Road Research Report:

TRIUMPH TR-4A

It's smoother and faster sailing with Triumph's new independent rear suspension.

In all things, it is evolution rather than revolution that produces satisfactory results, and we might say that this is particularly true in the automotive field. Consider the example set by Standard-Triumph Motor Company with their TR-series sports cars: some 12 years ago they went into production with a sports roadster, the TR-2 (developed from the prototype TR-1), which was in every regard evolved from contemporary, conservative engineering practice. Indeed, most of the mechanical elements had been borrowed from other machinery in the Standard-Triumph line.

As old-timers in the sport will recall, that first Triumph sports car to be sold in quantity here in America was something less than perfect. Not all of the bits that went into its making worked in perfect harmony, and it was decidedly rough and noisy. There was little pretension of refinement in any of its appointments,
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and we particularly remember, when the rains would come, how much we wished for an extra set of wipers on the inside of the windshield. The car’s top never seemed to feel obliged to hinder the progress of any passing breeze, and it fought what was at best a delaying action with water.

Even so, many of us bought those early Triumphs. They were inexpensive, and rather fast, moreover, they quickly established a reputation for exceptional reliability—a quality not attributable to all sports cars, then or now. There were small problems; none of man’s contrivances has ever been entirely free of them. Still, in the main, the TR-2 could be depended upon to deliver its owner to his destination, be it near or far, on a day-in, day-out basis, and that holds true right up to the present.

With the passing of years, refinements came. The overall finish was improved immensely; the top actually became waterproof; even the ride was somewhat better. In 1956, the process of evolution brought us 10 more horsepower, side-curtains (remember those things) with sliding “plexiglass” panels, and bigger brakes and the designation, TR-3. Then came disc brakes (Triumph was the first low-priced sports car to have them) with the TR-3A. Progress was on the march.

The first big change came with the TR-4, which had new bodywork with a lot of civilized features like roll-up windows, and a dash more (143cu) displacement. Still, underneath, it was the same car—with all the detail improvements made over the years, of course. Generally speaking, it was very well received, but by this time a lot of smart-alecks had discovered that a sports car need not ride like an ox-cart to handle properly, so much was said about the rear axle’s intrusive behavior. Quite probably, not much would have been made of it all had not Triumph been making economy sedans with all-independent suspension. In any case, the situation was remarked upon by practically everyone, and there were predictions that the Triumph sports car would be given the sedans’ independent rear suspension in due course.

Today, “due course” is upon us, as Standard-Triumph has introduced the TR-4A, which, in the evolutionary process, has improved immensely and, among other improvements, is an independent rear suspension. Curiously, this feature is listed as an optional extra, like overdrive or wire wheels; although, unlike the others, it most certainly cannot be added after the car leaves the factory. Apart from the obvious differences in hardware around the rear wheels and final drive, there is the fact that the entire frame is changed, which must surely make the TR-4A’s “IRS” one of the wildest “optional extras” ever offered by any manufacturer.

The TR-4A’s independent rear suspension has been borrowed almost in its entirety from the Triumph 2000 sedan. The company could have saved a lot of money by cobbling together something like the swing-axe system of the Herald sedan, but they have very wisely resisted the temptation. A swing-axe layout is a marvel of low cost and simplicity, but it gives huge and inconvenient camber changes. With swing axles, the suspension geometry is such that the wheels will try to “tuck under” when cornering hard, and one may unexpectedly find oneself in extremis right in the middle of a bend. The tendency toward this can be reduced, by recourse to funny-business with springs, etc., but total abandonment of the simple, high roll-center swing axe layout is best.

For their 2000, and now the TR-4A, Triumph uses a rear suspension that is, very roughly speaking, a “sort of” swing-axe (more accurately, swing-arm), but with a lowered roll center and reduced camber change. We do not have specific data on the TR-4A IRS, but it is presumably much the same as that of the 2000—which has a maximum of 7° negative camber on full bump; 5° positive on full rebound. With this geometry, the roll center is high enough to limit body lean in cornering, and there is the proper amount of camber change to hold the “outside” tire perpendicular to the road surface.

