithium base grease, see Figure 8-11.

**FIGURE 8-7**

**FIGURE 8-8**

**FIGURE 8-9**
6. With the slotted end facing outboard, pilot the pin into the outboard side of the front spring hanger leg, through the spring eye and into the spring hanger, see Figures 8-7 and 8-11.

7. Rotate the lock pin using the slot to align the key ways and install pinch bolts and fasteners as shown in Figure 8-11.

8. Tighten the front lock locknuts to 54 ± 9 foot pounds torque.

9. Remove axle support and install tires.

10. Raise the vehicle and remove the frame stands.

11. Lower the vehicle.

12. Remove the wheel chocks.

**SADDLE ASSEMBLY**

**DISASSEMBLY**

1. Place the vehicle on a level floor.

2. Chock the wheels.

3. Raise and support the axle.

4. Remove the tires.
5. Remove and discard the saddle cap fasteners that attach the saddle assembly to the center bushing, see Figure 8-12.

6. Remove the saddle cap.

7. Raise the vehicle’s frame to create a ½” (13 mm) gap between the saddle assembly and center bushing. Support the vehicle’s frame at this height.

8. Remove the top pad bolts from the saddle assembly.

9. Remove the leaf spring assembly, per the Leaf Spring Assembly in this section.

10. Remove the saddle assembly.

ASSEMBLY

1. Install the new saddle assembly.

2. Install the leaf spring assembly per the Leaf Spring Assembly in this section.

3. Remove the frame supports.

4. Lower the frame of the vehicle while engaging and centering the saddles on the equalizing beam’s center bushings, see Figure 8-13.

THE SADDLE ASSEMBLY IS ATTACHED TO THE CENTER BUSHINGS OF EACH EQUALIZING BEAM WITH TWO (2) SADDLE CAPS. EACH SADDLE CAP USES TWO (2) STUDS TO CLAMP THE CENTER BUSHING INNER METAL TO THE SADDLE. THE SADDLE CAPS MUST BE INSTALLED SO THAT THERE IS AN EVEN GAP BETWEEN THE SADDLE CAPS AND THE BASE OF THE SADDLE ASSEMBLY AS SHOWN IN FIGURE 8-14. IF THEY ARE NOT INSTALLED EVENLY THE SADDLE ASSEMBLY COULD BECOME DEFORMED, RESULTING IN BENT BOLTS OR DAMAGED SADDLE ASSEMBLY.

LOOSE OR OVER TORQUED FASTENERS CAN CAUSE COMPONENT DAMAGE, ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE, OR SEVERE PERSONAL INJURY. MAINTAIN CORRECT TORQUE VALUES AT ALL TIMES. CHECK TORQUE VALUES ON A REGULAR INSPECTION INTERVAL.

FIGURE 8-14
NOTE

Tightening the saddle cap fasteners properly will help prevent wear of mating components, such as the beam center bushing, saddle, and saddle cap.

5. While tightening the saddle cap fasteners maintain an even gap between the saddle and saddle cap, see Figure 8-14.

6. Tighten the saddle cap fasteners evenly in 50 foot pounds increments in the proper sequence to achieve uniform bolt tension as shown in Figure 8-15 until the final torque value is achieved. **DO NOT** exceed specified torque on saddle cap fasteners.
   - RT•RTE 34k-52k – Tighten \( \frac{3}{8}'' \) to \( 250 \pm 25 \) foot pounds torque.
   - RT 65k•70k – Tighten 1” to \( 290 \pm 12 \) foot pounds torque.

7. Install the tires.

8. Remove the support from the axles and lower the vehicle onto the ground.

9. Remove the wheel chocks.

**#1 FORWARD SPRING HANGERS**

Refer to RT•RTE Frame Hanger Selection Guide 45745-038 to aid in the proper identification of originally equipped RT•RTE•RU•RUE•U•UE drilled hangers in the aftermarket. This guide lists common drill patterns and castings.

**DISASSEMBLY**

1. Place the vehicle on a level floor.
2. Chock the wheels.
3. Raise the frame to remove the load from the suspension.
4. Support the frame.
5. Raise and support the axle.
6. Remove the tires.
7. Remove and discard the #1 forward hanger pinch bolt and fasteners, see Figure 8-16.

8. Drive out the pin in Figure 8-16.

9. Remove the #1 spring hanger frame fasteners per the vehicle manufacturer’s instructions.

10. Remove the #1 spring hanger.
ASSEMBLY

IMPORTANT
Thickness of the full length spacer must be equal to gap between the hanger and frame liner, see Figure 8-17.

1. Fit the horizontal flange of #1 spring hanger against the bottom horizontal flange of frame rail flush and tight, see Figure 8-17.
2. Install the #1 front spring hanger onto the frame.
3. Install #1 frame hanger fasteners per the vehicle manufacturer’s instructions.
4. Lubricate the inner diameter of the spring eye bushing with NLGI#2 – EP (Extreme Pressure) lithium base grease.
5. Lower the vehicle and align the spring eye with the pin opening of the frame hanger.
6. Lubricate the spring hanger pin with NLGI#2 – EP (Extreme Pressure) lithium base grease.
7. With the slotted end facing outboard, pilot the pin into the outside spring hanger leg, through the spring eye and into the spring hanger inboard leg, see Figure 8-18.
8. Rotate the lock pin using the slot to align the key ways and install the pinch bolts and fasteners as shown in Figure 8-18.
9. Tighten the front pinch bolt locknuts to 54 ± 9 foot pounds torque, see Figure 8-18.

10. Raise the vehicle and remove the frame stands.
11. Lower the vehicle.
12. Remove axle support and install tires.
13. Remove the wheel chocks.

#2 REAR SPRING HANGERS
Refer to RT•RTE Frame Hanger Selection Guide 45745-038 to aid in the proper identification of originally equipped RT•RTE•RU•RUE•U•UE drilled hangers in the aftermarket. This guide lists common drill patterns and castings.
DISASSEMBLY
1. Place the vehicle on a level floor.
2. Chock the wheels.
3. Remove and discard the rebound bolt spacer and fasteners from the leaf spring assembly, see Figure 8-19.
4. Raise the frame to remove the load from the suspension.
5. Support the frame.
6. Raise and support the axle.
7. Remove the tires.
8. Remove #2 spring hanger frame fasteners per the vehicle manufacturer instructions.
9. Remove the #2 rear spring hangers.

FIGURE 8-19

ASSEMBLY

FIGURE 8-20

IMPORTANT
Thickness of full length spacer must be equal to gap between the hanger and frame liner, see Figure 8-20.

1. Fit the horizontal flange of #2 spring hanger against the bottom horizontal flange of frame rail flush and tight, see Figure 8-20.

2. Install the new #2 spring hanger frame fasteners per the vehicle manufacturer’s specifications.
3. Raise the vehicle and remove the frame stands.
4. Lower the vehicle to seat the spring assembly into the #2 spring hanger.
5. Assemble the rebound bolt with spacer and locknut through the legs of the #2 rear spring hanger as shown in Figure 8-19.
6. Tighten the rebound locknuts to 42 ± 3 foot pounds torque.
7. Remove axle support and install tires.
8. Remove the wheel chocks.

**RTE #3 REAR EXTENDED LEAF SPRING HANGERS**

Refer to RT•RTE Frame Hanger Selection Guide 45745-038 to aid in the proper identification of originally equipped RT•RTE•RU•RUE•U•UE drilled hangers in the aftermarket. This guide lists common drill patterns and castings.

**DISASSEMBLY**

1. Place vehicle on a level floor.
2. Chock the wheels.
3. Remove the rear rebound bolt and spacer from the #2 rear hanger.
4. Raise the frame to remove the load from the spring.
5. Support the frame.
6. Remove the #3 hanger frame fasteners per the vehicle manufacturer’s instructions.
7. Remove the #3 extended leaf spring hanger.

**ASSEMBLY**

**IMPORTANT**

Thickness of full length spacer must be equal to gap between the hanger and frame liner, see Figure 8-22.

1. Install the new #3 frame hanger flush against the frame.
2. Install the #3 frame fasteners per the vehicle manufacturer’s instructions.
3. Lower the vehicle.

---

**FIGURE 8-21**

**FIGURE 8-22**

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**#2 Leaf Spring Hanger with #3 RTE Extended Leaf Spring Hangers**

- #2 Hanger
- #3 Hanger
- 1/2" Washer
- 1/2" Rebound Locknut
- Tightening Torque 42 ± 3
- Rebound Bolt Spacers
4. Assemble the rebound fastener with spacer through the legs of the #2 rear spring hanger as shown in Figure 8-21.
5. Tighten the rebound locknut to 42 ± 3 foot pounds torque, see Figure 8-21.
6. Remove the wheel chocks.

**TOP PAD BOLT SELECTION**

**NOTE**

Using the correct length top pad bolt is important to help ensure the RT•RTE suspension system and components function to their highest efficiency. Refer to the Top Pad Bold Selection Guide in the Part List section of this publication for proper top pad bolt selection.

