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NHTSA-215

2004 JUL -7 P 3 38

July 1, 2004

OFFICE OF  
DEFECT INVESTIGATION

**BY TELEFAX AND  
BY FEDEX**

National Highway Traffic Safety Administration  
400 Seventh Street, S.W.  
Washington, D.C. 20590

04V-329  
(17 pages)



**RE: NOTIFICATION OF DEFECT**

This report is being sent to you in compliance with 49 CFR Part 573 - Defect and Non-Compliance Reports.

1. **Manufacturer's Name:**

Motor Coach Industries Mexico, S.A. de C.V.  
Domicilio Conocido  
Corredor Industrial S/N 43990  
Ciudad Sahagun, Hidalgo México  
(plant closed)

Motor Coach Industries, Inc.  
1700 E. Golf Road  
Suite 300  
Schaumburg, IL 60173  
(current product supporting entity)

2. **Vehicle potentially containing the defect:**

MCI 2001 through 2003 model G4500 motor coaches manufactured at Motor Coach Industries Mexico's Sahagun facility prior to unit 80518.

3. **Number of vehicles potentially containing the defect:**

Up to 518 coaches.

4. **Percentage of vehicles potentially containing the defect:**

75 % or greater of the coaches.

5. **Description and Determination of Defect:**

In mid April 2004, MCI was notified of an issue with a 2002 G4500 coach 3BMXSMRA02S080310 with 326,409 miles. This coach was manufactured at Motor Coach Industries Mexico plant in Sahagun, Mexico. Customer complained about a noise in the front suspension of the coach and supplied photos of what seemed to be a damaged front radius rod bracket. Initial analysis indicated that the damage might have been caused by incorrect jacking of the front end and/or a significant impact with a fixed object on the front structural component at issue.

Further investigation and analysis indicated that an insufficient weld penetration issue

MOTOR COACH INDUSTRIES

may exist in the assemblage of parts for the lower radius rod bracket. MCI then arranged for the coach to be flat-bedded to MCI's Loudonville, Ohio facility for further inspection and repair.

MCI conducted further investigation to determine if the problem was due to a manufacturing defect or a service related incident. MCI's inspection of several exemplar G model coaches manufactured at different times indicates that an assembly error during the welding process of the lower radius rod bracket may have occurred and that the potential exists for further incidents.

MCI's investigation included an examination of other weld locations on the original coach and exemplars, which did not reveal any similar weld penetration deficiencies.

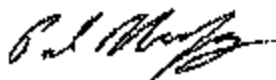
6. Program for Remedy:

MCI is preparing to implement a rework of the MCI 2001 through 2003 model G4500 motor coaches, prior to unit 80518, that are still in its possession.

A Field Change Program bulletin and customer notification letter (attached) providing instructions will be mailed to coach operators explaining the defect and proposed remedy to ensure that all affected vehicles are corrected.

MCI would appreciate NHTSA's prompt response in the assignment of a campaign number so that MCI can proceed with the release of a formal Field Change Program service bulletin.

Yours truly,  
MOTOR COACH INDUSTRIES, INC.



By: Paul Murphy  
Director - Regulatory Compliance

cc: Timothy Nalepka, MCI

July 1, 2004

DRAFT

**SUBJECT: FIELD CHANGE PROGRAM  
NHTSA Recall No.1**

**Ref: FCP Bulletin 227**

Dear Customer:

This notice is sent to you in accordance with the National Traffic and Motor Vehicle Safety Act.

Motor Coach Industries, Inc. ("MCI") has determined that a defect exists which relates to motor vehicle safety in certain MCI 2001 through 2003 G4500 model motor coaches prior to unit 80518.



**Safety Defect:**

The front lower radius rod mounting bracket components may not have received sufficient weld penetration at time of manufacture. As a result and over time, these welds may begin to crack, allowing movement and potential separation of the radius rod mounting bracket. MCI has been made aware of at least one field failure involving an MCI vehicle experiencing this anomaly.

**What Will MCI Do:**

We request your co-operation in repairing this defect as quickly as possible. Please make the necessary repairs as directed in the attached service bulletin. There will be no cost to you for this rework.

If you have any concerns or difficulties in relation to this Field Change Program, please contact our Customer Service Line at 1-800-241-2947.

You may also submit a complaint to:

Administrator  
National Highway Traffic Safety Administration  
400 Seventh Street, SW.  
Washington, DC 20590

or call the toll free Auto Safety Hotline at 800-424-9393.

MCI apologizes for any inconveniences this may cause, but we urge you to implement this Field Change Program as soon as possible, for your and your passengers' safety and satisfaction.

