

H TECHNICAL PROCEDURE

HENDRICKSON CHASSIS AXLE™ (HCA™) and HENDRICKSON TRAILER AXLE™ (HTA™)

SUBJECT: S-cam and Air Chamber Bracket
Repair Procedure

LIT NO: L1009

DATE: August 2008

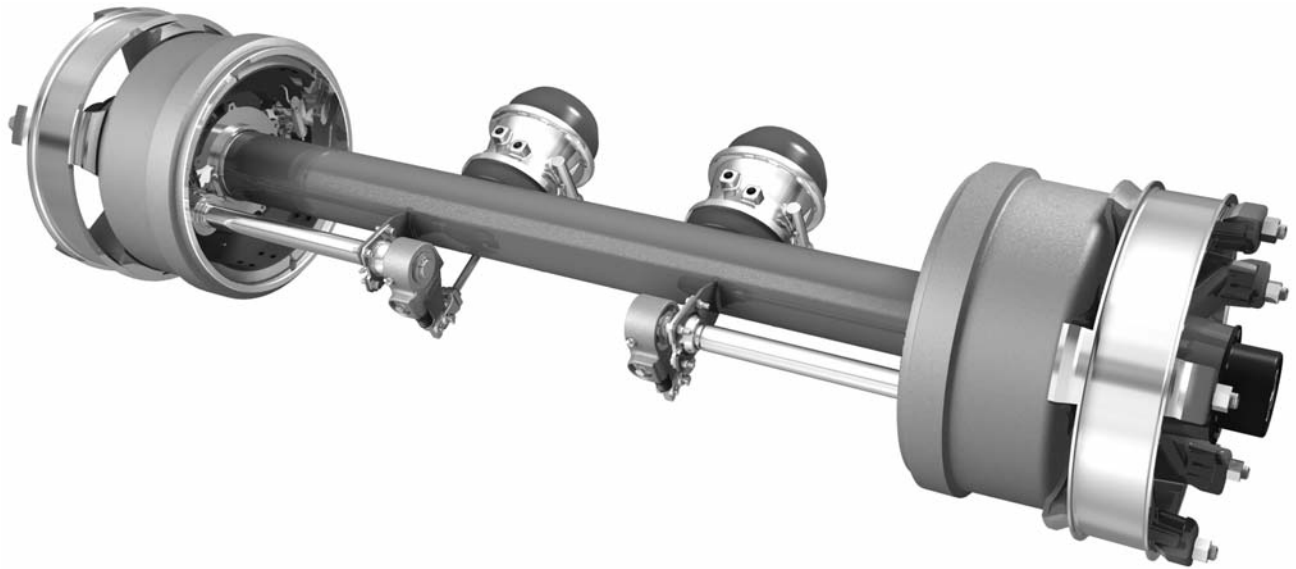


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SERVICE NOTES

This publication provides S-cam and air chamber bracket repair instructions and information for Hendrickson chassis axles. Before you begin:

- Read and understand all instructions and procedures before servicing any component.
- Read and observe all Caution and Warning statements to help avoid personal injury or property damage.
- Follow your company's maintenance, service, installation and diagnostic practices.

Hendrickson reserves the right to make changes and improvements to its products and publications at any time. Consult the Hendrickson website (www.hendrickson-intl.com) for the latest version of this manual.

IMPORTANT SAFETY NOTICE

Proper maintenance, service and repair is important to the reliable operation of the chassis axle. The procedures recommended by Hendrickson and described in this publication are methods of performing such maintenance, service and repair.

The warnings and cautions should be read carefully to help prevent personal injury and to assure that proper methods are used. Improper maintenance, service or repair can cause damage to the vehicle and other property, personal injury, an unsafe operating condition or void the manufacturer's warranty.

Carefully read, understand and follow all safety related information within this publication.

EXPLANATION OF SIGNAL WORDS

Hazard signal words (such as Danger, Warning or Caution) appear in various locations throughout this publication. Information accented by one of these signal words must be observed at all times.

Additional notes 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 immediate hazards which will result in severe personal injury or death.

WARNING Indicates hazards or unsafe practices which could result in severe personal injury or death.

CAUTION Indicates hazards or unsafe practices which could result in damage to machine or minor personal injury.

IMPORTANT An operating procedure, practice or condition that is essential to emphasize.

