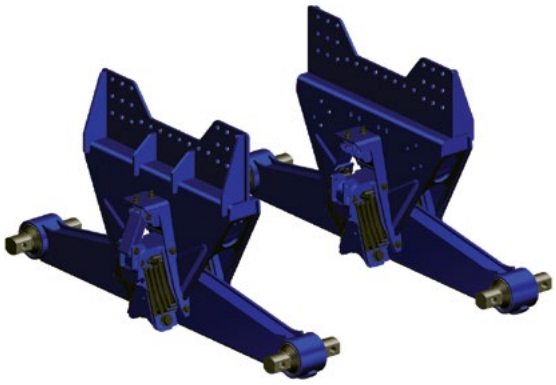
# Technical Publication

## W&C-TRR Rear Suspension System | For XCMG Mixer Trucks

**SUBJECT:** Service Instructions **LIT NO:** W&C282 TP
**DATE:** July 2023 **REVISION:** A



## TABLE OF CONTENTS


**Section 1** **Introduction** . . . . . 2

**Section 2** **Product Description** . . . . . 2

**Section 3** **Important Safety Notice** . . . . . 4

**Section 4** **Special Tools** . . . . . 7

**Section 5** **Parts Lists** . . . . . 8

**Section 6** **Preventive Maintenance**

Watson & Chalin China Recommended Inspection Intervals . . . . . 12

Component Inspection. . . . . 12

Progressive Load Spring . . . . . 13

Tie-bar Bolster Springs . . . . . 13

Rebound Straps. . . . . 14

Axle Bracket . . . . . 14

Equalizing Beam End Connection. . . . . 15

Bar Pin End Bushing . . . . . 16

V-torque Rods . . . . . 16

**Section 7** **Alignment & Adjustments**

Drive Axle Alignment . . . . . 17

**Section 8** **Component Replacement**

Fasteners . . . . . 18

Frame Hanger . . . . . 18

Rebound Strap . . . . . 19

Tie-bar Bolster Springs . . . . . 20

Progressive Load Spring . . . . . 21

Saddle Assembly. . . . . 22

Equalizing Beam . . . . . 23

Bar Pin End Bushings . . . . . 24

**Section 9** **Troubleshooting Guide** . . . . . 27

**Section 10** **Torque Specifications**. . . . . 28

SECTION 1
# Introduction

This publication is intended to acquaint and assist maintenance personnel in the preventive maintenance, service, repair and rebuild of the W&C-TRR rear suspension system for applicable XCMG brand mixer trucks.

**NOTE** Use only Genuine Watson & Chalin China parts for servicing this suspension system.

It is important to read and understand this entire Technical 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 W&C-TRR suspension system.

Watson & Chalin China reserves the right to make changes and improvements to its products and publications at any time. Contact Watson & Chalin China at +86.531.8880.9055 for information on the latest version of this manual.

**The latest revision of this publication is also available online at china.wcsuspensions-intl.com**

SECTION 2
# Product Description

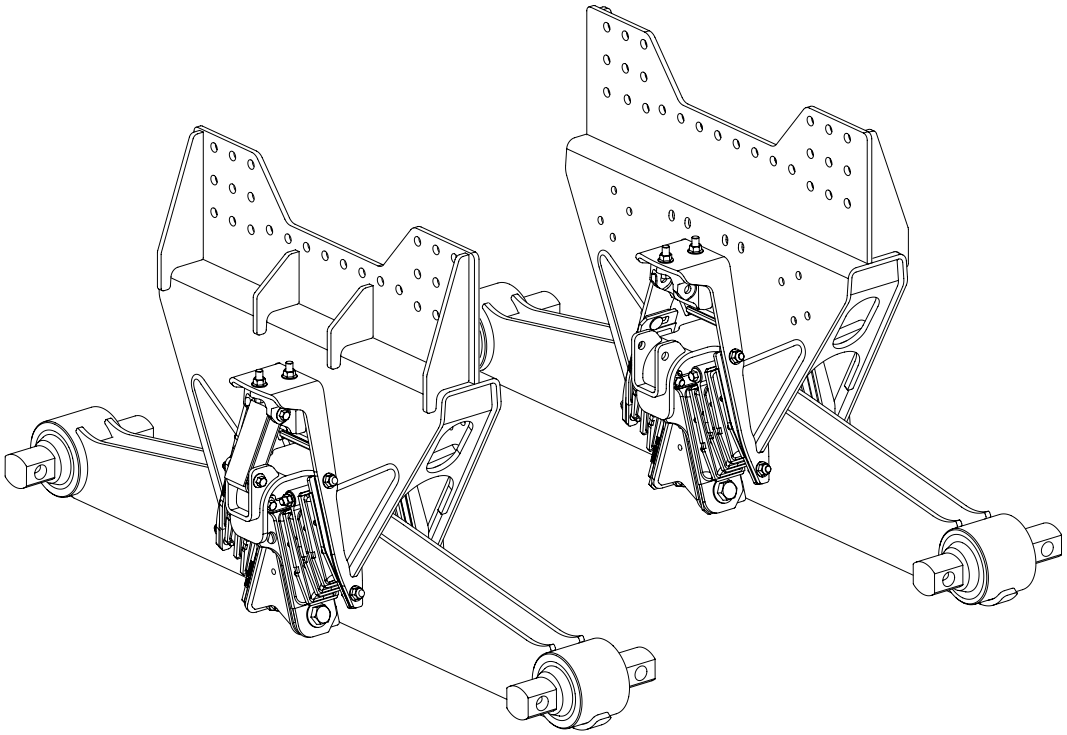
Advanced engineering design methods and experience gathered over years of experience led to the W&C-TRR, a rugged, yet lightweight rubber rear suspension that saves weight over competitive suspensions for greater payloads and route consolidation.

Suspension weight is reduced for greater payloads and improved durability through innovative design, higher strength materials and advanced manufacturing methods.

### MAJOR COMPONENTS INCLUDE:

- **Equalizing beam** — Formed and robotically-welded equalizing beam provides a narrow profile for weight savings, distributes load equally between both axles for improved traction, lowers the center of gravity to increase stability, and establishes a solid axle connection for improved handling.
- **Bar pin end connection** — Rugged axle connection extends bushing life, and allows easy axle alignment and serviceability.
- **Progressive load spring** — Engaged for a smooth ride and additional stability.
- **Rubber tie-bar bolster springs** — The unique design works with the progressive load spring to deliver enhanced empty ride quality and loaded stability.

FIGURE 2-1



## W&C-TRR SPECIFICATIONS

| | |
|---|---|
| Suspension Weight[1] (1350 mm beam length) | 334 Kilograms |
| Suspension Rating | 25 Metric Tons |
| Gross Combination Weight (GCW) Approval | 36 Metric Tons |
| Diagonal Articulation[2] | 161 Millimeters |
| Ride Heights (loaded)[3] | 250 Millimeters |
| Axle Spacing[4] | 1,350 Millimeters |

Watson & Chalin China approves the use of the W&C-TRR suspension in tractors and straight trucks in the following vocational truck applications: dump, concrete mixer, refuse, logging, and crane / boom platform. All such applications must comply with applicable Watson & Chalin China specifications and must also be approved by the respective vehicle manufacturer with the vehicle in its original, as-built configuration. Contact Watson & Chalin China and the respective vehicle manufacturer for approval of additional applications.

1. Suspension weight does not include V-torque rods and axle brackets.
2. Suspension articulation may exceed vehicle's capability and may be limited by vehicle manufacturer; vehicle manufacturer installed axle stops may restrict suspension's articulation.
3. W&C-TRR ride height measurements are taken from the centerline of the axle to the bottom of the truck frame.
4. Contact Watson & Chalin China for availability of beam lengths.

SECTION 3

# Important Safety Notice

Proper maintenance, service and repair are important to the reliable operation of the suspension. The procedures recommended by Watson & Chalin China 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 the vehicle unsafe in operation, or void the 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, CAN 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 that will make the service 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

**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 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 VALUES AT ALL TIMES. CHECK TORQUE VALUES ON A REGULAR BASIS AS SPECIFIED, USING A TORQUE WRENCH THAT IS REGULARLY CALIBRATED. TORQUE VALUES SPECIFIED IN THIS TECHNICAL PUBLICATION ARE FOR WATSON & CHALIN CHINA SUPPLIED FASTENERS ONLY. IF NON-WATSON & CHALIN CHINA FASTENERS ARE USED, FOLLOW TORQUE SPECIFICATION LISTED IN THE VEHICLE MANUFACTURER'S SERVICE MANUAL.

**WARNING**

### LOAD CAPACITY

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.

**WARNING**

### MODIFYING COMPONENTS

DO NOT MODIFY OR REWORK PARTS WITHOUT AUTHORIZATION FROM WATSON & CHALIN CHINA. DO NOT SUBSTITUTE REPLACEMENT COMPONENTS NOT AUTHORIZED BY WATSON & CHALIN CHINA. USE OF MODIFIED, REWORKED, SUBSTITUTE OR REPLACEMENT PARTS NOT AUTHORIZED BY WATSON & CHALIN CHINA MAY NOT MEET WATSON & CHALIN CHINA'S SPECIFICATIONS, AND CAN RESULT IN FAILURE OF THE PART, ADVERSE VEHICLE HANDLING, POSSIBLE PERSONAL INJURY OR PROPERTY DAMAGE, AND WILL VOID WARRANTY. USE ONLY WATSON & CHALIN CHINA AUTHORIZED REPLACEMENT PARTS.

**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 THE 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.

**WARNING**

### PERSONAL PROTECTIVE EQUIPMENT

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

**CAUTION**

### PROCEDURES AND TOOLS

A TECHNICIAN USING A SERVICE PROCEDURE OR TOOL WHICH HAS NOT BEEN RECOMMENDED BY WATSON & CHALIN CHINA MUST FIRST SATISFY THEMSELVES THAT NEITHER THEIR 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.

**WARNING**

### SUPPORT THE VEHICLE PRIOR TO SERVICING

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.

**CAUTION**

## IMPROPER VEHICLE LIFT OR SUPPORT METHOD

IMPROPER VEHICLE LIFT OR SUPPORT METHOD CAN CAUSE DAMAGE TO THE SUSPENSION TIE-BAR BOLSTER SPRINGS, AND CAN VOID ANY WARRANTY COVERAGE. DO NOT LIFT OR SUPPORT THE VEHICLE AT ONLY ONE OF THE TWO REAR DRIVE AXLES. WHEN LIFTING OR SUPPORTING THE VEHICLE USING THE DRIVE AXLES, ENSURE BOTH DRIVE AXLES ARE LIFTED AND SUPPORTED TOGETHER. READ, UNDERSTAND AND COMPLY WITH ANY ADDITIONAL VEHICLE LIFT AND SUPPORT INSTRUCTIONS PROVIDED BY THE VEHICLE MANUFACTURER OR LIFT EQUIPMENT MANUFACTURER.

**WARNING**

## V-TORQUE RODS

FOR VEHICLE STABILITY THE W&C-TRR SUSPENSION INCORPORATES V-TORQUE RODS SUPPLIED BY VEHICLE MANUFACTURER. 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 AND POSSIBLE TIRE CONTACT WITH THE FRAME.

