SECTION 7-C
SERVICE, ADJUSTMENT, INSTALLATION PROCEDURES— CHASSIS SUSPENSION

CONTENTS OF SECTION 7-C

7-9 TIRE SERVICE AND INSPECTION

a. Tire Inflation and Inspection

Maintenance of correct inflation pressure in all tires is one of the most important elements of tire care. Correct tire pressure is also of great importance to ease of handling and riding comfort. Overinflation is detrimental to tire life but not so much as underinflation. Inflate all tires as specified in paragraph 1-2.

All tires should be inspected regularly to avoid abnormal deterioration from preventable causes. If tires show abnormal or uneven wear the cause should be determined and correction should be made.

b. Tubeless Tire Repairs

After removal of puncturing object a small puncture may be sealed without removal of tire from wheel by injecting sealing dough with a gun. Larger punctures may be sealed by installation of a rubber plug with cement, after tire has been removed from wheel. Sealing dough with gun, and rubber plugs with cement are contained in tire repair kits available through tire dealers. These materials should be used as directed in the instructions supplied with the kits. If a puncture is unrepairable or there is other damage to the tire carcass, repairs should be made by authorized tire dealers in accordance with instructions of the tire manufacturer.

c. Wheel Leaks

Examine rim flanges for sharp dents and straighten, if necessary. The rim flanges should be thoroughly cleaned with No. 3 coarse steel wool, thereby removing all oxidized rubber, soap solution, etc.

In isolated cases loss of air may result from loose rivets or porous welds. If the leak is minute and the rivet is not perceptibly loose, the leak can be sealed with a cement available from tire manufacturers for this purpose. If the rivet is noticeably loose or the air leak is large, replace the wheel.

CAUTION: Under no condition should loose rivets or porous welds be brazed, welded or peened.

d. Demounting and Mounting of Tubeless Tire

When demounting a tubeless tire use care to avoid damaging the rim-seal ridges on tire beads. DO NOT USE TIRE IRONS TO FORCE BEADS AWAY FROM WHEEL RIM FLANGES.

When tire is removed, inspect it carefully to determine whether loss of air was caused by puncture or by improper fit of beads against rim flanges. If improper fit is indicated, check wheel as follows:

1. Straighten wheel rim flanges if bent or dented.

2. Clean rims thoroughly, using No. 3 course steel wool, to remove all oxidized rubber, soap solution, etc. Remove rust with wire brush.

3. Inspect butt weld and other areas of rim contacted by tire beads, to make certain there is

no groove or high spot. Remove any groove or high spot by filing smooth.

4. Inspect valve stem and replace it if damaged. Make certain that valve stem is properly installed to provide an air tight joint.

Before mounting a tubeless tire on a wheel, moisten a cloth with mounting compound or soap solution and wipe rim-seal ridges of both beads to remove all foreign substances.

Moisten base of both beads with mounting compound or soap solution to help beads snap into place when tire is inflated. Start tire over rim flange at point opposite valve stem. Align balance mark on tire with valve stem.

Inflate tire until both beads are firmly seated against rim flanges and temporarily inflate to 50 pounds pressure. Leak test wheel and tire assembly and if satisfactory, reduce to recommended pressure.

e. Interchanging Tires

Tires tend to wear unevenly and become unbalanced as mileage accumulates. Uneven tire wear is frequently the cause of tire noises which are attributed to rear axle gears, bearing, etc., and work is sometimes needlessly done on rear axles in an endeavor to correct the noise.

Tire life will be increased and uneven wear and noise will be less likely to occur if the tires, including the spare are balanced and interchanged at regular intervals of approximately 6000 miles. The recommended method of interchanging tires is shown in Figure 7-8.

f. Use of Tire Chains

Do not use tire chains on the front wheels under any circumstances because they will interfere with the steering mechanism. Any of the conventional full-type non-skid tire chains can be used on the rear wheels.

Tire chains should be loose enough to "creep" but tight enough to avoid striking fenders or other parts. If chains remain in one position, the tire side wall will be damaged. Tension springs (either metal coil springs or the rubber band type) must also be used in order to prevent chains contacting frame, etc. The use of tension springs will also reduce ordinary chain noise caused by loose cross links contacting pavement.

g. Wheel and Tire Balance

Wheel and tire balance is the equal distribution of the weight of the wheel and tire assembly around the axis of rotation. Wheel unbalance is the principal cause of tramp and general car shake and roughness, and contributes somewhat to steering troubles.

The original balance of the tire and wheel assembly may change as the tire wears. Severe acceleration, severe brake applications, fast cornering and side slip wear the tires out in spots and often upset the original balance condition and make it desirable to rebalance the tire and wheel as an assembly. Tire and wheel assemblies should be rebalanced after punctures are required.

Because of the speed at which cars are driven, it is important to test the wheel and tire assembly for dynamic balance. Dynamic balancing of a wheel and tire assembly must be done on a machine designed to indicate out of balance conditions while the wheel is rotating. Since procedures differ with different machines, the instructions of the equipment manufacturer must be carefully followed.

In some cases wheel and tire balance does not always overcome wheel balance complaints because the brake drums themselves are out of balance. Balancing drums with wheels and tires as an assembly is not always satisfactory because the balance is destroyed when wheels and tires are removed or interchanged. On cars where trouble is experienced in maintaining proper wheel balance, it is suggested that all drums be individually checked for static balance and corrected.

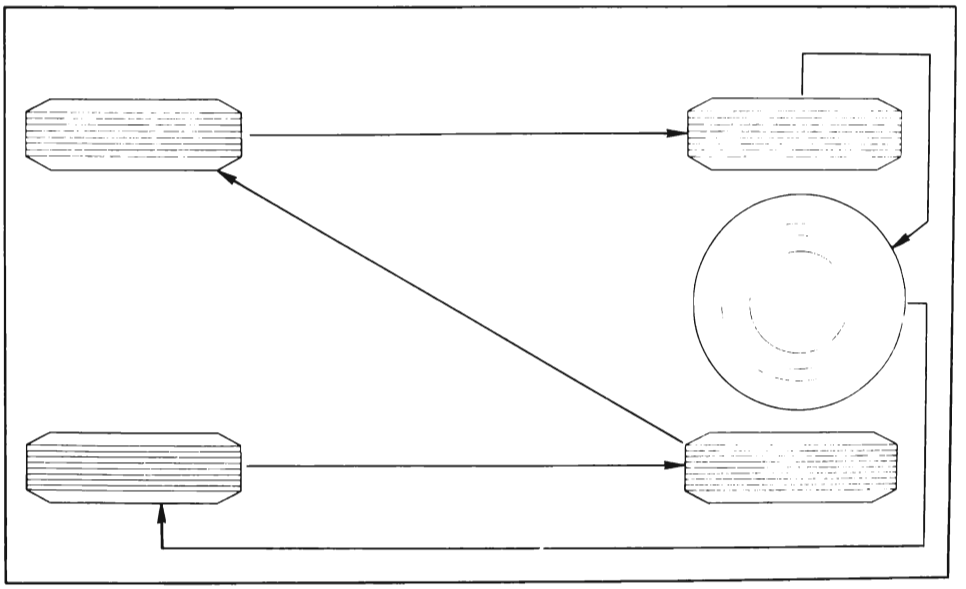


Figure 7-8—Method of Interchanging Tires

7-10 STABILIZER SHAFT, LINK AND GROMMETS

a. Stabilizer Shaft, Removal and Replacement

Disconnect stabilizer links (subpar. c) and disconnect the two underbody to shaft insulator mounts and brackets.

