

FMC Corporation
Motor Coach Division
333 Brokaw Road Box 664 Santa Clara California 95052

X URGENT

MANDATORY

ROUTINE

☐ INFORMATIONAL

July 26, 1976 Service Bulletin

2905-10001

ATTENTION: SERVICE MANAGERS AND OWNERS

GROUP

DESCRIPTION

This bulletin provides instructions for replacement of the front upper suspension arm alignment cam bushings and washers with lubricated bushings and washers. Replacement is necessary due to the poor lubricating qualities of the original bushings, which may cause seizing of the alignment cam and mount block and subsequent damage or failure of the upper suspension arm.

SUBJECT

Upper Suspension

5

Arm.

COMPLIANCE

Service Managers and owners must comply with this bulletin as soon as possible per recall notification #A0507.

MODEL (S) **AFFECTED**

Estimated accomplishment time for one mechanic is 4.0 hours. FMC/MCD will reimburse for labor up to a maximum of 4.0 hours. Coaches 00001

to 00645.

MATERIAL

MANPOWER

Replacement parts supplied at no charge by FMC/MCD are:

#M17031 4 ea. Steel Washers (Small)

4 ea. Steel Thrust Washers (Large) #M17198

#5109266 Oil Impregnated Washers (Large) #5109271 Oil Impregnated Washers (Small)

4 ea.

4 ea. #5109265 Bushings

4 ea. #5109268 Felt Packings

#5109267 Oilers 4 ea.

ea. #M25055 Cotter Pins

8 ea. #M17002 Locknuts

See Last page for current list of repair centers.



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GROUP ATTENTION: SERVICE MANAGERS AND OWNERS 5 ACCOMPLISHMENT INSTRUCTIONS SUBJECT Set parking brake and place a chock behind each rear tire. Upper Suspension Jack up front end and install a truck jack stand 2. under each front jacking point (figure 1). Arm. Remove front wheels to gain access to the suspension arms. Place a support under each front hub, and raise hub enough to relieve pressure on shock absorber (figure 2). Remove lower shock absorber locknut, bolt, and 5. washers. NOTE MODEL (S) It may be necessary to relieve pressure on **AFFECTED** shock absorber by jacking up control arm. Note position of cam notch in relation to cam lock, 6. Coaches 0001 and scribe a mark from the cam to the alignment cam block (figure 3). (Identify blocks left, right. to 00645. front and rear.) Loosen four bolts on top of each alignment cam block 7. and remove block from arm spindle assembly (figure 8. Remove four locknuts and bolts holding ball joint to suspension arm. Discard locknuts. 9. Remove upper suspension arm. Place suspension arm in vise; remove cotter pin and 10. nut, then remove cam and two washers from spindle (figure 4). Retain thin teflon coated washer (with small hole), and nut. Discard cotter pin. NOTE If cam is frozen on spindle, heat cam with a torch, and use a hammer and block of wood or other soft material to remove it from the spindle. NOTE When using vise, protect parts with a piece of scrap aluminum or other soft material. Using a 13/16 Proto spark plug socket (no. 5326), 11. and a 1-1/8 deep socket or a piece of pipe; place cam in vise, and press out the old bushing (figure 5)

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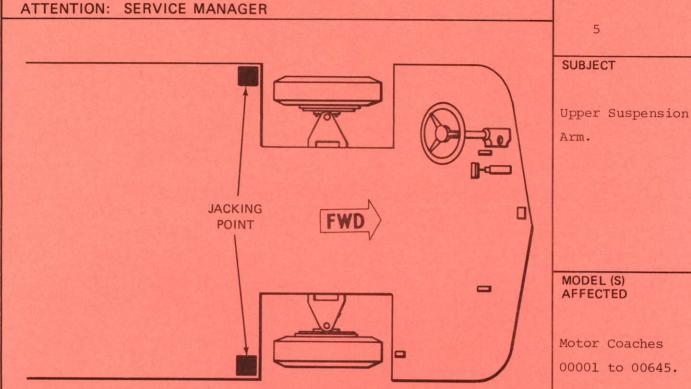


Figure 1. Front Jacking Points.