⚠ WARNING: Do not modify or rework parts. Do not use substitute parts of the axle components. Use of a modified part or replacement part not authorized by Hendrickson may not meet Hendrickson's specifications and can result in failure of the part, loss of vehicle control and possible personal injury or property damage. Use only Hendrickson authorized replacement parts. Do not modify parts without authorization from Hendrickson.

⚠ CAUTION: A mechanic 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 provided instructions assume all risks of consequential personal injury or damage to equipment.

⚠ WARNING: Always wear proper eye protection and other required personal protective equipment when performing vehicle maintenance, repair or service.



⚠ WARNING: Solvent cleaners can be flammable, poisonous and can cause burns. To help avoid serious personal injury, carefully follow the manufacturer's product instructions and guidelines and the following procedures:

- Wear proper eye protection
- Wear clothing that protects your skin
- Work in a well ventilated area
- Do not use gasoline, or solvents that contain gasoline. Gasoline can explode.
- 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.

⚠ WARNING: A serious or fatal injury can occur if you...

- Lack proper training
- Fail to follow proper procedures
- Do not use proper tools and safety equipment
- Assemble axle components improperly
- Use incompatible axle components
- Use axles or axle components in a non-approved application

⚠ WARNING: This manual contains detailed safety instructions. Read, understand and follow this manual.

- Get proper training
- Learn and follow safe operating procedures
- Use proper tools and safety equipment
- Use proper components that are in good condition

⚠ WARNING: If these procedures and specifications are not followed, damage to the axle could result. The resulting axle damage could cause an accident, property damage and / or serious injury.

AXLE WELDING PARAMETERS

⚠ CAUTION: Prevent bearing damage. When grounding welding equipment to the axle, prevent current from passing through the wheel bearings.

A connection that places a wheel bearing between the ground cable connection and the weld area can damage the bearing by electric arcing.

NOTE: A welder qualified in 2G position per ANSI / AWS D1.1-94 Section 5 Part C "Welder Qualification" must perform the welding.

1. Axle components and their mating parts must be at a minimum temperature of 60 degrees F (15.5 degrees C) and free from moisture, dirt, scale, paint and grease. Hendrickson recommends preheating the axle / bracket connections to a minimum of 300 degrees F (149 degrees C) before welding.
2. All welds must be performed in a flat or horizontal position.

SMAW WELDING

• Standard Electrode: AWS E7018 (Oven dried per manufacturer's specification)

0.125 diameter
120-140 Amps DC
Electrode positive

0.156 diameter
120-160 Amps DC
Electrode positive

GMAW WELDING

Spray transfer is the preferred transfer mode

• Standard Wire: AWS ER-70S-6
0.045 diameter

• Optional Wire: AWS ER-70S-3
0.045 diameter

• Volts: 26-30 DCRP

• Current: 275-325 AMPS

• Wire Feed Speed: 380-420 IPM



- Electrode Extension: 1/2- to 5/8-inch (12 to 16mm)
- Shielding Gas: 86 percent Ar 14 percent CO₂ at 30 to 45 CFH

NOTE: Any deviation from these welding parameters must be approved by Hendrickson Trailer Suspension Systems in writing.

S-CAM BRACKET REPAIR

1. If possible, remove axle from trailer.
2. Remove damaged S-cam bracket.

Grind away any remaining weld or S-cam bracket material from the axle tube (figure 1).

If bracket had been rewelded, use a cutting torch (oxy-fuel, plasma) to remove the majority of the bracket. Cut approximately 1/4 inch above the weld and grind remaining material from axle tube.



Figure 1. Previous bracket weld ground flush to axle tube surface

3. Slide a new S-cam bracket assembly onto the camshaft and place the bracket assembly on the axle tube. Position the S-cam bracket assembly on the axle tube so the camshaft is parallel to the axle tube and aligned with the other camshaft on the opposite end of the axle tube. Visual placement is acceptable, but the goal is to minimize misalignment. Laterally position the S-cam bracket assembly on the axle tube so the inside surface of the S-cam bracket assembly is 3 1/2 inches (90mm) from the end of the camshaft (figure 2).



