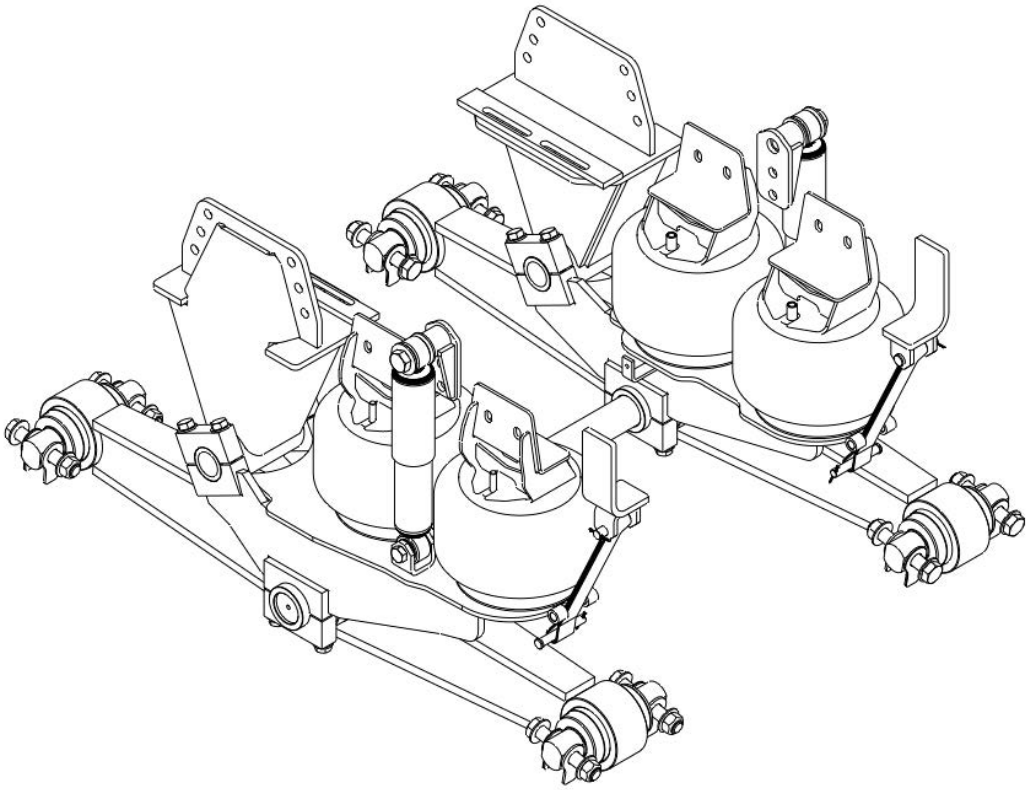
OWNER'S GUIDE

52K AIR LINK®
TANDEM DRIVE SUSPENSION

Chassis Suspensions



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52K AIR LINK Susp.
7/5/2023

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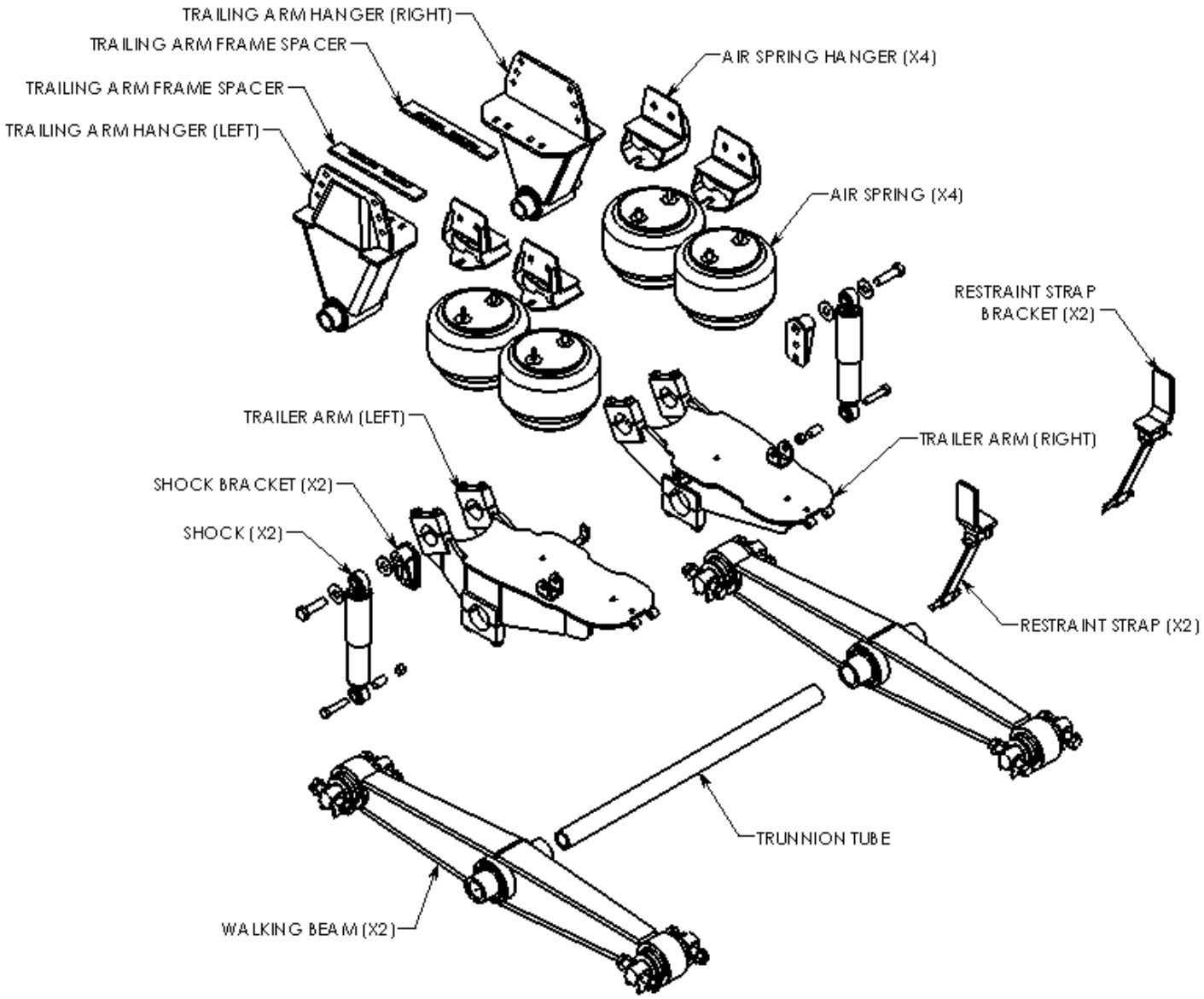
SECTION 1: EXPLODED VIEW



SECTION 2: INTRODUCTION

Description

The Air Link™ AL-520 suspension is a walking beam design with 4 air springs and two links. The suspension has two walking beams supported by two trailing arms with two air springs per arm to create the force required to achieve the desired suspension capacity.

The Air Link™ air suspension system combines the best attributes of air suspension technology and walking beam suspension precision for a smooth, stable and dependable ride. The excellent ride quality reduces the potential for impact damage to the truck and cargo, minimizing costly downtime and cargo damage. The Air Link™ robust construction is able to handle a nominal suspension capacity of 52,000lbs (ground load) in its stipulated operating environment. Utilizing greaseless polyurethane bushings at all suspension pivot points, the Air Link™ is virtually maintenance free. Because impact loads are directed through the air springs, bushing replacement is decreased dramatically.