**CAUTION**

INCORRECT TOP PAD BOLT LENGTHS CAN RESULT IN (1) FAILURE TO SUSTAIN PROPER CLAMP FORCE, (2) REDUCED AXLE/BEAM ARTICULATION, (3) INAPPROPRIATE CONTACT BETWEEN THE TOP PAD BOLT AND THE BEAM OR FRAME RAIL, ALL OF WHICH CAN CAUSE PREMATURE COMPONENT DAMAGE, PERSONAL INJURY, ADVERSE VEHICLE HANDLING, OR PROPERTY DAMAGE.

![Figure 8-23]

The proper bolt length as shown in Figure 8-23, can be determined by using the following guidelines:

- **Dimension A** is 1.88" (47.8 mm)
- **Dimension B** – measure the removed bolt, refer to Parts List Section of this publication.
- Ensure **Dimension B** is 3¼" (82.6 mm) plus the length of the thickness of the leaf spring assembly, top pad, saddle cap height.

![Figure 8-24]

Tighten torque in the proper sequence, ensure there is a **MINIMUM** of three full threads to a **MAXIMUM** of five full threads that extend beyond the end of the locknut, see Figure 8-24. These guidelines are necessary to help ensure:

- Full thread engagement in the locknuts.
- Proper clearance between the top pad bolt and the equalizing beams, or the frame and the top bolt in inverse bolt installations.

**EQUALIZING BEAM**

**SERVICE HINT**

It is recommended to remove both equalizing beams and the cross tube as a group even if only one equalizing beam needs service.

**DISASSEMBLY**

1. Chock the wheels of the steer axle.
2. Raise and support the drive axles with safety stands.
3. Remove the tires.
4. Support the pinion angle of the drive axles to prevent axle movement during service.
5. Remove and discard the saddle cap fasteners from both inboard and outboard sides of the equalizing beam.
6. Remove the saddle caps, see Figure 8-25.
7. Raise the vehicle’s frame just enough to create a ½" (13 mm) gap between the saddles and the center bushings. Support the vehicle’s frame at this height.
The weight of the equalizing beam assembly is approximately 155 pounds. Prior to removing the beam end fasteners from the equalizing beam, support the end of the equalizing beam to prevent dropping. Care should be taken at removal and installation to prevent personal injury or damage to components.

8. Support both equalizing beams with a floor jack.

**CAUTION**

Prior to disassembly of the equalizing beam bar pin (if equipped) fasteners, note the orientation of the bar pin alignment shims, see Figure 8-26. It is required that the bar pin alignment shims are installed in the same orientation and location as removed to preserve the existing vehicle alignment. Improper vehicle alignment can increase tire wear.

9. Remove and discard beam end attaching fasteners.

10. Slowly lower the floor jacks and remove/pry the equalizing beams from the axle brackets.

- **For bronze center bushings**
  a. Remove bronze center bushings and make note of the thrust washer count.
  b. Remove center sleeves and cross tube.

- **For rubber center bushings**
  a. Slide the equalizing beams off the cross tube and out from under the vehicle.
11. Remove the floor jacks from under the equalizing beams.

ASSEMBLY

1. Position the equalizing beams under the axles with a floor jack under the center of each equalizing beam.

   - For bronze center bushings
     a. Install the center sleeve and cross tube.
     b. Install the new thrust washers in the correct position and count.

   - For rubber center bushings
     a. Install the cross tube into the center bushing of each equalizing beam.

   **SERVICE HINT**
   Ensure the rubber center bushing end plug is located on the outboard side, see Figure 8-27.

   **SERVICE HINT**
   Increasing or decreasing the pinion angle may help align the axle bracket and equalizing beam end bushings.

2. Using the floor jacks, slowly raise both equalizing beams and cross tube as an assembly into the axle brackets. Ensure that each equalizing beam end bushing correctly engages the axle bracket.

   **NOTE**
   All equalizing beams are manufactured with the bar pin flats perpendicular to the equalizing beam’s axis. It is not necessary to adjust the bar pins to the same pinion angle as prior to disassembly. The rubber in the bushings will gradually allow the bar pins to adapt to the pinion angles of the drive axles. This is a normal function of the bar pin bushings.

   **SERVICE HINT**
   Installing the front bar pin bushings (if equipped) prior to the rear bar pin bushings will ease in the installation of the equalizing beam.

   **CAUTION**
   THE WEIGHT OF THE EQUALIZING BEAM ASSEMBLY IS APPROXIMATELY 155 POUNDS (70 KG). CARE SHOULD BE TAKEN AT REMOVAL AND INSTALLATION TO PREVENT PERSONAL INJURY OR DAMAGE TO COMPONENTS.

3. Mount the equalizing beam into the FRONT drive axle brackets. DO NOT install the alignment shims (if equipped) at this time.

4. Slide a ¾" (19 mm) bolt through both front axle brackets and the bar pin holes to temporarily support the beams.

5. Lift the REAR of the beam until the FRONT bar pin flats are parallel to the front drive axle bracket legs, see Figure 8-28.
A BAR PIN SHIM MUST BE INSTALLED AT EACH BOLT LOCATION. THE SAME PART NUMBER SHIM IN THE SAME ORIENTATION MUST BE USED AT BOTH BOLT LOCATIONS ON ANY ONE END BUSHING. DO NOT INSTALL OR STACK MORE THAN ONE SHIM AT EACH BOLT LOCATION. USE GENUINE HENDRICKSON BAR PIN SHIMS, DO NOT USE STANDARD WASHERS. FAILURE TO FOLLOW THESE WARNINGS MAY RESULT IN IMPROPER VEHICLE ALIGNMENT, FRACTURE OF THE AXLE BRACKET OR BAR PIN WHICH COULD RESULT IN ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

THE BAR PIN ALIGNMENT SHIM (PART NO. 50130-000) MUST BE INSTALLED WITH THE FOLDED EDGE FACING AWAY FROM THE CONFINEMENT WASHER, SEE FIGURE 8-29. FAILURE TO DO SO MAY RESULT IN SHIM DAMAGE, IMPROPER ALIGNMENT, DAMAGE OR FRACTURE OF THE AXLE BRACKET OR BAR PIN WHICH COULD RESULT IN ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

6. Partially install the FRONT INBOARD bar pin alignment shim and verify that the shim is in the same orientation as prior to disassembly, see Figure 8-26.

7. To complete installation of the alignment shim, remove the temporary ¾" (19 mm) bolt from the inboard bar pin hole and complete installation of the inboard alignment shim.

DISCARD USED FASTENERS. ALWAYS USE NEW FASTENERS TO COMPLETE A REPAIR. FAILURE TO DO SO COULD RESULT IN FAILURE OF THE PART OR MATING PARTS, ADVERSE VEHICLE HANDLING, PERSONAL INJURY, OR PROPERTY DAMAGE.

NOTE
Hendrickson recommends the use of Grade 8 bolts and Grade C locknuts. If flange head bolts and locknuts are not used then hardened structural washers must be used under bolt heads and locknuts.

8. Install the new 1" (25.4 mm) inboard bar pin fasteners. DO NOT tighten at this time.

9. Repeat Steps 7 through 9 for the FRONT OUTBOARD alignment shim.
10. Chock the **REAR** drive axle wheels to prevent movement while installing the rear bar pin into the axle bracket.

11. Support the current axle position of the rear axle pinion with a jack to assist with the installation of the rear bar pin.

**NOTE**

Prior to disassembly of the longitudinal torque rod, note the quantity and orientation of the longitudinal torque rod shims. It is required that the longitudinal torque rod shims are installed in the same orientation and location as removed to preserve the existing pinion angle.

12. Disconnect the longitudinal torque rod from the axle bracket, see vehicle manufacturer’s specifications.

13. Release the rear parking brakes, this will allow the rear axle to rotate without rotating the tires.

14. Lower the rear drive pinion until the rear drive axle bracket legs are parallel to the rear bar pin flats, see Figure 8-28.

15. Mount the equalizing beam into the **REAR** drive axle brackets. **DO NOT** install the bar pin alignment shims at this time.

16. Slide a ¾" (19 mm) bolt through all rear axle bracket and the bar pin holes to temporarily support the beams.

17. Partially install the **REAR INBOARD** bar pin alignment shim and verify that the shim is in the same orientation as prior to disassembly, see Figure 8-26.

18. To complete installation of the alignment shim, remove the temporary ¾" (19 mm) bolt from the inboard bar pin hole and complete installation of the inboard alignment shim.

19. Install new 1" (25.4 mm) inboard bar pin fasteners. **DO NOT** tighten at this time.

20. Repeat Steps 18 through 20 for the **REAR OUTBOARD** bar pin alignment shim.

**NOTE**

Prior to assembly of the longitudinal torque rod, note the quantity and orientation of the longitudinal torque rod shims. It is required that the longitudinal torque rod shims are installed in the same orientation and location as removed to preserve the existing alignment.