Figure 2. S-cam bracket assembly must be 3.5 inches (90mm) from the end of the camshaft

4. Using a felt-tip marker, place layout lines for the final weld on the axle tube (figure 3).
5. Making sure both items to be welded are free from moisture, dirt, scale, paint and grease, tack the S-cam bracket assembly in place on the axle tube using a 1/4-inch (6mm) tack weld on each side of the S-cam bracket (figure 4). The tack welds should be offset from each other about 1/4 inch (6mm) from the center of the S-cam bracket (figure 4).
6. Remove the camshaft and spherical bushing from the S-cam bracket assembly so that a good fillet weld, attaching the S-cam bracket to the axle tube, can be completed. Using a square, check the perpendicularity of the S-cam bracket

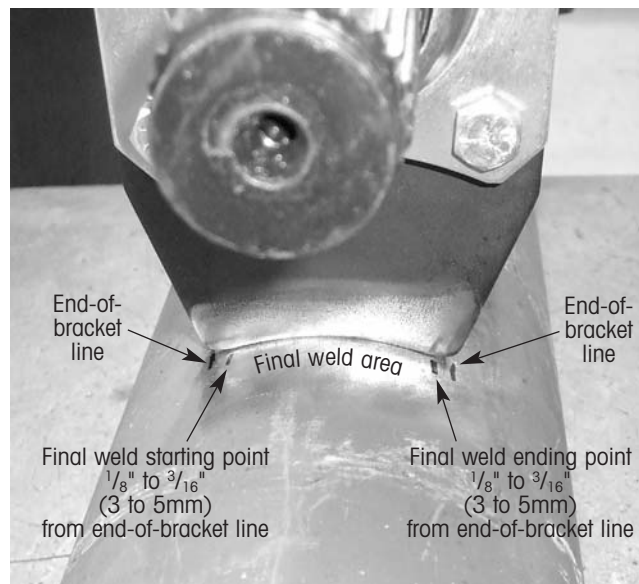


Figure 3. Weld placement layout

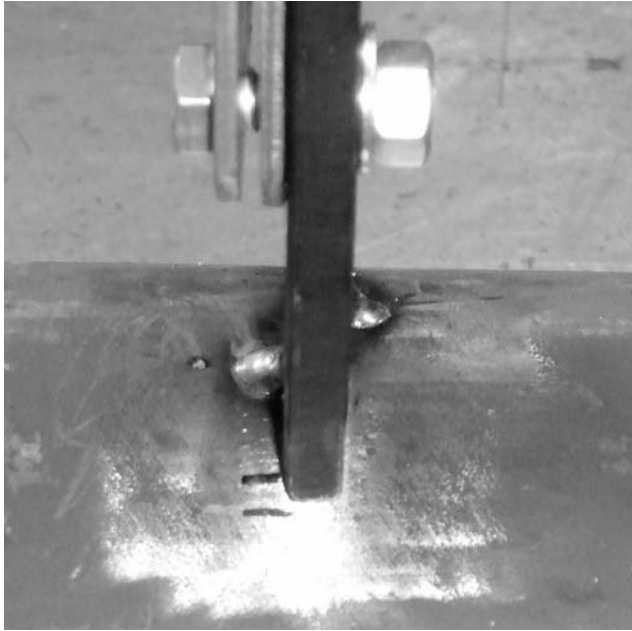


Figure 4. S-cam bracket tack weld placement

to the axle tube (figure 5). Make any adjustments prior to final weld.

NOTE: Thoroughly clean the slag from the tack welds before applying the final welds.

7. Final fillet weld size should be $\frac{1}{4}$ to $\frac{3}{8}$ inches (6 to 10mm) and should stop $\frac{1}{8}$ to $\frac{3}{16}$ inches (3 to 5mm) from both ends (figures 3 and 6). There should be two separate welds, one on

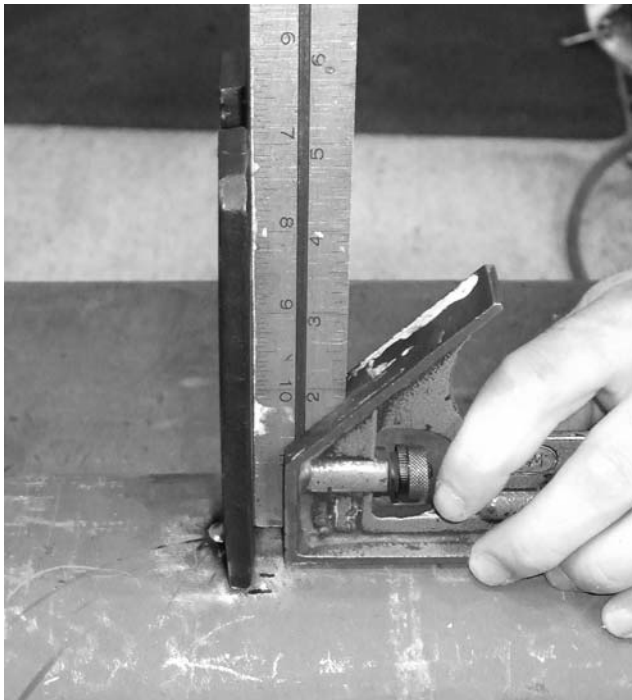


Figure 5. S-cam bracket must be perpendicular to axle tube



Figure 6. Final S-cam bracket weld

each side of the S-cam bracket, that do not extend around the ends of the bracket. Wrapping the weld around the ends of the S-cam bracket can lead to undercutting.