Components

- Trailing arm hangers
- Trailing arms
- Walking beams
- Air spring hangers
- Air springs
- Air system (interface with chassis)
- Shock absorbers
- Restraint straps
- Dual height control valves and linkages
- Trunnion tube

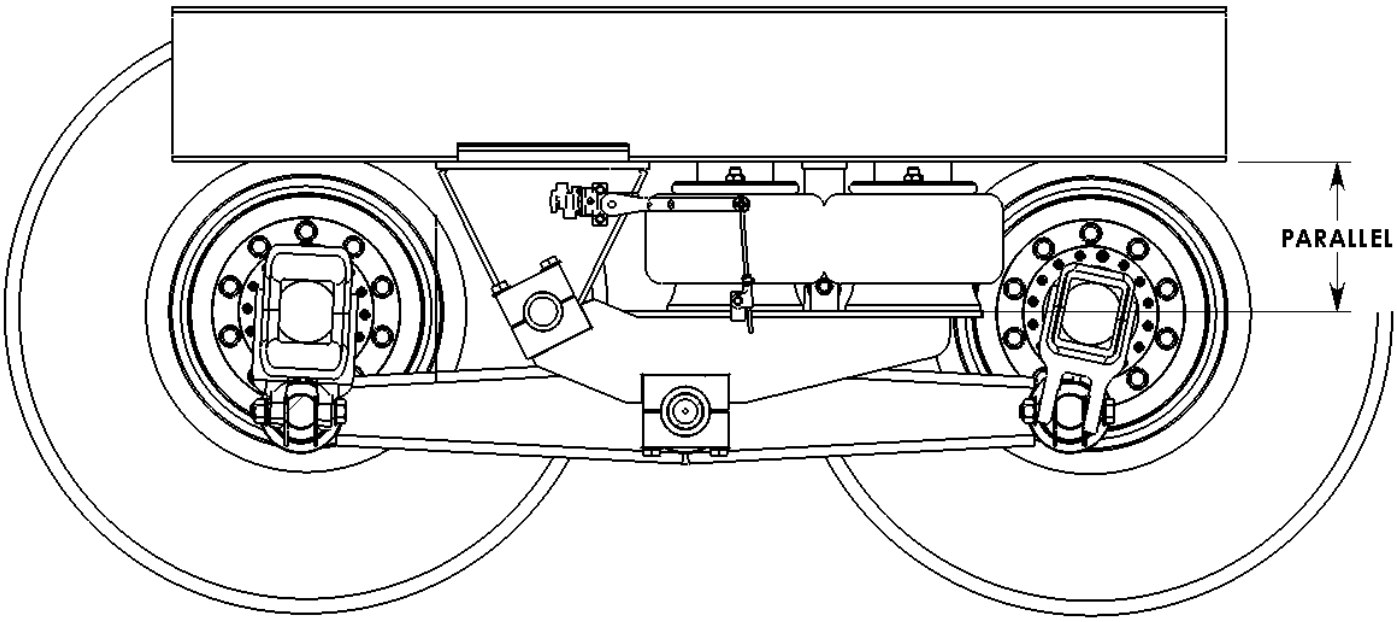
Features

- 52,000lbs [23,587 kg] capacity
- 52” [1321mm], 54” [1372mm], 60” [1524mm] nominal tandem axle spread
- 12” [304.8mm] expected cross articulation (axle end to axle end)
- 8” [203.2mm] of vertical axle travel (total articulation)
- Equal weight distribution between axles
- Low suspension maintenance with polyurethane bushings
- Minimized impact damage to truck and cargo
- Suspension remains operable in the event of air pressure loss
- Heavy duty shock absorbers tuned for optimized ride characteristics

SECTION 3: SUSPENSION RIDE HEIGHT AND SETUP

Suspension Ride Height

Suspension ride height is the distance from the bottom of the frame rail to the centerline of the axle. The suspension is at correct ride height when the trailing arm is parallel with the bottom flange of the chassis frame rails.



The suspension is designed to operate at a specific ride height, which must be maintained during the life of the suspension. Otherwise, incorrect loading can occur which can affect suspension performance, shorten component life and void the warranty of the suspension.

Operating the vehicle at a ride height that is lower or higher than designed can reduce vehicle stability, affect the alignment of the axles and therefore the tracking of the drive axles of the truck which can result in decreased tire life.

Link has prepared a specific work instruction for setting the ride height of the Air Link™ suspension system. Please refer to document "*LWI 053 rev.2 - REAR SUSPENSION RIDE HEIGHT ADJUSTMENT.pdf*"

SECTION 4: INSPECTION AND MAINTENANCE

Intervals

Inspect the suspension, suspension attachment points, air system, and shocks at regular intervals during normal operation and each time the truck is serviced.