To install, position insulator mounts and brackets over shaft and connect bracket to underbody. Torque bracket bolts to 13 ft. lbs. Connect stabilizer links, subparagraph c below. Do not lubricate insulator mounts.

b. Stabilizer Bracket and Insulator, Removal and Replacement

Stabilizer brackets should be replaced if damaged, and rubber insulator mounts replaced if deteriorated.

Replace by supporting stabilizer shaft in position and replacing brackets and mounts one at a time. Torque bracket bolts 35 ft. lbs.

c. Stabilizer Link Removal and Replacement

1. Remove nut from lower end of link. Remove link, spacer, retainers and grommets.

2. Inspect link and grommets.

3. Install grommets dry and use care to center the grommets in the seats on stabilizer shaft and bracket on lower control arm. Also, center the retainers on grommets before tightening rod nut.

4. Tighten rod nut to 7 ft. lbs.

NOTE: The measured distance from stabilizer shaft to bracket on lower control arm should be equal at both links. If dimensions are not equal, adjust nut, or replace grommets.

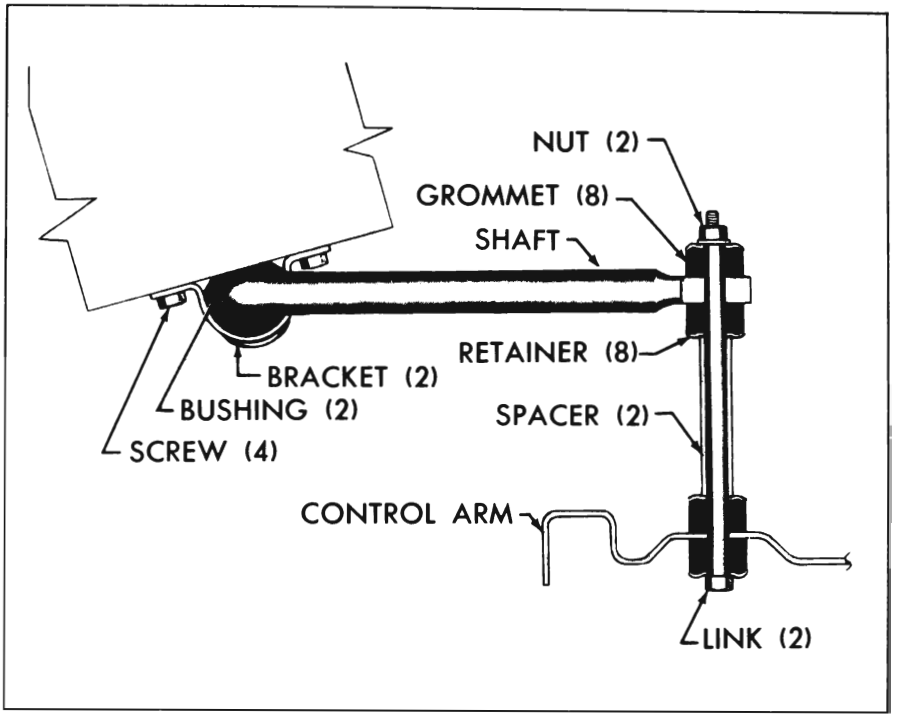


Figure 7-9—Stabilizer and Link

7-11 REPLACEMENT AND ADJUSTMENT OF FRONT WHEEL BEARINGS

a. Replacement of Bearings

1. Raise front of car and remove wheel with hub and drum assembly.

2. Remove oil seal from hub and remove cone (inner race), and roller bearing assemblies from cups (outer races) in hub. Wipe old lubricant out of hub and from steering knuckle spindle.

3. Clean and inspect all bearing parts. When inspecting or replacing cone and bearing assemblies, make certain the assemblies are free to creep on spindle of steering knuckle. Wiping the spindle clean and applying bearing lubricant will permit creeping and prevent rust forming between cones and spindle.

4. If bearings require replacement, drive the old cups from the hub. Install new cups with a soft (brass) drift being certain to start each squarely into hub to avoid distortion and possible cracking.

5. Thoroughly pack both roller bearing assemblies with new wheel bearing lubricant. Remove surplus lubricant. Apply light coating of lubricant to spindle and inside surface of wheel hub.

6. Place inner cone and bearing assembly in cup and install new oil seal.

7. Install wheel on spindle, then install outer cone and bearing assembly, washer and spindle nut.

8. Adjust bearings as follows (subpar. b).

b. Adjustment of Front Wheel Roller Bearings

1. Torque spindle nut to 19 ft. lbs. while rotating wheel.

2. Back of nut and re-torque to 11 ft. lbs.

3. If a spindle hole lines up with

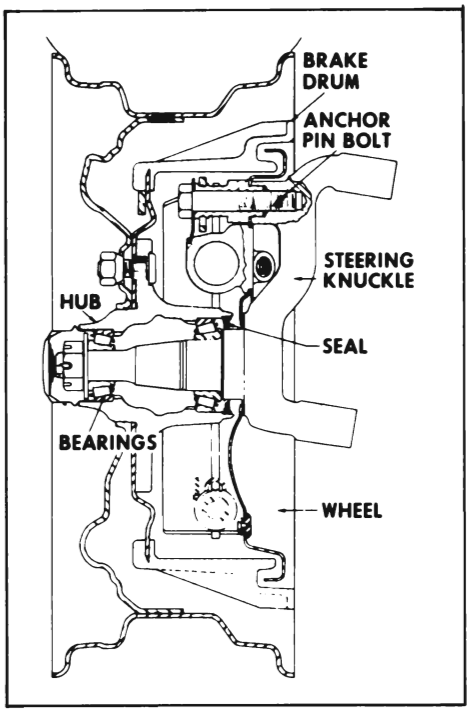


Figure 7-10—Front Wheel Hub and Bearings

one of the six nut slots, back off nut 1/6 turn and insert cotter key.

4. If neither spindle hole lines up with nut slot, back off nut a maximum of 3/12 turn and install cotter key.

5. Before installation of grease cap in hub, make sure that end of spindle and inside of cap are free of grease so the radio static collector makes good contact. Make sure that static collector is properly shaped to provide good contact between end of spindle and the grease cap.

7-12 BALL JOINTS

a. Upper Ball Joint Removal and Installation

The upper ball joint is riveted to the upper control arm. All service ball joints, however, will be provided with nut and bolt assemblies for replacement purposes.

The upper ball joint stud is spring loaded in its socket. If the upper stud has any perceptible shake, or can be twisted with the fingers, the upper ball joint should be replaced. See Figure 7-11.

b. Removal

1. Support car on car stand at the frame so front suspension is in full rebound position.

2. Remove front wheel.

3. Remove upper ball stud cotter key.

4. Loosen, but do not remove ball stud nut.

5. Rap steering knuckle sharply in area of ball stud to allow force of chassis spring to disengage tapered stud from knuckle. See Figure 7-12.

6. Place jack under lower control arm at spring seat. Raise jack until compression is relieved on upper control arm rubber rebound bumper.

