

ANTI-ROLL BARS

Add-on stability for big cars and small in the tight corners

BY DAVID BEAN, CAR LIFE ENGINEERING EDITOR

OUR ROAD TESTERS dubbed the Olds 4-4-2 "The Handler." Another Olds, the W-31 was flung around the test track like a slalom car. A recent Chevrolet Caprice refused to react like a barge, instead sported briskly through seemingly impossible curves and corners.

The reason in each case was that all were equipped with a rear anti-roll bar that markedly improved the handling. Surprisingly, anti-roll bars are not a new device or a particularly dramatic one. Even stranger is the fact that they're seldom used on a production car; but when they are, they compensate for handling deficiencies inherent in many chassis designs. Their presence makes them conspicuous, even to the most casual of enthusiasts.

The name anti-roll bar would suggest that they help the car resist body roll during cornering. True, but more correctly, they increase the *roll stiffness* of the suspension system. What could be simpler than an ordinary looking torsion bar linking both sides (either front or rear) of the suspension? The effect, though, on a bump that both wheels take equally, is to let them jounce the same amount, without deflecting the roll bar. However, when one wheel hits a worse bump than the other, or there's body lean, the bar is twisted, thereby adding its own spring force to that of the car's springs.

In order to retain a soft ride, automotive engineers have lowered spring rates, only to employ front anti-roll bars to keep body lean within limits.

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And it is a rare car indeed that does not have a front anti-roll bar now. There's a good reason anti-roll bars are used most often on the front instead of at both ends. First, on passenger cars, the rear springs are usually stiffer than the front ones because of passenger and luggage load considerations. Thus the rear springs already are contributing more to the roll stiffness than the front springs. Second, since in a rear-drive car, the rear wheels must be planted as firmly on the ground as possible—the less they are influenced by the leaning car body, the better. That is, a chassis with *stiff* rear springs or high rear roll stiffness tends to take the rear axle with it when it leans, lessening the grip of one wheel. (Picking up an inside rear wheel during hard cornering is a common example of this.) Third, adding roll stiffness to the front, e.g., attaching a front roll bar, tends to increase understeer, and current automotive philosophy holds that an understeering car is the safest for the average driver.

This is where the rear anti-roll bar comes in. Most American passenger cars have: (a) designed-in understeer characteristics either by front suspension geometry or high front roll stiffness, or (b) inherent understeer because of poor weight distribution due to a heavy engine placed over the front wheels.

Adding an anti-roll bar to the rear suspension would then decrease understeer, because the added rear roll stiffness causes—and here's the key—the rear tires to assume a greater portion of the total cornering load. This, in turn, causes the tires to deflect more, increasing the rear slip angle

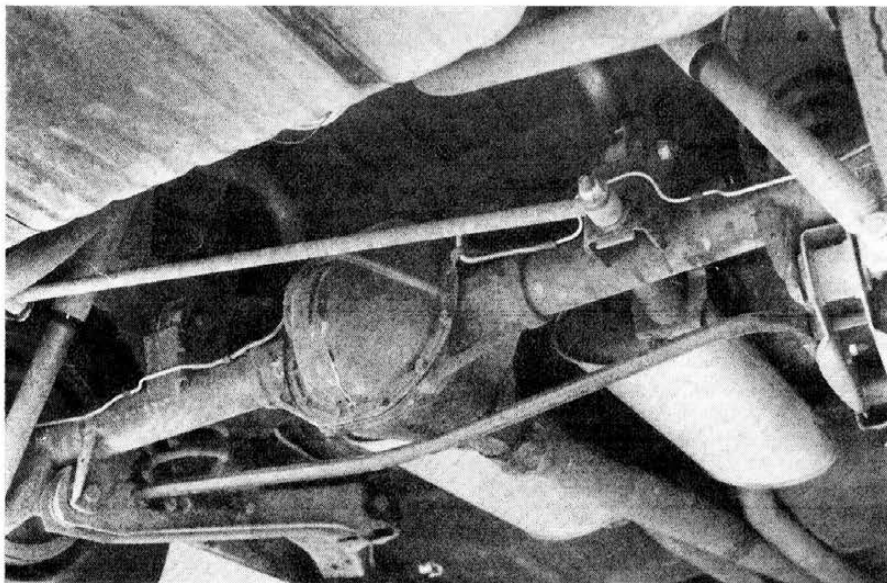
so that the rear of the car is "slipping" nearly as much as the front, a situation approaching neutral steer. Handling packages offered as a part of, or in conjunction with, high-performance engines are more and more incorporating rear anti-roll bars because, (a) the buyer of such a car is assumed to be more knowledgeable about handling and able to cope with (and prefer) less understeer; and (b) the heavier engine of the performance car causes too much understeer, even by current standards, and a rear bar is needed to balance the chassis.

Not many new-car buyers can get rear anti-roll bars. Currently, they're standard equipment on the Olds 4-4-2, Olds W-31 and Hurst/Olds 455. As options, Buick has one for its A-bodied intermediates (Special) as part of the ride control packages (option numbers F41 and Y43). The large Chevy gets one if the special purpose suspension is ordered (F41 again). Corvettes with 427-cid engines have them, but 350-cid models don't and don't need them. A bar is available on the large-body Oldsmobiles through the B07 HD suspension option. Ford fits only one as standard—on the new Boss 429 Mustang. No other car in the FoMoCo line is so equipped. Nor does Chrysler Corp. offer a rear bar in any option list. Interestingly, we wouldn't suggest that many Chrysler products need one. Plymouth and Dodge seem to stand alone in the industry with near neutral handling performance cars, because of their superior front suspension geometry. AMC offers none—but should.