**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. ACIDIC SOLUTIONS CANNOT BE USED ON ALUMINUM COMPONENTS.
6. 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.

SECTION 4

# Special Tools

## BAR PIN STYLE END BUSHING TOOLS

### INSTALLATION TOOLS

**Watson & Chalin China Part No. 066086-103**

**OTC Part No. 1757**

Visit otctools.com

Use with the beam removed from the truck, and in conjunction with OTC No. 51100 press plate and a 100 tonne hydraulic shop press.

### REMOVAL TOOLS

**Watson & Chalin China Part No. 066086-104**

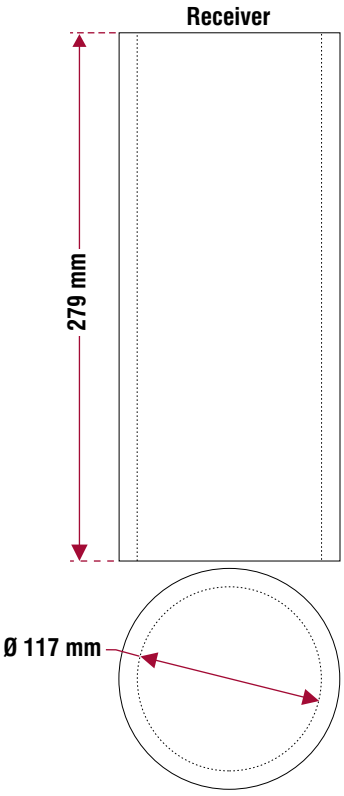
**OTC Part No. 206457**

Visit otctools.com

**Watson & Chalin China Part No. 066086-105**

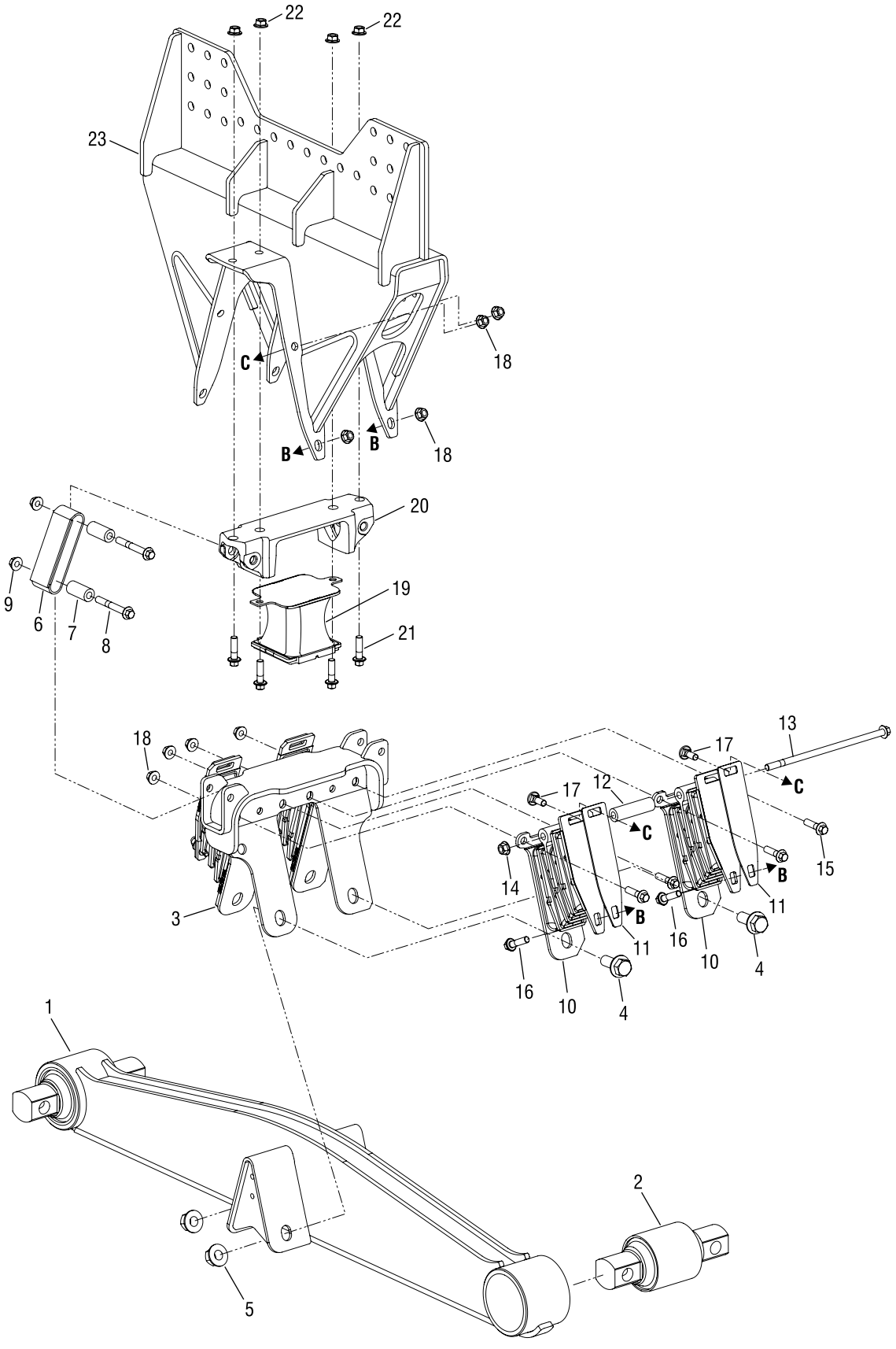
**OTC Part No. 302030**

Visit otctools.com



SECTION 5

# Parts Lists



| KEY NO. | PART NO. | DESCRIPTION | VEHICLE QTY. |
|---|---|---|---|
| | 024462-006 | **Equalizing Beam Service Kit, One Beam,** Includes Key Nos. 1-2, 4-5 | |
| | | *Equalizing Beam Assembly, 1350 mm Includes Key Nos. 1-2 | 2 |
| 1 | | *Equalizing Beam, 1350 mm | 2 |
| 2 | | *Bar Pin End Bushing | 4 |
| | 024462-002 | **Saddle Assembly Service Kit, One Saddle,** Includes Key Nos. 3-5, 8, 15, 18 | |
| 3 | | *Saddle Assembly | 2 |
| 4 | | *M20 x 1.5-6g x 50 mm Flange Bolt | 8 |
| 5 | | *M20 x 1.5 Flange Nut | 8 |
| | 060961-806 | **Rebound Strap Service Kit, One Strap,** Includes Key Nos. 6-9 | |
| 6 | | *Rebound Strap | 2 |
| 7 | | *Rebound Spacer | 4 |
| 8 | | *M12 x 1.75-6g x 90 mm Flange Bolt | 4 |
| 9 | | *M12 x 1.75 Flange Locknut | 4 |
| | | **Tie-Bar Bolster Spring Service Kits** | |
| | 024462-003 | Two Bolster Springs, Includes Key Nos. 4-5, 10-18 | |
| | 024462-004 | Four Bolster Springs, Includes Key Nos. 4-5, 10-18 | |

| KEY NO. | PART NO. | DESCRIPTION | VEHICLE QTY. |
|---|---|---|---|
| 10 | | *Tie-Bar Bolster Spring | 8 |
| 11 | | *Bolster Spring Top Plate Spacer | 8 |
| 12 | | *Tie-Bar Bolster Spring Spacer | 4 |
| 13 | | *M12 x 1.75-6g x 285 mm Flange Bolt | 4 |
| 14 | | *M12 x 1.75 Flange Locknut | 4 |
| 15 | | *M12 x 1.75-6g x 45 mm Flange Bolt | 8 |
| 16 | | *M12 x 1.75-6g x 35 mm Flange Bolt | 8 |
| 17 | | *M12 x 1.75-6g x 35 mm Round Head Square Neck Bolt | 8 |
| 18 | | *M12 x 1.75 Flange Locknut | 32 |
| | 024462-005 | **Progressive Load Spring Service Kit,** One Spring, Includes Key Nos. 8,19, 21-22 | |
| 19 | | *Progressive Load Spring | 2 |
| 20 | 077234-050 | Load Spring Rebound Bracket | 2 |
| 21 | | *M12 x 1.75-6g x 45 mm Flange Bolt | 8 |
| 22 | | *M12 x 1.75 Flange Locknut | 8 |
| 23 | 077995-551 | Frame Hanger | 2 |

## W&C-TRR CROSS REFERENCE

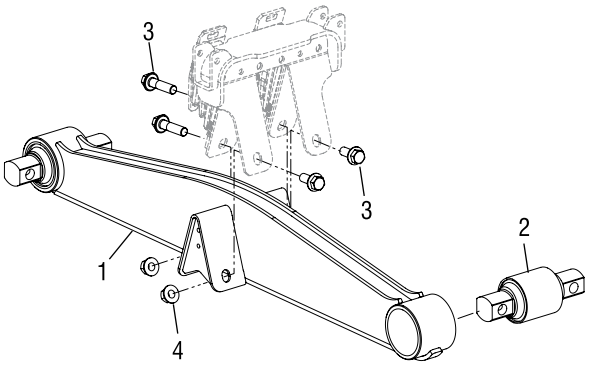
| WATSON & CHALIN CHINA PART NO. | XCMG PART NO. | DESCRIPTION |
|---|---|---|
| 024462-006 | 459341037 | Equalizing Beam Service Kit, One Beam |
| 024462-002 | 459341038 | Saddle Assembly Service Kit, One Saddle |
| 024462-003 | 459341039 | Tie-Bar Bolster Spring Service Kit, Two Bolster Springs |
| 024462-004 | 459341040 | Tie-Bar Bolster Spring Service Kit, Four Bolster Springs |
| 024462-005 | 459341041 | Progressive Load Spring Service Kit, One Spring |
| 060961-806 | 459341042 | Rebound Strap Service Kit, One Strap |
| 077234-050 | 459341043 | Load Spring Rebound Bracket |
| 077995-551 | 459341044 | Frame Hanger |

NOTES: * Item included in assembly or service kit only, part not sold separately.

V-torque rods are not supplied by Watson & Chalin China, although it is a required component. Watson & Chalin China is not responsible for components supplied by the vehicle manufacturer. For assistance with inspection, maintenance and rebuild instructions on these components see vehicle manufacturer.