7. Remove the stud nut and lift upper control arm from knuckle.

8. Support the brake drum assembly by wiring it to the flange on the frame near the upper control arm bumper.

9. Place a wood block between the upper control arm and the frame to act as a support during the following operations.

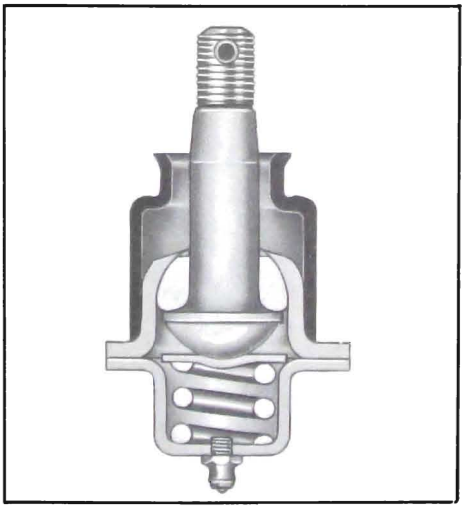


Figure 7-11—Upper Ball Joint

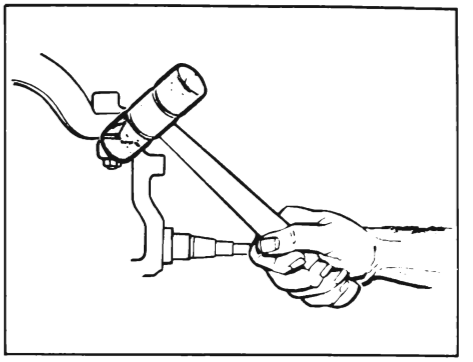


Figure 7-12—Separating Steering Knuckle from Ball Joint

10. Center punch the four rivets as close to the center as possible.

11. Drill a 1/8" hole through the center of the rivets about 1/2 to 3/4 the length of the rivet.

12. Using a 7/32" drill, enlarge the hole, drilling again about 1/2 the length of the rivet.

13. With a chisel, remove the rivet heads.

14. Using a 1/4" punch and hammer, remove the rivets. Remove ball joint.

c. Installation

1. Install the new ball joint in the upper control arm, and attach with the bolt and nut assemblies provided. Insert the bolts from the bottom with the nut and lock washers on top. Torque to 15-20 ft. lbs.

2. Turn tapered stud so cotter pin hole is fore and aft and assemble the dust shields over the stud. After unwiring the brake drum assembly and removing the wood block from between the arm and the frame, move the knuckle up by jacking under outer edge of spring seat.

3. Wipe tapered hole in knuckle and tapered stud clean and assemble stud to knuckle with castellated nut. Torque to 40-60 ft. lbs. Install the cotter pin.

4. Install wheel and tire.

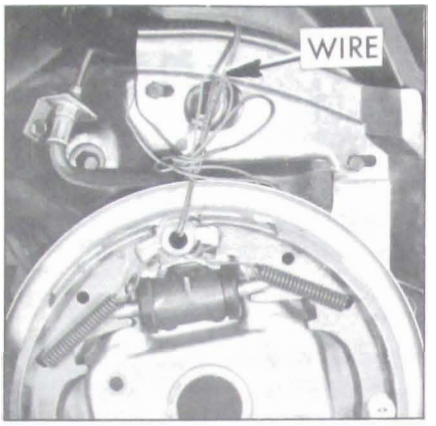


Figure 7-13—Wiring Brake Drum to Frame Flange

d. Lower Ball Joint Removal and Installation

The lower ball joint assembly is pressed into the lower control arm and is serviced separately. The lower ball joint is not spring equipped and depends upon car weight to load the ball. See Figure 7-14.

The lower ball joint should never be replaced merely because it "feels" loose when in an unloaded position.

e. Removal

1. Raise front of car and place

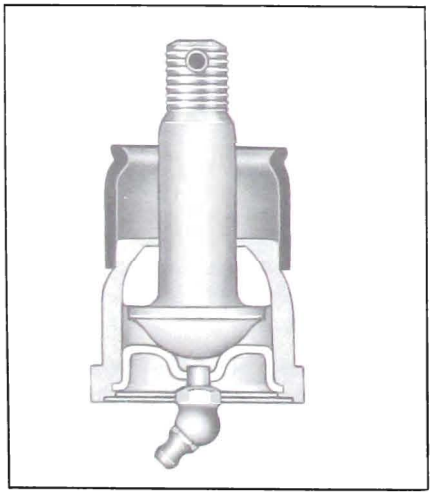


Figure 7-14—Lower Ball Joint

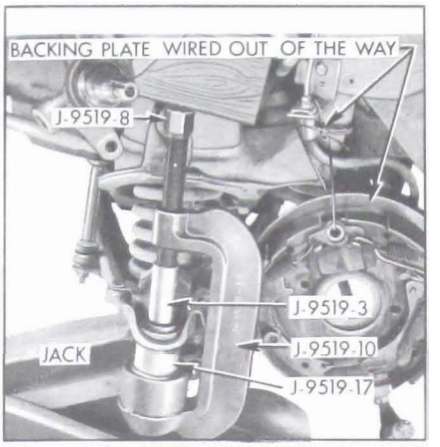


Figure 7-15—Lower Ball Joint Remover Tool in Place

jack stands under frame side rails. Remove wheel with hub and drum assembly.

2. Remove the brake backing plate. If the backing plate is wired carefully out of the way as shown in Figure 7-15, there will be no need to disconnect the brake hose.

3. Remove the ball stud cotter key. Loosen, but do not remove, the ball stud nut.

4. Rap steering knuckle sharply in the area of the ball stud to allow the force of the chassis spring to disengage the tapered ball stud from the knuckle. NOTE: It is sometimes helpful to wedge a block of wood under the upper control arm to provide a solid

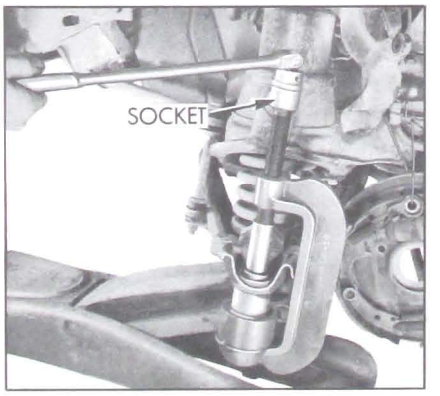


Figure 7-16—Removing Lower Ball Joint

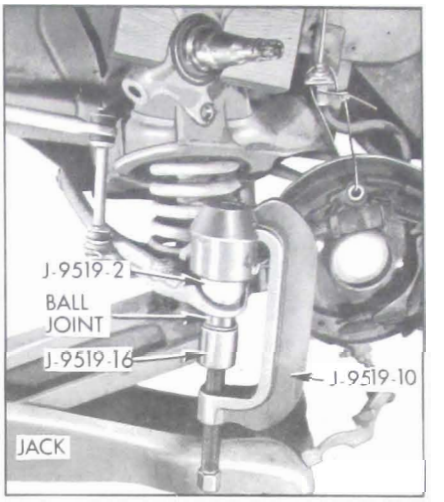


Figure 7-17—Lower Ball Joint Installer in Place

stop so the lower ball stud can be loosened with a more solid hammer rap.

5. Place a jack under the lower control arm at the spring seat. Raise the jack until compression is relieved on the upper control arm rubber rebound bumper. Remove the stud nut. Move the steering knuckle out of the way.

