TECHNICAL BULLETIN

SUBJECT: Steering Knuckle Assembly Inspection and Replacement Instructions

LIT NO: H893

DATE: January 2024 **REV:** A

Introduction

Hendrickson has learned a limited number of its COMPOSILITE EXS20 and SC20 steerable auxiliary lift axle suspension assemblies and individual steering knuckle assembly components are equipped with bearing journals that may not have been seated correctly to the backbones of the left and right-side steering knuckle assembly components during manufacture between September 19, 2023, and October 18, 2023.

Hendrickson is assisting its applicable vehicle/equipment manufacturer customers regarding this matter to (1) locate affected steering knuckle assembly components and/or completed lift axle suspension assemblies, (2) facilitate proper inspections of such assemblies, and (3) provide and install applicable Replacement Parts Service Kits free of charge by a Hendrickson representative. Hendrickson will manage and track all shipments of Replacement Parts Service Kits, and will provide, as applicable, standard allocation of labor hours for installation of such kits that may not be installed by a Hendrickson representative.

This publication provides procedures to assist with the inspection and replacement of applicable components of the above-referenced COMPOSILITE EXS20 and SC20 lift axle suspension assemblies or individual steering knuckle assembly components. In addition, as applicable, refer to the current versions of Hendrickson Publication Nos. TP–H633 (COMPOSILITE SC Steerable Auxiliary Axle Suspension Systems – Installation & Preventive Maintenance) or H819 (COMPOSILITE EXS Steerable Auxiliary Axle Suspension Systems – Owner's Manual), both available at https://www.hendrickson-intl.com, for additional service, repair, rebuild, and safety instructions before performing service work on such Hendrickson COMPOSILITE systems.

Replacement Parts Service Kits

Hendrickson plans to ship Replacement Parts Service Kits directly to the applicable vehicle manufacturer, which can then distribute such kits to affected vehicle owners.

Replacement Parts Service Kits will contain, as applicable depending upon the respective COMPOSILITE EXS20 or SC20 assembly serial number provided to Hendrickson, the following items:

- Wheel-end hub cap bolts
- Wheel-end hub cap gaskets
- Wheel-end hub assemblies
- Wheel seals
- Axle spindle nut kit
- Left hand steering knuckle assembly (install if needed per following instructions)
- Right hand steering knuckle assembly (install if needed per following instructions)
- Stabilizer bolt kit
- Cotter pins
- Bolt-on brake / upper KP connection bolts
- Bolt-on brake / upper KP connection nuts
- Bolt-on brake / upper KP connection washers
- Zerks

Important Safety Notice

Proper installation, maintenance, service, and repair is 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.

All safety related information should be read carefully to help prevent personal injury and to assure that proper methods are used. Improper installation, 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 installation, 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 CAN RESULT IN SERIOUS INJURY OR DEATH.

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 that will make the servicing being performed a little easier and / or faster.

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

SAFETY PRECAUTIONS

WARNING

REPAIR AND RECONDITIONING

THE REPAIR OR RECONDITIONING OF AUXILIARY AXLE COMPONENTS THAT ARE BENT, DAMAGED OR OUT OF SPECIFICATION IS NOT ALLOWED. ANY AXLE COMPONENTS FOUND TO BE DAMAGED OR OUT OF SPECIFICATION, MUST BE REPLACED. AXLE COMPONENTS CANNOT BE BENT, WELDED, HEATED, OR REPAIRED WITHOUT REDUCING THE STRENGTH OR LIFE OF THE COMPONENT. FAILURE TO FOLLOW THESE GUIDELINES CAN CAUSE ADVERSE VEHICLE HANDLING, POSSIBLE PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE AND WILL VOID APPLICABLE WARRANTIES.

WARNING

PERSONAL PROTECTIVE EQUIPMENT

ALWAYS WEAR PROPER EYE PROTECTION AND OTHER REQUIRED PERSONAL PROTECTIVE EQUIPMENT TO HELP PREVENT PERSONAL INJURY WHEN YOU PERFORM VEHICLE MAINTENANCE, REPAIR OR SERVICE.