Caution: These recommended inspection and maintenance intervals are intended to add to and not replace the chassis manufacturer's recommended service schedules.

Level A - Daily Inspection (as part of typical vehicle walk around)

1. Visually inspect from the outside of vehicle all components of suspension for damage.
2. Visually check for signs of loose or unexpected movement of components.
3. Visually check that the ride height is even from side to side of vehicle.
   Trailing arm is parallel with bottom of frame rail.
   See *Section 3: Suspension Ride Height and Set-up*
4. Listen for air leaks with suspension air system charged.

Level B - Initial Inservice Inspection (between 500-1000 miles)

1. Inspect HCV for signs of damage.
2. Inspect the trailing arm hanger bushing for wear or damage.
   See APPENDIX C
3. Inspect the walking beam bushings for damage or wear.
   See APPENDIX C
4. Inspect the walking beam to axle connection for missing or loose hardware.
5. Inspect shocks.
   See APPENDIX D
6. Inspect air springs for excessive wear or damage to the air bag.
   See APPENDIX B
7. Inspect restraint straps.
   See APPENDIX E

Level C - Yearly Inspection

1. Perform all **Level B** inspection.
2. Check the tightness of all hardware, as necessary, re-torque to the proper specification.
   See APPENDIX A for torque specifications.
3. Inspect the control rods for damage or wear.
   See APPENDIX F
4. Inspect the air system for damage or wear to hoses.
5. Check for air leaks using soapy water between air fittings and hoses.
6. Alignment – if alignment is necessary refer to document
   "*LWI 053 rev.2 - REAR SUSPENSION RIDE HEIGHT ADJUSTMENT.pdf*"

Alignment

Alignment for the AirLink is done at the walking beam end bushings. Please refer to LINK's specific work instruction: ***"****LWI 050 rev.1 - BAR PIN ALIGNMENT.pdf****"*** for this process.

The following symptoms may indicate that an alignment may be needed.
Check the following:

- Uneven or rapid tire wear.
- "Dog tracking" / "Crab walking" of the chassis.
- Squealing tires.

Inspection

Height Control Valves

Visually review the height control valve linkage to ensure that it is properly set up and operating correctly.
Check the following:

- The linkage connections and air fittings for tightness.
- For air leaks using soapy water.
- The valve body for cracks and other damage.
- That the height control valve is securely fastened to the bracket off the trailing arm hangers or frame rails.

Shock Absorbers

The following symptoms may indicate that the shock absorbers need to be repaired or replaced:

- Leaking—When the outside of the shock appears wet and oily or where fluid is found dripping off the shock. However some sweating is acceptable and new shocks are shipped oiled to protect from corrosion.
- Excess vibration—If the suspension transmit excessive vibration to the body then it is indicating the shock is no longer damping correctly.
- Poor ride quality—Excessive bounce when you hit a bump. Feeling of swaying or rolling when making a turn. Excessive squat of the rear of the vehicle during acceleration.

Physical damage to the shock may require replacement:

- Damaged upper or lower bushing
- Incorrect installation
- Damaged dust tube
- Bent or dented shock absorber body

Refer to Appendix D for assessment of condition.

Restraint Straps

Inspect the restraint straps for signs of damage. A visual inspection is sufficient.

Refer to Appendix E for assessment of condition.

Air Springs

Inspect the air springs for signs of damage. A visual inspection is sufficient.

Refer to Appendix B for assessment of condition.

Control Rods

Inspect the two longitudinal and two transverse control rods. Control rods may have been supplied with the suspension or may be outside of the suspension supply, however they directly impact the performance of the suspension. Follow all guidelines for inspection as provided by the supplier or Chassis manufacturer and replace or repair accordingly.

- Torque rod is damaged from original longitudinal profile.
- Excessive offset movement of bushing from the centerline of the outer housing.
- Center pins are worn or misaligned
- Cracked bushings
- Expanded mounting pin hole
- If you can move the end of the torque rod easily with your hand, its most likely time to replace it

Refer to Appendix F for assessment of condition.