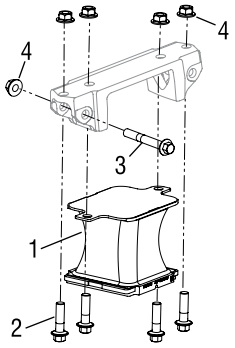
# W&C-TRR Service Kits

**Service Kit No.** 024462-006 | Equalizing Beam, One Beam



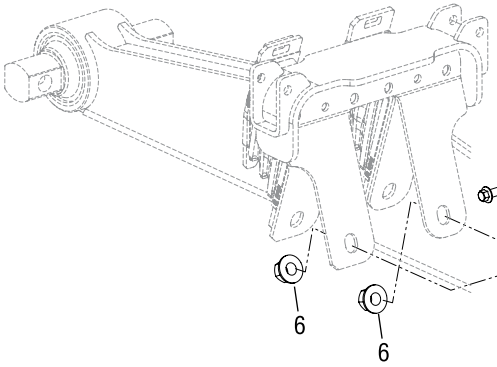

| KEY NO. | PART NO. | DESCRIPTION | KIT QTY. |
|---|---|---|---|
| 1 | | *Equalizing Beam, 1350 mm | 1 |
| 2 | | *Bar Pin End Bushing | 2 |
| 3 | | *M20 x 1.5-6g x 50 mm Flange Bolt | 4 |
| 4 | | *M20 x 1.5 Flange Nut | 4 |

**Service Kit No.** 24462-005 | Progressive Load Spring, One Side



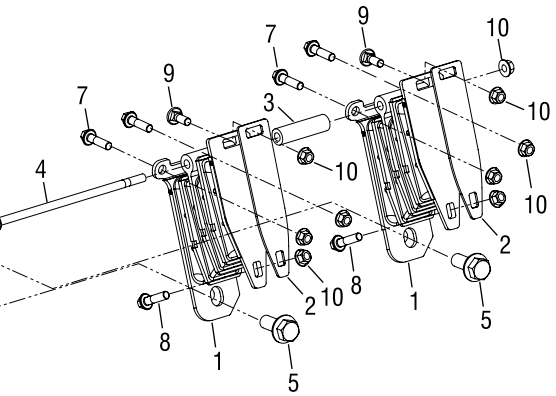

| KEY NO. | PART NO. | DESCRIPTION | KIT QTY. |
|---|---|---|---|
| 1 | | *Progressive Load Spring | 1 |
| 2 | | *M12 x 1.75-6g x 45 mm Flange Bolt | 4 |
| 3 | | *M12 x 1.75-6g x 90 mm Flange Bolt | 1 |
| 4 | | *M12 x 1.75 Flange Locknut | 5 |

**Service Kit No.** 024462-003 | Tie-Bar Bolster Spring, Two Bolsters




| KEY NO. | PART NO. | DESCRIPTION | KIT QTY. |
|---|---|---|---|
| 1 | | *Tie-Bar Bolster Spring | 2 |
| 2 | | *Bolster Spring Top Plate Spacer | 2 |
| 3 | | *Tie-Bar Bolster Spring Spacer | 1 |
| 4 | | *M12 x 1.75-6g x 285 mm Flange Bolt | 1 |
| 5 | | *M20 x 1.5-6g x 50 mm Flange Bolt | 2 |
| 6 | | *M20 x 1.5 Flange Nut | 2 |
| 7 | | *M12 x 1.75-6g x 45 mm Flange Bolt | 4 |
| 8 | | *M12 x 1.75-6g x 35 mm Flange Bolt | 2 |
| 9 | | *M12 x 1.75-6g x 35 mm Round Head Square Neck Bolt | 2 |
| 10 | | *M12 x 1.75 Flange Locknut | 9 |

**Service Kit No.** 024462-004 | Tie-Bar Bolster Spring, Four Bolsters

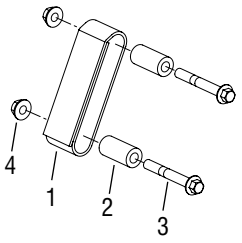



| KEY NO. | PART NO. | DESCRIPTION | KIT QTY. |
|---|---|---|---|
| 1 | | *Tie-Bar Bolster Spring | 4 |
| 2 | | *Bolster Spring Top Plate Spacer | 4 |
| 3 | | *Tie-Bar Bolster Spring Spacer | 2 |
| 4 | | *M12 x 1.75-6g x 285 mm Flange Bolt | 2 |
| 5 | | *M20 x 1.5-6g x 50 mm Flange Bolt | 4 |
| 6 | | *M20 x 1.5 Flange Nut | 4 |
| 7 | | *M12 x 1.75-6g x 45 mm Flange Bolt | 8 |
| 8 | | *M12 x 1.75-6g x 35 mm Flange Bolt | 4 |
| 9 | | *M12 x 1.75-6g x 35 mm Round Head Square Neck Bolt | 4 |
| 10 | | *M12 x 1.75 Flange Locknut | 18 |

**NOTE:** *Item included in assembly or service kit only, part not sold separately.

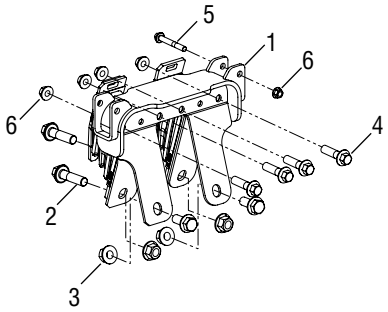
# W&C-TRR Service Kits

**Service Kit No.** | Rebound Strap
**060961-806** | One Strap




| KEY NO. | PART NO. | DESCRIPTION | KIT QTY. |
|---|---|---|---|
| 1 | | *Rebound Strap | 1 |
| 2 | | *Rebound Spacer | 2 |
| 3 | | *M12 x 1.75-6g x 90 mm Flange Bolt | 2 |
| 4 | | *M12 x 1.75 Flange Locknut | 2 |

**Service Kit No.** | Saddle Assembly
**024462-002** | One Saddle




| KEY NO. | PART NO. | DESCRIPTION | KIT QTY. |
|---|---|---|---|
| 1 | | Saddle Assembly | 1 |
| 2 | | *M20 x 1.5-6g x 50 mm Flange Bolt | 4 |
| 3 | | *M20 x 1.5 Flange Nut | 4 |
| 4 | | *M12 x 1.75-6g x 45 mm Flange Bolt | 4 |
| 5 | | *M12 x 1.75-6g x 90 mm Flange Bolt | 1 |
| 6 | | *M12 x 1.75 Flange Locknut | 5 |

**NOTE:** *Item included in assembly or service kit only, part not sold separately.

SECTION 6

# Preventive Maintenance

Following appropriate inspection procedures is important to help ensure the proper maintenance and operation of the W&C-TRR suspension system and component parts function to their highest efficiency. Look and replace any bent, cracked, worn or damaged parts.

| WATSON & CHALIN CHINA RECOMMENDED INSPECTION INTERVALS | PRE-DELIVERY INSPECTION | FIRST IN-SERVICE INSPECTION | PREVENTIVE MAINTENANCE |
|---|---|---|---|
| Visually inspect suspension for proper assembly and function.<br>Inspect the fasteners for proper torque as recommended in the Torque Specifications Section of this publication with special attention to the following suspension connections:<br>• Saddle to equalizing beam<br>• Equalizing beam end<br>• Bolster springs to frame hanger<br>• Load spring rebound bracket to frame hanger | Within the first 500 Kilometers | Within the first 2,000 Kilometers | Every 12 months |
| Visually inspect for proper assembly and function. Check for all of the following and replace components as necessary.<br>• Signs of unusual movement, loose or missing components<br>• Signs of abrasive or adverse contact with other components<br>• Damaged, bent or cracked parts | | | |
| Inspect progressive load springs, rebound straps and tie-bar bolster springs | | | Every 3 months |
| Verify the lateral alignment of axles are within the vehicle manufacturer's tolerances | | | Every 12 months |

## COMPONENT INSPECTION

Following the appropriate inspection procedures is important to help ensure the proper maintenance and operation of the W&C-TRR suspension system and component parts. Look for and replace worn, damaged, bent or cracked parts.

- **Equalizing beam assembly** — Check the overall condition of the equalizing beam for dents, dings, or other damage. Check for any metal-to-metal contact in the equalizing beam end connections. See equalizing beam end connection inspection in this section.
- **Fasteners** — Look for any loose or damaged fasteners on the entire suspension. Make sure all fasteners are tightened to a torque value within the specified torque range. See recommended torque specifications for Watson & Chalin China supplied fasteners in Torque Specification Section of this publication. For fasteners not supplied by Watson & Chalin China, see the vehicle manufacturer. Use a calibrated torque wrench to check torque.

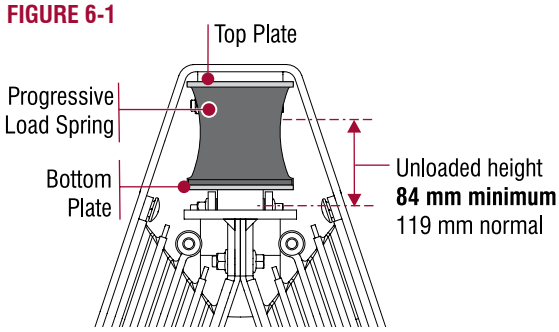
**NOTE** Watson & Chalin China recommends the use of CL. 10.9 bolts, and CL. 10 locknuts. Washers are not necessary when flanged fasteners are used.

- **Frame hangers / Saddle** — Look for any signs of wear and damage. Check all attaching fasteners for proper torque. Visually inspect for signs of movement on the frame rail or damage. Inspect the area around the gussets for cracks.
- **Progressive load spring, tie-bar bolster spring and rebound strap** — See Progressive Load Spring, Tie-Bar Bolster Springs and Rebound Strap inspection in this section.
- **Wear and damage** — Inspect all parts of the suspension for wear and damage. Look for bent or cracked parts.

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

## PROGRESSIVE LOAD SPRING

FIGURE 6-1



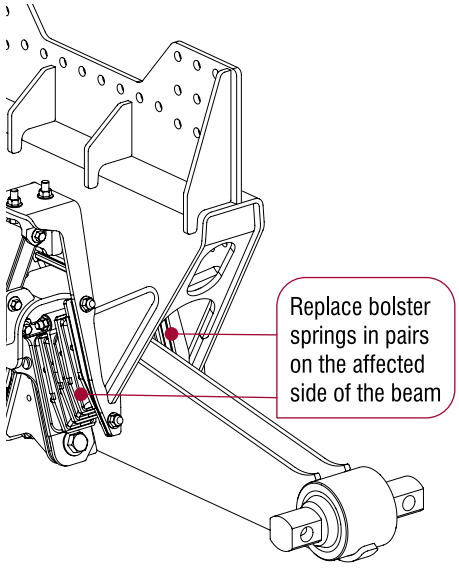

A visual inspection of the progressive load spring is required every three months.

**Progressive load spring** — If the progressive load spring is:

- Visual damage, replace as outlined in the Component Replacement Section of this publication.
- With the vehicle in the unloaded condition, measure the height of the progressive load spring from the top plate to the bottom plate, see Figure 6-1. Normal height is 119 mm, if the measurement height is 84 mm or less, replace as outlined in the Component Replacement Section of this publication.

## TIE-BAR BOLSTER SPRINGS

FIGURE 6-2




Inspect the tie-bar bolster springs every 3 months, see Figure 6-2. Actual tie-bar bolster spring service condition and performance may vary depending upon suspension and vehicle configuration, operation, service and other factors.