Sincerely,

*Motor Coach Industries, Inc.*

U.S. and Canadian Service Departments



# Service Bulletin No. 227

MODEL G4100/G4500 Series Coaches	TYPE Field Change Program	SECTION/GROUP 12-Suspension	DATE
SUBJECT <b>RADIUS ROD BRACKETS ON FRONT AXLE LEG ASSEMBLY</b>			
CONDITIONS			

# DRAFT

Ref. NHTSA Recall No.: 04V-XXX

### Description:

MCI has made design changes to improve the durability and reliability of the front radius rod bracket installation. As a result, MCI advises that all G model coaches between the range of unit numbers 80001 to 80518 implement the specified steps in this procedure.

### Parts

Qty.	Old P/N	New P/N	Description
2		03-53-1242	Bracket - Support, Top, Radius Rod ( if required upon inspection )
2		03-53-1243	Bracket - Support, Bottom, Radius Rod ( if required upon inspection )
2		03-53-1251	Plate ( if required upon inspection )
2		03-53-8007	Plate ( if required upon inspection )
2		19-01-6017	Capscrew - DIN961 - 10.9/MF16 - 1.5X75, HCS BZ
2		19-01-6280	Capscrew - DIN960 - 10.9/MF16 - 1.5X70, HCS
8		19-02-6080	Flatwasher - DIN6916 - BLK/M16
4		19-03-8008	Nut - DIN934 - CL10M16 - 1.5
a/r		21-7209-5	Loctite
a/r		21-7512-7	Never-Seize
a/r		23-04-0005	Sika Remover, 208 tectyl based undercoating
a/r		12-03-8083	Shim - Lower Radius Rod, 0.135 inch
a/r		12-03-8084	Shim - Lower Radius Rod, 0.080 inch
a/r		12-03-8085	Shim - Lower Radius Rod, 0.030 inch
a/r			Undercoating, Hydroarmor, Dolphin 7755 or,
a/r			Undercoating, Tectyl based



## NOTE

**Welding may only be done by an experienced and qualified person. All welding must conform to AWS D1.1 Structural Welding Code - Steel. All applicable instructions and prohibitions must be followed.**

**Follow the welding disconnect procedure for non-multiplex and multiplexed coaches on Pages 11 & 12.**

The following procedure can be done using either welding method listed below:

1. SHIELDED METAL ARC WELDING ( SMAW )
  - a. 1 / 8 rod - 7018 rod
2. METAL CORE ARC WELDING ( MCAW )
  - a. 0.045 diameter ER70C-8 wire ( shielding gas - 90% Argon, 10% CO2 )



## WARNING

**Wear safe eye protection at all times while performing maintenance to prevent serious personal injury.**

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**Service Procedure:**

**General notes**

Read this entire procedure before beginning work.

