Photos by Ralph Poole

HIGH SPEED HANDLING

By BARNEY NAVARRO

A SHORT ride in one of the better handling sports cars has made many an auto enthusiast suspension conscious. After taking corners at high speeds with less rebellion from the tires, even the most prejudiced critic is convinced that the sports cars "have something."

The Mexican road race last fall also added considerably to the interest in control at maximum speeds. Italian Lancias, winners in the big sports car class, won respect for their handling qualities. And the Lincolns—placing 1-2-3-4 in the heavy stock car class—stimulated further speculation.

What did the Lincolns have that made it possible for them to take turns at 90 mph—turns that would scare the wits out of the average driver in a normal car at 60?

Before we go into the subject, a definition of the term "handling" is necessary. Saying that a car handles well does not mean that it steers easily. Many cars that offer little resistance in control require much guess work to figure out in advance what path they will follow when the steering wheel is given a twist.

In contrast, the behavior of a good handling car is definitely predictable. It will negotiate a turn at high speeds without front end drift or rear end wash out. Fast travel is possible without feeling that the car is floating down the highway undirected. The brakes can be applied without wheel flutter or loss of control.

THE average enthusiast is most interested in what improvements can be made on his personal car. Space would never permit a detailed discussion of individual makes, but the principles involved are so universal that they will provide a good picture of what can be done to produce a better chassis.

Modifications in suspension are limited by two factors: How much money do we want to spend and how adaptable is the stock suspension? Few will want to pay out $5,000 to correct or improve a $2,500 automobile; nor will anyone want to install a Lincoln front suspension assembly under just any car just because the car may have certain limits of adaptability.

Regardless of the type of car, balance and traction are the essential points in making it handle properly. In this discussion, however, balance is of little importance. You will not want to go through the trouble of moving the engine in your car back two feet just to get balance. So the only feature left to work on is the traction problem, for it ultimately is the loss of traction that causes a car to spin out in a turn.

To obtain maximum traction between tires and pavement, wheels must remain perpendicular to the pavement and stay in contact with it at all times. Tilting and bouncing wheels provide poor adhesion between tires and road while in a corner.

Tilting, at first glance, may not appear to be an evil because the front wheels of all Detroit automobiles lean in the same manner that a bicycle does in taking a turn. As a matter of fact, a few sports cars have been built with front ends that are purposely designed to make the wheels lean. The practice has a certain limited usefulness.

On a gummy clay surface, for instance, wheels may tend to slide sideways in a turn. But tilting them causes the side drift to force clay into the tread for better traction. However, except under these circumstances, the built-in tilt causes less tire surface to be in contact with the road, resulting in less traction.

A further disadvantage is the crowned tread surface that develops on the tires by the wheels being at different angles to the road. In fact, such a tread produces considerably less adhesion than a flat tread because of the smaller area of contact.

A STRAIGHT axle, such as the older model cars used, is much better for handling than is the A-frame type of individual suspension. As long as all four wheels remain on the road with a straight axle, the wheels are perpendicular. When an A-frame suspension is employed, the wheels will lean in the turns. The tilt can be reduced, but it cannot be completely eliminated.

By installing a heavier ride stabilizer bar, such as was done on the Lincolns that ran in Mexico, a reduction can be effected. This bar is mounted on the front end of all American automobiles that are equipped with individual suspension. Its purpose is to reduce the individuality of the independent suspension designs.

When the car leans, the bar twists like a torsion bar from the force applied on the low side of the car. This tension is transmitted to the front suspension of the high side and attempts to lift the wheel off the road. Naturally, the effort is not successful in lifting the wheel, but it does cancel some of the lifting effect of its spring and permits the car to ride flatter.

Why don't the cars come with heavier ride stabilizer bars as stock equipment? Simply because the ride obtained with them would be much rougher than the average car owner would care to have.

Some automobile manufacturers use heavier bars on their station wagons which can be fitted to ordinary passenger coupes and sedans to improve stability. Lincoln supplies one that is part of the road race kit. If there does not happen to be one on the market for your particular car, it can be made by any good blacksmith who will make the necessary adaptations.

However, not all cars will show the improvement in handling with heavy ride stabilizer bars that is obtained with the Lincoln. The suspension arms of the Lincoln are the longest on any American stock car and, consequently, the front wheels tilt less in their up and down travel. The 1954 Fords and Mercurys fit into the same category, so we should see outstanding results with them, too.