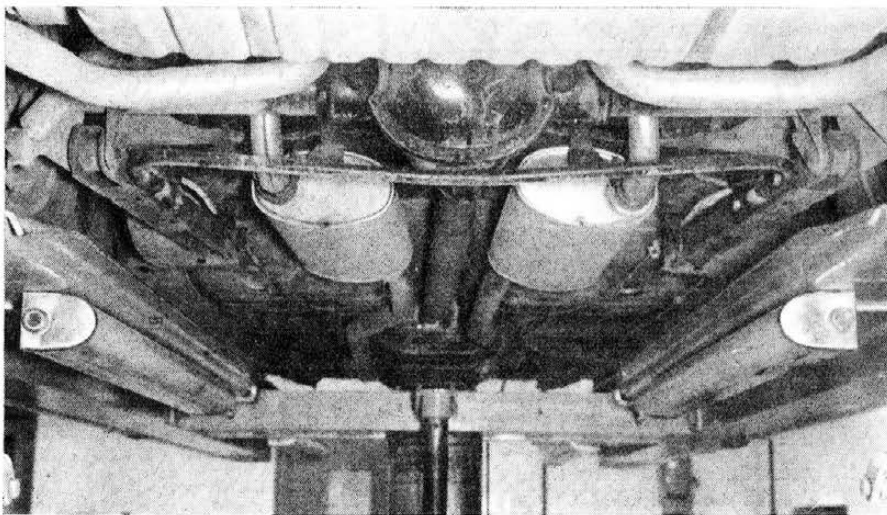
All the above makes, CAR LIFE's testers believe, should have more neutral handling (except Chrysler

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continued



CHEVY REAR ANTI-ROLL BAR will fit any large-size '65 or later Chevy. Note spacer used inside control arms to keep mounting bolts from collapsing channel. Upper track bar controls lateral location of axle. Also called a rear stabilizer bar, or sway bar, it is often confused with an anti-roll bar.



OLDS 4-4-2 BAR is also used on W-31 and Hurst/Olds. Buick has an identical unit for its A-body cars and a similar one is available on the big Olds. Note that control arms have been boxed instead of using spacers.

Corp.'s performance cars). Engineers for several brands, however, have actively resisted going the rear anti-roll bar route. Soft cars for the masses is the corporate goal. (Worst offender: Lincoln-Mercury which doesn't build outstanding cars, so far

as suspension is concerned, in any but its intermediate line.)

There are alternatives, though, even when an enthusiast can't find anti-roll bars on an option list. Cars with similar bodies within the large corporations can take parts across brand-

name lines. For instance, a Caprice roll bar will fit on a Pontiac Catalina after drilling a few holes and making sure attachment members are reinforced.

If, for instance, you have a '66 or later GM A-body car (Chevelle, Tempest, Special or Cutlass) or a '69 Grand Prix, the Olds 4-4-2 bar (Part Number 394926, group 7.241) or the Buick kit (Part Number 1394195, group 7.241) will bolt right on. The large Olds bar (Part Number 396620, group 7.241) will fit any of the '65 or later full-size Oldsmobiles, Pontiacs and Buicks (except Riviera). The Chevy bar (Part Number 3856396) fits all large Chevs from '65 on. For the '62-'64 full-size Oldsmobiles and Pontiacs, either the 4-4-2 or the Chevy bar will fit. Attachment of all these is essentially the same. The bar is secured to each lower control arm by two bolts, with the working length of the bar passing beneath the differential housing.

[To attach, drill four holes in control arms; provide some means of supporting the channel section so that it isn't collapsed when the bolts are drawn tight (Buick provides spacers for this, Olds boxes the arm by welding a plate across the bottom); and then bolt it on.]

The Boss 429 Mustang bar (Part Number C9ZX5A772-A) will fit any '65 or later Mustang that is equipped with the large rear axle. Mustang has needed one badly for years.

No other factory anti-roll bars are available at present. For those cars not covered by the kits mentioned, ADDCO, a small firm in Florida, manufactures both front and rear anti-roll bars for nearly every car made. Most models are available in two or more sizes, for those wanting a choice between street (firm) and competition (downright jarring) trim. ADDCO's address: 700 East St., Lake Park, Fla. 33403.

After equipping a car with a rear anti-roll bar, a driver will notice that it feels much more nimble, secure and predictable. Yet the ride will be no stiffer than before. Note that we have not said that the cornering power will be increased. An anti-roll bar can, through related factors, assist the suspension in retaining some of the adhesion it would lose due to bad suspension geometry, but it will not increase the cornering power of a chassis that already has a good system. What it does do, is help the *handling*. That is, the driver knows more about what the suspension is doing and what he can do with it. The limit of adhesion hasn't changed, but the driver can now get closer to it with a greater margin of safety. Not a bad deal for under \$20. ■