CAUTION

PROCEDURES AND TOOLS

A MECHANIC USING A SERVICE PROCEDURE OR TOOL, THAT 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 ASSUME ALL RISKS OF POTENTIAL PERSONAL INJURY OR DAMAGE TO EQUIPMENT INVOLVED.

WARNING

FASTENERS

DISCARD USED FASTENERS. ALWAYS USE NEW FASTENERS TO COMPLETE A REPAIR. FAILURE TO DO SO COULD RESULT IN FAILURE OF THE PART OR MATING COMPONENTS, 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 SPECIFICATIONS LISTED IN THE VEHICLE MANUFACTURER'S SERVICE MANUAL.

WARNING

MODIFYING COMPONENTS

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 APPLICABLE WARRANTIES. USE ONLY HENDRICKSON-AUTHORIZED REPLACEMENT PARTS.

THE VEHICLE MANUFACTURER SHOULD BE CONSULTED BEFORE MAKING ANY CHANGES TO THE VEHICLE'S FRAME. TYPICALLY, CUTTING OR ALTERING THE VEHICLE'S FRAME OR SIDE RAIL IS NOT PERMITTED AND MAY AFFECT THE MANUFACTURER'S WARRANTY COVERAGE.

ANY INSTALLATION DEVIATIONS MUST BE APPROVED IN WRITING BY HENDRICKSON'S PRODUCT ENGINEERING DEPARTMENT. FAILURE TO COMPLY WITH ANY OF THE ABOVE WILL VOID APPLICABLE WARRANTIES.

⚠ WARNING

DAMAGED AXLE COMPONENTS

IF A VEHICLE EQUIPPED WITH A HENDRICKSON AUXILIARY AXLE IS INVOLVED IN A CRASH, A THOROUGH INSPECTION OF THE AXLE MUST BE PERFORMED NOTING THE CONDITION OF THE AXLE BEAM, KINGPINS, AND KNUCKLE ASSEMBLIES, INCLUDING THE AREAS OF AXLE-TO-KINGPIN INTERFACE, FOR ANY DAMAGE, GAPS, KINGPIN MOVEMENT OR PLAY. IF ANY COMPONENT APPEARS DAMAGED, OR THE KINGPINS APPEAR TO CONTAIN ANY DAMAGE, GAPS, MOVEMENT OR PLAY, THE COMPLETE AXLE ASSEMBLY MUST BE REPLACED.

IN ADDITION, IN THE EVENT A CRASH RESULTS IN EXCESSIVE SIDE LOAD DAMAGE TO ADJACENT PARTS, SUCH AS A BENT WHEEL, HUB, OR SPINDLE, IT IS STRONGLY RECOMMENDED TO REPLACE SUCH ADJACENT PARTS AND THE COMPLETE AXLE ASSEMBLY.

CONTACT HENDRICKSON TECHNICAL SERVICES DEPARTMENT WITH ANY QUESTIONS. FAILURE TO REPLACE ANY DAMAGED COMPONENTS CAN CAUSE ADVERSE VEHICLE HANDLING, POSSIBLE PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE AND WILL VOID ANY APPLICABLE WARRANTIES.

⚠ WARNING

SUPPORT THE VEHICLE PRIOR TO SERVICING

PLACE THE VEHICLE ON A LEVEL FLOOR AND CHOCK THE WHEELS TO HELP PREVENT THE VEHICLE FROM MOVING. PRIOR TO SERVICING A VEHICLE IN THE RAISED POSITION, PROPERLY SUPPORT THE VEHICLE WITH SAFETY STANDS. DO NOT WORK AROUND OR UNDER A RAISED VEHICLE SUPPORTED ONLY WITH FLOOR JACKS OR OTHER LIFTING DEVICES, FAILURE TO DO SO CAN CAUSE DEATH, PERSONAL INJURY OR DAMAGE TO COMPONENTS.

⚠ WARNING

IMPROPER JACKING METHOD

IMPROPER JACKING METHOD CAN CAUSE STRUCTURAL DAMAGE AND RESULT IN ADVERSE VEHICLE HANDLING, SEVERE PERSONAL INJURY OR DEATH. DO NOT USE AXLE BEAM OUTBOARD OF AXLE SPRING SEATS. REFER TO VEHICLE MANUFACTURER FOR PROPER JACKING INSTRUCTIONS.