**Use Safe Shop Practices At All Times.**

1. Turn the main battery disconnect switch to the OFF position.



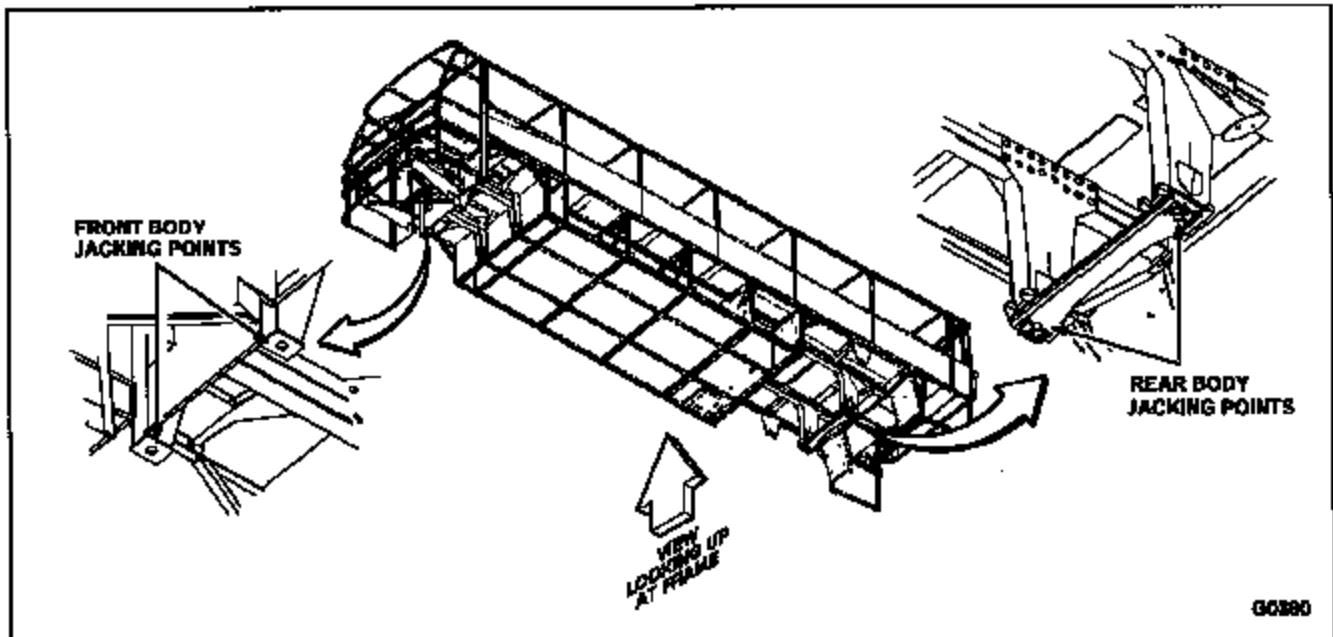
**REFER TO MANUAL**

*Refer to Section 3H / Towing and Jacking, in the MCI G Series Maintenance Manual, for the basic rules, procedures and safety precautions that must be followed before a coach is to be lifted.*



**NOTE**

*Raise the coach to the desired height. Position jackstands at the front and rear frame support points, according to Figure 1, to ensure that the coach is securely supported before attempting work underneath the coach.*



**Figure 1. Underframe Jackstand Support Points ( Section 3H / Maintenance Manual )**



**NOTE**

*The trailing axle should be lifted only when the trailing axle's suspension air bellows are exhausted. Close the tag axle suspension shut-off valves, located in the RH, rear service compartment ( Figure 2 ).*



Figure 2.

2. Support the drive and tag axes.
3. Clean the surface of the front leg ( using an Industrial heat gun and steel brush ), to remove all the dirt and loose rust.



## REFER TO MANUAL

*Refer to the Maintenance Manual / Section 3 / Exterior Maintenance, for the basic procedures for cleaning exterior surfaces before attempting to remove dirt or corrosion.*

*Refer to the Maintenance Manual / Section 3 / Exterior Maintenance / Corrosion Prevention, for information about corrosion protection, on repaired and non-repaired coaches.*

*Refer to the Maintenance Manual / Section 12 / Suspension, for the basic procedure on radius rod removal.*

4. Remove and retain the radius rod, to gain access to the lower radius rod bracket assembly. Discard the existing radius rod mounting hardware.
5. Using sika remover ( part number 23-04-0005 ), remove any existing sikaflex from the lower radius rod bracket assembly.
6. Using a clean cloth, apply a petroleum based solvent to the tectyl based undercoating on the lower radius rod bracket assembly. Allow enough time for the solvent to flash off. Using a pressure washer, apply low pressure steam. Visually check to ensure that the undercoating has been removed from the rework area.
7. Visually inspect the lower radius rod bracket assembly.
8. If no cracks are present at the radius rod mounting holes and no damage to the assembly has occurred, reweld all joints according to Figure 5. Upon completion of rewelding all joints, proceed to Step 14.
9. If cracks are present at the radius rod mounting holes, or the assembly has become detached and/or damaged, the radius rod bracket assembly will have to be replaced as outlined in Steps 10. to 13.



## NOTE

*A front axle alignment is required on coaches installing the new support bracket and plates.*

- Using a disc or plasma cutter, remove the damaged bracket ensuring no damage to the front leg body ( Figure 3 ).



Figure 3.



### NOTE

*Grind the area flush, ensuring a clean surface to install the new bracket assembly.*

- Preheat the foot pad to 400 degrees F ( Figure 4 ). Use a temperature stick to verify that proper preheat temperature has been achieved.

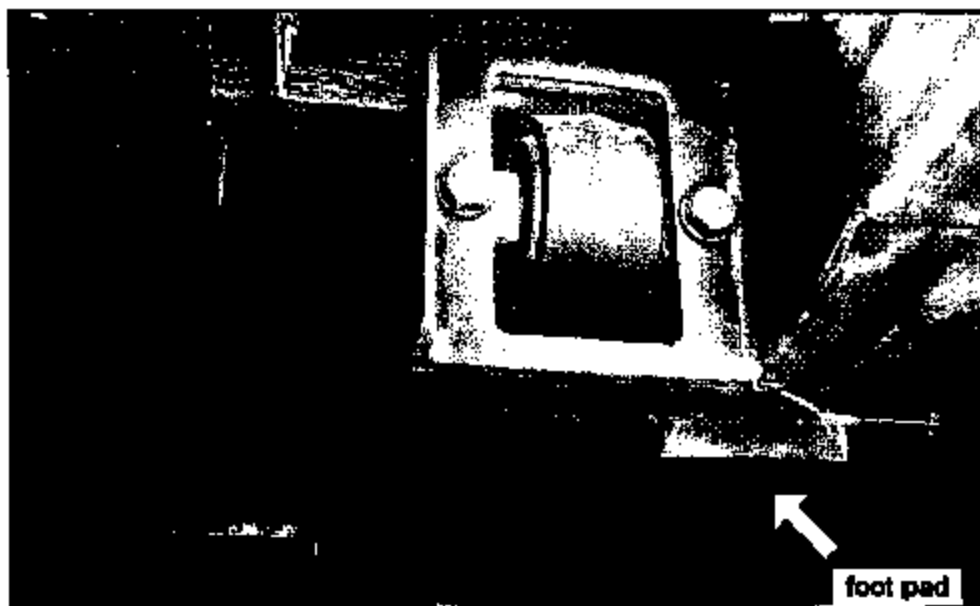


Figure 4. Reference photo only, radius rod removal is required to perform retrofit steps.