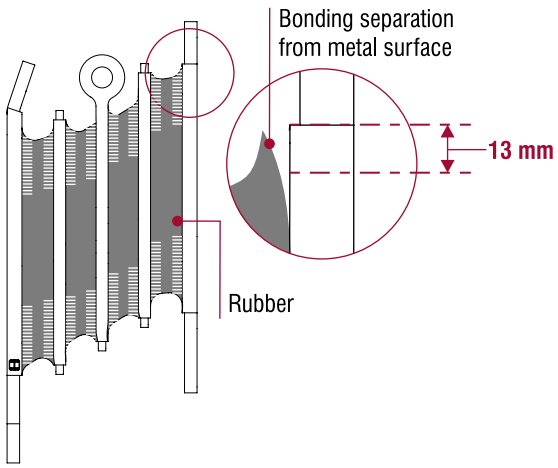
### INSPECTION

The following inspection guidelines are intended to assist vehicle operators and maintenance personnel in examining the tie-bar bolster springs and determining when replacements may be needed.

In the event one tie-bar bolster spring on one side of the equalizing beam shows signs of damage or excessive wear, Watson & Chalin China recommends that both bolster springs installed on that equalizing beam be replaced, see Figure 6-2. When the bolster springs are replaced on one side only, the vehicle may lean slightly. The new bolster springs will tend to settle to some degree, and return the vehicle to its original condition. The following procedure is recommended for proper inspection.

1. Chock the front wheels to prevent movement of the vehicle during inspection of the suspension.
2. Raise rear of vehicle approximately 100 mm to 125 mm (just prior of lifting the rear wheels off ground) and support with stands.
3. Inspect all tie-bar bolster springs using the following criteria. If cuts, splits, or bonding separation are detected in the rubber, measure the depth of the damaged area using a machinist scale or W&C-TRR gauge to determine if replacement is required.
   - **Bent, burred or overhanging edges** of the tie-bar bolster spring metal plates may occur due to mishandling in service. If the rubber is not trapped, and there are no sharp metal edges in contact with the free surface of the rubber, this condition is acceptable.
   - **Creases** formed by folding of the rubber surface under load are acceptable. These creases appear as stripes on the surface, polished by wear or covered with tacky rubber.
   - Minor oil and grease contamination in the rubber due to vehicle operation is acceptable. A slight change in shape of the rubber due to permanent set should not be mistaken for oil and grease contamination. Certain softening of the rubber surface is acceptable. However, unacceptable swelling due to contamination will require tie-bar bolster spring replacement. In the unloaded condition, if the bolster spring rubber is swollen beyond the edge of the metal plates, then tie-bar bolster spring replacement is necessary.

FIGURE 6-3




- **Cuts or Splits** in the rubber of over 25 mm in length and an average depth of 10 mm are not acceptable and require tie-bar bolster spring replacement. In particular, look for signs of cuts or splits in the rubber at points indicated in Figure 6-3 as "///////".
- **Bonding separation** of the rubber from a bonded metal surface to a depth of up to 13 mm is acceptable. If any bonding separation is more than 13 mm deep, both bolster springs should be replaced on the affected side of the vehicle (see Figure 6-3). An unloaded bolster spring may be inspected for any bonding separation by measuring at points indicated in Figure 6-3 as "///////". Any thin film or other residual rubber material on the metal plates resulting from the molding process may be ignored during inspection.

## REBOUND STRAPS

The rebound straps helps prevent the overextension of the tie-bar bolster springs during vehicle operation. If the rebound strap is torn, frayed or not intact, replace as outlined in the Component Replacement Section of this publication.

## AXLE BRACKET

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

FIGURE 6-4
SIDEVIEW

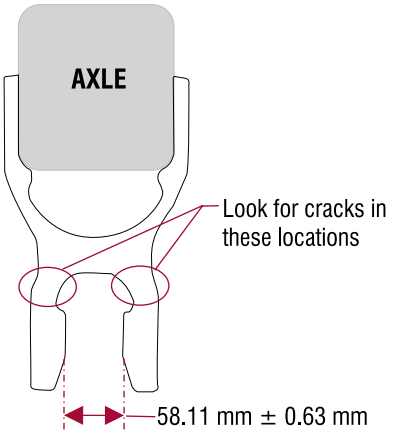
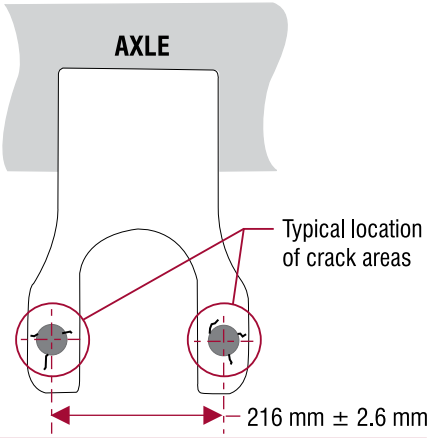



FIGURE 6-5
FRONT/ REAR VIEW



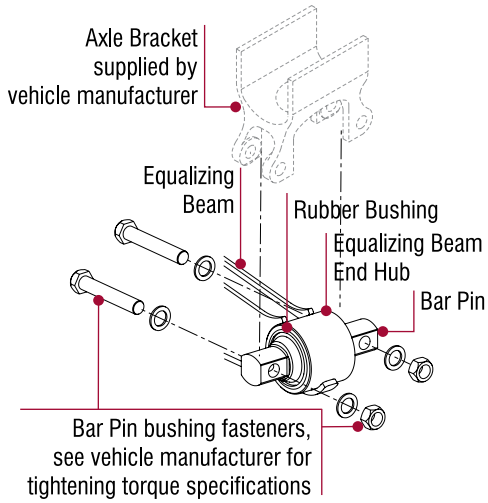

**NOTE:** Typical axle bracket shown

- **Visual Inspection** — When inspecting the equalizing beam end connection also inspect the axle brackets for damage or cracks, see Figure 6-4. Any axle bracket that is found damaged or cracked must be repaired or replaced.
- **Physical Inspection** — When an equalizing beam is removed for repair, or an inspection of the equalizing beam end connection reveals movement:
  - Inspect the axle brackets for damage or cracks in the locations shown in Figures 6-4 and 6-5. Any axle bracket that is found damaged or cracked must be repaired or replaced.
  - Measure the distance between the axle bracket legs for correct width, refer to Figures 6-4 and 6-5 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.

## EQUALIZING BEAM END CONNECTION

FIGURE 6-6




The equalizing beam end connection for the **W&C-TRR** is a bar pin style rubber bushing, see Figure 6-6.

An inspection of the equalizing beam end connection is necessary when a vehicle is in the shop for major repair work or every six months, whichever comes first.

**NOTE**

The equalizing beam end connections require 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

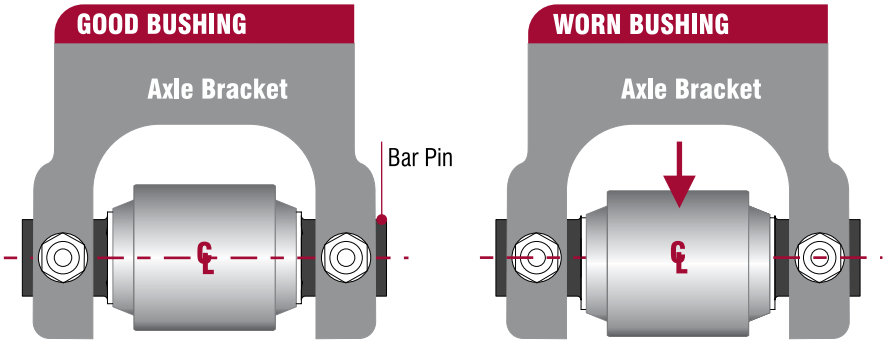
1. Chock the wheels.
2. Visually inspect the equalizing beam end connection for signs of excessive wear or looseness.

**SERVICE HINT**

An equalizing beam end connection that 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.
- Look for the equalizing beam to be lower in the axle bracket, see Figure 6-7.
- If the bar pin beam end bushing is visually offset a floor jack test should be performed, refer to the Physical Inspection.

FIGURE 6-7




A **GOOD** bushing will result in the equalizing beam end hub appearing to be **centered** with the centerline of the bar pin in the axle bracket

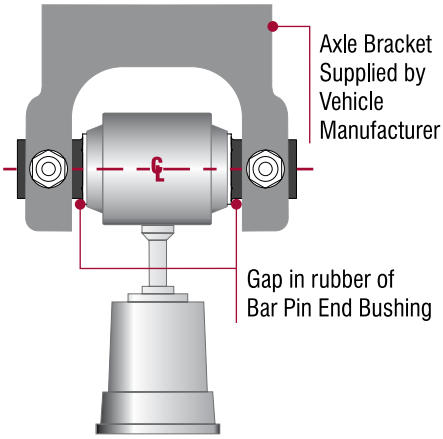
A **WORN** bushing will result in the equalizing beam end hub appearing to be **offset/below** the centerline of the bar pin in the axle bracket

### PHYSICAL INSPECTION

**NOTE**

The gap at each side of the visible rubber on the lower part of the bar pin end bushing is normal, see Figure 6-8, it is not an indication to replace the bushing. 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.

FIGURE 6-8



**⚠ WARNING**

IF BAR PIN END 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.

1. If bar pin movement or looseness is detected in the equalizing beam end hub, **DO NOT** operate the vehicle. Check and record torque values, as received, for each beam end fastener.
2. Correct torque values as required making sure all fasteners are tightened within the vehicle manufacturer's specifications.
3. Recheck the equalizing beam end connections for signs of looseness.
4. 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 the Component Replacement Section of this publication.

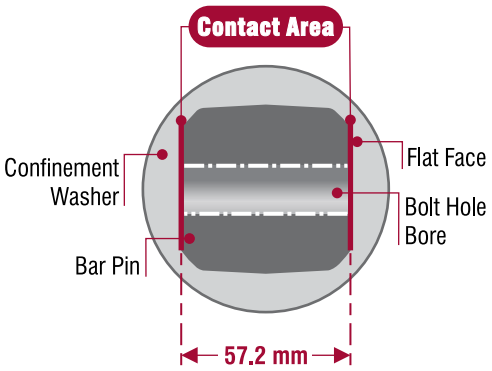
## BAR PIN END BUSHING

### VISUAL INSPECTION

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

- If the contact area, see Figure 6-9 (the flat face area where bar pin contacts the axle bracket) reveal signs of excessive wear. A bar pin thickness measurement of less than 57.2 mm.
- If the bar pin bolt holes bores reveal signs of elongation or wear, see Figure 6-9.

FIGURE 6-9




If bar pin measurement is **less than 57.2 mm**, replacement is required.