21. Install the longitudinal torque rod and spacers as per the vehicle manufacturer’s specifications.

22. Re-apply rear parking brake.

23. Install the longitudinal torque rod and any longitudinal torque rod shims in the same orientation as prior to disassembly. Tighten the fasteners to the vehicle manufacturer’s specifications.

24. Re-apply rear parking brake.

**NOTE**

Prior to assembly of the rear fasteners, ensure that all the bar pin shims are installed in the same orientation as prior to disassembly.

25. Tighten the bar pin **locknuts** to $525 \pm 75$ foot pounds torque, or if tightening on the **bolt head**, tighten to $575 \pm 75$ foot pounds torque.

26. Remove the frame supports and lower the frame of the vehicle being careful to engage the saddles on the equalizing beam’s center bushings.

27. Center the saddle on the equalizing beam center bushing, see Figure 8-30.

28. **For bronze bushings**

a. It may be necessary to add or remove thrust washers to fill the gap.
THE SADDLE ASSEMBLY IS ATTACHED TO THE CENTER BUSHINGS OF EACH EQUALIZING BEAM WITH TWO (2) SADDLE CAPS. EACH SADDLE CAP USES TWO (2) STUDS TO CLAMP THE CENTER BUSHING INNER METAL TO THE SADDLE. THE SADDLE CAPS MUST BE INSTALLED SO THAT THERE IS AN EVEN GAP BETWEEN THE SADDLE CAPS AND THE BASE OF THE SADDLE ASSEMBLY AS SHOWN IN FIGURE 8-30. IF THEY ARE NOT INSTALLED EVENLY THE SADDLE ASSEMBLY COULD BECOME DEFORMED, RESULTING IN BENT BOLTS OR DAMAGED SADDLE ASSEMBLY.

29. While tightening the saddle cap bolt fasteners maintain an even gap between the saddle and saddle cap, see Figure 8-31.

![Figure 8-31](image)

DISCARD USED FASTENERS. ALWAYS USE NEW FASTENERS TO COMPLETE A REPAIR. FAILURE TO DO SO COULD RESULT IN FAILURE OF THE PART OR MATING PARTS, ADVERSE VEHICLE HANDLING, PERSONAL INJURY, OR PROPERTY DAMAGE.

NOTE

Hendrickson recommends the use of Grade 8 bolts and Grade C locknuts. If flange head bolts and locknuts are not used then hardened structural washers must be used under bolt heads and locknuts.

30. Tighten the saddle cap fasteners evenly in 50 foot pounds increments in the proper sequence to achieve uniform bolt tension as shown in Figure 8-32 until the final torque value is achieved. DO NOT exceed specified torque on saddle cap fasteners.

- **RT•RTE 34K-52K** – Tighten \( \frac{7}{8}'' \) to 250 ± 25 foot pounds torque.
- **RT 65K•70K** – Tighten 1" to 290 ± 12 foot pounds torque.

NOTE

Tightening the saddle cap bolt fasteners properly will help prevent wear of mating components, beam center bushing, saddle, and saddle cap.

31. Install the tires.
32. Remove the supports from the drive axles and lower the vehicle onto the ground.
33. Remove the wheel chocks.

**RUBBER CENTER BUSHING**

YOU WILL NEED:

- A vertical shop press with a capacity of at least 100 tons.
- Refer to Special Tools Section of this publication.
  - 28K-52K Capacity, Tool Part No. 66086-102
  - 40K Capacity, Tool Part No. 66086-100
  - 65K-85K Capacity, Tool Part No. 66086-101
DISASSEMBLY

NOTE
Whenever an equalizing beam is removed for repair, or inspection of the equalizing beam end connection reveals movement, measure the distance between the axle bracket legs for correct width. Refer to Axle Bracket in Preventive Maintenance Section of this publication for measurement location and dimensions. An axle bracket outside of the measurement range must be repaired or replaced. Consult the vehicle manufacturer for inspection, component repair and replacement instructions.

1. Remove the equalizing beam assembly from the vehicle. Follow the equalizing beam disassembly procedure in this section.

WARNING
DO NOT USE A CUTTING TORCH TO REMOVE ANY FASTENERS OR BUSHINGS. THE USE OF HEAT ON SUSPENSION COMPONENTS WILL ADVERSELY AFFECT THE STRENGTH OF THESE PARTS. A COMPONENT DAMAGED IN THIS MANNER CAN RESULT IN ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

2. Place the equalizing beam assembly in a shop press with the center hub firmly supported on the press bed.

NOTE
Before attempting to remove the beam center bushings, inspect the inside face of each equalizing beam center hub. If the outer metal of the center bushing is worn, the edge may have mushroomed over the face of the beam hub. This material must be removed with a chisel or disc sander before tooling adapters can be positioned for bushing removal.

3. Install the center bushing removal tool centered on the center bushing.

4. Push directly on center bushing removal tool until the center bushing is pressed out of the equalizing beam bore.

INSPECTION
After removing the center bushings, thoroughly inspect the beam bores. If damaged from center bushing removal, replace with a new equalizing beam. DO NOT re-bush or otherwise use an equalizing beam that has been damaged.

WARNING
FAILURE TO REPLACE AN EQUALIZING BEAM THAT HAS BEEN DAMAGED FROM BUSHING REMOval CAN RESULT IN THE FAILURE OF THAT BEAM, LEADING TO ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

1. Measure the inner diameter (I.D.) of the equalizing beam’s center bushing bore and the center bushing’s outside diameter (O.D.). The specification of the equalizing beam’s center bore on a new RT•RTE equalizing beam:

   - **Inside diameter** – 4.739" ± 0.004" (120.37 mm ± 0.10 mm).
   - **Each measurement is to be taken as the average of any two readings at 90 degrees in the same plane, see Figure 8-33. If component is not within the specified range, replacement is required.**
ASSEMBLY
1. Clean the bores of the equalizing beams with emery cloth, removing any nicks or metal buildup from bushing removal.
2. The equalizing beam bore may have a more substantial lead in chamfer at one end of the bore than the other. Take advantage of the larger chamfer by pressing in the new center bushing from this end.
3. Place the equalizing beam in a shop press on the receiving tool.
4. Support the beam squarely at the bore area to avoid distortion of the beam bore or bending of the beam.
5. Lubricate the outer diameter (O.D.) of the center bushing and the inner diameter (I.D.) of the beam bore with NLGI#2 – EP (Extreme Pressure) lithium base grease.
6. Ensure the bushing is square to the equalizing beam bore.
7. Install the center bushing installation tool and press in the new center bushing until the outer metal sleeve is centered in the equalizing beam’s bore, see Figure 8-34.
8. Install the equalizing beam onto the vehicle, refer to the Equalizing Beam Assembly procedure in this section.

BRONZE CENTER BUSHING

YOU WILL NEED:
- A vertical shop press with a capacity of at least 100 tons.
- Bronze Center Bushing Tools, refer to Special Tools Section of this publication.
  - 34K–52K OTC Tool No. 1744
  - 65K–70K OTC Tool Nos. 204266, and 38095

NOTE
Each Bronze Center Bushing Service Kit, as shown in Figure 8-35, contains eight (8) thrust washers, enough for two (2) thrust washer at each side of each beam center hub.

- 34K Capacity, Bronze Center Bushing Service Kit No. 30436-000L
- 40K–52K Capacity, Bronze Center Bushing Service Kit No. 30437-000L
- 65K–70K Capacity, Bronze Center Bushing Service Kit No. 45374-000

WARNING
DISCARD USED FASTENERS. ALWAYS USE NEW FASTENERS TO COMPLETE A REPAIR. FAILURE TO DO SO COULD RESULT IN FAILURE OF THE PART OR MATING PARTS, ADVERSE VEHICLE HANDLING, PERSONAL INJURY, OR PROPERTY DAMAGE.
NOTE
Hendrickson recommends the use of Grade 8 bolts and Grade C locknuts. If flange head bolts and locknuts are not used then hardened structural washers must be used under bolt heads and locknuts.

DISASSEMBLY

NOTE
Whenever an equalizing beam is removed for repair, or inspection of the equalizing beam end connection reveals movement, measure the distance between the axle bracket legs for correct width. Refer to Axle Bracket in Preventive Maintenance Section of this publication for measurement location and dimensions. An axle bracket outside of the measurement range must be repaired or replaced. Consult the vehicle manufacturer for inspection, component repair and replacement instructions.

1. Remove the equalizing beam assembly from the vehicle. Follow the equalizing beam disassembly procedure in this section.

WARNING
DO NOT USE A CUTTING TORCH TO REMOVE ANY FASTENERS OR BUSHINGS. THE USE OF HEAT ON SUSPENSION COMPONENTS WILL ADVERSELY AFFECT THE STRENGTH OF THESE PARTS. A COMPONENT DAMAGED IN THIS MANNER CAN RESULT IN ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

2. Remove center rubber seal on pressing side, see Figure 8-39.

3. Place the equalizing beam assembly squarely in a shop press with the center hub firmly supported on the press bed.

4. Install and center the removing / installing tool (see Figure 8-37) on the center bushing.
   - 34K OTC Tool No. 302025
   - 38K-52K OTC Tool No. 302024
   - 65K-70K OTC Tool No. 38095

5. Using a shop press, push directly on the removing / installing tool until the center bushing is pressed out of the equalizing beam bore.