7. Upon completion, paint / undercoat, reinstall the camshaft and spherical bushing, and fully lubricate both spider and cam bushings.

AIR CHAMBER BRACKET REPAIR

1. If possible, remove axle from trailer.
2. Remove damaged air chamber bracket.

Grind away any remaining weld or air chamber bracket material from the axle tube.

If bracket had been rewelded, use a cutting torch (oxy-fuel, plasma) to remove the majority of the bracket. Cut approximately $\frac{1}{4}$ inch (6mm) above

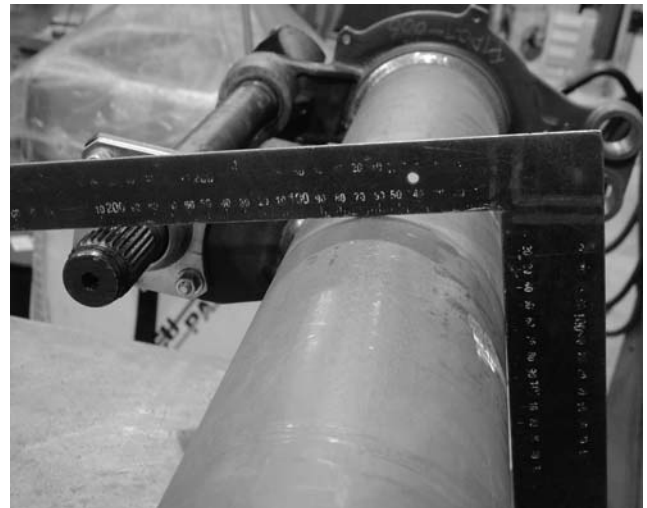


Figure 7. Framing square helps position air chamber bracket

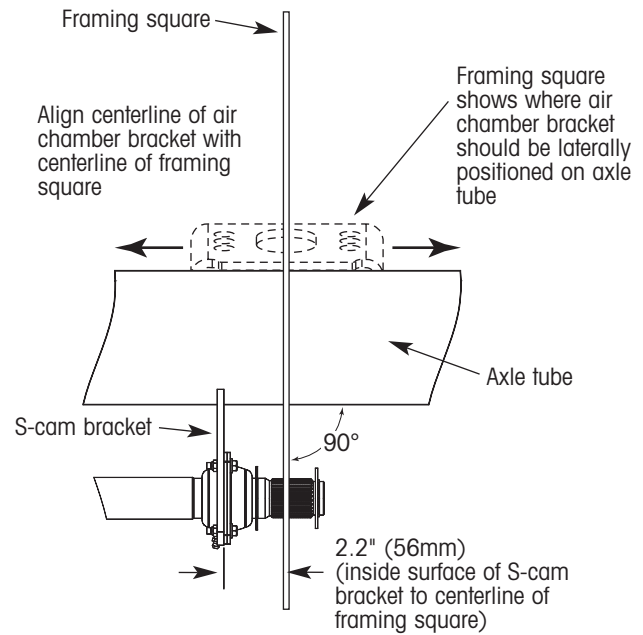
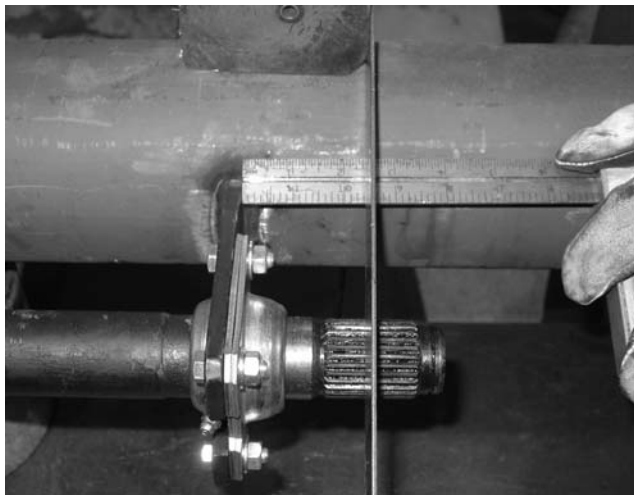


Figure 8. Using a framing square to determine air chamber bracket placement

the weld and grind remaining material from axle tube.