## V-TORQUE RODS

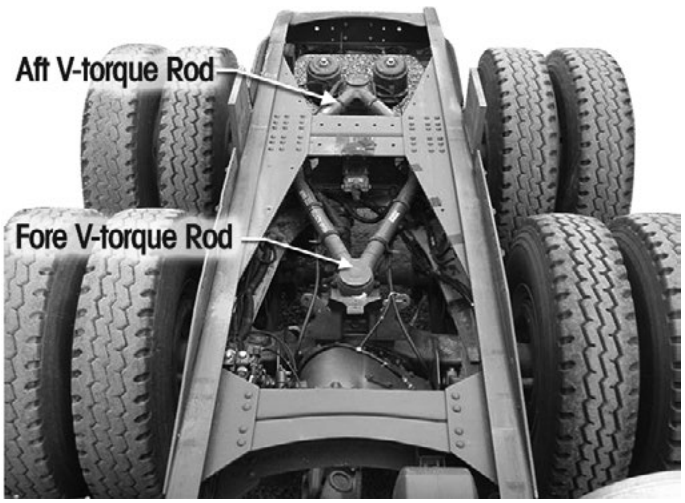
**NOTE**

V-torque rods are not supplied by Watson & Chalin China, but are a required components. Watson & Chalin China is not responsible for components supplied by the vehicle manufacturer. For assistance with inspection, maintenance and rebuild instructions on these components see vehicle manufacturer.

**⚠ WARNING**

FOR VEHICLE STABILITY THE W&C-TRR SUSPENSION INCORPORATES V-TORQUE RODS SUPPLIED BY VEHICLE MANUFACTURER. 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 AND POSSIBLE TIRE CONTACT WITH THE FRAME.

FIGURE 6-10




The W&C-TRR suspension is equipped by the vehicle manufacturer with V-torque rods that control axle movement during braking, accelerating, and cornering, see Figure 6-10. The mounting brackets at the axle ends of the V-torque rods are furnished as part of the axle housings by the vehicle manufacturer or the axle manufacturer. The length of the V-torque rods is determined by the vehicle manufacturer for optimum drive line angles.

The frame rail ends are bolted into the brackets supplied by the vehicle manufacturer.

The V-torque rods must be connected and in good working condition when operating the vehicle. Consult the vehicle manufacturer for inspection, component repair or replacement instructions.

SECTION 7

# Alignment & Adjustments

## DRIVE AXLE ALIGNMENT

- The primary control for alignment is the location of the frame hanger assemblies as installed on the frame rails by the vehicle manufacturer, and the location of the axle brackets on the axles as installed by the axle or vehicle manufacturer. No alignment adjustment is available, refer to the vehicle manufacturer with any questions regarding lateral alignment.
- Axle centering and pinion angles are controlled by the V-torque rods. Design, layout, and installation responsibility belongs to the vehicle manufacturer. Contact the vehicle manufacturer if there are issues relating to axle centering or pinion angles.
- Ride height is controlled by the design of the suspension. No adjustment is possible. However, wear of the progressive load spring may result in slightly lower ride height over time. Replacement of worn progressive load springs should restore ride height to original specifications.

SECTION 8

# Component Replacement

## FASTENERS

Watson & Chalin China 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 Watson & Chalin China's Torque Specifications Section of this publication. If non-Watson & Chalin China fasteners are used, follow torque specifications listed in the vehicle manufacturer's service manual.

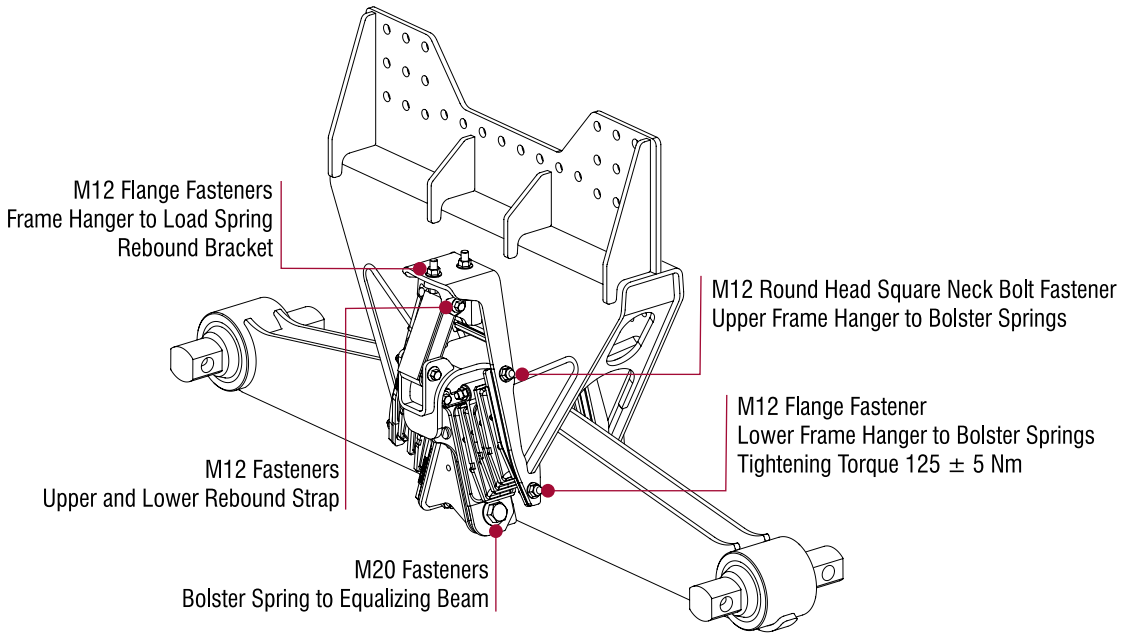
**NOTE** Watson & Chalin China recommends the use of CL 10.9 bolts, and CL 10 locknuts. Washers are not necessary when flanged fasteners are used.

## FRAME HANGER

### DISASSEMBLY

1. Chock the front wheels of the vehicle.
2. Remove upper rebound strap fasteners.
3. Remove the M12 fasteners from the frame hanger to the tie-bar bolster springs, see Figure 8-1.
4. Remove M12 fasteners from frame hanger to load spring rebound bracket, see Figure 8-1.

FIGURE 8-1




5. Raise the frame enough to allow a gap between the tie-bar bolster springs and the frame hanger.
6. Remove the frame fasteners, see manufacturer's guidelines.

**WARNING** THE WEIGHT OF THE FRAME HANGER IS APPROXIMATELY 51.9 KILOGRAMS. CARE SHOULD BE TAKEN AT REMOVAL AND INSTALLATION TO PREVENT PERSONAL INJURY OR DAMAGE TO COMPONENTS.

7. Remove the frame hanger.

### ASSEMBLY

1. Mount the new frame hanger to the frame rail, see vehicle manufacturer's recommended torque specification for proper torque values.
2. Completely lower the vehicle.
3. Install the M12 fasteners into the load spring rebound bracket and frame hanger. Tighten to 125 ± 5 Nm torque, see Figure 8-2.

FIGURE 8-2

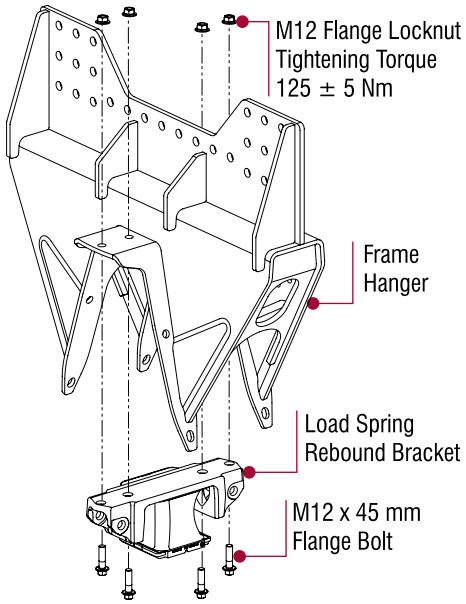
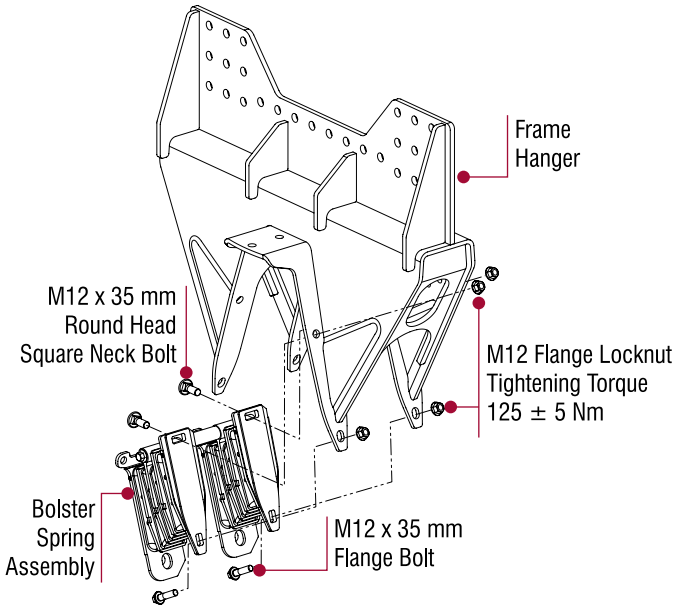



FIGURE 8-3



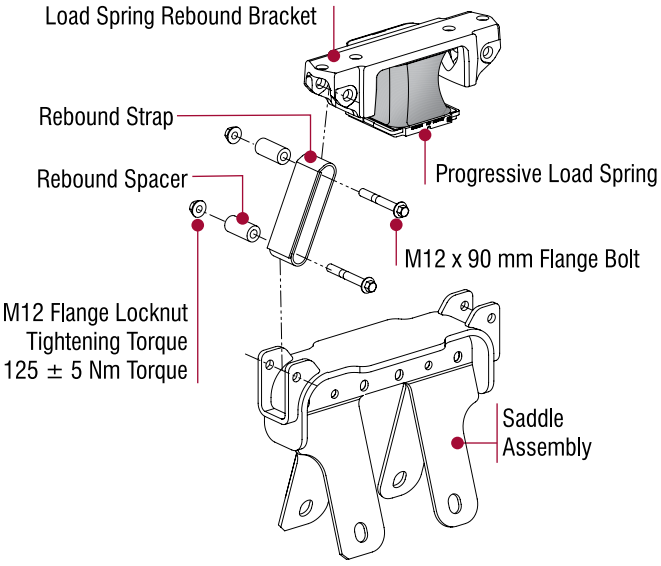

4. Install the tie-bar bolster spring assembly to frame hanger and tighten to 125 ± 5 Nm torque, see Figure 8-3.
5. Install the upper rebound strap fastener and tighten to 125 ± 5 Nm torque, see Figure 8-4.
6. Remove wheel chocks.

## REBOUND STRAP

### DISASSEMBLY

1. Chock the front wheels of the vehicle.
2. Remove and discard the M12 upper and lower rebound strap M12 fasteners and spacers, see Figure 8-1.
3. Slide the rebound strap out of the saddle assembly.
4. Remove and discard rebound strap.

FIGURE 8-4




### ASSEMBLY

**CAUTION**

THE REBOUND STRAP MUST BE INSTALLED WITH THE SEWN AREA FACING AWAY FROM THE SADDLE AND EQUALIZING BEAM. FAILURE TO DO SO WILL RESULT IN PREMATURE WEAR OF THE REBOUND STRAP.