- Tack weld the new support brackets and plates ( part numbers 03-53-1242, 03-53-1249, 03-53-6007 and 03-53-1251 ) into position, according to Figure 5.
- Weld the new bracket assembly to the front leg, using the weld sizes and locations in Figure 5.

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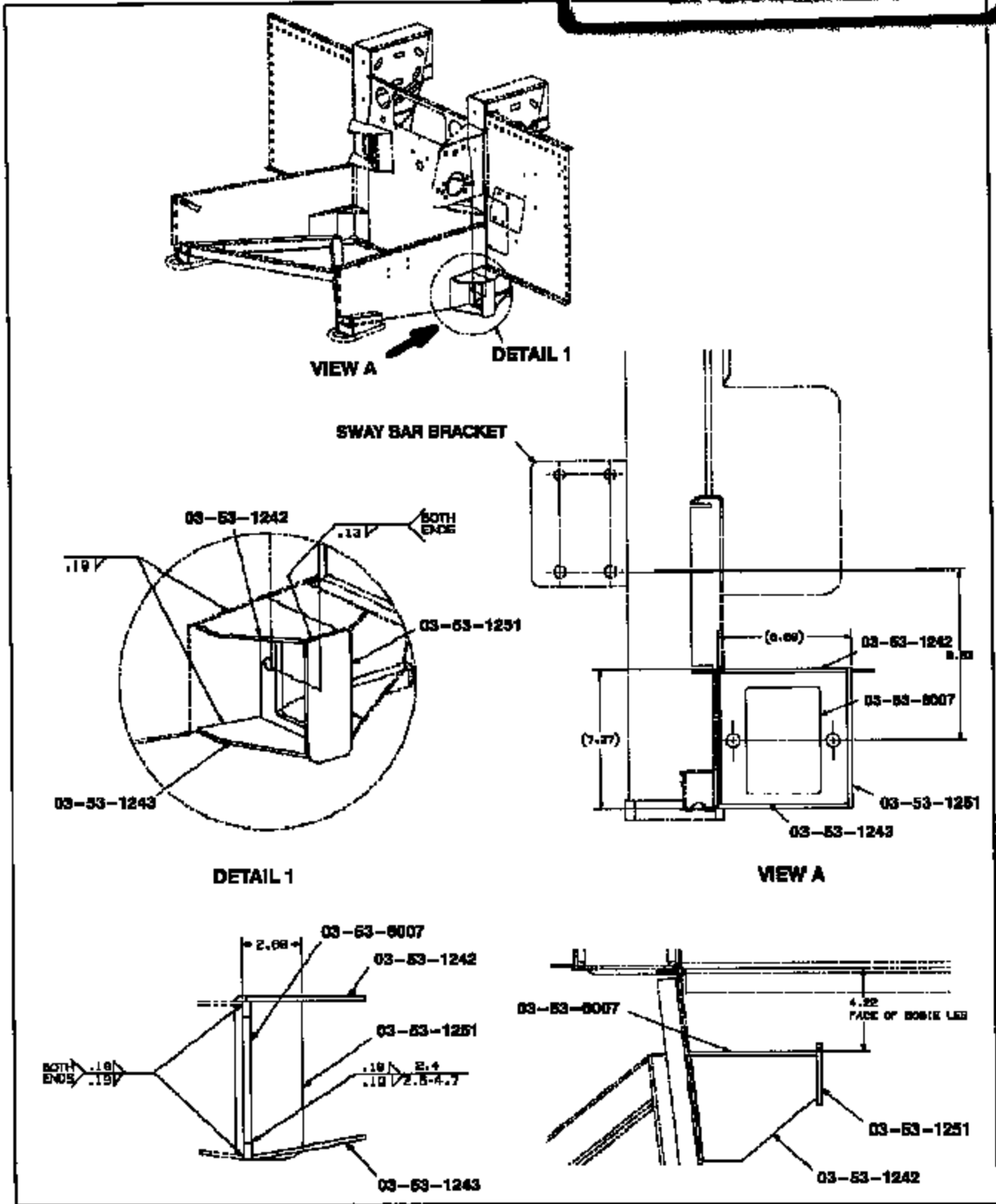


Figure 5.