INSPECTION
After removing the center bushings, thoroughly inspect the beam bores. If damaged from center bushing removal, replace with a new equalizing beam. DO NOT re-bush or otherwise use an equalizing beam that has been damaged.

WARNING
FAILURE TO REPLACE AN EQUALIZING BEAM THAT HAS BEEN DAMAGED FROM BUSHING REMOVAL CAN RESULT IN THE FAILURE OF THAT BEAM, LEADING TO ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

WARNING
IF TORCH UNDERCUTTING IS FOUND FROM PREVIOUS REBUSHING, REPLACE WITH A NEW EQUALIZING BEAM. DO NOT TAKE THE RESPONSIBILITY FOR POSSIBLE ROAD FAILURE BY REBUSHING A BEAM IN THIS CONDITION. FAILURE TO REPLACE AN EQUALIZING BEAM THAT HAS TORCH UNDERCUTTING COULD RESULT IN THE FAILURE OF THAT BEAM, LEADING TO ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.
1. Measure the inner diameter (I.D.) of the equalizing beam’s center bushing bore and the center bushing’s outer diameter (O.D.). The specification of the equalizing beam’s center bore on a new RT•RTE equalizing beam:

- **Inside diameter** –
  
  \[ 4.739" \pm 0.004" \]  
  \[ (120.37 \text{ mm} \pm 0.10 \text{ mm}) \].

- Each measurement is to be taken as the average of any two readings at 90 degrees in the same plane, see Figure 8-36. If component is not within the specified range, replacement is required.

### ASSEMBLY

1. Clean the bores of the equalizing beams with emery cloth, removing any nicks or metal buildup from bushing removal.

2. The equalizing beam bore may have a more substantial lead chamfer at one end of the bore than the other. Take advantage of the larger chamfer by pressing in the new center bushing from this end.

3. Place the equalizing beam in a shop press on the receiving tool.

4. Support the beam squarely at the bore area to avoid distortion of the beam bore or bending of the beam.

5. Lubricate the outer diameter (O.D.) of the bronze center bushing and the inner diameter (I.D.) of the equalizing center beam bore with NLGI#2 – EP (Extreme Pressure) lithium base grease.

6. Ensure the bronze center bushing is square to the equalizing beam bore.

7. Assemble the OTC tool components, see Figure 8-37. Position the deep ridge of the installing tool (see Figure 8-37) against the bronze center bushing. Center the removing / installing tool (see Figure 8-37) on top of the installing tool as shown in Figure 8-38.
8. Using a shop press, push directly on the removing/installing tool and press in the new center bushing until the outer metal sleeve is centered and recessed in the equalizing beam's bore, see Figure 8-38.

**NOTE**
The seals are installed with their lips pointing outward. This allows the grease to purge past the seals during lubrication, and prevents outside contaminants from entering the bronze bushings.

9. Position the equalizing **beam center seal** on the bronze center bushing as shown in Figure 8-39.

10. Invert the installing tool so that the shallow ridge rests against the equalizing beam center seal as shown in Figure 8-39. Set the beam center seal in place by lightly tapping the removing/installing tool with a hammer, see Figure 8-37. Bronze center seals are installed at the correct depth when the installing tool makes contact at all points of the face of the equalizing beam.

![Figure 8-39](image)

11. Lubricate bronze center bushings with NLGI#2 – EP (Extreme Pressure) lithium base grease.

12. Install the center sleeve.

13. Install the cross tube.

14. Install the equalizing beam onto the vehicle, refer to the Equalizing Beam Assembly procedure in this section.

**BAR PIN END BUSHINGS**

**WARNING**

WHEN REMOVING AND INSTALLING BAR PIN END BUSHINGS IN THE EQUALIZING BEAMS, FOLLOW THE PROCEDURES OUTLINED IN THIS PUBLICATION. DO NOT USE A CUTTING TORCH TO REMOVE THE BUSHING OUTER METALS PRESSED IN THE EQUALIZING BEAM BORES. WELDING, TORCHING OR ATTACHING MATERIAL TO THE EQUALIZING BEAM MUST NEVER BE PERFORMED. THE USE OF HEAT CAN ADVERSELY AFFECT THE STRENGTH OF THE EQUALIZING BEAMS AND CAN CAUSE DAMAGE TO THE EQUALIZING BEAM ASSEMBLY, ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

**NOTE**

Hendrickson bar pin service kits containing alignment shims, (Kit No. 34013-088L) or (Rotating Bar Pin Bushing Kit No. 34013-188) contain all the components required for one (1) equalizing beam end, see Parts List Section of this publication.

**YOU WILL NEED:**
- A shop press with a capacity of at least 100 tons.
- Bar pin style tool – Refer to Special Tools Section of this publication.
- Installation tool Part No. 66086-103.
- Removal tools Part No. 66086-104 and 66086-105.

**Shop Made Receiving tool** – The receiving tool completely supports the equalizing beam hub being serviced and is tall enough to receive the bushing as it is being pressed in or out, see Special Tools Section of this publication.

**REMOVAL**

**NOTE**
Whenever an equalizing beam is removed for repair, or inspection of the equalizing beam end connection reveals movement, measure the distance between the axle bracket legs for correct width. Refer to Axle Bracket in Preventive Maintenance Section of this publication for measurement location and dimensions. An axle bracket outside of the measurement range must be repaired or replaced. Consult the vehicle manufacturer for inspection, component repair and replacement instructions.

1. Remove equalizing beam assembly from vehicle as detailed in the Equalizing Beam Disassembly instructions in this section.
2. Place the equalizing beam in the shop press with the beam end hub squarely supported on the press bed.

**NOTE**
If replacing the bar pin with a rotating bar pin end bushing, it is not necessary to mark the orientation of the bar pin flats.

3. Prior to removal, mark the orientation of the bar pin flats, see Figure 8-40. Mark orientation the equalizing beam with a paint stick.

4. Press on the end bushing inner metal, see Figure 8-41, of the end bushing until the inner metal is flush with the top of the beam end hub. This will dislodge the confinement washer and move the bushing rubber away from the outer metal of the bushing so the removal tool can be installed.

5. Center the bushing push out tool directly on the bushing’s outer metal and press the bushing out of the equalizing beam end hub.
6. After removing the bar pin end bushings, thoroughly inspect each end hub bore.

**INSPECTION**
After removing the bar pin end bushings, thoroughly inspect the beam bores. If the equalizing beam is damaged from end bushing removal, replacement of the equalizing beam is required, replace with a new equalizing beam. **DO NOT** re-bush or otherwise use an equalizing beam that has been damaged.

**WARNING**
**FAILURE TO REPLACE AN EQUALIZING BEAM THAT HAS BEEN DAMAGED FROM BUSHING REMOVAL CAN RESULT IN THE FAILURE OF THAT BEAM, LEADING TO ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.**

When installing bar pin end bushings the following Steps will minimize the chance of damaging a new bar pin end bushing:

![Figure 8-40](image1)
![Figure 8-41](image2)
1. Clean the end hub bores with emery cloth or hone, removing any nicks or metal buildup from bushing removal.

2. Measure the equalizing beam end hub bore inner diameter and the bushing outer diameter. The Hendrickson specification for the equalizing beam end hub bore diameter of the equalizing beam is 4.365" ± .004", (110.87 mm ± .10 mm) see Figure 8-42. If components are NOT within the specified range, replacement is required.

**CAUTION**

ALWAYS USE THE BUSHING’S OUTER METAL FOR PRESSING OPERATIONS, UNLESS OTHERWISE INSTRUCTED. PRESSING ON THE BUSHINGS INNER METAL MAY DAMAGE THE BUSHING REQUIRING BUSHING REPLACEMENT.

**BAR PIN END BUSHING INSTALLATION**

1. Place the equalizing beam in a shop press with the end hub (see Figure 8-43) squarely supported on the press bed or receiving tool, see Special Tools Section of this publication.

2. Install Hendrickson Part No. 66086-103 (OTC 1757) end bushing installation tool (refer to Special Tools Section of this publication) on the new end bushing as shown in Figure 8-43. Tighten the through bolt until the two halves of the tool touch. The installation tool compresses the rubber between the inner and outer metal of the bushing to allow press force to be transmitted only to the outer metal of the bushing.

**SERVICE HINT**

The end hub bore may have a more substantial leading chamfer at one end of the bore than the other. Take advantage of the larger chamfer by pressing in the new bushing from this end.

3. Lubricate the equalizing beam end hub inside diameter AND the bar pin end bushing’s outer metal with a heavy layer of NLGI #2 – EP (Extreme Pressure) lithium base grease, see Figure 8-43.