Of course, one of the big advantages (and doubtless the one for which it was chosen) of the Triumph independent rear suspension, is that each rear wheel is carried on a single member. These members are massive aluminum castings, pivoted on rubber bushings at their forward end. The pivot centerlines run diagonally across the chassis; if they were parallel with the rear axle centerline the car would have a trailing link rear suspension, with a roll center at ground level. The suspension members are, by the way, rather intricate, with recesses for the coil-type springs cast in, and lugs behind the hub section for mounting the dampers. Recesses are also cast-in at the hub end of the suspension members, and the outboard half-shaft joints fit into these. The axles themselves are flanked by separate hubs that bolt onto the suspension members, and camber adjustments are made by inserting shims under the hubs. More shims, under the suspension pivot clevises, gives an adjustment for toe-in. All of this suspension adjustability should make the racing element among Triumph fanatics very happy.

The IRS final drive assembly uses much the same center-section as the live-axle arrangement, except, of course, that there the axle-housing tubes should emerge from the gear casing there are stub shafts and the inboard U-joints. The gear casing is vibration-insulated from the rest of the car by its four widely spaced rubber mounts. One of the problems always associated with independent rear suspensions is that of drive-component noise being transmitted up into the passenger compartment. Triumph has taken appropriate measures to confine the noise to its source—and have been largely, if not entirely, successful.

With the drastic alteration in rear suspension, the IRS Triumph has had equally drastic alterations in its rear frame section. The double rails with X-member frame used under Triumph’s live-axle car is simply not compatible with the independent rear suspension system used. So (to the extent that we could determine by slithering around under the car), the frame rails have been moved outward, and then jog in, just ahead of the rear wheels. The suspension pivots are on this turned-in leg. The rear legs of the X-member come back to join with the inner ends of the rails, and then extend on back, running roughly parallel to the chassis centerline, to assume the function of the now-shortened frame rails. A high, channel-section perch for the upper ends of the coil springs has been added to the frame immediately forward of the drive. The impression we get is that most of the previous frame has been utilized, but very cleverly rearranged to do its new job. It is especially interesting, and a compliment to all concerned, that even with all of the added hardware under the back of the car, no encroachments have been made into trunk or passenger space.

With or without the IRS, the TR-4A must be counted as a considerable improvement over its predecessors. It is, for example, a better handling car. The front suspension geometry has been changed to raise
lever, previously positioned a long arm’s reach over on the right side of the transmission cover, has been moved to a spot between the seat, over the driveshaft tunnel. The change in position is all to the good, but now that one must lift the lever, it is difficult to get enough pressure to set the rear brakes securely, and it was necessary for us to leave the transmission engaged to insure that the car would not roll away, helterskelter, on its own. For reasons that escape us, the gear-shift lever has been shortened. Now a nubby lever may look quite dashing, but the shortening operation has left the selector without enough leverage to pop fast shifts unless a lot of muscle is applied.

All of the remaining controls are located as before, and that is a mixture of good and bad—mostly the former. The steering-column bolts can be loosened, and the wheel-reach adjusted, as in the TR-4, but it now develops that some vertical adjustment is needed as well. That extra padding in the seats has done wonders for comfort in one’s nether regions, but it also gives a slightly higher sitting position—and that brings one’s thighs up too close to the lower rim of the steering wheel. Skinny types will not be unduly bothered by this, but many will find that their knuckles tend to limit travel when they wind the wheel around.

We like the instrument layout. The speedo and tach are large, round, readable instruments, and are positioned right in front of the wheel. The use of colored lights has been held to a bare minimum: a light flashes with the turn indicators and another warns that the generator is not charging. This last is just a warning device, as an ammeter has also been provided. You also get oil pressure, fuel level and water temperature gauges. There is a dazzling array of knobs and switches, including a trio of “wands” extending out from the steering column for lights, turn-indicators and the overdrive, but very graphic coded markings prevent confusion. The only one of the small controls that is poorly placed is the pull-knob for the hood latch. This one is tucked away over at the far right, and well up under the dash; a good spot for it in the right-hand drive cars, but as the bulk of Triumph’s sports cars are sold abroad, with left-hand drive, it is odd that they do not move it a trike nearer to hand. Those who smoke would, no doubt, also like the car better if it had an ashtray capable of holding more than one ash. Everyone will like the wind deflector extending down from dash to transmission tunnel; it is wider than before, and the edges have been padded so that it is possible to bang one’s leg against it without getting a bruise.