**Figure 6. Radius rod bracket with new support brackets and plates.**



**CAUTION**

*To prevent personal injury, allow enough time for the weld area to cool down.*



**NOTE**

*Apply never-seize ( part number 21-7512-7 ) to radius rods prior to attaching to front bogie.*

*Ensure that there is no never-seize present on any bolts.*

*Apply Loctite ( part number 21-7208-5 ) to threads prior to installing.*

14. Using new fasteners, install radius rod according to Figure 7. Torque 19-01-6280 to 65–72 lb–ft. Torque 19-03-6008 to 171–189 lb–ft.
15. Repeat Steps 3. to 14. to opposite side.

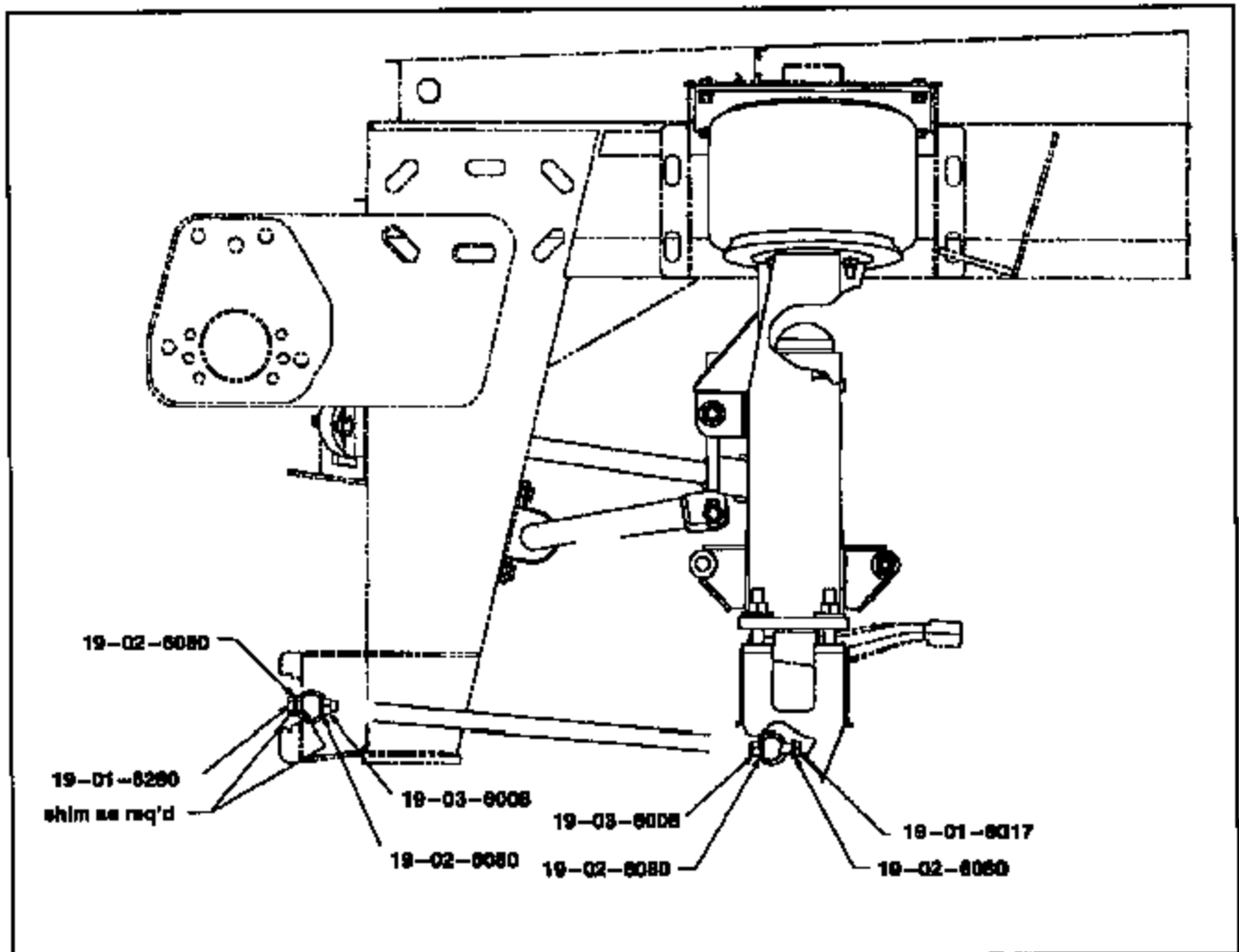


Figure 7.

- 18. Visually inspect the rework area to ensure that the metal surface is clean dry and free of rust and oil. Apply a tectyl based undercoating to the reworked area.