4. Position the equalizing beam end bushing and installation tool on the end hub. Verify the bolt holes in the end bushing are in line with the beam axis, see Figure 8-44.
NOTE
The end bushing must be square with the equalizing beam end hub before pressing the end bushing into the equalizing beam. End bushings pressed in at an angle will damage the end bushing and the equalizing beam.

5. Verify the end bushing’s outer metal is square with the end hub. Damage to the equalizing beam and the end bushing will result if the bushings are pressed in at an angle.

CAUTION
CARE MUST BE TAKEN DURING THE INSTALLATION OF THE BUSHING. DO NOT PUSH ON THE INNER METAL OF THE BUSHING, DOING SO WILL CAUSE DAMAGE TO THE BUSHING AND VOID WARRANTY.

6. Install the end bushing into the end hub by pressing on the installation tool until the installation tool contacts the end hub. This will center the bushing in the end hub, see Figure 8-45.

7. Install the equalizing beam onto vehicle, refer to the Equalizing Beam Assembly procedure in this section.

ADAPTER STYLE END BUSHING

You will need:
- A shop press with a capacity of at least 100 tons.
- Air hammer / chisel / Bent chisel, see Figure 8-46.
- End Bushing tool – Refer to Special Tools Section of this publication.
  - 28 - 52K Capacity, Part No. 66086-101

ADAPTER REMOVAL

WARNING
THE ADAPTER REMOVAL PROCESS CAN CAUSE DAMAGE. REUSE OF DAMAGED OR WORN ADAPTERS COULD RESULT IN A COMPONENT FAILURE LEADING TO ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY.

SERVICE HINT
It is recommended that a penetrating oil be applied to all beam end connections prior to removal to aide in disassembly.

1. Chock the wheels of the steer axle.
2. Raise and support the drive axles with safety stands.
3. Remove the tires.

WARNING
PRIOR TO REMOVING BOTH EQUALIZING BEAMS, SUPPORT THE PINION OF EACH DRIVE AXLE. FAILURE TO DO SO CAN RESULT IN PERSONAL INJURY OR ALLOW THE AXLES TO SHIFT MAKING REASSEMBLY MORE DIFFICULT.
4. Support the pinion angle of the drive axles to prevent axle movement during service.
5. Remove and discard the saddle cap fasteners from both inboard and outboard sides of the equalizing beam.
6. Remove the saddle caps, see Figure 8-25.

7. Raise the vehicle’s frame just enough to create a ½” (13 mm) gap between the saddles and the center bushings. Support the vehicle’s frame at this height.

**CAUTION**

THE WEIGHT OF THE EQUALIZING BEAM ASSEMBLY IS APPROXIMATELY 155 POUNDS. PRIOR TO REMOVING THE BEAM END FASTENERS FROM THE EQUALIZING BEAM, SUPPORT THE END OF THE EQUALIZING BEAM TO PREVENT FROM DROPPING. CARE SHOULD BE TAKEN AT REMOVAL AND INSTALLATION TO PREVENT PERSONAL INJURY OR DAMAGE TO COMPONENTS.

8. Support both equalizing beams with floor jacks.
9. Remove the cotter pin(s) and the locknut(s) or slotted nut(s) as equipped.
10. Remove the beam end bolt or shaft (as equipped), see Figure 8-47.

**NOTE**

Due to the process necessary to remove the beam end adapters, the adapter can be subjected to damage. **DO NOT** reuse worn or damaged adapters.

11. The beam end adapters have two chisel recesses located in their flanges as shown in Figure 8-48.
12. Locate the recess for the chisel, rotate the adapter if necessary. Place the air hammer/chisel in the recess to rotate the adapter collar.
13. If the beam end adapter does not turn, use a hammer to rap the outside of the axle bracket legs around the adapter area and repeat air hammer chisel procedure until removed.
14. Remove the beam end adapter from the other equalizing beam ends.
15. Slowly lower the floor jacks and remove/pry the equalizing beams from the axle brackets.
16. Remove the end bushing adapter tube (if equipped), see Figure 8-47.
17. Remove the floor jacks from under the equalizing beams.
18. Position the equalizing beam in the shop press and align the end bushing removal / replacement adapter tool with the tapered end down on top of the rubber end bushing, see Figure 8-49.

19. Apply hydraulic force and push out the old bushing.

**INSTALLATION**

1. Clean the end bushing bore with a cylinder ball hone or emery paper of any debris.

2. Lubricate the equalizing beam bore and the equalizing beam center bushing outer metal sleeve with NLGI#2 – EP (Extreme Pressure) grease, see Figure 8-50.

3. Position the end bushing removal / replacement adapter tool with the tapered up on the clamp tool.

4. Use a wrench to tighten the installing clamp tool on the rubber bushing and the end bushing replacement adapter as shown in Figure 8-51.

**WARNING**

CHECK TO ENSURE PROPER ALIGNMENT OF TOOLING ADAPTERS WITH EQUALIZING BEAM COMPONENTS BEFORE APPLYING FULL HYDRAULIC PRESSURE WITH A SHOP PRESS.

5. Apply hydraulic force and press the new bushing into place. The bushing will be completely seated when the clamp makes contact with the beam face.

6. Using the floor jacks, slowly raise both equalizing beams and cross tube as an assembly into the axle brackets. Ensure that each equalizing beam end bushing correctly engages the axle bracket.

7. Install one (1) adapter through the axle bracket leg at the wheel side, into the beam end bushing.

8. Install the other adapter through the axle bracket leg at the axle side, taking advantage of the cut-off flange on the adapter to clear the axle.
9. Rotate the adapters so that the adapter cut-off flats are vertical as shown in Figure 8-52.

10. Install the end shaft and slotted nuts.

11. Place the axles in their normal operating positions before the slotted nuts are torqued to specifications.

**WARNING**

IF THE TIGHTENING TORQUES RECOMMENDED BELOW ARE NOT PROPERLY MAINTAINED, THE METAL SURFACES OF THE AXLE BRACKET LEGS, HOLES, ADAPTERS AND RUBBER BUSHING INNER METALS CAN EXPERIENCE EXCESSIVE WEAR AND/OR FAILURE. THIS CAN CAUSE SEPARATION OF COMPONENTS AND ADVERSE VEHICLE HANDLING, PROPERTY DAMAGE OR PERSONAL INJURY.

12. Tighten the locknuts until final torque value is achieved, **DO NOT EXCEED** specified torque value.

- **RT 34K-40K** – Tighten ¾” Locknut to 225 ± 15 foot pounds torque, see Figure 8-53
- **RT 46K-52K** – Tighten 1” Locknut to 470 ± 25 foot pounds torque, see Figure 8-53
- **RT 65K•70K** – Refer to the RT 65K•70K Tightening Procedure

**FIGURE 8-53**

13. Install the tires.

14. Remove the supports from the drive axles and lower the vehicle onto the ground.

15. Remove the wheel chocks.

**RT 65K•70K TIGHTENING TORQUE PROCEDURE**

The proper tightening torque procedure for the **RT 65K•70K** suspensions, equipped with two or three piece adapter or the tube and nut type beam end connections must be performed to ensure that the proper clamp force of the axle bracket legs against the end bushing’s inner metal is obtained to achieve the maximum service life from the suspension system and mounting hardware.

Two or three piece adapter type and tube and nut type beam end connections require the fasteners be tightened and maintained to a torque value within the specified torque range, see Table 8-1 on Page 65.

A simple torque wrench will **not** be sufficient to obtain the proper torque requirement. The proper torque requirement can be obtained with the use of a torque multiplier. If one is not available the use of a slug wrench is recommended.
TORQUE PROCEDURE
Prior to removing the equalizing beam assembly from chassis:
1. Ensure the vehicle is properly supported with frame stands.
2. Chock the front wheels of the vehicle.
3. Place a jack under each beam end, as shown in Figure 8-54.
4. Check for movement of the rubber end bushing inner metal. If movement is noted, it cannot be eliminated by tightening the fasteners due to the excessive wear of mating parts and increasing clearance tolerances. If movement is noted, **DO NOT** operate the vehicle. Replace the rubber end bushing and all connecting parts.

ASSEMBLY

**NOTE**
Axles must be in operational position before fasteners are tightened to prevent pre-loading of the rubber bushing.

1. Position the equalizing beam assembly in the axle bracket on the axle.
2. Apply an anti-seize compound to all mating metal surfaces of the axle brackets, end bushings, and mounting hardware. This will aid in the assembly as well as prevent possible corrosion making future disassembly difficult.
3. Insert the adapter or tube beam end connections, see Figure 8-55. For specific part numbers, see Table 8-2 on page 66.

**NOTE**
For the adapter type connection, rotate the adapters so the adapter flats are vertical, see Figure 8-56.

4. Assemble one (1) slotted nut to the shaft and install the cotter pin. Place a suitable wrench on the nut and ensure the wrench is locked in place (braced) to prevent movement.
5. Tighten using one of the following methods:

   **METHOD A:** Torque Multiplier, You will need:
   - Torque Multiplier
     a. Assemble the opposite nut and use a torque wrench with a multiplier.
     b. Tighten the nut to torque multiplier value shown in Table 8-1 on page 65.
     c. Install the cotter pin. The nut may be advanced to the next nut slot. **DO NOT** back off nut.