6. Install Lower Ball Joint Remover and Installer J-9519 as shown in Figure 7-15. Note that the larger O.D. portion of Detail J-9519-16 is positioned in J-9519-10.

7. Tighten Detail J-9519-8 with a socket and handle as shown in Figure 7-16 until ball joint is forced out of the lower control arm. CAUTION: Ball joint may pop out suddenly!

f. Installation

1. Position ball joint minus dust shield in lower control arm and install Tool J-9519 as shown in Figure 7-17. Note that the larger O.D. portion of Tool Detail J-9519-17 is positioned in Detail J-9519-10.

2. With a suitable socket and handle force the ball joint into the

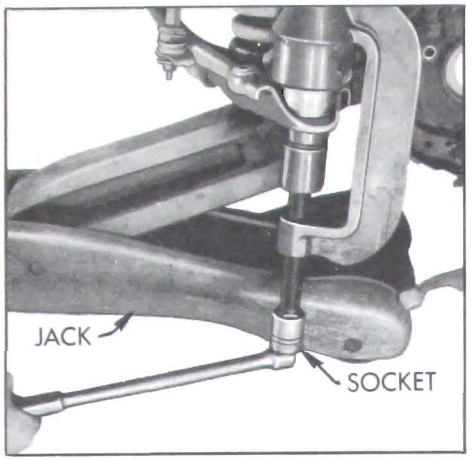


Figure 7-18—Lower Ball Joint Installation

lower control arm until it is fully seated.

3. Turn the stud so the cotter key hole is fore and aft, and assemble the rubber dust shield to the stud.

4. Position the tapered stud in the knuckle and install nut. Tighten the nut to 80 ft. lbs. and install cotter key.

5. Install wheel with hub and drum assembly. Adjust wheel bearing (par. 7-11). Remove car stand and lower car.

7-13 UPPER CONTROL ARM AND SHAFT—REMOVAL AND INSTALLATION

a. Removal

1. Support car on car stand by frame, allowing front suspension to be in the full rebound position.

2. Remove front wheel.

3. Remove upper ball joint stud cotter key.

4. Loosen, but do not remove ball stud nut.

5. Rap steering knuckle sharply in area of ball stud to allow force of chassis spring to disengage tapered stud from knuckle.

6. Place jack under lower control arm at spring seat. Raise jack until compression on upper rebound bumper is relieved.

7. Remove ball stud nut and lift upper control arm from knuckle.

8. Remove upper control arm shaft to frame nuts and lock washers, noting the number, thickness and location of the adjusting shims.

9. Clamp the arm in a vise and remove the bushings, seals and shaft. Clean away old grease and inspect parts for damage or wear. Replace all excessively worn parts.

b. Installation

1. Assemble new grease seals on the shaft. Apply a coating of good quality chassis lubricant to the shaft threads and position the shaft in the new control arm-ball joint assembly.

2. Start second bushing into the upper control arm with shaft threaded into the opposite bushing. See Figure 7-19.

3. After bushing has been threaded part way into arm, rotate shaft to engage threads of second bushing as an aid in piloting the bushing squarely into position.

4. Tighten bushing into arm until hex section of bushing seats firmly into arm. Shaft should be free enough to turn by hand. Install

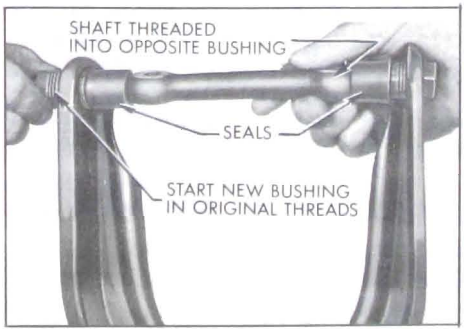


Figure 7-19—Upper Control Arm Bushing Replacement

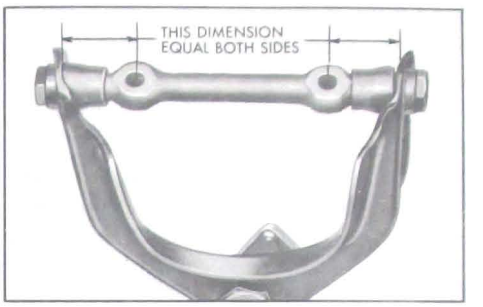


Figure 7-20—Upper Control Arm Shaft Position

grease fittings and lubricate bushings.

5. Rotate shaft to make distance between shaft bolt holes and arm equal both sides as nearly as possible. See Figure 7-20.

6. Assemble upper control arm and shaft assembly to frame, making certain the number, thickness, and location of adjusting shims between shaft and bracket are correct. Torque shaft to frame nuts to 75 ft. lbs. with a

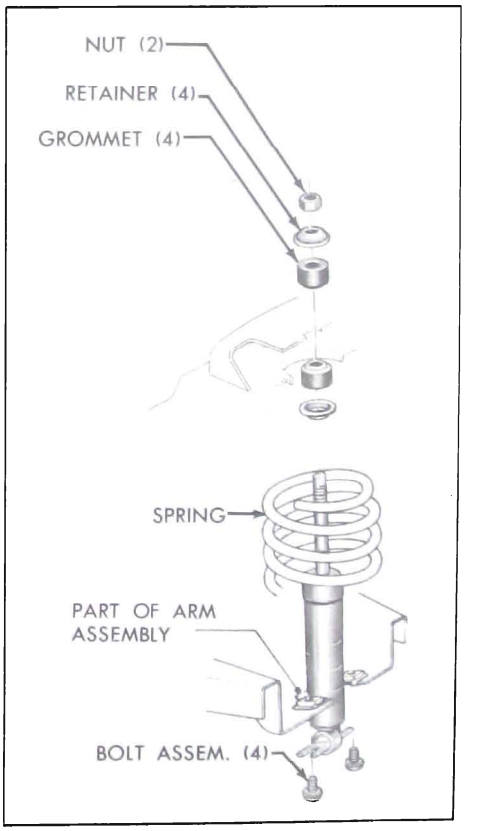


Figure 7-21—Shock Absorber Mounting

standard drive socket and J-1313 Torque Wrench or its equivalent.

7. Assemble tapered stud to knuckle with cotter pin holes fore and aft. Install castellated nut. Torque to 40-60 ft. lbs. and install cotter pin.

8. Install wheel.

9. Check and adjust front end alignment if necessary.

10. Lubricate with a long effectiveness grease equivalent to Buick Specification #742.

7-14 FRONT SHOCK ABSOBER—REMOVAL AND INSTALLATION

a. Removal

1. Remove upper shock absorber attaching nut, grommet retainer, and grommet.

2. Raise front of car.

3. Remove the two lower attaching screws and remove shock absorber, lower grommet retainer, and grommet through the spring seat.

4. Check shock absorber for damage or oil leakage. Push and pull shock absorber in an upright position. If smooth hydraulic resistance is not present in both directions, replace shock.

b. Installation

1. Make certain that new shock absorber is correct for car model. Check part number stamped on out-tube against number in the Master Chassis Parts Catalog in Group 7.345. Substitution of other than the correctly calibrated shock absorber may adversely affect car performance, and is not recommended by Buick Motor Division.

2. Extend shock and install one grommet retainer and one grommet on shock absorber and slide through hole in lower spring seat. Attach with two screws. Torque to 12-24 ft. lbs.