1. Slide the rebound spacer through **lower** rebound strap loop.

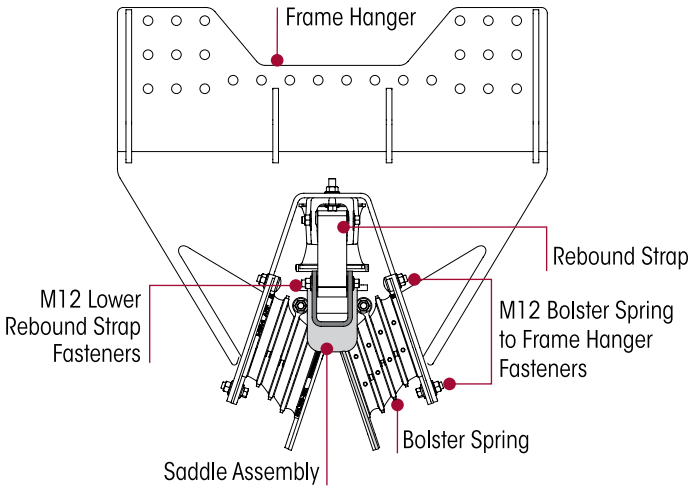
**NOTE** Ensure the sewn area on rebound strap is facing away from the saddle and equalizing beam.

2. Install the M12 fasteners into the saddle assembly.
3. Tighten the M12 fastener to 125 ± 5 Nm torque, see Figure 8-4.
4. Slide the rebound spacer through the **upper** rebound strap loop.
5. Install the M12 fasteners into the load spring rebound bracket.
6. Tighten the M12 fastener to 125 ± 5 Nm torque, see Figure 8-4.
7. Remove the wheel chocks.

## TIE-BAR BOLSTER SPRINGS

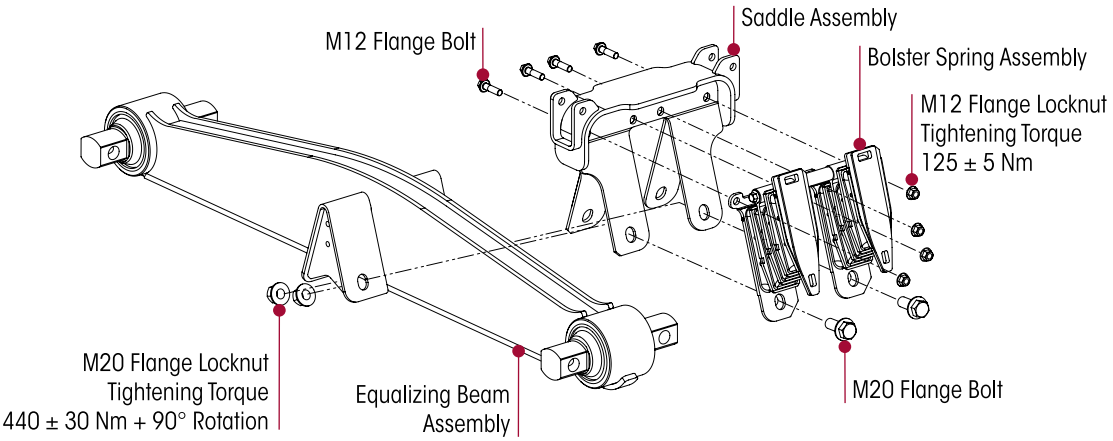
### DISASSEMBLY

FIGURE 8-5



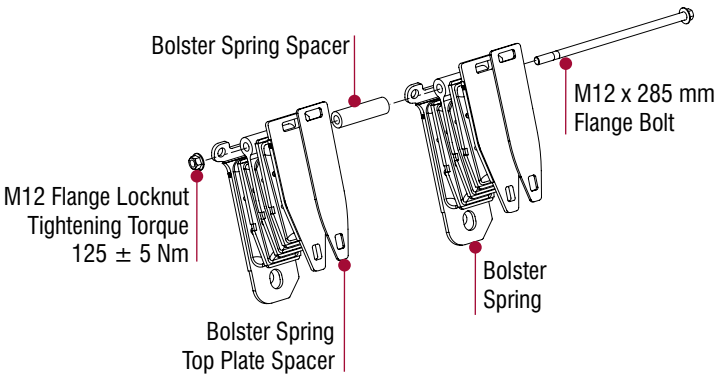

1. Chock the front wheels of the vehicle.
2. Remove upper rebound strap fasteners.
3. Remove the M12 fasteners from the frame hanger to the tie-bar bolster springs, see Figure 8-5.
4. Remove the tie-bar bolt and spacer.
5. Raise the rear of the vehicle frame to clear the tie-bar bolster springs from the equalizing beam. Support the vehicle frame at this height with safety stands.
6. Remove the upper M12 fasteners that connect the tie-bar bolster springs to the saddle assembly, see Figure 8-6.
7. Remove the lower M20 fasteners connecting the tie-bar bolster springs to the equalizing beam, see Figure 8-6.
8. Remove the tie-bar bolster springs, see Figure 8-6.

FIGURE 8-6




### ASSEMBLY

FIGURE 8-7




1. Loosely install the M12 fasteners connecting the tie-bar bolsters to the saddle assembly.
2. Mount the bolster spring top plate spacer and tie-bar bolster springs to the frame hanger and loosely install upper fasteners. **DO NOT** tighten at this time.
3. Install the tie-bar bolt from the outboard side and install spacer. Tighten fasteners to 125 ± 5 Nm torque, see Figure 8-7.
4. Tighten the upper tie-bar bolster spring fasteners to the frame hanger to 125 ± 5 Nm torque, see Figure 8-3.

5. Lower the vehicle.
6. Install the lower tie-bar M20 fasteners to the equalizing beam and tighten to 440 ± 30 Nm + 90° rotation torque, see Figure 8-6.
7. Tighten the tie-bar bolster springs M12 fasteners to the saddle to 125 ± 5 Nm torque, see Figure 8-6.
8. Install the upper rebound strap fasteners and spacer. Tighten fasteners to 125 ± 5 Nm torque.
9. Remove wheel chocks.

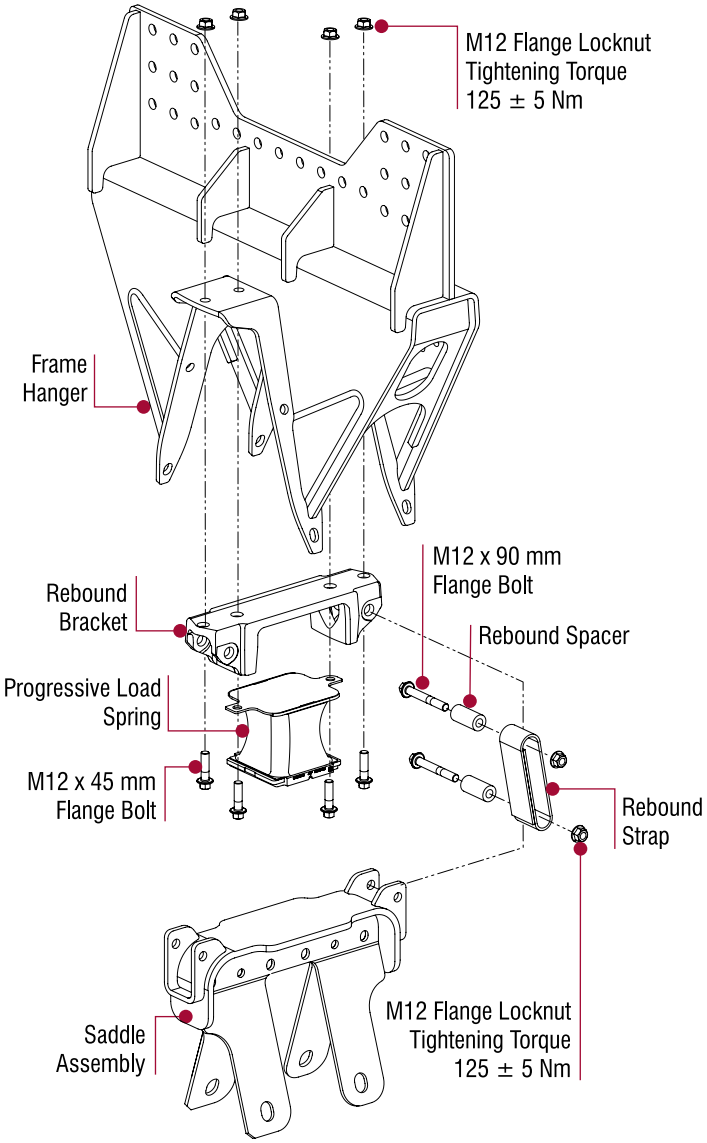
## PROGRESSIVE LOAD SPRING

**SERVICE HINT** Tire removal is not necessary for the replacement of the load spring.

### DISASSEMBLY

1. Chock the front wheels of the vehicle.
2. Remove the M12 upper rebound strap fasteners and spacers.
3. Raise the vehicle until the suspension is fully extended with the tires completely off the ground. Support the frame at this height with safety stands.
4. Remove M12 fasteners from frame hanger to progressive load spring assembly.
5. Remove the progressive load spring from the load spring rebound bracket, see Figure 8-8.

FIGURE 8-8



### ASSEMBLY

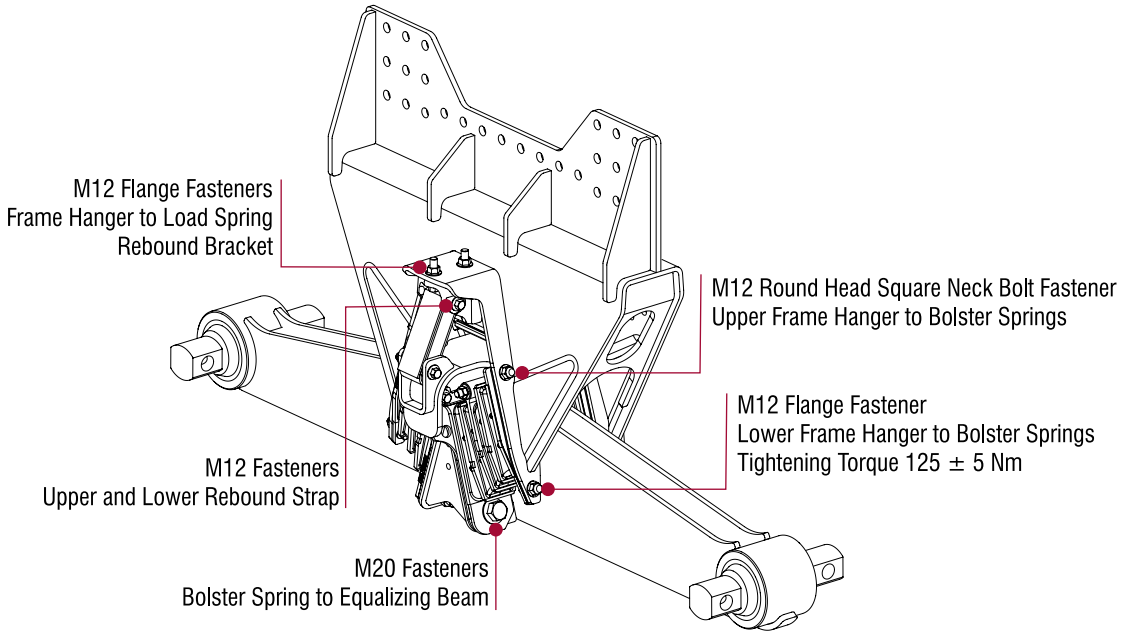
1. Install the new progressive load spring to the load spring rebound bracket.
2. Attach the new progressive load spring assembly and connect to the frame hanger. Tighten to 125 ± 5 Nm torque, see Figure 8-8.
3. Lower the frame.
4. Install upper rebound strap, M12 fasteners and spacers to the load spring rebound bracket. Tighten to 125 ± 5 Nm torque, see Figure 8-8.
5. Remove the wheel chocks.