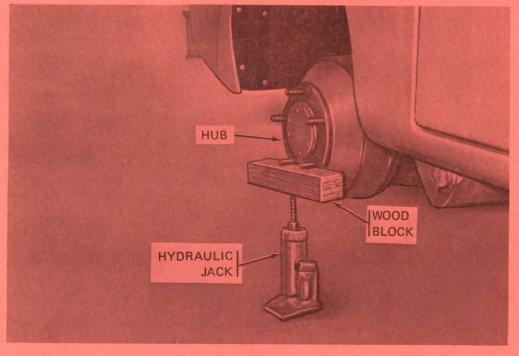


Figure 2. Hub Support.

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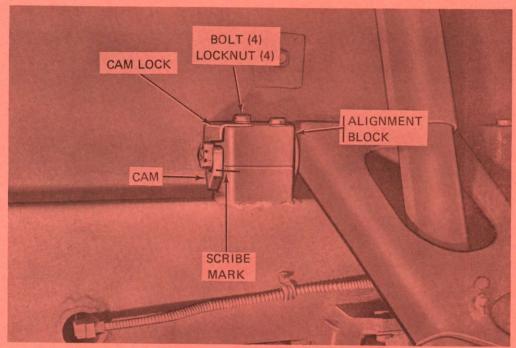


Figure 3. Cam to Block Scribe Mark.

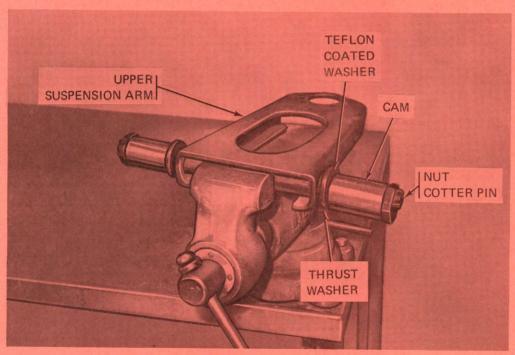


Figure 4. Removing Cam.

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SUBJECT

Upper Suspension Arm.

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12.	Clean spindle and cam in dry cleaning solvent, then remove rust or burrs with crocus cloth and	Upper Suspension
	wire brush. Be sure you clean all surfaces of the cam, especially the bushing bore. Wash it off	Arm
13.	again in solvent. Inspect spindle-to-suspension arm weld for cracks.	
	If you find a crack, do not attempt to reweld it. Order a replacement arm and spindle assembly	
14.	#5100066-W01 from FMC/MCD. Place cam in vice with outboard (hex) end up.	
	Punch mark at dead center of hex. Using a 3/16 drill bit, drill a hole approximately 1-1/4 to	
	1-1/2 inch deep. Then drill a hole through the side of the cam (same size), to intersect the first	MODEL (S)
15.	hole and into the bushing bore (figure 6). Counterbore hole in outboard (hex) end of cam using	ALLEGIED
	a 3/8 drill bit. The counterbore should be at	Coaches 00001
16.	least 3/8 inch deep. Clean out both holes. Position oiler to cam, place cam in vise, and press	to 00645.
17.	oiler into counterbored hole. Chamfer inboard end of cam bore. Slide new oil	
	impregnated washer (large), over new bushing, and position cam and bushing in vise. Take care to	
	protect oiler. Press bushing into cam (figure 7). End of bushing must be flush with face of oil im-	
18.	pregnated washer (figure 8). Place suspension arm in vise. Soak new felt pack-	
	ing in 140 weight gear oil. Assemble cam on spindle as follows (figure 9):	
	a. New Steel thrust washer (large). b. Retained teflon coated bushing washer	
	(with small hole).	
	c. New oil impregnated washer (large). d. Cam with new bushing and oiler.	
	e. New oil-soaked felt packing. f. New oil impregnated washer (small).	
	g. New steel washer (small). h. Retained slotted nut (finger tight).	