   **CAUTION**
   DO NOT BACK OFF NUT TO INSTALL COTTER PIN, DOING SO MAY REDUCE THE TIGHTENING TORQUE BELOW THE REQUIRED SPECIFICATION.

   **METHOD B:** Slug Wrench, You will need:
Two (2) slug wrenches, see Figure 8-57.

4 pound hammer

a. Assemble the opposite nut and using a torque wrench, tighten the nut to the initial torque value shown in Table 8-1 on page 65.

b. Remove torque wrench and replace with the Slug Wrench. Use a four pound hammer, tighten the assembly by hitting the slug wrench near the handle as shown in Figure 8-58 until the nut has been turned to the degrees specified in Table 8-1 on page 65.

c. Install the cotter pin. The nut may be advanced to the next nut slot, DO NOT back off nut.

**CAUTION**

REPEATED HAMMERING BEYOND THE DEGREE SPECIFIED CAN CAUSE COMPONENT DAMAGE.

**CAUTION**

DO NOT BACK OFF NUT TO INSTALL COTTER PIN, DOING SO MAY REDUCE THE TIGHTENING TORQUE BELOW THE REQUIRED SPECIFICATION.

**TABLE 8-1**

<table>
<thead>
<tr>
<th>SLUG WRENCH METHOD</th>
<th>TORQUE MULTIPLIER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TUBE AND NUT END CONNECTION</strong></td>
<td></td>
</tr>
<tr>
<td>Initial Torque</td>
<td>Plus</td>
</tr>
<tr>
<td>200 ft. lbs.</td>
<td>½ or 120° turn on slotted nut</td>
</tr>
<tr>
<td><strong>TWO AND THREE PIECE ADAPTER END CONNECTION</strong></td>
<td></td>
</tr>
<tr>
<td>125 ft. lbs.</td>
<td>¼ or 90° turn on castle nut</td>
</tr>
</tbody>
</table>
**WARNING**

INSUFFICIENT TIGHTENING TORQUE VALUE CAN CAUSE PREMATURE WEAR AND DAMAGE TO THE AXLE BRACKET LEGS, HOLES AND/OR BEAM END CONNECTION COMPONENTS, THIS CAN FURTHER CAUSE FAILURE AND SEPARATION OF COMPONENTS, AND RESULT IN ADVERSE VEHICLE HANDLING, SEVERE PERSONAL INJURY OR DEATH. MAINTAIN PROPER TIGHTENING TORQUE VALUE AT ALL TIMES.

**TABLE 8-2**

<table>
<thead>
<tr>
<th>TWO-PIECE</th>
<th>THREE-PIECE</th>
<th>TUBE AND NUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kit Nos. 21140-004 • 21140-007 21140-031 • 21140-043 • 21140-052</td>
<td>Kit Nos. 21140-026 • 21140-027</td>
<td>Kit No. 21140-006</td>
</tr>
</tbody>
</table>

**LONGITUDINAL TORQUE RODS**

**DISASSEMBLY**

1. Chock the front wheels of the vehicle.

**SERVICE HINT**

To remove all the load from the longitudinal torque rod, raise or lower the pinion as needed. This will ease the removal of the longitudinal torque rod.

2. Support the pinion on the axle being serviced.

**NOTE**

Prior to disassembly of the longitudinal torque rod, note the quantity and orientation of the longitudinal torque rod shims. It is required that the longitudinal torque rod shims are installed in the same orientation and location as removed to preserve the existing alignment.

3. Remove the torque rod mounting fasteners and shims (if equipped).

4. Remove the fasteners that connect the longitudinal torque rod to the cross member and axle brackets.

5. Remove longitudinal torque rod, see Figure 8-59.

**FIGURE 8-59**
ASSEMBLY
1. Install longitudinal torque rod.
2. Install the fasteners and any shims that were removed to the cross member and axle brackets.

NOTE
Hendrickson recommends the use of Grade 8 bolts and Grade C locknuts. If flange head bolts and locknuts are not used then hardened structural washers must be used under bolt heads and locknuts.

3. Tighten all fasteners to vehicle manufacturer’s torque specifications.
4. Verify proper pinion angle, and correct with drop in shims between the torque rod bar pin and the cross member or axle bracket depending on the direction of adjustment needed. Contact the vehicle manufacturer for proper pinion angle specifications.
5. Remove wheel chocks.

TRANSVERSE TORQUE RODS

DISASSEMBLY
1. Chock the front wheels of the vehicle.

SERVICE HINT
Note the quantity and location of shims removed to maintain the lateral alignment of the axle during assembly. See Alignment & Adjustments Section of this publication.

2. Remove the torque rod mounting fasteners.
3. Remove the transverse torque rod.
4. Inspect the mounting surfaces for any wear or damage. Repair or replace as necessary.

ASSEMBLY
1. Install the transverse torque rod.
2. Install the mounting fasteners and any shims that were removed.

NOTE
Hendrickson recommends the using Grade 8 bolts and Grade C locknuts for all torque rod attachments.

3. Tighten all fasteners to the required torque specification. Refer to vehicle manufacturer for specifications.
4. Check the lateral alignment. If not within vehicle manufacturer’s specified range, a lateral alignment is necessary. See Lateral Alignment in the Alignment & Adjustments Section of this publication.
5. Remove the wheel chocks.

ULTRA ROD • ULTRA ROD PLUS TORQUE ROD BUSHINGS

YOU WILL NEED
- A vertical press with a capacity of at least 10 tons.
- Shop made receiving tool and installation/removal tool, refer to the Special Tools Selection of this publication for more information.
- Funnel Tools Part No. (66086-001 ULTRA ROD) • (66086-000 ULTRA ROD PLUS)
DISASSEMBLY

1. Remove torque rods as detailed in Torque Rod Disassembly instructions in this section.

**WARNING**

DO NOT USE HEAT OR USE A CUTTING TORCH TO REMOVE THE BUSHINGS FROM THE TORQUE ROD. THE USE OF HEAT WILL ADVERSELY AFFECT THE STRENGTH OF THE TORQUE ROD. HEAT CAN CHANGE THE MATERIAL PROPERTIES. A COMPONENT DAMAGED IN THIS MANNER CAN RESULT IN ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

2. Support the torque rod end tube centered on the receiving tool. Be sure the torque rod is squarely supported on the press bed for safety.

3. Push directly on the straddle mount bar pin, until the top of the pin is level with the top of torque rod end tube. Place the push out tool directly on top of the bar pin and press until the bushing clears the torque rod end tube.

4. Remove the fasteners from the tapered bar pin bushing, and support the torque rod end on the receiving tool with the tapered stud pointing up and the end tube centered on the tool. Be sure the torque rod is squarely supported on the press bed for safety.

5. Push directly on the tapered stud until the bushing clears the torque rod end tube.

ASSEMBLY

1. Clean and inspect the inner diameter of the torque rod end tubes.

**NOTE**

DO NOT use paraffinic oil, or soap base lubricant. Such lubricants can cause adverse reactions with the bushing, such as deterioration of the rubber, causing premature failure. Use ONLY a light Naphthenic base oil, such as 60 SUS at 100°F.

2. Lubricate the inner diameter of the torque rod end tubes and the new rubber bushings with a light Naphthenic base oil, such as 60 SUS at 100°F; see Figure 8-61.

3. Support the torque rod end tube centered on the receiving tool. Be sure the torque rod is squarely supported on the press bed for safety. The straddle mount bar pin bushings must have the mounting flats positioned at zero degrees to the shank of the torque rod, see Figure 8-62.

4. Push directly on the straddle mount bar pin, or the tapered stud. The bushing must be centered within the end hubs of the torque rod.
   - When pushing in the new rubber bushings, overshoot the desired final position by approximately 3/16” (4.76 mm), see Figure 8-63.
   - Push the rubber bushing again from the opposite side to center the rubber bushing within the end hub, see Figure 8-64.

**CAUTION**

IF THE TORQUE ROD ASSEMBLY IS NOT ALLOWED THE ALLOTTED TIME FOR THE LUBRICANT TO DISSIPATE, THE BUSHING MAY SLIDE FROM THE TORQUE ROD END HUB CAUSING THE BUSHING TO BE REMOVED AND A NEW BUSHING RE-INSTALLED.
5. Wipe off the excess lubricant. Allow the lubricant four hours to dissipate prior to operating the vehicle.
6. Install the torque rod as detailed in the Torque Rod Assembly instructions in this section.

**XTRB TORQUE ROD BUSHINGS**

**You Will Need**
- A vertical press with a capacity of at least 10 tons.
- Shop made receiving tool and installation/removal tool, see the Special Tools Section of this publication for more information.