## SADDLE ASSEMBLY

### DISASSEMBLY

1. Chock the front wheels of the vehicle.
2. Remove the M12 fasteners from the frame hanger to the tie-bar bolster springs, see Figure 8-9.
3. Remove the M12 fasteners from frame hanger to load spring rebound bracket, see Figure 8-9.
4. Remove the lower fastener and spacer from the rebound straps, see Figure 8-9.
5. Remove the tie-bar bolt and spacer.
6. Raise the rear of the vehicle enough to clear the frame hanger from the equalizing beam. Support the vehicle at this height with safety stands.
7. Slide the progressive load spring assembly out of the saddle assembly.
8. Remove the M12 fasteners connecting the tie-bar bolster springs to the saddle assembly.
9. Remove M20 fasteners connecting the tie-bar bolster springs to the equalizing beam, see Figure 8-9.
10. Remove the bolster springs.
11. Remove the saddle assembly.

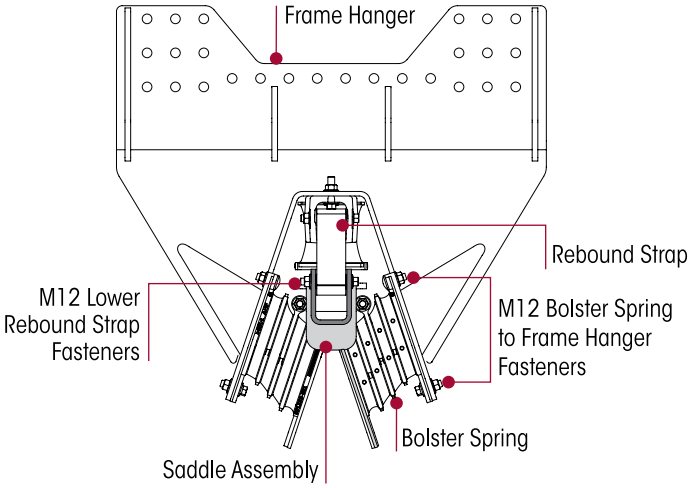
FIGURE 8-9




### ASSEMBLY

1. Place the saddle assembly on the equalizing beam.
2. Position the tie-bar bolster springs to the saddle assembly.
3. Install the M12 and M20 fasteners and hand tighten, **DO NOT** tighten at this time, see Figure 8-9.
4. Install the tie-bar bolster springs, see Tie Bar Bolster Spring in this Section.

FIGURE 8-10




5. Install the progressive load spring assembly to the frame hanger and tighten fasteners to 125 ± 5 Nm torque.
6. Lower the vehicle.
7. Install upper tie-bar bolster springs fasteners to the frame hanger. Tighten fasteners to 125 ± 5 Nm torque, see Figure 8-10.
8. Install the M12 lower rebound strap fasteners and spacer into the saddle assembly, see Figure 8-10.
9. Tighten the lower rebound strap fasteners to 125 ± 5 Nm torque.
10. Remove the wheel chocks.

## EQUALIZING BEAM

### DISASSEMBLY

1. Chock the **FRONT** wheels of the vehicle.
2. If both equalizing beams need replacement repeat Steps 3 through 8 for removal of the opposing equalizing beam **AFTER** the first equalizing beam is installed.
3. Remove lower tie-bar bolster spring M20 fasteners on both equalizing beams.
4. Raise and support frame with safety stands.

**WARNING**

THE WEIGHT OF THE EQUALIZING BEAM ASSEMBLY IS APPROXIMATELY 62.2 KILOGRAMS. PRIOR TO REMOVING THE BAR PIN BOLTS 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.

5. Support the equalizing beam being serviced.
6. Remove and discard bar pin fasteners that connect the end bushing bar pin to the axle bracket.
7. Lower the equalizing beam from the axle brackets and remove from vehicle.

### ASSEMBLY

**NOTE**

All W&C-TRR 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 pins prior to the rear bar pins will ease in the installation of the equalizing beam.

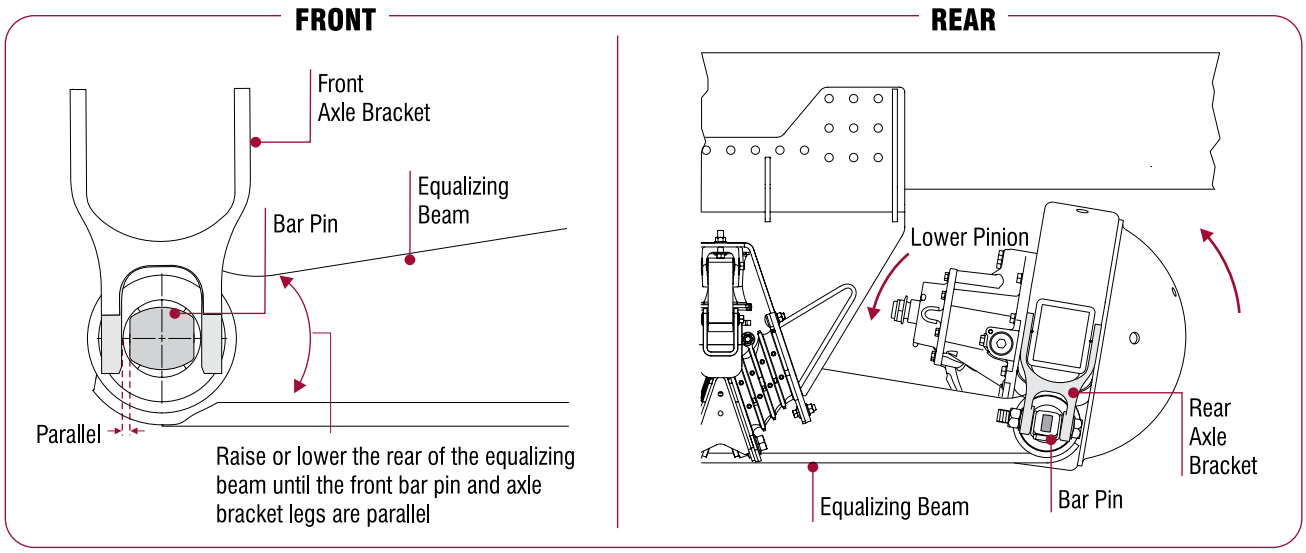
**WARNING**

THE WEIGHT OF THE EQUALIZING BEAM ASSEMBLY IS APPROXIMATELY 62.2 KILOGRAMS. CARE SHOULD BE TAKEN AT REMOVAL AND INSTALLATION TO PREVENT PERSONAL INJURY OR DAMAGE TO COMPONENTS.

1. Mount the equalizing beam into the **FRONT** drive axle bracket.
2. Chock the **REAR** drive axle wheels to prevent movement while installing the rear bar pin into the axle bracket.
3. Support the current axle position of the rear axle pinion with a jack to assist with the installation of the rear bar pin.
4. Disconnect the rear V-torque rod from the torque rod axle bracket.
5. Lower the rear drive pinion until the axle bracket legs are parallel to the rear bar pin flats, see Figure 8-11.
6. Mount the equalizing beam into the **REAR** drive axle brackets.
7. Install NEW bar pin fasteners. **DO NOT** tighten at this time.

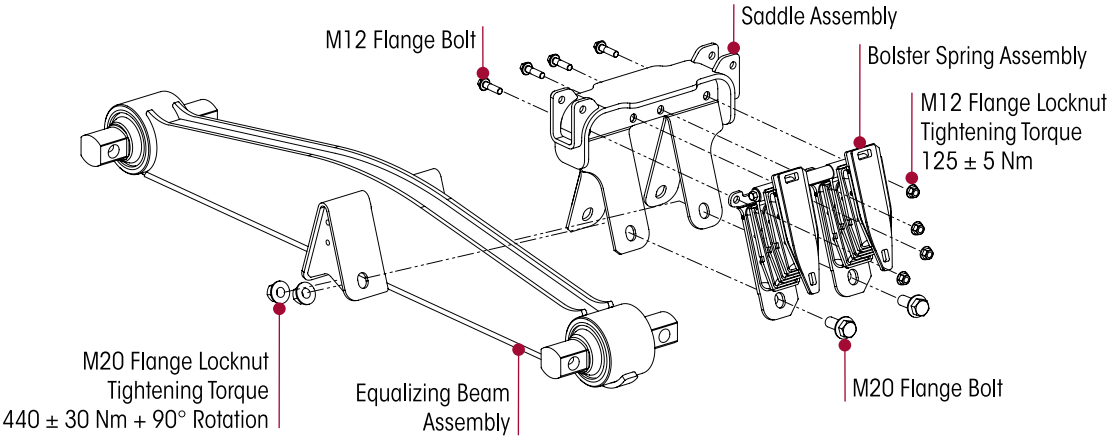
8. Install the rear V-torque rod to the torque rod axle bracket. Tighten the fasteners to the vehicle manufacturer's specifications.
9. Tighten the bar pin fasteners to vehicle manufacturer's specification.
10. Lower the vehicle.

FIGURE 8-11




11. Install the M20 fasteners connecting bolster to the equalizing beam and tighten to 440 ± 30 Nm + 90° rotation torque, see Figure 8-12.
12. Remove wheel chocks.

FIGURE 8-12




## BAR PIN END BUSHINGS

**You will need:**

- A shop press with a capacity of at least 45 metric tones, End bushing kit (see Parts List Section of this publication), Bar pin installation, removal and a shop made receiving tools (Refer to Special Tools Section of this publication.)

**WARNING**

WHEN REMOVING AND INSTALLING 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 BEAM BORES OR FASTENERS. 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.

**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** Watson & Chalin China recommends the use of Class 10.9 bolts, hardened washers, and Class 10 locknuts. Hardened washers are not necessary when flange head fasteners are used.

## BUSHING REMOVAL

1. Remove the equalizing beam 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 receiving tool.
3. Prior to removal, note the orientation of the bar pin flats, see Figure 8-13. Mark orientation on the equalizing beam with a paint stick.

**FIGURE 8-13**

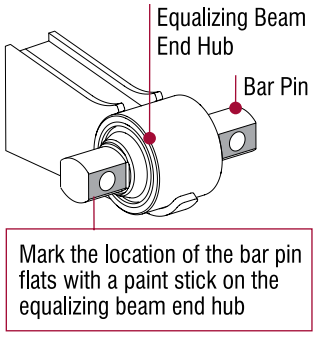
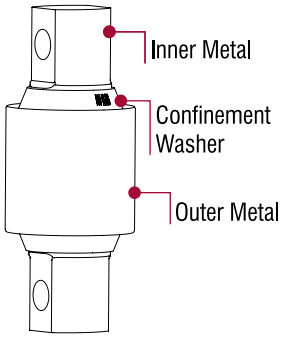



**FIGURE 8-14**




4. Press on the end bushing inner metal, see Figure 8-14, 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 end bushing removal tool directly on the bushing's outer metal (see Figure 8-14) and press the bushing out of the beam end hub.
6. After removing the equalizing beam end bushings, clean and inspect each beam end hub bore.