Bushings and Pivots

Inspect the bushings for signs of wear. The following is a list of bushings in the suspension that should be specifically inspected for significant signs of wear. It is common for all polyurethane bushings to have some ragged edges over time and does not impact on the performance of the bushing. Significant wear must be addressed.

1	Trailing arm hanger bushing (P/N: 206-00-070)	2X
2	Walking beam centre bushing (P/N: 206-00-066)	2X
3	Walking beam bar pin end bushing (P/N: 206-00-045)	4X

Refer to Appendix C for assessment of condition.

Inspect the structure of the suspension

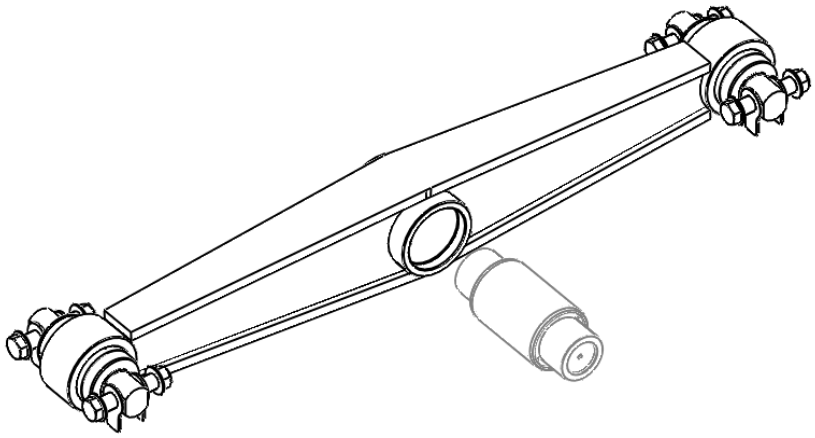
Visually review the performance and quality of the fabricated components of the suspension:

- Shock absorber brackets – upper and lower: for crack initiation or wear of the connection points.
- Trailing arm hangers: for any signs of crack initiation and missing hardware.
- Trailing arms: for any signs of crack initiation and any missing hardware.
- Retaining blocks and fasteners: to ensure they are all present and undamaged and verify expected torque values are maintained.
- Walking beams: for signs of crack initiation and wear on the cylinders.
- Air spring hangers: for signs of crack initiation and missing hardware.

SECTION 5: BUSHING REPLACEMENT

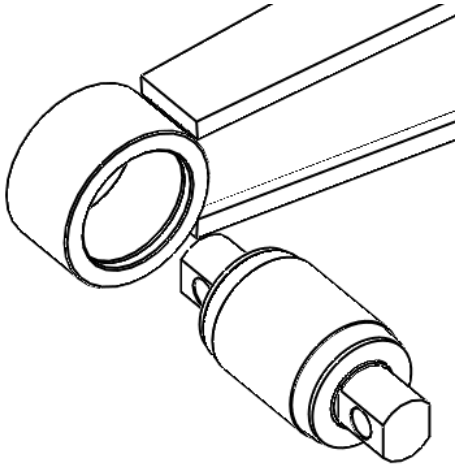
Walking Beam Center Bushing (P/N: 206-00-066)

Please refer to LINK's specific work instruction: ***"****LWI 131 rev.0 - Bushing Installation—Walking Beam—bar pin bushings.pdf****"*** for this process.



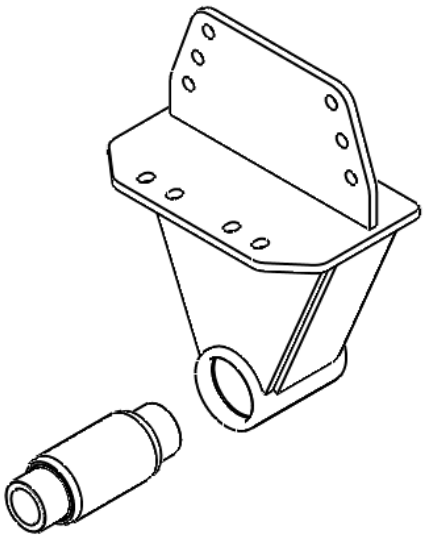
Walking Beam Bar Pin End Bushing (P/N: 206-00-045)

Please refer to LINK's specific work instruction: ***"****LWI 131 rev.0 - Bushing Installation—Walking Beam—bar pin bushings.pdf****"*** for this process.