⚠ WARNING

SUPPORT THE LIFT AXLE PRIOR TO SERVICING

PLACE THE VEHICLE ON A LEVEL FLOOR AND CHOCK THE WHEELS TO HELP PREVENT THE VEHICLE FROM MOVING. PRIOR TO SERVICING A LIFT AXLE IN THE RAISED POSITION, (1) PROPERLY SUPPORT THE LIFT AXLE WITH SAFETY STANDS, AND (2) RELEASE ALL AIR PRESSURE IN THE LIFT AXLE AIR SPRINGS AND RIDE SPRINGS. DO NOT WORK AROUND OR UNDER A RAISED LIFT AXLE SUPPORTED ONLY WITH FLOOR JACKS OR OTHER LIFTING DEVICES, FAILURE TO DO SO CAN CAUSE DEATH, PERSONAL INJURY OR DAMAGE TO COMPONENTS.

⚠ WARNING

AIR SPRINGS

AIR SPRING ASSEMBLIES MUST BE DEFLATED PRIOR TO LOOSENING ANY ADJACENT HARDWARE. UNRESTRICTED AIR SPRING ASSEMBLIES CAN VIOLENTLY SHIFT. DO NOT INFLATE AIR SPRING ASSEMBLIES WHEN THEY ARE UNRESTRICTED. AIR SPRING ASSEMBLIES MUST BE RESTRICTED BY SUSPENSION OR OTHER ADEQUATE STRUCTURE. DO NOT INFLATE BEYOND PRESSURES RECOMMENDED BY AIR SPRING MANUFACTURER. CONTACT HENDRICKSON TECHNICAL SERVICES FOR DETAILS. IMPROPER USE OR OVER INFLATION MAY CAUSE AIR SPRING ASSEMBLIES TO BURST, CAUSING PROPERTY DAMAGE AND / OR SEVERE PERSONAL INJURY.

EXHAUST ALL PRESSURE IN LIFT AXLE AIR SPRINGS AND VEHICLE AIR SYSTEM BEFORE WORKING ON OR AROUND LIFT AXLE. FAILURE TO DO SO CAN CAUSE SEVERE PERSONAL INJURY OR DEATH.

PRIOR TO AND DURING DEFLATION AND INFLATION OF THE AIR SUSPENSION SYSTEM, ENSURE THAT ALL PERSONNEL AND EQUIPMENT ARE CLEAR FROM UNDER THE VEHICLE AND AROUND THE SERVICE AREA, FAILURE TO DO SO CAN CAUSE SEVERE PERSONAL INJURY, DEATH, OR PROPERTY DAMAGE.

⚠ CAUTION

INFLATE THE SUSPENSION SLOWLY AND MAKE SURE THE RUBBER BLADDER OF THE AIR SPRING INFLATES UNIFORMLY AND IS NOT BINDING. FAILURE TO DO SO CAN CAUSE DAMAGE TO THE AIR SPRING AND / OR MOUNTING BRACKETS AND WILL VOID APPLICABLE WARRANTIES.

⚠ 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 SOLVENTS THAT CONTAIN GASOLINE. GASOLINE 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 APPLICABLE WARRANTIES.

⚠ WARNING

LIFT AXLE CAMBER

UNAUTHORIZED WELDING OR MODIFICATIONS CAN CAUSE CRACKS OR OTHER LIFT AXLE STRUCTURAL DAMAGE AND RESULT IN ADVERSE VEHICLE HANDLING, SEVERE PERSONAL INJURY OR DEATH. DO NOT BEND, WELD OR MODIFY AXLE WITHOUT AUTHORIZATION FROM HENDRICKSON. AXLE CAMBER IS NOT ADJUSTABLE. DO NOT CHANGE THE AXLE CAMBER ANGLE OR BEND THE AXLE BEAM. BENDING THE AXLE BEAM TO CHANGE THE CAMBER ANGLE CAN DAMAGE THE AXLE AND REDUCE AXLE STRENGTH, CAN CAUSE ADVERSE VEHICLE HANDLING, POSSIBLY CAUSING PERSONAL INJURY OR PROPERTY DAMAGE AND WILL VOID APPLICABLE WARRANTIES.

⚠ 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.