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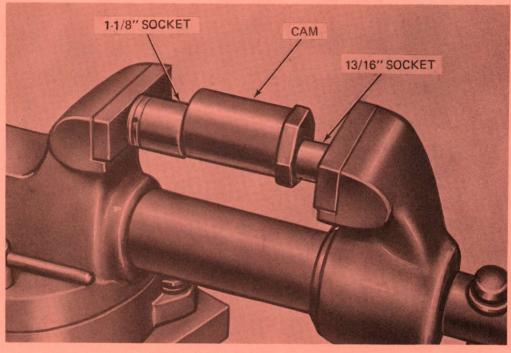


Figure 5. Removing Old Bushing.



Figure 6. Drilling Cam.

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Upper Suspension Arm.

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Figure 7. Pressing New Bushing into Cam.

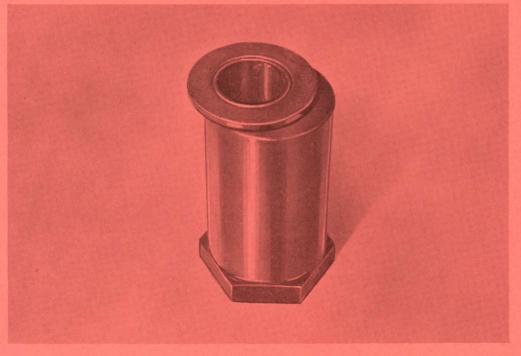


Figure 8. End of Bushing Flush with Washer.

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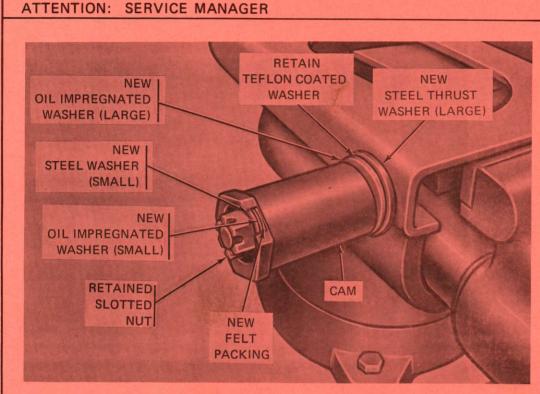


Figure 9. Assembling Cam.

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Upper Suspension Arm.

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19. Lubricate cam through oiler with 140 weight gear oil. Hold finger over bleeder hole until air is	SUBJECT
bled out and oil appears. Tighten slotted cam nut finger tight and turn to next slot on nut, secure with new cotter pin.	Upper Suspension Arm.
20. After all cams have been reworked, install upper suspension arm and spindle assembly in lower half of alignment cam blocks.	
21. Install top half of each alignment cam block (identified to bottom half). Align scribe marks and secure with four bolts and lockwashers. Tighten bolts to 32 to 34 foot pounds torque. Check suspension arm for binding.	
22. Position ball joint to spindle assembly, and secure with four bolts and new locknuts. Tighten locknuts to 36 to 38 foot pounds torque.	
23. Position shock absorber, and secure with washers, bolt and locknut. Tighten locknut to 212 to 234 foot pounds torque.	Coaches 00001
24. Remove hub supports; install wheels, and remove jack stands.	to 00645.
25. Lower front end of vehicle and remove rear tire chocks.	

f. Wheel Alignment. Proper wheel alignment ensures that the suspension and steering systems will function to provide optimum handling, steering, and stability with minimum tire wear.

Six adjustments are required to properly align the coach suspension and steering system.

Levelling — Coach should be level laterally (side-to-side) and the rear end should be 1/8 inch lower than the front.

Camber — The angle the top of the front wheel tilts out (positive) or (negative) in relation to true vertical. The coach front wheels tilt inward at the top at an angle of 1/2 degree negative camber.

Caster — The forward or rearward angle of tilt from true vertical of the steering spindle as established at lower and upper attachment points to the suspension arms. The spindle attachment point to the upper arm on the coach is aft of the lower attachment point. A centerline drawn from the spindle lower-to-upper attach points would, if viewed from the side, indicate the difference from true vertical to be 2 degrees positive caster.

Toe-out (front) — The difference in measured inches between the front edges (of outer tread edge) of the two front tires vs the difference of the rear edges when measured at approximately hub level. The coach measurement should indicate the front edge tire-to-tire distance to be 3/8 inch more than rear.