Trailing Arm Hanger Bushing (P/N: 206-00-070)

Please refer to LINK's specific work instruction: ***"****LWI 009 rev.6 - Bushing Installation—Hanger.pdf****"*** for this process.



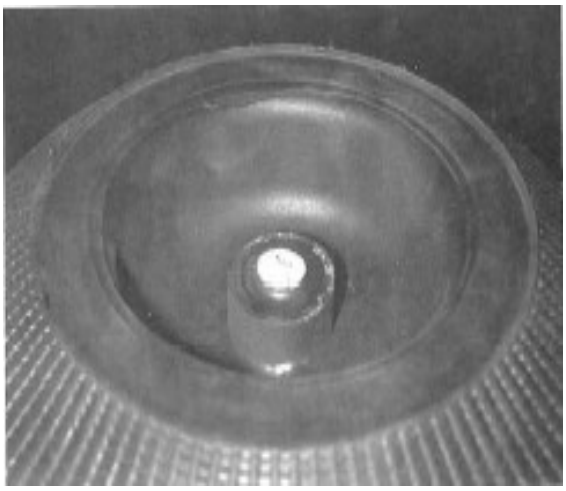
APPENDIX A: TORQUE SPECIFICATIONS

Location Description	Size	Torque, lb.-ft. [Nm] Dry
Trailing arm blocks [Note 1]	Ø3/4" UNF Hex head bolt	250 [339]
Walking beam par pin bushing	Ø1" UNC Bolt	450 [610]
Shock upper bolt to shock bracket [Note 3]	Ø1" UNC Hex head bolt	200-250 [271-389]
Shock upper bolt thru frame [Note 3]	Ø1" UNC Hex head bolt and nut	250 [389]
Shock lower mount	Ø3/4" UNC Hex head bolt	180-200 [244-271]
Air spring lower bolts	Ø1/2" UNC Hex head bolt	25-30 [34-41]
Air spring top stud mount nut	Ø1/2" UNC Nut	25-30 [34-41]
Air spring top combo stud jam nut	Ø3/4" UNF Jam nut	25-30 [34-41]
HCV mounting bolts	Ø1/4" UNC Hex head bolt	80-100 [9-11]
HCV arm to linkage rod [Note 2]	Ø1/4" UNC Hex head bolt and nut	5-10 [1-2]
Linkage rod boot to L-bracket [Note 2]	Ø1/4" UNC Hex head bolt and nut	5-10 [1-2]
HCV arm mounting pin nut [Note 2]	Ø1/4" UNC Stud and hex nut option	60-72 [7-8]
HCV L-bracket mounting pin nut [Note 2]	Ø1/4" UNC Stud and hex nut option	60-72 [7-8]

Notes:

1. Trailing arm block bolt must use a thread locking compound (Loctite 243) during installation.
2. The HCV's supplied by LINK may be bolted or have a pin connection. For the bolted connection, it is imperative that the connection remain loose to allow the HCV linkage grommet to rotate on the bolt. The pin connection needs to be secured to the HCV arms and L-bracket. Then the linkage will press on into place.
3. Upper shock mount bolt may mount through the frame or into a shock mount bracket. If mounted into bracket use thread locking compound (Loctite 243).

APPENDIX B: AIR SPRING ASSESSMENT



Failure: **Over torqueing mounting bolts**

Assessment:

Fittings can break or the threads can be damaged by over -torque. (Note: grease or lubrication on the threads can affect the torque and may cause damage)

Resolution:

Follow recommended torque specification during installation. Do not use an air wrench for installation.

Failure: **Over extension**

Assessment:

The air spring is operated outside the maximum range as a result of unrestrained trailing arm travel (defective or improperly adjusted trailing arm restraint or height leveling system). The abuse may result in the separation of the bellows from the upper or lower mounting parts.

Resolution:

Check and/or adjust the height leveling system. Inspect the trailing arm restraint (shock) for damage to shock itself or mounting locations to prevent the air spring from exceeding its maximum extension range.