Special Tools

- 15/16" COMBINATION WRENCH
- 15/16" COMBINATION WRENCH
- 15/16" X 1/2" DRIVE DEEP WELL SOCKET
- 1 1/8" COMBINATION WRENCH
- 1 1/8" X 1/2" DRIVE SOCKET
- 1/2" DRIVE IMPACT GUN
- 1/2" DRIVE RATCHET
- TWO 0.010" FEELER GAUGES
- SMALL BOTTLE JACK
- MAGNETIC-BASE DIAL INDICATOR
- WRENCH FOR HUBCAP PLUG
- DIGITAL PROTRACTOR OR EQUIVALENT
- TORQUE VALVES:
- STANDARD TIE ROD, 7/8" NUT, 125-175 FT. LBS.
  - BRAKE BOLTS, 160-180 FT. LBS.
  - STABILIZER BOLTS, 75-120 FT. LBS.
  - HUBCAP BOLTS, 12-16 FT. LBS.

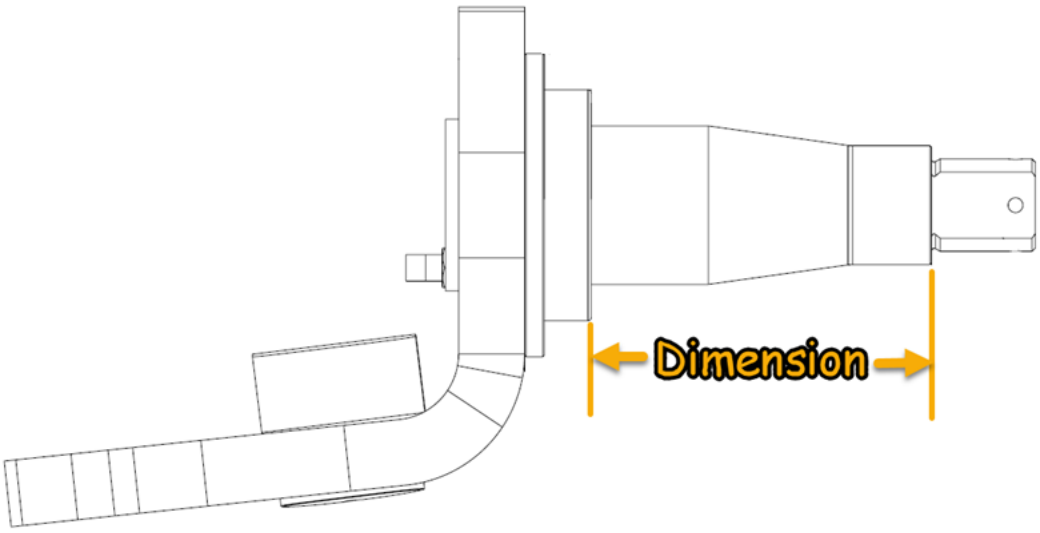
Disassembly

1. Chock the truck so it cannot roll.
2. With the lift axle suspension raised, remove the lug nuts from the wheels, then remove the wheels.
3. Lower the lift axle suspension onto jack stands.
4. Remove the brake drums.
5. Remove the hubcaps and drain the existing oil.
6. Remove the locking device on each axle spindle nut.
7. Loosen the spindle nut to remove the hub assembly from each axle spindle.

Inspection (IMPORTANT!)

At this point, inspect each axle spindle to measure the distance between the bearing journal and the turned step at the threads. See Figure 1.

Figure 1



If the measured dimension is **greater than or equal to 6.450"**, the bearing journal is fully seated, and the respective steering knuckle assembly is to stay on the lift axle assembly. The following steps will need to be completed:

Reassembly

1. Install **NEW** wheel-end hub assemblies provided by Hendrickson.
2. Complete manual torque process, per Recommended Practice No. RP 618. from the Technology & Maintenance Council ("TMC")
3. Measure **and record** endplay, per TMC RP 618.
4. Install the NEW hubcaps and / or gaskets provided by Hendrickson.
5. Fill with oil per label on hubcap.