**DISASSEMBLY**
1. Remove the torque rod(s) as detailed in Torque Rod Disassembly instructions in this section.

**WARNING**
DO NOT USE HEAT OR USE A CUTTING TORCH TO REMOVE THE BUSHINGS FROM THE TORQUE ROD. THE USE OF HEAT WILL ADVERSELY AFFECT THE STRENGTH OF THE TORQUE ROD. HEAT CAN CHANGE THE MATERIAL PROPERTIES. A COMPONENT DAMAGED IN THIS MANNER CAN RESULT IN ADVERSE VEHICLE HANDLING AND POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE.

**SERVICE HINT**
When servicing a straddle mount bar pin bushing assembly, mark the clocking position of the straddle mount bar pin flats with a paint stick on the torque rod end hub prior to disassembly, see Figure 8-66. This marking will serve as a guide when installing the new bushing assembly so the original clocking position can be retained.

2. Mark the clocking position of the straddle mount bar pin flats with a paint stick on the torque rod end hub prior to disassembly, see Figure 8-66.
3. Support the torque rod end hub centered on the receiving tool. Be sure the torque rod is squarely supported on the press bed for safety.
4. Push directly on the straddle mount bar pin, until the top of the bar pin is level with the top of torque rod end hub, see Figure 8-67.

5. Place the shop made removal tool on the bar pin and press until the bushing clears the torque rod hub, see Figure 8-68.

6. Remove the fastener from the tapered bar pin bushing, and support the torque rod hub on the receiving tool with the tapered stud pointing down and the end hub centered on the tool. Be sure the torque rod is squarely supported on the press bed for safety.

ASSEMBLY

1. Clean and inspect the inner diameter of the torque rod end hubs, see Figure 8-69.

SERVICE HINT

DO NOT use a paraffinic oil, or soap base lubricant. Such lubricants can cause adverse reactions with the bushing, causing premature failure.

2. Lubricate the inner diameter of the torque rod end hubs and the new bushings with NLGI#2 – EP (Extreme Pressure) lithium base grease, see Figure 8-70.

3. Support the torque rod end hub centered on the receiving tool. Be sure the torque rod is squarely supported on the press bed for safety.

4. Re-align the bar pin bushings to the mark made before removal as shown in Figure 8-66.

5. Using the shop made tool, place the installer tool on the bushing and press in. The bushing must be centered within the hub of the torque rod.

6. Wipe off the excess lubricant.

7. Install the torque rod as detailed in the Torque Rod Assembly instructions in this section.
CROSS TUBE EQUIPPED WITH RUBBER BUSHINGS

A cross tube seldom requires replacement, usually only when it has been bent, possibly due to hitting an object. A bent cross tube may cause misalignment of the axles, and must be replaced immediately to eliminate abnormal tire wear.

NOTE

Method A can only be used for RT 65K and up.

Method A Equalizing Beam Removal Method - Follow the Equalizing Beam component replacement procedure in this section. Within the procedure, after removal of the equalizing beams when the equalizing beams are separated, remove and replace cross tube.

Method B Center Bushing End Plug Removal (RT™•RTE™ 34K through 52K only).

You will need:

■ Center Bushing End Plug (see Parts Lists Section).
■ Cutting Torch
■ Welding Equipment
■ Hole Saw

DISASSEMBLY

1. Use a work bay with a level surface.
2. Chock the front steer axle wheels.

CAUTION

FOLLOW THE SAFETY GUIDELINES FOR OPERATING THE TORCH. USE CAUTION AS PARTS MAY BE HOT.

3. Use a cutting torch to make two cuts in the cross tube, see Figure 8-71.
4. Remove the cut section of the cross tube and slide the remaining sections out of the center bushings and discard.
5. Use a 2" hole saw and remove only one (1) center bushing end plug from the suspension.

FIGURE 8-71
ASSEMBLY
1. Clean the open end of the center bushing bore to approximately 1" (25.4 mm) depth of weld and debris.
2. From the open center bushing slide the new cross tube into both center bushings.
3. It may be necessary to use a floor jack under one or both equalizing beams to align the cross tube.
4. Position the end plug ¼" (6.35 mm) recessed in the center bushings and tack weld, see Figure 8-72.
5. Check end plug position, final weld shall be a ¼" (6.35 mm) fillet.

CROSS TUBE EQUIPPED WITH BRONZE BUSHINGS
A cross tube seldom requires replacement, usually only when it has been bent, possibly due to hitting an object. A bent cross tube may cause misalignment of the axles, and must be replaced immediately to eliminate abnormal tire wear.

DISASSEMBLY
1. Use a work bay with a level surface.
2. Chock the front steer axle wheels.
3. Remove and discard saddle cap fasteners.
4. Remove the saddle cap.
5. Raise the vehicle frame just enough to create a gap between the saddles and center sleeves.
6. Prior to removal of the center bushing sleeves, note the quantity and position of thrust washers.
7. Remove the center bushing sleeves.
8. Remove the cross tube.

ASSEMBLY
1. Ensure the center bushing is clean of debris and has a good film of NLGI#2 – EP (Extreme Pressure) lithium base grease applied.
2. Insert one (1) center sleeve.
3. From the other side of the vehicle, insert the cross tube through the equalizing beam and into the installed center sleeve.
4. Insert the second center bushing sleeve.
5. Clean any excess grease from the outside of the center sleeves.

CAUTION
OPERATING A VEHICLE WITH AN INSUFFICIENT NUMBER OF THRUST WASHERS MAY ALLOW SIDE MOVEMENT BETWEEN THE SADDLES AND THE EQUALIZING BEAM THAT CAN AFFECT VEHICLE HANDLING AND STEERING BY THE OPERATOR AND CAN CAUSE PREMATURE COMPONENT WEAR.
6. Reinstall the thrust washers.
7. Install as many thrust washers as possible until the remaining gap is less than the thickness of one (1) thrust washer.

**NOTE**
Each bronze center bushing kit contains eight (8) thrust washers, enough for two (2) washers at each side of each beam center hub, see Figure 8-35.

8. Slowly lower the vehicle ensuring the saddles are centered on the center bushing sleeves.
9. Install the saddle caps and fasteners.
10. Tighten saddle cap fasteners to $250 \pm 25$ foot pounds torque.
11. Remove wheel chocks.
SECTION 9
Torque Specifications

RT™ • RTE™ 34K • 40K • 46K

Hendrickson recommended torque values provided in Foot Pounds

1. 54 ± 9
2. 42 ± 3
3. 125 ± 25
4. Tighten until Lockwasher is locked
5. 300 ± 25
6. 60 ± 5
7. 250 ± 25
8. 575 ± 75 At the Bolt Head
9. 34K • 40K 225 ± 15
   46K 470 ± 25
10a. 200 ± 25 at the locknut
10b. 75 ± 15 at the bolt head

Leaf Spring Assembly
Part Number Location

“A” Saddle Assembly
Leg Height

Hanger #1
Hanger #2
Hanger #3 RTE Only
## Hendrickson Recommended Torque Specifications

<table>
<thead>
<tr>
<th>NO.</th>
<th>Component</th>
<th>Fastener QTY.</th>
<th>Size</th>
<th>Torque Value FOOT POUNDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Spring Pin Double Lock Locknut</td>
<td>4</td>
<td>½&quot;-13 UNC</td>
<td>54 ± 9</td>
</tr>
<tr>
<td>2</td>
<td>Rear Spring Hanger Locknut</td>
<td>4</td>
<td>½&quot;-10 UNC</td>
<td>42 ± 3</td>
</tr>
<tr>
<td>3</td>
<td>Top Pad Set Screw</td>
<td>4</td>
<td>¾&quot;-10 UNC</td>
<td>125 ± 25</td>
</tr>
<tr>
<td>4</td>
<td>Top Pad Set Screw Locknut</td>
<td>8</td>
<td>1&quot;-10 UNC</td>
<td>Tighten until Lockwasher locks</td>
</tr>
<tr>
<td>5</td>
<td>Top Pad Locknut</td>
<td>8</td>
<td>1&quot;-14 UNS</td>
<td>*300 ± 25</td>
</tr>
<tr>
<td>6</td>
<td>Saddle Cap Stud</td>
<td>8</td>
<td>¾&quot;-14 UNF</td>
<td>60 ± 5</td>
</tr>
<tr>
<td>7</td>
<td>Saddle Cap Stud Locknut</td>
<td>8</td>
<td>¾&quot;-14 UNF</td>
<td>250 ± 25</td>
</tr>
<tr>
<td>8</td>
<td>Bar pin Attachment to Axle</td>
<td>8</td>
<td>1&quot;-8 UNC</td>
<td>575 ± 75</td>
</tr>
<tr>
<td></td>
<td>at the Bolt Head</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>at the Locknut</td>
<td>8</td>
<td>1&quot;-8 UNC</td>
<td>525 ± 75</td>
</tr>
<tr>
<td>9</td>
<td>Adapter Style</td>
<td>4</td>
<td>¾&quot;-16 UNF</td>
<td>225 ± 15</td>
</tr>
<tr>
<td></td>
<td>34K • 40K</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>46K</td>
<td>4</td>
<td>1&quot;-14 UNS</td>
<td>470 ± 25</td>
</tr>
<tr>
<td>10a</td>
<td>Transverse Torque Rod to Axle Bracket</td>
<td>2</td>
<td>1¼&quot;-12 UNF</td>
<td>200 ± 25</td>
</tr>
<tr>
<td>10b</td>
<td>at the Locknut</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>at the Bolt Head</td>
<td>2</td>
<td>½&quot;-11 UNC</td>
<td>75 ± 15</td>
</tr>
</tbody>
</table>