Toe-in (rear outboard wheels) — Measure same as front; should be 1/8 (plug 0, minus 1/16).

Steering wheel spoke positioning — see figure 7-1. Position spokes as shown, in accordance with paragraph 7-6f(6).

- (1) Levelling the Coach. Prior to wheel alignment, check levelling and adjust as required. The rear end of the coach should be 1/8 inch lower than the front. This can be adjusted as follows:
- (a) Place turntables (swivel pads) with lock-pins installed on a level, preferably concrete floor, directly in front of coach front and rear outboard wheels.

- (b) Drive coach straight onto turntables and center the tires on swivel pads; front wheels positioned straight ahead.
 - (c) Set parking brake.
- (d) Check all tires for 75 pounds pressure. Inflate or deflate, as required, to obtain specified psi.

Caution

A normal road-operating load should be on the coach for these procedures. Domestic and automotive systems serviced, holding tanks empty or low, normal kitchenware, supplies, and baggage in place in cabinets and closets.

- (e) Measure coach height at two front and two rear jack points, jot down location and measurements, and compare the figures. Each rear measurement should be equal and each should be 1/8 inch lower than the front end measurement. If these measurements are obtained, proceed to paragraph 7-6f(2); if not, perform steps (f) and (g) below.
- (f) Adjust rear end height by removing four cap screws and torsion bar anchor cover plate located on forward wall of each wheel well. To get access to the plate, pull the rubber strip inboard out of the retainer groove. Turn torsion bar anchor adjustment bolt, as required, to increase or decrease until specified rear end height is obtained.

NOTE

When adjusting, check left-hand and right-hand side measurements frequently, as adjustment on one side affects height of opposite side. Coach must be level laterally while maintaining proper height.

- (g) Reinstall access plates, and insert rubber strips upon completion of previous step.
- (2) Camber adjustment (fig. 7-1, 7-4, and 7-5). With coach leveled as specified in previous paragraph, adjust camber to (negative) 1/2 degree as follows:

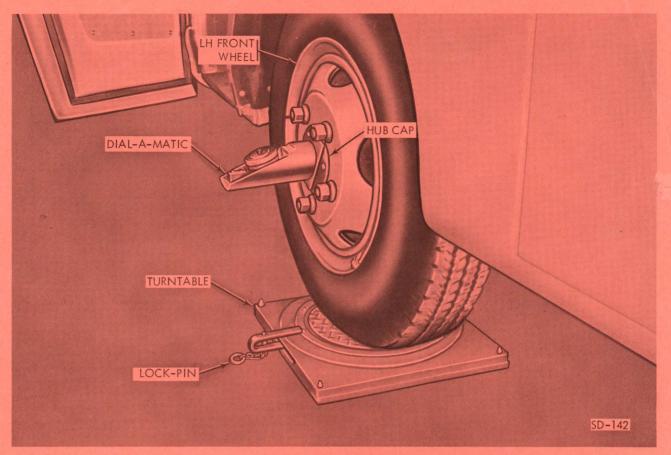


Figure 7-5. Front Wheel Alignment

- (a) Loosen the nuts and bolts securing rod end clamps (fig. 7-1, item 6) to control link rod (fig. 7-1, item 14) on both right-hand and left-hand rods, at each end of each rod. Rods must be free to turn on threaded ends of sockets. Also loosen radius rod end clamps in same manner to accomplish later steps.
- (b) Using a John Bean "Dial-A-Matic" caster, camber and dual-level indicating device (fig. 7-5), or equivalent, magnetically attach to left-hand front wheel hub cap, with adapter, to get readings directly in line from spindle axle.
- (c) Remove the lock-pins from front wheel turntable swivel pads. Set to zero "0" reading on gage.
- (d) Remove the two hold-down bolts securing the alignment cam lock to each end of the forward and aft split-block mounts; remove locks (fig. 7-1, item 19).

Warning

To permit rotation of alignment cam, slightly loosen the two hold-down bolts remaining in the two split-block mounts. If loosened too far, they might strip-out, allowing wheel assembly to abruptly sag outward.