**NOTE**

*Ensure that there is a 50 % overlap on every application pass.  
Allow enough time for the undercoating to cure.*

*Procedure complete.*

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## DO NOT PROCEED PRIOR TO READING

THE ALIGNMENT PROCEDURE LISTED BELOW IS ONLY REQUIRED FOR COACHES THAT INSTALLED NEW SUPPORT BRACKETS AND PLATES.

### ALIGNMENT: FRONT AXLE

Correct front end alignment must be maintained for ease of steering and satisfactory tire life. Road shock, vibrations and normal stresses that are set up in the front end under average operation can result in loss of front end alignment. Refer to the following alignment data and specifications for correct adjustments.

**NOTE:** Front wheel balance should first be checked to make sure that the difficulties are not originating from out-of-balance front wheels or tires. Wheel installation and runout, wheel bearing adjustment, tie rod and draglink end wear should also be considered. Correct front end alignment can be obtained and maintained only when steering knuckles are in satisfactory condition. Factors in front end alignment are as follows:

**FRONT WHEEL CAMBER:** The amount the wheel leans outward "Positive Camber" or inward "Negative Camber" from the vertical plane, usually measured in degrees. All coach axles have "Unbiased" or equal camber.

**NOTE:** Axles are 1/4 degree "Positive Camber" in the unloaded condition, but may exhibit "Negative Camber" in some loaded conditions.

**FRONT WHEEL TOE-IN:** The distance the wheels are closer together at the front than at the rear.

**AXLE CASTER:** The fore and aft inclination from vertical of the steering knuckle. "Positive Caster" is indicated with the top of the steering knuckle towards the rear of the vehicle. "Negative Caster" is indicated with the top of the steering knuckle towards the front of the vehicle. "Zero Caster" means no inclination of the steering knuckle. All axles used on coaches should have non-adjustable positive caster.

**NOTE:** Excessive caster, in combination with some of the other items, and/or in combination with road conditions, can cause wheel shimmy. A recommended 3.0 degree caster angle can be achieved by shimming the radius rod's front mounting brackets. The lower bracket mountings are in line with the axle center, and therefore effect greater change (Figure 8). If caster angle is less than 2.0 degrees or more than 4.0 degrees contact MCI Customer Service for further instructions.

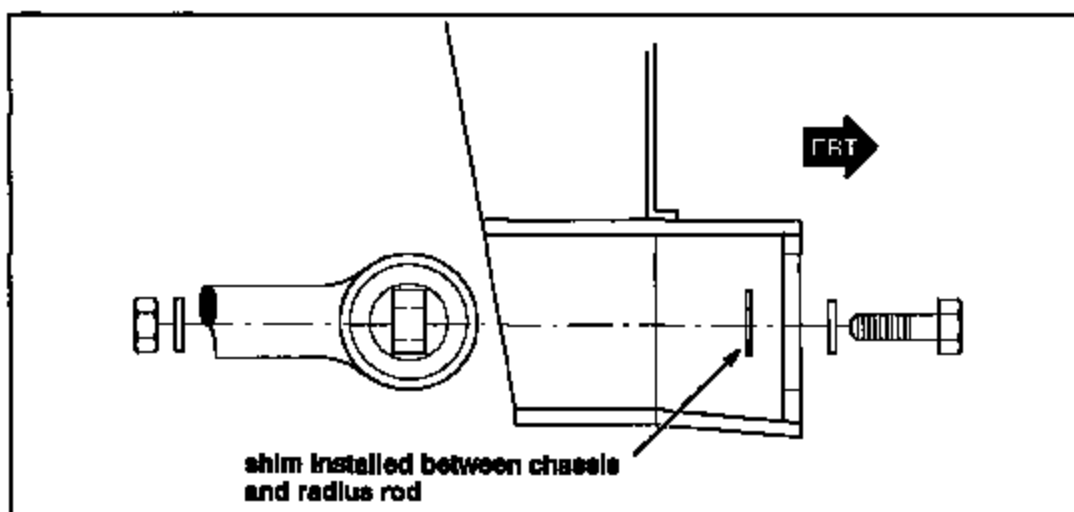


Figure 8.

**NOTE:** Axles used on coaches have non-adjustable camber, caster and knuckle pin inclination angles, however, caster can be affected by radius rod changes and/or adjustments.

**KNUCKLE PIN INCLINATION:** The amount knuckle pins are inclined inward at the top. Knuckle pin inclination is non-adjustable.

**STEERING GEOMETRY:** The specific location and/or movement of the mechanical links that maintain correct wheel alignment in relationship to the axle.



## **WARNING**

*Any manipulation of or alteration to these characteristics could severely affect the axle's steering geometry.*

**NOTE:** Camber, caster and toe-in settings can be found under "Alignment Data" in the specifications at the end of Section 1A in the G Coach Maintenance Manual.