If the measured dimension is **less than 6.450"**, the bearing journal is NOT fully seated and the respective steering knuckle assembly must be replaced by performing the following steps:

Additional Disassembly

1. Remove the brake assembly.
2. Remove the stabilizer hardware off the steering knuckle arm.

⚠ WARNING THE STABILIZER IS EQUIPPED WITH A COIL SPRING THAT CONTAINS STORED ENERGY ONCE INSTALLED ON THE AXLE. PRIOR TO AND DURING STABILIZER REMOVAL AND INSTALLATION, THE STABILIZER MUST BE PROPERLY COMPRESSED AND RESTRAINED. FAILURE TO DO SO MAY ALLOW THE STABLIZER TO RELEASE THE STORED ENERGY, RESULTING IN POSSIBLE DAMAGE TO COMPONENTS AND/OR PERSONAL INJURY.

3. Remove the tie rod by removing the cotter pin and loosening the nut. See Figure 2.

Figure 2

4. Insert a block of wood or bottle jack under the steering knuckle to ensure it is stable.
5. Remove the zerk fittings so it is easier to remove the upper connection from the steering knuckle backbone.
6. Remove the out-of-specification steering knuckle backbone and the axle spindle. Re-use the thrust bearings and shims.

Reassembly

1. Install the upper kingpin onto the kingpin.
2. Pre-grease the kingpin bushing on each **NEW** steering knuckle assembly provided by Hendrickson.
3. Install each **NEW** steering knuckle assembly.
4. Bolt the upper kingpin to each steering knuckle along with the bolt-on brake.
5. Measure **and record** vertical endplay on each steering knuckle assembly.
6. Re-install grease fittings into the upper and lower kingpin housings.
7. Grease the upper and lower kingpin bushings until grease purges.
8. Install the tie rod to the **NEW** steering knucle assembly backbone arms with the new hardware.
9. Install the **NEW** wheel-end hub assemblies provided by Hendrickson, per TMC RP 618.
10. Complete manual torque process, per TMC RP 618.
11. Measure **and record** endplay on each wheel-end hub assembly, per TMC RP 618.
12. Install the **NEW** hubcaps and gaskets provided by Hendrickson.
13. Fill with oil per label on hubcap.

For any questions regarding the above instructions,, please contact Brett Spring at Hendrickson (email: brettspring@hendrickson-intl.com; phone 740-929-5615).

Upon Completion

Upon completion of the above instructions, email to Jaymie Rector at Hendrickson (email: jrector@hendrickson-intl.com; phone: 740-929-5603) the following information:

1. Endplay measurements for both wheel-end hub assemblies on each respective COMPOSILITE assembly.
2. Vertical endplay measurements for both steering knuckle assemblies on each respective COMPOSILITE assembly.
3. Please note if each respective COMPOSILITE assembly was equipped with tires / wheels (Y/N).
4. The complete Vehicle Identification Number (VIN) of the vehicle equipped with each respective COMPOSILITE assembly.
5. Both the part number and serial number of each respective COMPOSILITE assembly.

In addition, all component parts replaced per the above instructions must be returned to Hendrickson Auxiliary Axle Systems, 277 North High Street Hebron, OH 43025. Wheel-end hub assemblies need to be placed in sealed bags prior to return. Hendrickson will assist in arranging for the shipment of all such replaced component parts to Hendrickson free of charge.

NOTE: If the axle spindles DO NOT need to be replaced, Hendrickson will cover 1.5 hours of labor per side for any work not conducted by an authorized Hendrickson representative. If the axle spindles DO need to be replaced, Hendrickson will cover 3 hours of labor per side for any work not conducted by an authorized Hendrickson representative.

Related YouTube Videos:

COMPOSILITE SC Fabricated Knuckle Disassembly - YouTube

COMPOSILITE SC Fabricated Knuckle Assembly - YouTube

COMPOSILITE SC Bolt-On Brake Replacement - YouTube

Actual product performance may vary depending upon vehicle configuration, operation, service and other factors.
All applications must comply with applicable Hendrickson specifications and must be approved by the respective vehicle manufacturer with the vehicle in its original, as-built configuration.
Contact Hendrickson for additional details regarding specifications, applications, capacities, and operation, service and maintenance instructions.

*Call Hendrickson at **800.660.2829** or **800.668.5360** in Canada for additional information.*

HENDRICKSON

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