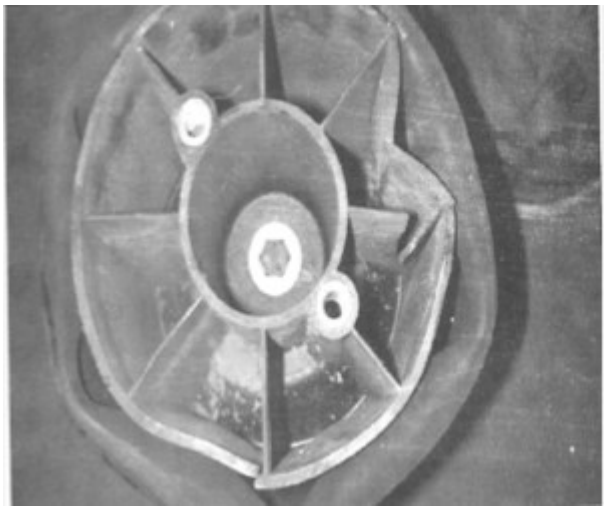
Failure: **Abrasion**

Assessment:

Bellows in contact with other components of the vehicle or foreign objects (e.g. rocks, dirt, etc.) that accumulate at the piston/roller portion of the bellows. They may rub through the bellows during operation.

Resolution:

Avoid contact between bellows and any other part the vehicle. Check air springs periodically and remove foreign objects from the rolling portion of the bellows. (Warning: Do not use solvents for washing)



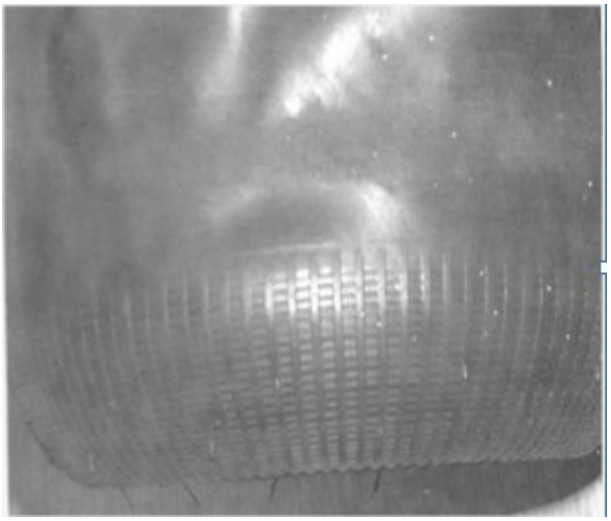
Failure: **Overload**

Assessment:

When overloading the vehicle, the height leveling valve will open to adjust the vehicle height by increasing the pressure inside the air spring up to the maximum air system pressure. Deformation or damage to the bellows, piston and/or bead plate may occur if suspension capacity is exceeded.

Resolution:

Avoid overloading the vehicle.



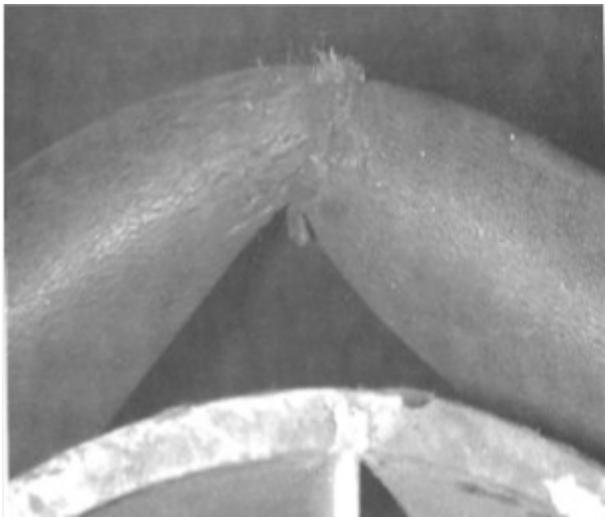
Failure: **Contamination**

Assessment:

Air spring bellows are not resistant to solvents, hydraulic oils or lubricants. Permanent exposure to chemicals will cause premature failure of the air spring system.