We would award high points, too, for the two-speed windshield wipers and windshield washers, comforting signs of civilization, both. And we would like to toss in a good word for such miscellany as padded sun visors and the generally excellent interior fit and finish.

In compliance with the various smog-allegation laws, Triumph cars are fitted with crankcase rebreathers. In the past, crankcase fumes have been fed into the carburetor mouths, which can cause gumming of those somewhat delicate instruments, but now the fumes are led right into the manifold via a one-way control valve. On the TR-1A (as on late series TR-4s) you also get paper-element air cleaners, and these will actually stop fine particles of dust—a function never served by the old-style gravel-strainer filters.

On the exhaust side of the engine, the TR-4A has a very fancy manifold. The end cylinders are paired; so are the center cylinders—and the pairs feed into separate exhaust pipes that stay separate right down (Text continued on page 90; specifications overleaf)
TRIUMPH TR-4A
Top speed, estimated 104 mph
Temperature 57°F
Wind velocity 4 mph
Altitude above sea level 150 ft
In 4 runs, 0.60 mph times varied between 9.5 and 10.2 seconds

Standing 1/4 Mile
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Importer: Standard-Triumph Motor Co. Inc.
575 Madison Ave.
New York, N. Y.

PRICES
Price as tested: $3049 East Coast POE

ENGINE
Water-cooled, four-in-line, cast iron block, 3 main bearings
Bore x stroke: 3.39 x 3.62 in, 86 x 92 mm
Displacement: 130.5 cu in, 2138 cc
Compression ratio: 9.0 to 1
Carburetion: 2 Stromberg 175 CD
Valve gear: Pushrod overhead valves and rocker arms
Valve diameter: Intake 1.56 in, exhaust 1.30 in
Valve lift: Intake 0.45 in, exhaust 0.30 in
Valve timing
Intake open: 15° BTDC
Intake close: 55° ATDC
Exhaust open: 18° ATDC
Exhaust close: 4° ATDC
Power (net): 105 bhp @ 4700 rpm
Torque: 132.5 lbs ft @ 3000 rpm
Specific power and specific fuel consumption: 805 bhp per cu in, 49.2 bhp per liter
Usable range of engine speeds: 1000-5000 rpm
Electrical system: 12 Volt, 51 amp hr battery
Fuel recommended: Premium
Mileage: 22-28 mpg
Range on 14-gallon tank: 308-392 miles

DRIVE TRAIN
Clutch: 9-inch single dry plate diaphragm spring
Transmission: 4-speed, all synchromesh

Gear Ratio
Rev: 3.22:
1st: 3.139
2nd: 2.01
3rd: 1.325
4th: 1.00
5th: 0.82
Final drive ratio: 3.70 to 1

CHASSIS
X-member frame, separate all-steel body
Wheelbase: 88.0 in
Track: F 50, R 49.2 in
Length: 158 in
Width: 67.5 in
Height: 58.0 in
Ground clearance: 6 in
Dry weight: 2800 lbs

Suspension
Front: Ind. unequal length wishbones and coil springs
Rear: 24 lbs
Weight distribution front/rear: 51/49%

Brakes: Girling disc front, 9-in drums rear

Engine: 2138 cc, 105 bhp

MAINTENANCE
Crankcase capacity: 6 qts
Oil change interval: 6000 miles
Grease fittings: 15

ACCELERATION
Zero to 30 mph: 22.9 sec
40 mph: 47.1 sec
50 mph: 67.9 sec
60 mph: 78.7 sec
70 mph: 89.8 sec
80 mph: 99.8 sec
90 mph: 74.4 sec
Standing 1/4 mile: 7.6 mph in 17.5 sec

Above, a side view of the 105-hp Triumph engine, as used in the TR-4 and TR-4A. Below, an end view of the same engine, minus the Stromberg 175 CD carburetors (which replaced the original SU's). Arrows trace the path of the oil circulation.