**NOTE:** Torque values listed above apply only if Hendrickson supplied fasteners are used. If non Hendrickson fasteners are used, follow torque specification listed in vehicle manufacturer’s service manual.  
* All threads must be lubricated with SAE 20 oil before assembly to obtain the correct relationship of torque and fastener tension.
**Hendrickson recommended torque values provided in Foot Pounds**

- **Hanger #1**
  - 1. $54 \pm 9$

- **Hanger #2**
  - 2. $42 \pm 3$
  - 10a. $200 \pm 25$
    - at the locknut

- **Hanger #3 (RTE Only)**
  - 3. $125 \pm 25$
  - 4. Tighten until Lockwasher is locked

- **Leaf Spring Assembly Part Number location**

- **"A" Saddle Assembly Leg Height**

- **RT™ • RTE™ 48K • 50K • 52K**

- **RT™ • RTE™**

- **7. $250 \pm 25$**

- **8. $575 \pm 75$
  - At the Bolt Head**

- **9. $470 \pm 25$**
## Hendrickson Recommended Torque Specifications

<table>
<thead>
<tr>
<th>NO.</th>
<th>COMPONENT</th>
<th>FASTENER</th>
<th>TORQUE VALUE FOOT POUNDS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>QTY.</td>
<td>SIZE</td>
</tr>
<tr>
<td>1</td>
<td>Spring Pin Double Lock Locknut</td>
<td>4</td>
<td>¼&quot;-13 UNC</td>
</tr>
<tr>
<td>2</td>
<td>Rear Spring Hanger Locknut</td>
<td>4</td>
<td>½&quot;-13 UNC</td>
</tr>
<tr>
<td>3</td>
<td>Top Pad Square Head Set Screw</td>
<td>4</td>
<td>¾&quot;-10 UNC</td>
</tr>
<tr>
<td>4</td>
<td>Top Pad Set Screw Locknut</td>
<td>4</td>
<td>¾&quot;-10 UNC</td>
</tr>
<tr>
<td>5</td>
<td>Top Pad Locknut</td>
<td>2</td>
<td>1&quot;-14 UNS</td>
</tr>
<tr>
<td>6</td>
<td>Saddle Cap Stud</td>
<td>8</td>
<td>½&quot;-14 UNF</td>
</tr>
<tr>
<td>7</td>
<td>Saddle Cap Stud Locknut</td>
<td>8</td>
<td>½&quot;-14 UNF</td>
</tr>
<tr>
<td>8</td>
<td>Bar pin Attachment to Axle</td>
<td>8</td>
<td>1¾&quot;-8 UNC</td>
</tr>
<tr>
<td></td>
<td>at the Bolt Head</td>
<td>8</td>
<td>1¾&quot;-8 UNC</td>
</tr>
<tr>
<td>9</td>
<td>Adapter Style</td>
<td>4</td>
<td>1¾&quot;-14 UNS</td>
</tr>
<tr>
<td>10a</td>
<td>Transverse Torque Rod to Axle</td>
<td>2</td>
<td>1¼&quot;-12 UNF</td>
</tr>
<tr>
<td>10b</td>
<td>at the Bolt Head</td>
<td>2</td>
<td>5/8&quot;-11 UNC</td>
</tr>
<tr>
<td></td>
<td>at the Locknut</td>
<td>2</td>
<td>1¼&quot;-12 UNF</td>
</tr>
</tbody>
</table>

**NOTE:** Torque values listed above apply only if Hendrickson supplied fasteners are used. If non-Hendrickson fasteners are used, follow torque specification listed in vehicle manufacturer’s service manual.

* All threads must be lubricated with SAE 20 oil before assembly to obtain the correct relationship of torque and fastener tension.
Hendrickson recommended torque values provided in Foot Pounds

- 8a. 200 ± 25 at the locknut
- 8b. at the bolt head 75 ± 15
- 1. 54 ± 9
- 2. 42 ± 3
- 3. 160 ± 40
- 4. 385 ± 25
- 5. 75 ± 5
- 6. 290 ± 12
- 7a. 700 ± 100
- 7b. 1200 ± 100
- RT™ 65K • 70K
<table>
<thead>
<tr>
<th>NO.</th>
<th>COMPONENT</th>
<th>FASTENER</th>
<th>TORQUE VALUE FOOT POUNDS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>COMPONENT</td>
<td>QTY.</td>
<td>SIZE</td>
</tr>
<tr>
<td>1</td>
<td>Spring Pin Double Lock Locknut</td>
<td>4</td>
<td>½&quot;-13 UNC</td>
</tr>
<tr>
<td>2</td>
<td>Rear Spring Hanger Locknut</td>
<td>4</td>
<td>¾&quot;-16 UNF</td>
</tr>
<tr>
<td>3</td>
<td>Top Pad Internal Hex Head Set Screw</td>
<td>8</td>
<td>¾&quot;-10 UNC</td>
</tr>
<tr>
<td>4</td>
<td>Top Pad Locknut</td>
<td>8</td>
<td>1¾&quot;-14 UNS</td>
</tr>
<tr>
<td>5</td>
<td>Saddle Cap Stud</td>
<td>8</td>
<td>1¾&quot;-14 UNS</td>
</tr>
<tr>
<td>6</td>
<td>Saddle Cap Stud Locknut</td>
<td>8</td>
<td>1¾&quot;-14 UNS</td>
</tr>
<tr>
<td>7a</td>
<td>Slotted Nut Beam End Connection</td>
<td>4</td>
<td>1¾&quot;-14 UNS</td>
</tr>
<tr>
<td>7b</td>
<td>Tube Nut</td>
<td>8</td>
<td>3&quot;- 12 UNF</td>
</tr>
<tr>
<td>8a</td>
<td>Transverse Torque Rod to Axle</td>
<td>2</td>
<td>1¼&quot;-12 UNF</td>
</tr>
<tr>
<td>8b</td>
<td>Transverse Torque Rod to Axle</td>
<td>2</td>
<td>¾&quot;-11 UNC</td>
</tr>
</tbody>
</table>

**NOTE:** Torque values listed above apply only if Hendrickson supplied fasteners are used. If non Hendrickson fasteners are used, follow torque specification listed in vehicle manufacturer’s service manual.

* All threads must be lubricated with SAE 20 oil before assembly to obtain the correct relationship of torque and fastener tension.

** Refer to RT 65K • 70K Torque Procedure in this publication, see Table 8-1 and 8-2, page 65.
# SECTION 10
## Troubleshooting Guide

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>POSSIBLE CAUSE</th>
<th>CORRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main leaf spring broken</td>
<td>Spring eye broken</td>
<td>Replace entire leaf spring assembly</td>
</tr>
<tr>
<td>Vehicle bouncing excessively</td>
<td>No shock absorber installed</td>
<td>Install shock absorbers. See Preventive Maintenance Section</td>
</tr>
<tr>
<td></td>
<td>Leaking shock absorber</td>
<td>Replace shock absorber</td>
</tr>
<tr>
<td></td>
<td>Damaged shock absorber</td>
<td></td>
</tr>
<tr>
<td>Suspension has harsh or bumpy ride</td>
<td>Damaged leaf spring assembly</td>
<td>Replace leaf spring assembly</td>
</tr>
<tr>
<td>Vehicle leans</td>
<td>Damaged leaf spring assembly</td>
<td>Replace leaf spring assembly</td>
</tr>
<tr>
<td>Irregular tire wear</td>
<td>Incorrect axle alignment</td>
<td>Align axles. Refer to vehicle manufacturer’s specifications</td>
</tr>
<tr>
<td>Loose saddle fasteners</td>
<td>Suspension is overloaded</td>
<td>Redistribute load to correct weight</td>
</tr>
<tr>
<td></td>
<td>Frequent hard stop/start</td>
<td>Increase inspection interval of fasteners</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Review driving habits to reduce frequency of hard stop/start</td>
</tr>
<tr>
<td>Outer frame bracket cracked</td>
<td>Suspension is overloaded</td>
<td>Redistribute load to correct weight</td>
</tr>
<tr>
<td></td>
<td>Loose saddle fasteners</td>
<td>Increase inspection interval of fasteners</td>
</tr>
<tr>
<td>Saddle leg to beam contact</td>
<td>Slipped/loose/broken inner frame bracket</td>
<td>Correct inner frame bracket condition</td>
</tr>
<tr>
<td></td>
<td>Axles not centered</td>
<td>Center axles under frame rails</td>
</tr>
</tbody>
</table>