3. Install one grommet and one grommet retainer on shaft extending through frame. Attach one nut and torque to 5-10 ft. lbs. Lower car and remove jack.

7-15 CHECKING AND INSTALLATION OF CHASSIS SPRINGS

Optional equipment, undercoating, accumulated dirt, etc., change the car weight and must be considered when checking spring trim dimensions. Because of the many possible variations in loading due to optional equipment, it is not possible to give dimensions for all; therefore, the spring trim dimensions given below are for the standard car only, without optional equipment or undercoating and with car at curb weight. Curb weight includes gas, oil, water, and spare tire but no passengers.

Before measuring spring trim dimensions, bounce both ends of car up and down several times to make sure there is no bind in suspension members, and to let springs take a natural position.

a. Measuring Trim Height

1. Front Spring. On a car having service miles, the front spring trim dimension "Y" should be as shown in Figure 7-22 chart.

NOTE: When checking NEW springs, add 1/4".

2. Rear Springs. On a car having service miles, the rear spring trim dimensions should be as shown in Figure 7-19 chart.

NOTE: When checking NEW springs, add 3/8".

b. Removal and Installation of Chassis Springs

Front Springs

1. Raise front of car. Remove wheel with hub and drum assembly.

2. Disconnect stabilizer link from lower control arm and remove shock absorber according to instructions in paragraph 7-14.

3. Disconnect lower control arm ball joint from steering knuckle according to instructions in paragraph 7-12.

4. Lower floor jack until spring is fully extended and remove coil spring.

5. Position spring with top of spring seated in front suspension cross member. The top of the spring may be identified by a ground (flat) coil. Rotate spring so the end of the bottom coil will index with edge of hole in lower control arm spring seat.

6. Raise lower control arm to compress spring and allow assembly of ball joint to steering knuckle. Connect ball joint to knuckle according to instructions in paragraph 7-12.

7. Install shock absorber according to instructions in paragraph 7-14. Connect stabilizer link to lower control arm according to instructions in paragraph 7-10.

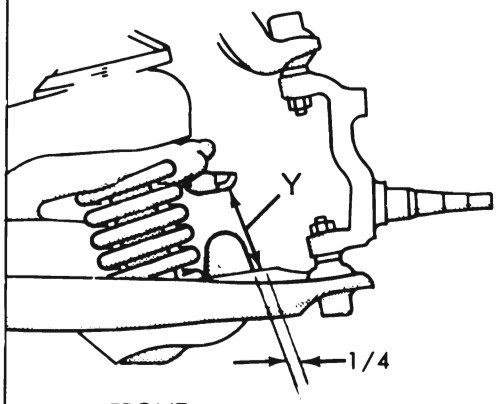
8. Reinstall wheel with hub and drum assembly. Adjust wheel bearings (par. 7-11).

7-16 FRONT LOWER CONTROL ARM—REMOVAL AND INSTALLATION

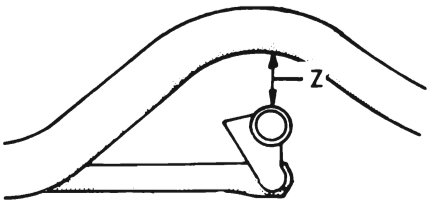
a. Removal

1. Remove coil spring according to outline in paragraph 7-15.

2. Remove the two nuts and lock washers attaching the control arm to the frame.



FRONT



REAR COIL SPRING

CHASSIS TRIM DIMENSION						
MODEL	FRONT COIL Y±1/4			REAR COIL Z±3/8		
	CURB WEIGHT	NORMAL LOAD	NO. PASS.	CURB WEIGHT	NORMAL LOAD	NO. PASS.
4027	4-11/32	3-5/16	2	5-5/8	3-23/32	2
4035	4-9/16	3-13/32	2	6	4-1/8	3
4067	4-11/32	3-5/16	2	5-5/8	3-23/32	2
4069	4-11/32	3-5/16	2	5-5/8	3-23/32	2
4127	4-11/32	3-5/16	2	5-5/8	3-23/32	2
4135	4-9/16	3-13/32	2	6	4-1/8	3
4169	4-11/32	3-5/16	2	5-5/8	3-23/32	2
4337	4-11/32	3-5/16	2	5-5/8	3-23/32	2
4367	4-11/32	3-5/16	2	5-5/8	3-23/32	2
4369	4-11/32	3-5/16	2	5-5/8	3-23/32	2

THESE DIMENSIONS DO NOT APPLY TO OPTIONAL SPRINGS.

SEDAN NORMAL LOAD
TRIM DIMENSIONS DETERMINED WITH 4 PASSENGER LOAD, 2-150 POUND PASSENGERS IN FRONT SEAT AND 2-150 POUND PASSENGERS IN REAR SEAT.

TWO SEAT WAGON NORMAL LOAD
TRIM DIMENSIONS DETERMINED WITH 5 PASSENGER LOAD, 2-150 POUND PASSENGERS IN FRONT SEAT AND 3-150 POUND PASSENGERS IN REAR SEAT.

Figure 7-22—Trim Height Chart

3. If lower control arm is to be replaced, remove the rubber bumper and attaching nut.

b. Installation

1. Install rubber bumper and attaching nut. Torque to 15-25 ft. lbs.

2. Install arm with the bolt heads to the front of the car.

3. Reinstall coil spring according to instructions in paragraph 7-15.

7-17 STEERING KNUCKLE REMOVAL

a. Removal

1. Raise front of car. Remove wheel with hub and drum assembly.

2. Disengage lock plate from brake anchor bolt and remove bolt. Remove two bolts holding brake backing plate and steering arm to steering knuckle. Support brake backing plate out of the way to avoid damage to brake hose and linings.

3. Remove cotter pins from nuts on both ball joint tapered studs. Loosen, but do not remove nuts.

4. Force of chassis spring will tend to disengage ball joint tapered stud from steering knuckle. Rap knuckle sharply in area of ball stud to loosen stud from knuckle.

5. Support lower control arm and remove nuts from ball joint tapered studs. Raise upper control arm and remove tapered studs from knuckle. Remove steering knuckle.

b. Installation

1. Clean the tapered studs of the ball joints and insert them into steering knuckle.

2. Align the cotter pin holes fore and aft and install the castellated nuts. Torque to 50 ft. lbs. on the upper nut and 82 ft. lbs. on the lower nut.

3. Position steering arm and brake backing plate to steering knuckle, being certain that the brake anchor pin engages properly in steering knuckle. Install 2 bolts and castellated nuts. Torque to 60-82 ft. lbs. Install anchor pin bolt and torque to 92 ft. lbs. Bend lock plate to engage flats on brake anchor bolt head.

4. Install wheels, lubricate and adjust bearings (par. 7-11).

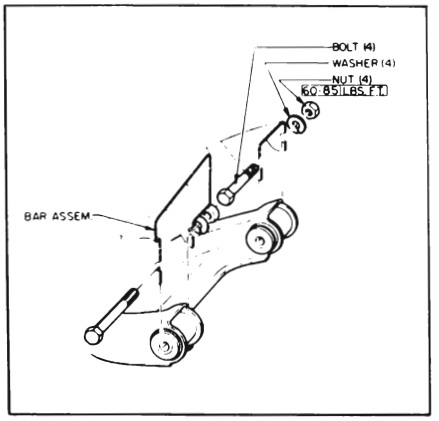


Figure 7-23—Lower Control Arm Detail

7-18 FRONT WHEEL ALIGNMENT

Wheel alignment is the mechanics of properly adjusting all the factors affecting the position of front wheels so as to cause the car to steer with the least effort and to reduce tire wear to a minimum.