### **Checking Camber**

Camber variations may be caused by wear at wheel bearings and steering knuckle bushings or by bent knuckle or sagging axle center.

Excessive positive camber results in irregular wear of tires at outer shoulders. Negative or reverse camber causes wear at inner shoulders. Ease of steering is also affected by any deviation from specified camber.

Position front wheels on turning plates in a straight ahead position. Attach alignment gauges to each wheel spindle. Record the camber readings for each wheel and compare with specifications at the end of this section.

### **Adjusting Toe-In**

Incorrect toe-in results in excessive tire wear caused by side slippage. Unstable steering with a tendency to wander may also result. The following steps are to check and adjust toe-in:

Do not measure toe-in with the front axle jacked up. The toe-in should be measured with the weight of the vehicle on the axle.

1. Turn main battery disconnect to off. Jack up, level and block the front axle.
2. Use paint or chalk to contrast (white-out) the center area of both front tires around the entire circumference.
3. Position a scribe or pointed instrument mounted on a steady fixture, against the contrast area of each tire and rotate the tires to scribe a base line reference mark.
4. Place a full-floating turning radius gauge plate under each wheel. Lower the vehicle and remove the lock pins from the gauge plates. If full-floating gauge plates are not available, lower the vehicle and move it backward and then forward approximately 6 feet (1.8m).
5. Position trammel bar at rear of tires and adjust pointer to line up with scribed reference lines and lock in place (scale should be set on zero). Pointers must be raised to spindle height on the tire ( Figure 9 ).
6. Position the trammel bar at the front of the tires. Adjust the scale and so that the pointers line up with the scribe marks.
7. Read toe-in or toe-out from the scale. Toe-in should read  $0.03 \pm 0.03$  inches ( $0.76 \pm 0.76$  mm).
8. Recheck the toe-in to ensure that it is correct.
9. If adjustment is necessary, loosen the tie rod clamps and turn the tie rod as required, then re-tighten the clamps. If the vehicle is not on gauge plates, move it backward, then forward about 6 feet (1.8 meters).

**DRAFT**





## **NON-MULTIPLEX WELDING CAUTION**

*The following information must be read before beginning any welding. The prohibitions and requirements must be followed to prevent personal injury and damage to electrical components. Also follow any welding instructions and cautions associated with the specific component being repaired.*

*Welding may only be done by an experienced and qualified person. All welding must conform to AWS D1.1 Structural Welding Code - Steel. All applicable instructions and prohibitions must be followed.*

*Position ground contacts and barriers as close as possible to the weld area to protect components (wiring, brake lines, bearings, hydraulic lines, etc.) from heat, contact by weld splatter and arcing.*

### **PRE-WELDING DISCONNECTION ON G4500 NON-MULTIPLEX COACHES ( UNIT NUMBERS 80026 – 80412 AND 80418 – 80451 )**

1. Switch the main battery disconnect OFF
2. In the **BATTERY COMPARTMENT**, in the order given:
  - a. Disconnect the ground.
  - b. Disconnect the 12-volt cable at the battery and tape terminals.
  - c. Disconnect the 24-volt cable at the battery and tape terminals.
3. In the **FRONT JUNCTION BOX COMPARTMENT**, in the order given:
  - a. Disconnect the transmission ECU ( 3 connectors ).
  - b. Disconnect the ABS ECU ( 5 connectors ).
  - c. Disconnect the 2 connectors from the HVAC controller.
4. In the **ENGINE COMPARTMENT**, in the order given:
  - a. Disconnect all connectors on the engine ECM ( 5 connectors ).
  - b. Disconnect the transmission main plug ( 1 connector ).
5. In the **DRIVERS CONSOLE**:
  - a. Disconnect the translator module ( P-15 ).
6. In the **INSTRUMENT PANEL**:
  - a. Disconnect the black connector ( P-19 ).
7. On the **STEERING COLUMN**:
  - a. Disconnect the 3 connectors ( P-AA, P-BB and P-183 ).
8. In the **WIPER CONTROL MODULE**:
  - a. Disconnect the 2 connectors ( P-10 and P-11 ).
9. In the **CRUISE CONTROL MODULE**:
  - a. Disconnect the 3 connectors ( J-2, J-3 and P-31 ).
10. In the **LEFT HAND SWITCH PANEL**:
  - a. Disconnect the HVAC driver's control module.
11. In the **PROHEAT CONTROL MODULE**:
  - a. Disconnect the Proheat power cable at the Proheat control module.