3. Place a framing square on the axle contacting the camshaft splines as shown in figures 7 and 8.
4. Place a new air chamber bracket on the axle tube and orient so that it contacts framing square as shown in figure 9.
5. Making sure the items to be welded are free from moisture, dirt, scale, paint and grease, tack the air chamber bracket in place using a 1/4-inch (6mm) tack weld on both sides of the air chamber bracket. Tacks should be near the center of the bracket (figure 10).

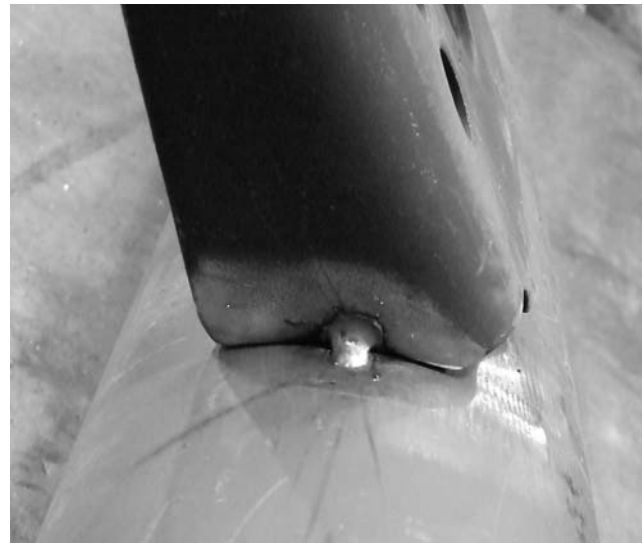


Figure 10. Air chamber bracket tack weld placement



Figure 9. Tangentially positioning air chamber bracket

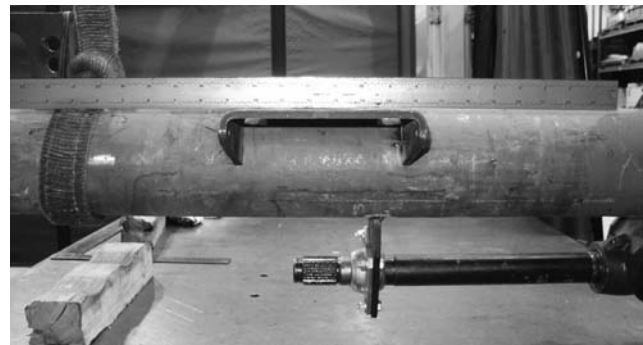


Figure 11. Air chamber bracket must be parallel to axle tube

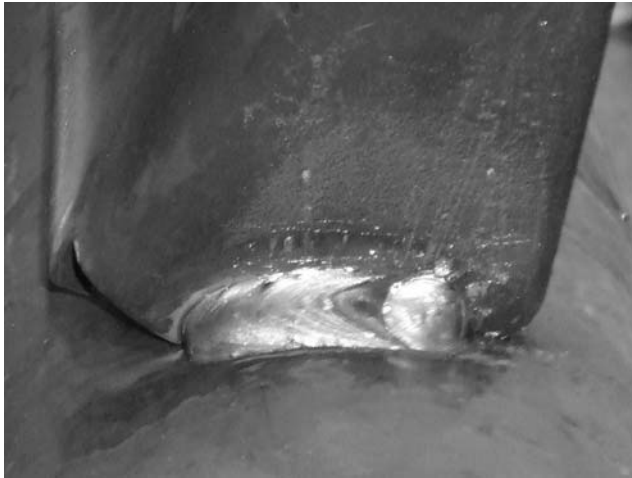


Figure 12. Final air chamber bracket weld (outside of bracket)