Correct alignment of the underbody is essential to proper alignment of front and rear wheels. Briefly, the essentials are that the underbody must be square in plan view within specified limits, that the top and bottom surfaces of front cross member must be parallel fore and aft, and the upper control arms and lower control arms must be at correct location in respect to shafts and front cross member. All bushings, ball joints and bolts must be of proper torque and in usable condition.

Wheel and tire balance has an important effect on steering and tire wear. If wheels and tires are out of balance, "shimmy" or "tramp" may develop or tires may wear unevenly and give the erroneous impression that the wheels are not in proper alignment. For this reason, the wheel and tire assemblies should be known to be in proper balance before assuming that wheels are out of alignment.

Close limits on caster, front wheel camber, and theoretical king pin inclination are beneficial to car handling, but require only reasonable accuracy to provide normal tire life. With the type of front suspension used, the toe-in adjustment is much more important than caster and camber is so far as tire wear is concerned. Caster and camber adjustments need not be considered unless visual inspection shows these settings to be out, or unless the car gives poor handling on the road.

In the majority of cases, services consisting of inflating tires of specified pressure and interchanging tires at recommended intervals (par. 7-9), balancing all wheels and tires (par. 7-9), adjusting steering gear (par. 8-4), and setting toe-in correctly (subpar. e, below) will provide more

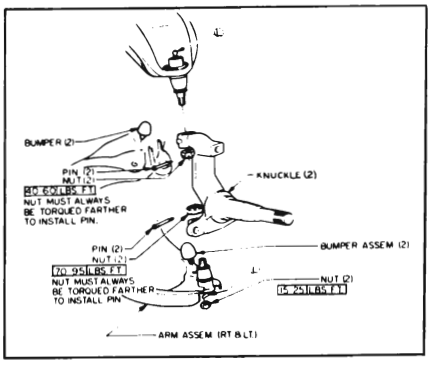


Figure 7-24—Steering Knuckle Detail

improvement in car handling and tire wear than will front end alignment adjustments as usually made on front end alignment equipment.

The use of accurate front end alignment is essential to determine whether front suspension parts have been damaged by shock or accident, and to obtain correct alignment settings after new parts have been installed.

a. Inspection Before Checking Front Wheel Alignment

Before any attempt is made to check or make any adjustment affecting caster, camber, toe-in, theoretical king pin inclination, or steering geometry, the following checks and inspections must be made to insure correctness of alignment equipment readings and alignment adjustments.

1. The front tires should have approximately the same wear and all tires must be inflated to specified pressures (par. 1-2).

2. Check front wheel bearings for looseness and adjust, if necessary

3. Check for run-out of wheels and tires and correct to within limit of .107" run-out at sides of tires, if necessary.

4. Check wheels and tires for balance and correct if out of balance (par. 7-9).

5. Check for looseness at ball joints and tie rod ends; if found excessive it must be corrected before alignment readings will have any value (par. 8-4).

6. Check shock absorber action and correct, if necessary (par. 7-14, 7-21).

7. Check trim height; if out of limits, correct with shims or replace spring.

CAUTION: Consideration must be given the optional equipment on the car, undercoating, dirt, etc. Good judgment should be exercised before replacing a spring when car trim height is only slightly out of limits. Spring replacement under conditions of excessive weight as mentioned above will accomplish little and must be accompanied by shimming to obtain satisfactory results. 1/8" shims are available through Buick Parts Warehouses under Group 7.425. Refer to paragraph 7-15.

8. Car must be on level surface. Raise front of car slightly and place Front End Alignment Height.

9. Raise rear of car slightly.

10. It is advisable to check the condition and accuracy of any equipment being used to check front end alignment, and to make certain that instructions of the manufacturer are thoroughly understood.

b. Checking Caster and Camber Settings

Since caster and camber are both adjusted by shimming in the same locations, both of these settings must be checked before changing either setting.

CAUTION: Regardless of equipment used to check caster and camber, car must be on level surface both transversely and fore and aft. Since camber and caster vary in proportion to the height of the front springs, it is very important that the correct alignment height is maintained while checking (subpar. a, above).

Alignment height is used only when checking and adjusting caster and camber and should not be confused with trim height which is used to establish proper spring dimensions.

When equipment is used which bears against the tire or wheel rim to obtain readings, it is very essential that the tires or wheels be checked for run-out. Readings must be taken at points which have no run-out or which lie in the same plane. Caster and camber should be within limits shown in Figure 7-26. Note that the caster angles at both front wheels need not be exactly the same but must be within 3/4 degrees of each other. Likewise, the camber angles on both sides must be within 3/4 degrees of each other. If caster and camber are not within the specified limits, adjust as described below.

c. Adjustment of Caster and Camber

Caster and camber are adjusted by shimming at the upper control arm shaft attaching points. These shims are available in thicknesses of .030", .060" and .120", and are listed under Group 6.178 of the Master Parts list.

Adding shims at the front locations will change caster and camber toward negative. Adding shims at the rear locations will change caster toward positive and camber toward negative. Adding equal shims at both front and rear locations will not change caster but will change camber toward negative.

To adjust, loosen both front and rear bolts to free the shims for removal or addition. After installing or removing shims (limit to .380" in any one stack), tighten and torque shaft nuts to 75 ft. lbs. Recheck alignment and correct