*Pre-welding Disconnection Procedure complete.*



## MULTIPLEX WELDING CAUTION

*The following information must be read before beginning any welding. The prohibitions and requirements must be followed to prevent personal injury and damage to electrical components. Also follow any welding instructions and cautions associated with the specific component being repaired.*

*Welding may only be done by an experienced and qualified person. All welding must conform to AWS D1.1 Structural Welding Code - Steel. All applicable instructions and prohibitions must be followed.*

*Position ground contacts and barriers as close as possible to the weld area to protect components (wiring, brake lines, bearings, hydraulic lines, etc.) from heat, contact by weld spatter and arcing.*

### **PRE-WELDING DISCONNECTION ON G4500 MULTIPLEXED COACHES ( UNIT NUMBERS 80413 – 80417 AND 80452 – 80518 )**

1. Switch the main battery disconnect OFF
2. In the **BATTERY COMPARTMENT**, in the order given:
  - a. Disconnect the ground.
  - b. Disconnect the 12-volt cable at the battery and tape terminals.
  - c. Disconnect the 24-volt cable at the battery and tape terminals.
3. In the **FRONT JUNCTION BOX COMPARTMENT**, in the order given:
  - a. Disconnect the transmission ECU ( 8 connectors ).
  - b. Disconnect the ABS ECU ( 5 connectors ).
  - c. Disconnect the 2 connectors from the HVAC controller.
4. In the **ENGINE COMPARTMENT**, in the order given:
  - a. Disconnect all connectors on the engine ECM ( 5 connectors ).
  - b. Disconnect the transmission main plug ( 1 connector ).
5. In the **DRIVERS CONSOLE**:
  - a. Disconnect the translator module ( P-15 ).
6. In the **INSTRUMENT PANEL**:
  - a. Disconnect the red connector ( P-19 ).
7. On the **STEERING COLUMN**:
  - a. Disconnect the 3 connectors ( P-AA, P-BB and P-183 ).
8. In the **WIPER CONTROL MODULE**:
  - a. Disconnect the 2 connectors ( P-10 and P-11 ).
9. In the **CRUISE CONTROL MODULE**:
  - a. Disconnect the 3 connectors ( J-2, J-3 and P-31 ).
10. In the **LEFT HAND SWITCH PANEL**:
  - a. Disconnect the HVAC driver's control module.
11. At the **MBC MODULE BLACK**:
  - a. Disconnect connector.
12. In the **PROHEAT CONTROL MODULE**:
  - a. Disconnect the Proheat power cable at the Proheat control module.

*Pre-welding Disconnection Procedure complete.*

**POST-WELDING RE-CONNECTION ON G4500 MODEL COACH**

1. When welding is complete, re-connect all items in the **exact reverse order** from disconnection. Re-connection order is critical to safety.



**WARNING**

*To prevent personal injury, exercise extreme caution at power-up.*

2. Verify that all connections are complete and secure.
3. Warn all personnel in the area that the power is going to be switched on.
4. Ensure that all personnel are clear of the immediate area.
5. Switch the main battery disconnect ON.

*Post-Welding Connection Procedure complete.*



**NOTE**

**AFTER POST-WELDING CONNECTION PROCEDURE IS COMPLETE, TEST ALL COACH SYSTEMS TO ENSURE PROPER FUNCTIONING OF EACH COMPONENT**

*Post welding Re-connection Procedure complete.*

**DRAFT**

Mail or fax the completed warranty claim form to MCI's warranty department, or photocopy and mail it to:

MCI Fleet Support  
Attn: Warranty Department  
7001 Universal Coach Drive  
Louisville, KY 40258  
Fax Number 1-800-360-8886

to receive credit for the hours used to complete this task. Contact the MCI Fleet Support Technical Center at 1-800-241-2847 for any further information.

***Field Change Program Conditions:***

The parts required for this change will be supplied without charge.

A labor allowance of 3.0 hours will be granted against claim SB227.1, for the procedure of rewelding both existing RH and LH radius rod brackets on G4500 model coaches.

A labor allowance of 5.9 hours will be granted against claim SB227.2, for the procedure of rewelding one of the existing radius rod brackets and installing the specified parts to the other radius rod bracket on G4500 model coaches. An allowance of 2 hours for the alignment of the front axle on G4500 model coaches is included in the 5.9 labor allowance.

A labor allowance of 6.7 hours will be granted against claim SB227.3, for the procedure of installing the specified parts to both RH and LH radius rod brackets on G4500 model coaches. An allowance of 2 hours for the alignment of the front axle on G4500 model coaches is included in the 6.7 labor allowance.

Only 1 claim ( SB227.1, 227.2 or 227.3 ) can be charged against the coach VIN number.

This labor allowance will be credited to your MCI Fleet Support Parts Account on receipt of a "Warranty Claim Form" as detailed in your Owner Warranty manual.

This program will end on December XX, 2004.

Motor Coach apologizes for any inconvenience resulting from this campaign, but urges you to implement this change as soon as possible.

Sincerely,

*Motor Coach Industries*  
U.S. and Canadian Service Departments.