Bouncing wheels that spend almost

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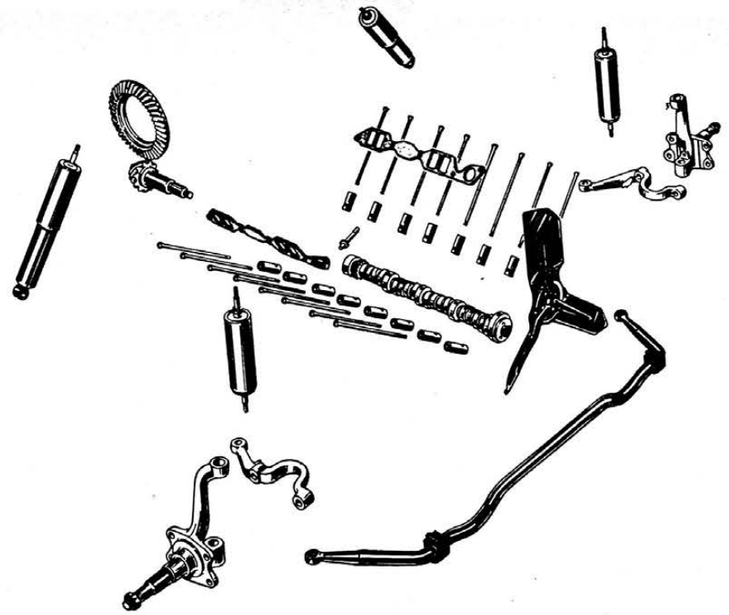
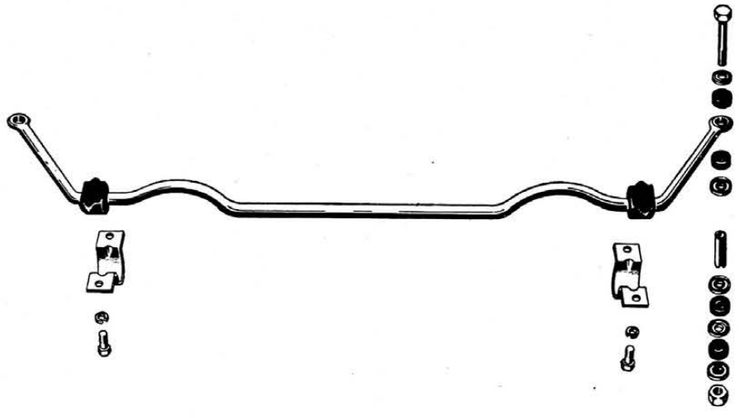


Heavy duty Lincoln kit includes front stabilizer bar that is heavier and stiffer, plus extra shocks and bigger spindles. Other parts shown, which do not relate to improved suspension and handling characteristics, are chiefly engine and rear end items



This is the standard Lincoln front stabilizer bar and the accompanying fittings. While some cars can be improved in handling, not all can approach the Lincoln

To check on handling of Mexican road race Lincolns, MOTOR LIFE testers ran the Ray Crawford entry over twisting mountain roads. Photos below and at top of opposite page were taken at speed on turn, yet notice flat position of body

PLYMOUTH TEST

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EQUIPMENT: electric fifth wheel, electric speedometer, electric odometer, fuel-flow meter, Perfometer, calibrated clocks.

SPEED TEST SURFACE: asphalt

SPEED COURSE: surveyed quarter-mile, half-mile and mile

PERFORMANCE

ACCELERATION IN SECONDS:

Standing Quarter-Mile	22.4
0-30 mph	6.1
0-45 mph	13.3
0-60 mph	24.5

TOP SPEED:

Fastest One-Way Run	86.17 mph
Slowest One-Way Run	81.40 mph
Average of Six Runs	83.10 mph

FUEL CONSUMPTION:

Steady 30 mph	22.4 mpg
Steady 45 mph	20.7 mpg
Steady 60 mph	16.5 mpg
Total Test Mileage	1,216 miles @ 16 mpg

SPEEDOMETER CORRECTIONS:

Indicated	Actual
30 mph	27.5 mph
45 mph	42.9 mph
60 mph	56.3 mph

STEERING:

Turns, Lock-to-Lock	3¼
Turning Circle	39 feet

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more time in air than on the ground are another high speed hazard. It just isn't possible to produce a spring and shock absorber combination that will give "feather-bed, baby-buggy" ride at low speeds without sacrificing control at high speeds. It could be done if the car buyer would go for shocks adjustable from the dash, but such devices are not plentiful so stiffer shock action will have to be substituted in your car.

The most inexpensive way to do this is to add an extra shock absorber at each wheel. Before you do this, be warned that you can't have your cake and eat it too.

The addition of the extra shocks will give you a wonderful feeling of security at high speeds, but at a slower pace your car will ride like a child's toy wagon on a cobblestone street.

One of the easiest methods of obtaining better handling qualities in your car with the least sacrifice in riding comfort is the replacement of squashy air-ride tires with the standard size. Higher tire inflation pressures mean less deforming of the rubber in high-side thrust during turning maneuvers.

Any change in tire size, if the diameter is different, should be accompanied by a wheel alignment job, with a competent expert doing the work. Wheels that fight each other because of misalignment reduce adhesion to the road so much that this point cannot be underestimated.

IN THE NEXT ISSUE:

- FIRST FULL REPORT ON GM'S EXPERIMENTAL CARS FOR 1954
- SPECIAL DESIGN STORY ON AMERICA'S FIRST GAS TURBINE AUTO
- HOW TO LUBRICATE YOUR CAR AT HOME FOR POSITIVE RESULTS