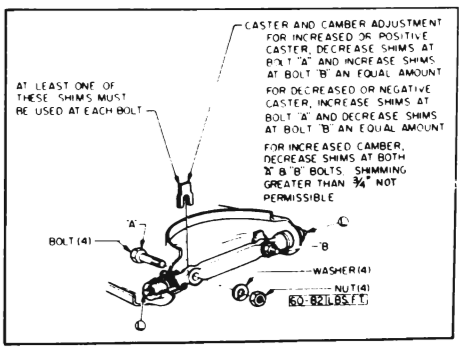


Figure 7-25—Adjusting Shims

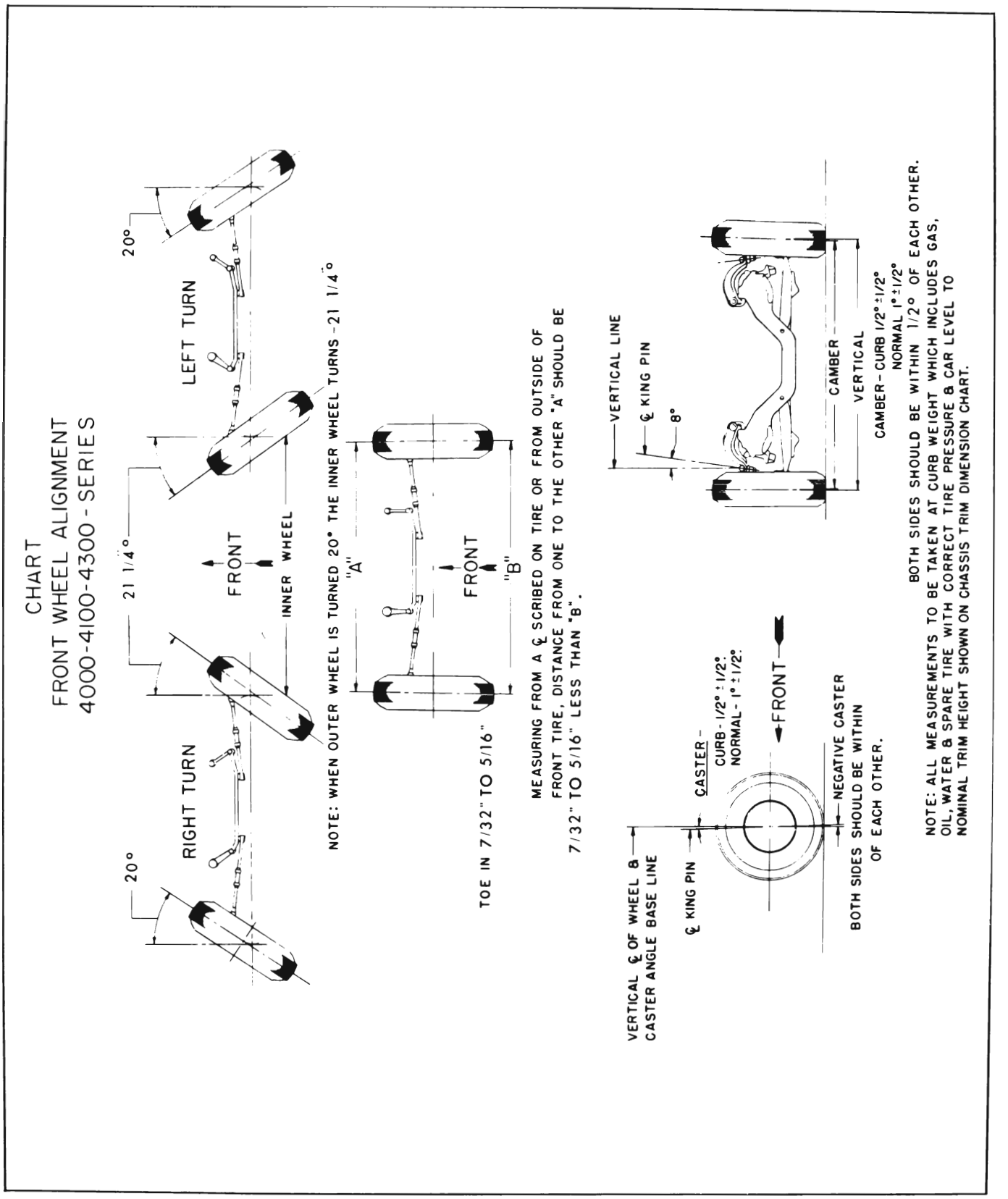


Figure 7-26—Front Wheel Alignment

toe-in, if necessary. It is imperative to adhere strictly to the torque specifications given in paragraph 7-1.

d. Checking Theoretical King Pin Inclination

CAUTION: When checking theoretical king pin inclination, car must be on a level surface, both transversely and fore and aft. It must be maintained at specified alignment height while checking (subpar. a, above).

With camber known to be within specified limits, theoretical king pin inclination should check within specified limits given in Figure 7-26.

If camber is incorrect beyond limits of adjustment and theoretical king pin inclination is correct, or nearly so, a bent steering knuckle is indicated.

There is no adjustment for theoretical king pin inclination as this factor depends on the accuracy of the front suspension parts. Distorted parts should be replaced with new parts. The practice of heating and bending front suspension parts to correct errors is not recommended as this may produce soft spots in the metal in which fatigue and breakage may develop in service.

e. Checking and Adjusting Toe-In

CAUTION: Car must be at curb weight and running height (DO NOT USE ALIGNMENT SET J-8973 - bounce front end and allow it to settle to running height). Steering gear and front wheel bearings must be properly adjusted with no looseness at tie rod ends. The car should be moved forward one complete revolution of the wheels before the toe-in check and adjustment are started and the car should never be moved backward while making the check and adjustment.

1. Turn steering wheel to straight ahead position, with front wheels in straight ahead position.

2. Measure the horizontal distance from the near edge of front boss of lower control arm shaft to the front edge of brake backing plate, on each side. Adjust tie rods, if necessary, to make measurements equal on both sides.

3. Using a suitable toe-in gauge, measure the distance between outside walls of tires at the front at a height approximately horizontal to floor and through the centerline of the wheel assembly. See Figure 7-26.

NOTE: An accurate check also can be made by raising and rotating front wheels to scribe a fine line near the center of each tire, then, with tires on the floor and front end at running height, measure between scribed lines with a suitable trammel.

4. Roll the car forward until measuring points on tires are approximately 180° from point used in Step 3 above.

The measurement at the front (dimension "A") should be 7/32" to 5/16" less than the measurement at the rear (dimension "B"). See Figure 7-26.

5. If toe-in is not within specified limits, loosen clamp bolts and turn adjusting sleeves at tie rod ends as required. Decrease toe-in by turning left sleeve in same direction as wheel rotates moving forward and turn right sleeve in opposite direction. Increase toe-in by turning both sleeves in opposite direction.

CAUTION: Left and right adjusting sleeves must be turned exactly the same amount but in opposite directions when changing toe-in, in order to maintain front wheels in straight ahead position when steering wheel is in straight ahead position.

6. After correct toe-in is secured, tighten clamp bolts securely.

CAUTION: The steering knuckle and steering arm "rock" or tilt as front wheel rises and falls. Therefore, it is of vital importance to position the bottom face of tie rod and parallel with machined surface at outer end of steering arm when tie rod length is adjusted. Severe damage and possible failure can result unless this precaution is observed. Tie rod sleeve clamps must be positioned straight down to 45° forward to provide clearance.

f. Checking Steering Geometry (Turning Angles)

CAUTION: Be sure that caster, camber, and toe-in have all been properly corrected before checking steering geometry. Steering geometry must be checked with the weight of the car on the wheels.

1. With the front wheels resting on full floating turntables, turn wheels to the right until the outside (left) wheel is set at 20 degrees. The inside (right) wheel should then set at 23 degrees 40 minutes. See Figure 7-26.

2. Repeat this test by turning front wheels to the left until the outside (right) wheel sets at 20 degrees; the inside (left) wheel should then set at 23 degrees 40 minutes.

3. Errors in steering geometry generally indicate bent steering arms, but may also be caused by other incorrect front end factors. If the error is caused by a bent steering arm, it must be replaced. Replacement of such parts must be followed by a complete front end check as described above.