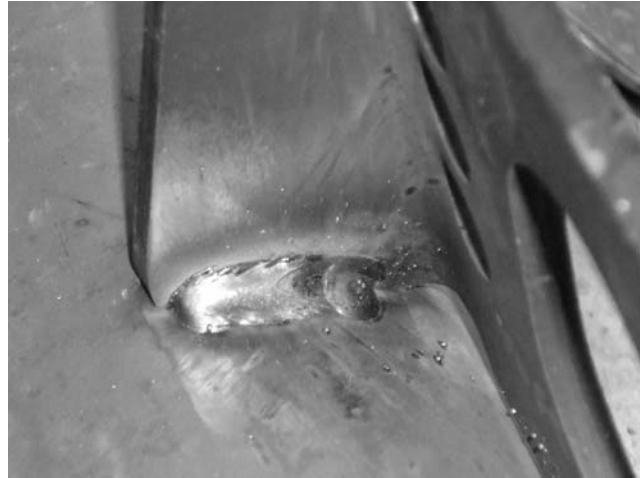


Figure 13. Final air chamber bracket weld (inside of bracket)

6. The air chamber bracket must be positioned so that its mounting surface is parallel to the other air chamber bracket on the opposite end of the axle tube. If possible, lay a straight edge across the air chamber bracket to check parallelism to the other bracket or to the axle tube (figure 11). Make any adjustments prior to final weld.

NOTE: Thoroughly clean the slag from the tack welds before applying the final welds.

7. Final fillet weld size should be $\frac{1}{4}$ to $\frac{3}{8}$ inches (6 to 10mm) and should stop $\frac{1}{8}$ to $\frac{3}{16}$ inches (3 to 5mm) from both ends. There should be two separate welds per bracket side, one on the outside (figure 12) and one on the inside (figure 13) on each side of the air chamber bracket, that do not extend around the ends of the bracket. Wrapping the weld around the ends of the air chamber bracket can lead to undercutting.

This procedure should create the optimum 105-degree setup angle as shown in figure 14.

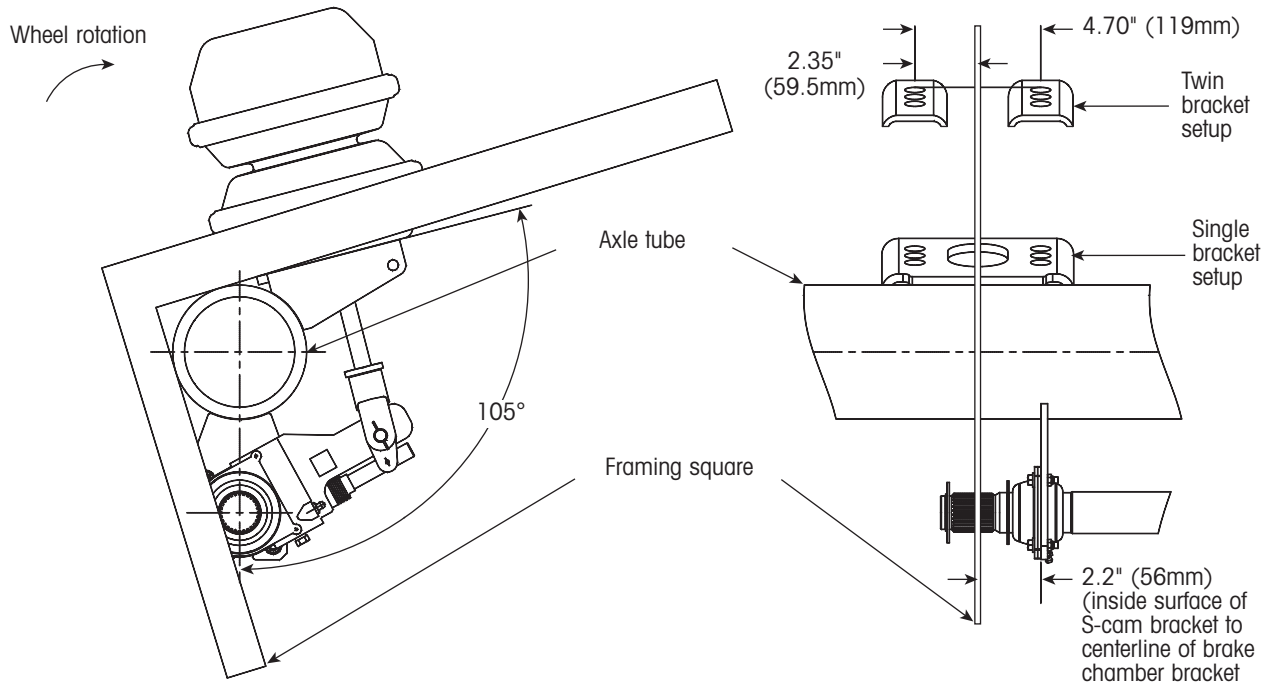


Figure 14. Air chamber bracket positioning details

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