- (e) Check the camber for a 0+1/2 reading on the Dial-A-Matic by first rotating to center the cross-level bubble. Then turn the dial wheel to center the dial-level bubble. Read camber from the camber dial (large outer dial).
- (f) Adjust the forward and aft eccentric alignment cams equally, using a 1 and 7/8 inch socket, until a 1/2 degree negative camber reading is obtained. Tighten mount block bolts, then reinstall cam locks and secure with bolts; torque all bolts 32 to 34 foot-pounds.

- (g) Repeat procedures on right-hand wheel.
- (3) Caster Adjustment (fig. 7-5). With levelling and camber adjusted as outlined in preceding steps, proceed to adjust caster to 2 degrees positive as follows:
- (a) Reinstall Dial-A-Matic as previously described, on left-hand hub cap.
- (b) Turn wheel to a 15-degree angle outboard (left-hand turn) setting on turntable gage. Center the cross and dial level bubbles on the Dial-A-Matic. Set caster dial to "0" by holding the dial wheel stationary and turning the hex knob to align the "0" line on the caster dial with the index mark on the parapet.
- (c) Turn until front of wheel is at a 15-degree angle inboard (right-hand turn) indication in turntable gage.
- (d) Center the Dial-A-Matic cross and dial level bubbles.
- (e) The Dial-A-Matic caster reading should be 2 degrees positive. If necessary, adjust by turning radius rod (use a pipe wrench if necessary).
- (f) Recycle wheel to all of the previous positions and verify that adjustment stays within allowable tolerance.
- (g) Repeat procedure on right-hand wheel.
- (h) Remove Dial-A-Matic and adapter from hub cap mount holes; reinstall hub cap attaching bolts (both sides).
- (4) Toe-out Adjustment (Front) (fig. 7-5). With levelling, camber and caster adjusted as outlined in preceding steps, adjust toe-out 3/8 inches as follows:
- (a) Position front wheel straight ahead on turntable.
- (b) Use a 6-inch square and check that the lower aft-extending arm (fig. 7-1) on the bell-crank (left-hand side) is parallel with adjacent coach frame. If not parallel, loosen nuts and bolts on the clamps at each end of the drag link rod, which attaches the upper bellcrank arm to the pitman arm, and adjust lower arms until parallel; retighten clamps.
- (c) Make a preliminary toe-out check by measuring the distance between the frame and inboard edge of the wheel rim at the rear end of wheel; then measure at front end. The measurement at the front should be 3/16 inch more than the rear measurement.

- (d) Adjust, if required to obtain the toeout specified in previous step, by turning the control link rod which connects bellcrank to the spindle control arm.
- (e) Repeat steps (a), (c), and (d) on right-hand wheel.
- (f) Using a steel tape or other measuring device, measure the distance between the aft end of the right-hand and left-hand front wheel tires (at the outer thread edge approximately hub level); then measure at the front ends of the wheels. The distance at the front should be 3/8 inch more at the front than at the rear.
- (g) If toe-out specified in the previous step is not obtained, repeat step (d) on both right-hand and left-hand wheels until required toe-out is obtained.

NOTE

Retighten all linkage rod end clamps by tightening the attaching nuts and bolts at each end.

- (5) Toe-in Adjustment (Rear) (fig. 7-With front toe-out adjusted as outlined above, check he rear outboard wheel toe-in and adjust, if required, as follows:
- Using a cord (twine or stong) of approximately 30-foot length, wrap one end around right and outboard rear tire at approximately hub letel. Secure to the integral side of tire. Pull cord to the and extend length of coach to front tire, and secure opposite and of cord to front tire same position as real. Front wheels are positioned as adjusted as previous procedures.
- (b) Check that d touches front tire fore and aft outboard faces evenly; then check for same condition at ear outboard tire.
- (c) If rear or coard the surfaces do not contact cord both fore and aft outer edges, adjust rear toe-in in coordance with the following steps (d) through j). If cord is properly contacting tire surface, no further rear toe-in adjustments are no essary. Check opposite side.
- (d) Determine amount of rear wheel oe-in adjustment needed; if small, adjust only at the outboard trailing arm pivot mount block.
- (e) Loosen the four bolts securing the upper half of the split pivot block to the frame.

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