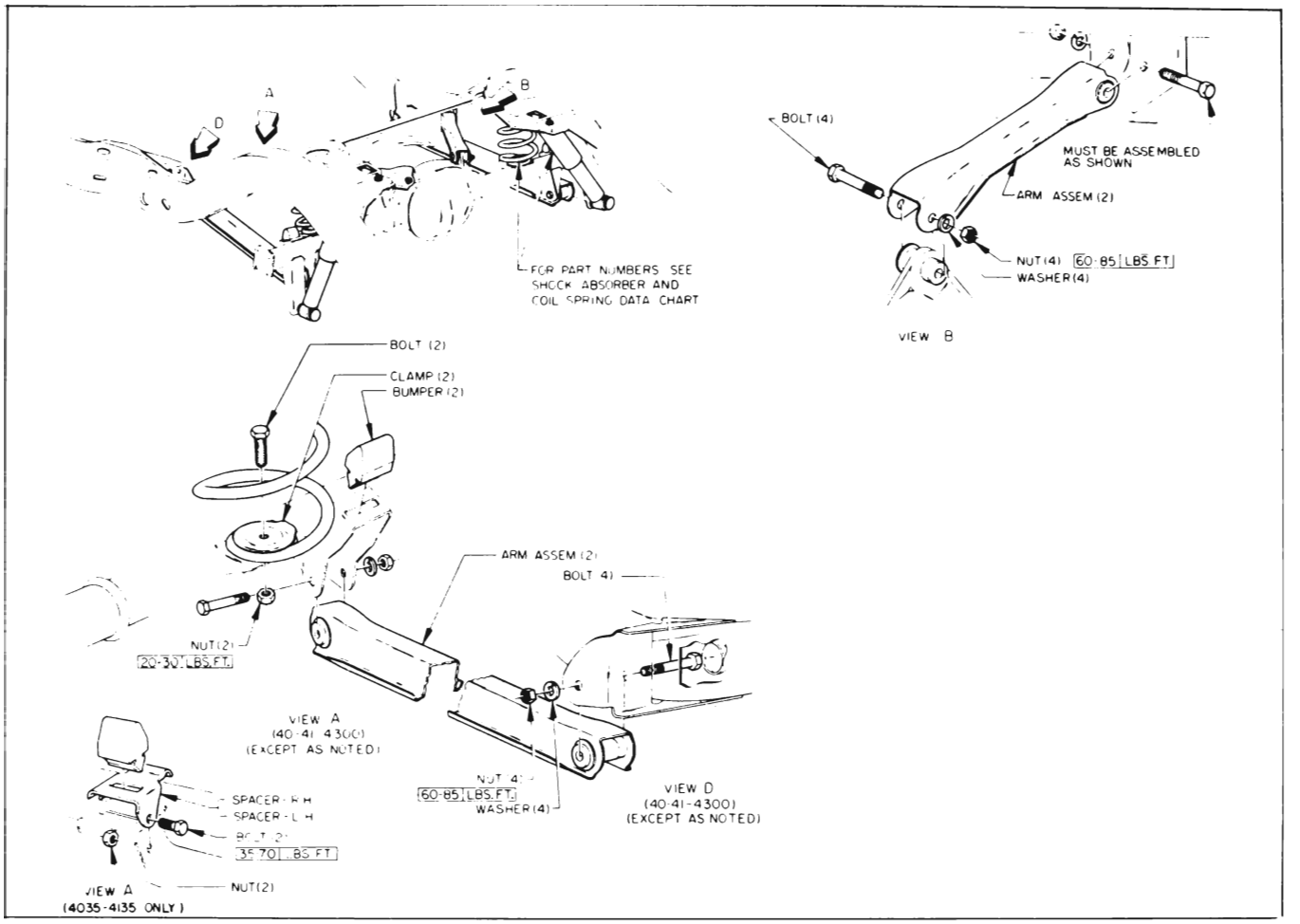


Figure 7-27—Rear Suspension Details

7-19 REAR LOWER CONTROL ARM—REMOVAL AND INSTALLATION

a. Removal

1. Remove rear coil spring (par. 7-22).

2. Remove rear attaching nuts, lock washers, and bolts.

3. Remove front attaching parts and remove arm.

4. Check arm and bushings for obvious damage. Replace if necessary.

b. Installation

1. Position arm in place and attach as shown in Figure 7-27. Torque the rear nut and bolt to 25 ft. lbs. and the front nut and bolt to 72 ft. lbs.

2. Check for correct pinion angle and adjust if necessary (par. 6-16).

7-20 REAR UPPER CONTROL ARM—REMOVAL AND INSTALLATION

a. Removal

1. Raise rear of car and support rear axle assembly.

2. Disconnect control arm at carrier housing by removing a nut, cam, and cam bolt assembly. See Figure 7-27.

3. Disconnect arm at frame by removing nut, lock washer, and bolt. Remove arm.

4. Check control arm and bushing at carrier housing for damage or wear. Replace bushing if necessary. Replace arm if bent or malformed.

b. Installation

1. Attach arm at the frame with nut, lock washer, and bolt. Torque to 60-85 ft. lbs. See Figure 7-27.

2. Install cam bolt, cam, and nut at carrier housing. Torque to 60-85 ft. lbs.

3. Check pinion angle and adjust if necessary. See paragraph 6-16.

7-21 REAR SHOCK ABSORBER—REMOVAL AND INSTALLATION

a. Removal

1. Raise rear of car and support rear axle assembly.

2. Disconnect shock at upper end. Disconnect shock at lower end and remove shock. See Figure 7-27.

CAUTION: A hex is located on the stud between the axle bracket and shock absorber lower bushing in order that a wrench may be used to remove the lower attaching nut without turning the stud. Failure to hold the stud in this manner will result in damage to the mechanical bond between the shock absorber bushing and the lower mounting stud.

3. Check shock absorber for obvious physical damage and oil leakage. Push and pull shock absorber in an upright position. If smooth hydraulic resistance is not present in both directions, replace shock.

b. Installation

1. Make certain that new shock absorber is correct for car model as indicated by part number stamped on the outer tube. See Master Chassis Parts Catalog Group 7.345 for standard and optional parts.

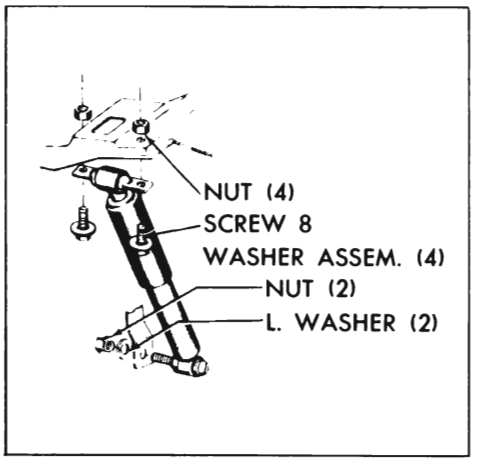


Figure 7-28—Rear Shock Absorber Installation

2. Loosely attach shock to both mounting points. Torque upper bolts to 12-24 ft. lbs. and the lower hex nut to 30-60 ft. lbs. See Figure 7-28.

CAUTION: Shock absorber calibrations as furnished in production have been carefully engineered to provide the best ride control over a wide range of driving conditions. Substitution of other calibrations can alter handling and ride characteristics and are not recommended by Buick Motor Division.

7-22 REAR CHASSIS SPRING—REMOVAL AND INSTALLATION

a. Removal

1. Raise car and support rear axle assembly.

2. Provide slack in parking brake cable to allow rear axle to be lowered without damaging cable. Disconnect shock absorber at lower end on same side that spring is being removed. See Figure 7-27.

3. Remove bolt and nut that hold spring clamp to lower end of spring.

4. Lower rear axle and remove spring.

b. Installation

1. Position spring so that the flat or ground end is at the top of the spring seat.

2. Raise rear axle and connect shock absorber to rear axle. Torque nut to 45 ft. lbs.

3. Tighten parking brake cable, remove rear axle support and lower car. See paragraph 7-15 for checking procedure.