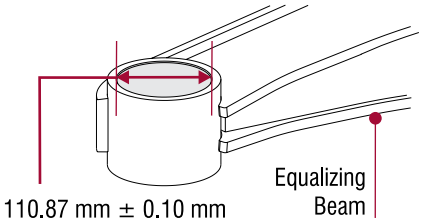
## END HUB PREPARATION AND INSPECTION

**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 8-15**
**Equalizing Beam End Hub Bore Diameter**




1. Clean the equalizing beam 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 outside diameter. If components are **NOT** within the specified range, replacement is required.
   - The Watson & Chalin China specification for the equalizing beam end hub bore diameter is 110.97 mm / 110.77 mm, see Figure 8-15.

## END BUSHING INSTALLATION

**SERVICE HINT** 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 end bushing from this end.

1. Place the equalizing beam in a shop press with the end hub, see Figure 8-16 , squarely supported on the receiving tool.
2. Install the end bushing installation tool (refer to Special Tools Section of this publication) on the new end bushing as shown in Figure 8-16. Tighten the through bolt until the two halves of the tool meet.
3. Lubricate the inside diameter of the equalizing beam end hub AND the bar pin end bushing's outer metal with a heavy layer of NLGI #2 – EP (Extreme Pressure) lithium base grease, see Figure 8-16.

4. Position the bar pin end bushing and installation tool on the equalizing beam end hub. Verify the end bushing is in line with the alignment mark made prior to removal.

**NOTE**

The end bushing must be square with the equalizing beam end hub before pressing the end bushing into the beam. End bushings pressed in at an angle will damage the end bushing and the equalizing beam.

**FIGURE 8-16**

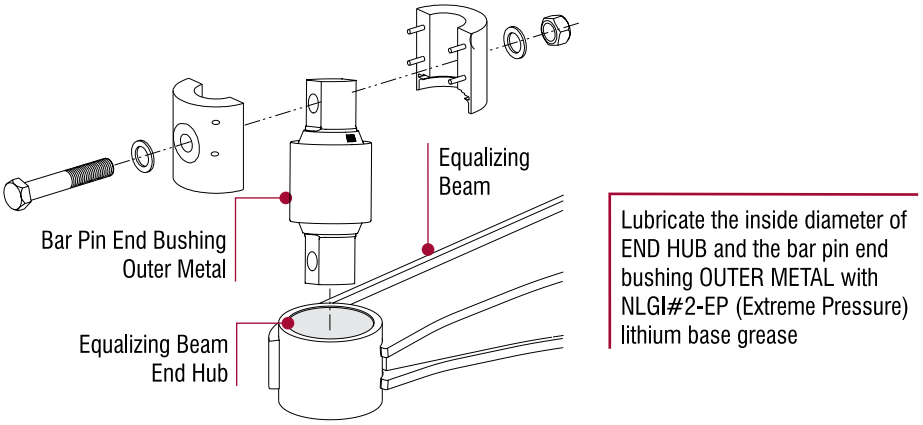
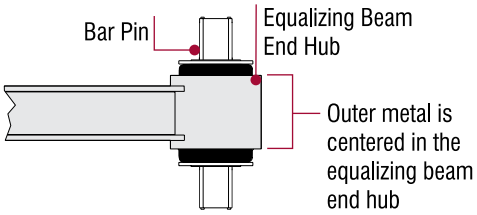



**FIGURE 8-17**




5. Verify the end bushing's outer metal is aligned with the end hub. Equalizing beam and end bushing damage 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 8-17.
7. Install the equalizing beam assembly into vehicle as detailed in Equalizing Beam assembly instructions in this section.

SECTION 9

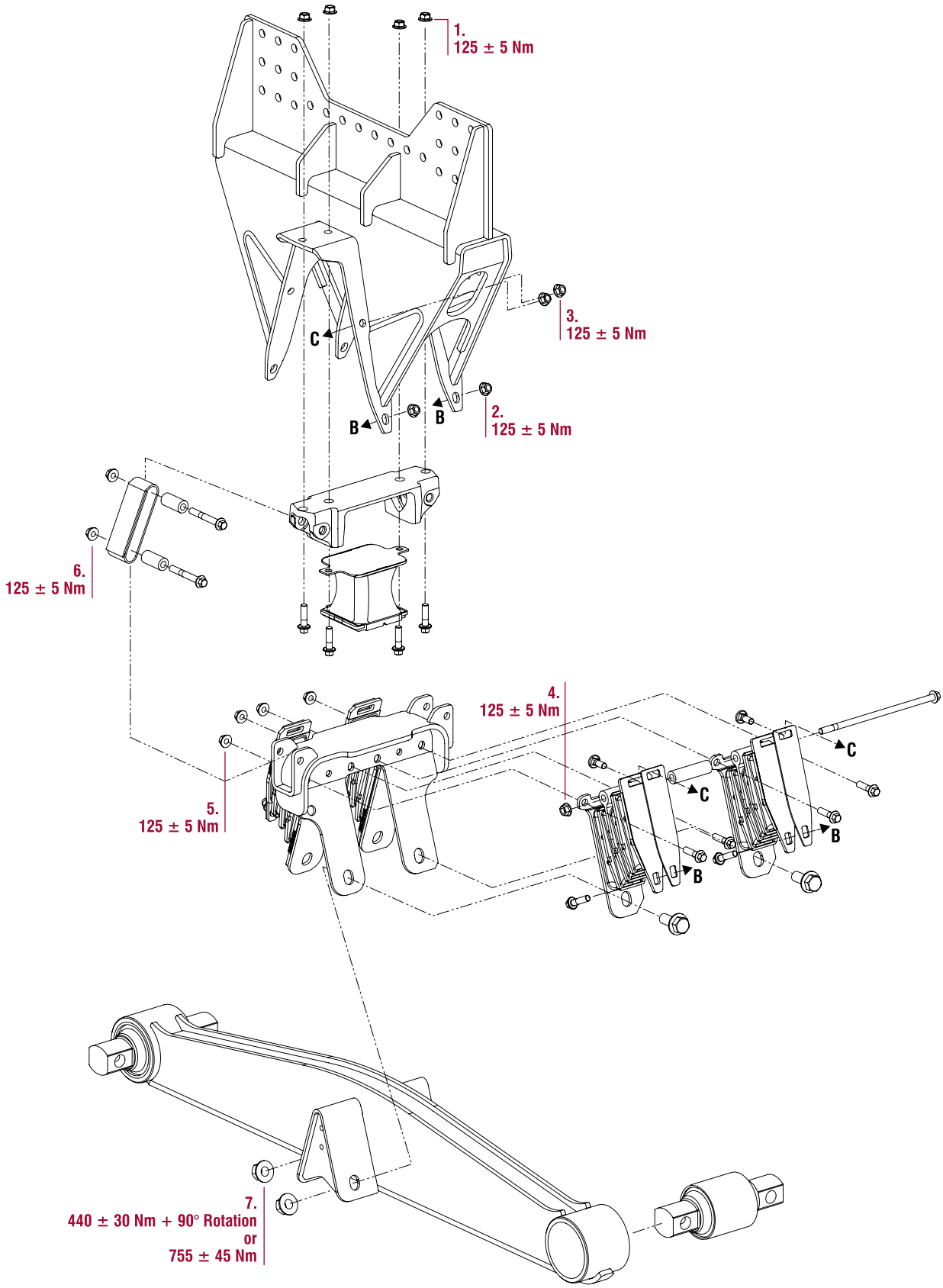
# Troubleshooting Guide

| W&C-TRR TROUBLESHOOTING GUIDE | | |
|---|---|---|
| **CONDITION** | **POSSIBLE CAUSE** | **CORRECTION** |
| Suspension has harsh or bumpy ride | Damaged progressive load spring | Replace the progressive load spring |
| | Damaged tie-bar bolster springs assembly | Replace the tie-bar bolster springs assembly |
| Vehicle leans | Damaged progressive load spring | Replace the progressive load spring |
| | Damaged tie-bar bolster springs assembly | Replace the tie-bar bolster springs assembly |
| Irregular tire wear | Bent axle | Replace the axle housing |
| Bulged tie-bar bolster springs | Suspension is overloaded | Redistribute the load to correct weight and replace the bolster springs |
| | Worn progressive load spring | Replace the progressive load spring and replace the bolster springs |
| | Axles not centered | Center the axles under frame rails and replace the bolster springs |
| Loose saddle assembly fasteners | Suspension is overloaded | Redistribute the load to correct the weight |
| | Frequent hard stop/start | Increase the fastener inspection intervals |
| | | Review the driving habits to reduce the frequency of hard stop/start |
| Outboard frame bracket cracked | Suspension is overloaded | Redistribute the load to correct weight |
| Saddle leg to equalizing beam contact | Axles not centered | Center the axles under frame rails |

SECTION 10

# Torque Specifications

**WATSON & CHALIN CHINA RECOMMENDED TORQUE VALUES PROVIDED IN NEWTON METERS**



## W&C-TRR for XCMG

| WATSON & CHALIN CHINA RECOMMENDED TORQUE SPECIFICATIONS | | | | |
|---|---|---|---|---|
| NO. | COMPONENT | FASTENER | | *TORQUE VALUE IN NEWTON METERS |
| | | SIZE | QUANTITY | |
| Frame Fasteners furnished and installed by Truck Manufacturer | | | | |
| 1 | Frame Hanger to Progressive Load Spring Rebound Bracket | M12 | 8 | 125 ± 5 |
| 2 | Frame Hanger to Lower Tie-bar Bolster Spring | | 8 | |
| 3 | Frame Hanger to Upper Tie-bar Bolster Spring | | 8 | |
| 4 | Tie-bar Bolster Spring | | 4 | |
| 5 | Tie-bar Bolster Spring to Saddle Assembly | | 8 | |
| 6 | Saddle Assembly to Rebound Strap | | 4 | |
| 7 | Tie-bar Bolster Spring to Equalizing Beam | M20 | 8 | 440 ± 30 + 90° rotation or 755 ± 45 |
| **NOTE:** Torque values listed above apply only if Watson & Chalin China supplied fasteners are used. If non Watson & Chalin China fasteners are used, follow torque specification listed in vehicle manufacturer's service manual. | | | | |

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

**Contact Watson & Chalin China at +86 531 8880 9055 for additional information.**

**Watson & Chalin China**
No. 1668 North Section of Chunbo Road
East New Dist of Jinan High- Tech Industrial Development Zone
Jinan City, Shandong Province, China, 250104
+86 531 8880 9055 • Fax +86 531 8880 9059
**china.wcsuspensions-intl.com**

W&C282 TP Rev A 07-23
Watson & Chalin is a brand of Hendrickson
Printed in United States of America