Resolution:

Check air spring system periodically. Avoid too much oil in the air supply lines. Remove lubricants from the bellows. Do not use mineral based cleaners. Do not use any solvents.



Failure: **Low Pressure**

Assessment:

Operating the air spring system without internal air pressure prevents the bellows from rolling uniformly over the piston/girdle hoop, it may cause it to fold. Permanent operation without internal air pressure will significantly increase wear or the bellows.

Resolution:

Avoid operating the air spring system without internal air pressure for an extended period of time. Allow the suspension to "air-up" prior to operation. Check the air supply lines periodically for leaks. Examine the bellows for the development of folds.

APPENDIX C: BUSHING ASSESSMENT

Failure: **Bushing Delamination**

Assessment:

All bushings are double bonded for better performance. If the bushing delaminates from the inner or outer sleeve to where a gap/void is created, it will affect performance.

Resolution:

Replace bushing.

Failure: **Bushing Shifting**

Assessment:

The polyurethane bushings will resist side loading however in the event of excessive side loading the walking beam can shift on the outer sleeve on the bushing. Applies to walking beam end bushings, center bushings and trailing arm hanger bushings.

Resolution:

Depending on the severity. Minor shifting (<1/4" [6.35mm]) is to be monitored in case it becomes worse. Anything more and the torque rods/ alignment must be checked and the bushing replaced.

Failure: **Minor Abrasion and cutting of the polyurethane**

Assessment:

The polyurethane will have a tendency to receive minor abrasions and cuts during normal use. Cross articulation of the axle will tend to cut the outer sleeve groove into the poly. Applies to walking beam end bushings.

Resolution:

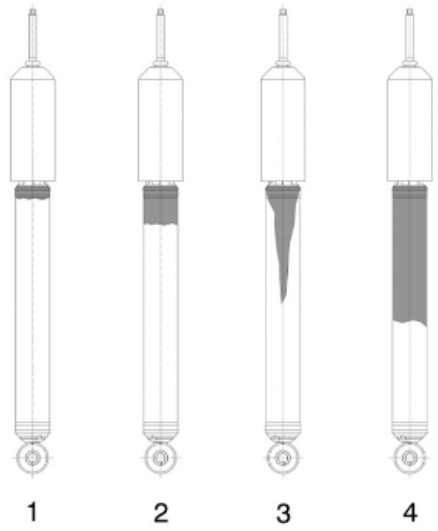
Continue to monitor. Cuts and abrasions are completely normal and expected for this application.

APPENDIX D: SHOCK ASSESSMENT

Assessment	Resolution
Bent or Damaged piston rod	Requires replacement
Broken, damaged or missing mounting hardware	Requires replacement hardware
Binding or seized	Requires replacement
Dents in shock housing or body	Further inspection required. Only in units where dents restrict movement is replacement required.
Severely corroded shock housing	Requires replacement
Missing shock or strut	Requires replacement
Punctured shock housing or body	Requires replacement
Leaking oil, enough for fluid to be running down body	Requires replacement [1]

Notes:

[1] Shocks are supplied with a small quantity of oil on the rods for shipping purposes. This may give the appearance of a shock leak. If the shocks are relatively new, wipe away oil and monitor. If the oil reappears, replacement may be warranted.



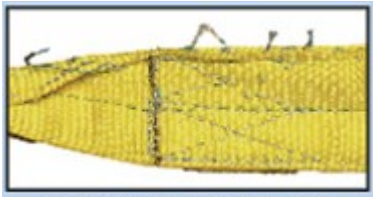
Oil found on units 1 and 2 reflect weepage and do not require replacement.
Units 3 and 4 reflect leakage and require replacement.

APPENDIX E: RESTRAINT STRAP ASSESSMENT

If any damage is visible as shown below, replace the restraint strap.

EDGE CUT

ABRASIONS



BROKEN OR WORN STITCHES

SNAG

DAMAGED EYE

TENSILE BREAK

PUNCTURE

CUT

APPENDIX F: CONTROL ROD ASSESSMENT

If any damage is visible as shown below, replace the control rod.

Bushing material is cracked or torn

Bushing “Walkout”

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