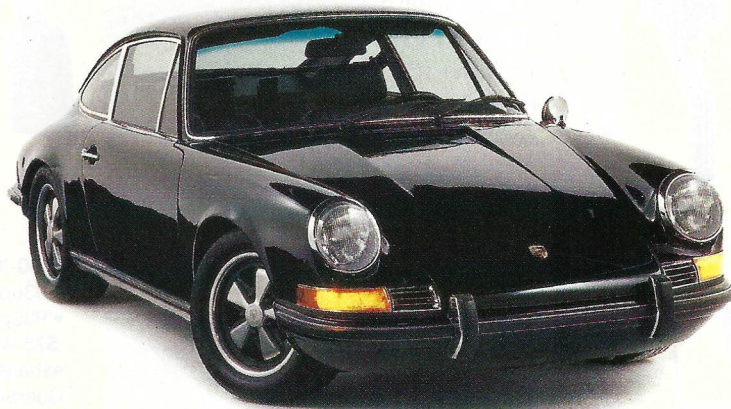


Project 911S

Part 3: Front Suspension

by Mitchell Sam Rossi

PHOTOS BY LES BIDRAWN



Plain and simple, long-term storage wreaks havoc on automobiles. They are complicated pieces of machinery, and the highly strung sports car variety is in constant need of regular exercise. If someone had the foresight to squirrel away a new 911S in 1970, they would today possess an automotive treasure. But their cache, left untouched for three decades, would have suffered a few of the scoundrels of time that also foiled plans of jumping behind the wheel of my green coupe and dashing off for a drive into the sunset.

There are ways to minimize the decay. I imagine Delahayes and Bugattis and historically significant Ferraris are draped in fine cotton veils and placed in cedar vaults with rows of air purifiers laboring endlessly.

Most enthusiasts know enough to drain the fuel and, in the case of watercooled cars, purge the radiator. Some mechanics suggest filling the engine with enough oil to submerge the inner workings, and many advise lifting the car off the ground to save the tires. All of them advocate turning the motor over every few weeks even if it is just by hand.

The majority of us, however, simply unplug the battery, roll up the windows and fling a car cover over our vehicles. That was the degree of my storage preparation, save for the fact that my early 911S carries two batteries and I surprisingly remembered to disconnect and remove them both. But as I began to revive the S, it was immediately clear there are many evils in letting a car stagnate.

During the trek from the backyard to the garage, I found the original front Koni shocks had collapsed completely while the right rear was frozen stiff. The brakes were useless, as the fluid had used its sabbatical to disintegrate the rubber seals surrounding the calipers' pistons. Luckily, the mechanical handbrake defied the forces of gravity and momentum and saved me from rolling into the neighbor's yard.

With the S out of the shadows, it became painfully obvious that the task of restoring it to roadworthy, let alone race ready, was going to be daunting. Every aspect of the car's mechanics was in desperate need of attention. So where to begin?

Although the engine ran, it was far from whirling at peak performance. Yet, even if the flat-six had survived my neglect, it meant little if the S had no legs to stand on. Thus, it seemed reasonable to start with the suspension system.

The following description to remove and restore the front suspension works for the 1969-1973 cars. The 911E, however, and those 911s that were delivered with the optional Boge hydropneumatic suspension, did not use torsion bars inside their control arms. Their disassembly is simpler, but to upgrade to a more responsive system, torsion bar-equipped control arms must replace the originals.

Tackling the Front Suspension

Disassembling an early 911's front suspension is a simple procedure once the car is off the ground and the wheels are removed. As my S was in stock condition, it still had the shroud covers bolted behind the spindles. These were designed to protect against rocks and road debris. Having planned to plumb fresh air directly to the brakes via small discs that focused cool air into the center of the ventilated rotors, the stock pieces were relegated to the discard box.

The front brake calipers are fastened to the struts by two retaining bolts. Drain as much brake fluid as possible from the system before removing the flexible lines, otherwise this will turn into an extremely messy procedure. Take care in keeping this fluid from the car's paint and your skin, cleaning all spills immediately.

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Anti-sway bar droplink connection point on control arm.



Turbo tie rod upgrade.

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Pry off the grease cap by working the blade of a small screwdriver around the sides. Don't be tempted to use the studs as a fulcrum point, as you will certainly damage the threads. Removing the cap uncovers the wheel bearing clamp nut that is secured with an Allen bolt. Loosen the Allen and spin the nut off the spindle.

A good tug on the disc would normally remove the wheel hub, disc and bearing. In my case, however, a large rubber mallet and several stern whacks against the back of the rotor were needed to entice the hub free.

Now remove the castellated nut holding the steering tie rod end. It may be tempting to use a heavy-duty pickle fork and hammer to jimmy the two pieces apart, but, unless you are replacing them, it is better to use the proper tie rod end remover tool.

The rubber on the tie rods of my car was already torn, and as I had ordered the more precise turbo tie rods from Tweeks.com, a parts supply house (see sidebar), I went the way of the pickle fork and brute force. It destroyed the tie

rod end, but the steering arm held up well against my barbaric methods.

The car's front anti-sway bar connects to the control arm by means of a vertical drop link. Disconnect the link from the lower attachment bracket. A note about the bracket: Since I intended on replacing the stock sway bar with a larger unit, I had the bracket reinforced with more welds than the factory had originally used. This is a simple but often overlooked modification.

At the bottom of the strut you will find the 13mm lock nut and wedge bolt that secures the ball joint shaft of the control arm. Once you remove the nut, the bolt may need to be tapped out. This should be done carefully as not to damage the bolt's threads. Don't be surprised if the two suspension pieces do not separate easily. You may need to use a floor jack to raise the strut and reduce the pressure on the ball joint shaft. This allows the arm to be worked free.

The last thing holding the strut is the large hex nut atop the shock absorber's piston rod inside the trunk. Once this is removed, the strut can be withdrawn from the car.

Now for the control arms. Under the car, just behind the fuel tank, is a protective steel panel. Removing this allows access to the steel rein-



Old control arm—arrow points to deteriorated bushing.

forcing crossbar that runs perpendicular to the car's direction of travel. This bar not only supports the rear of the control arms but also the steering rack.

From the front of the arm, unbolt and remove the cover bracket and bushing housing. This exposes the original rubber bushings and a steel cap covering the torsion bar. It also reveals the suspension attachment point that is often damaged by rust. If there is extensive corrosion, aftermarket replacement pans are available. Be certain the installation is done correctly, otherwise the front suspension system may never work as precisely as intended.

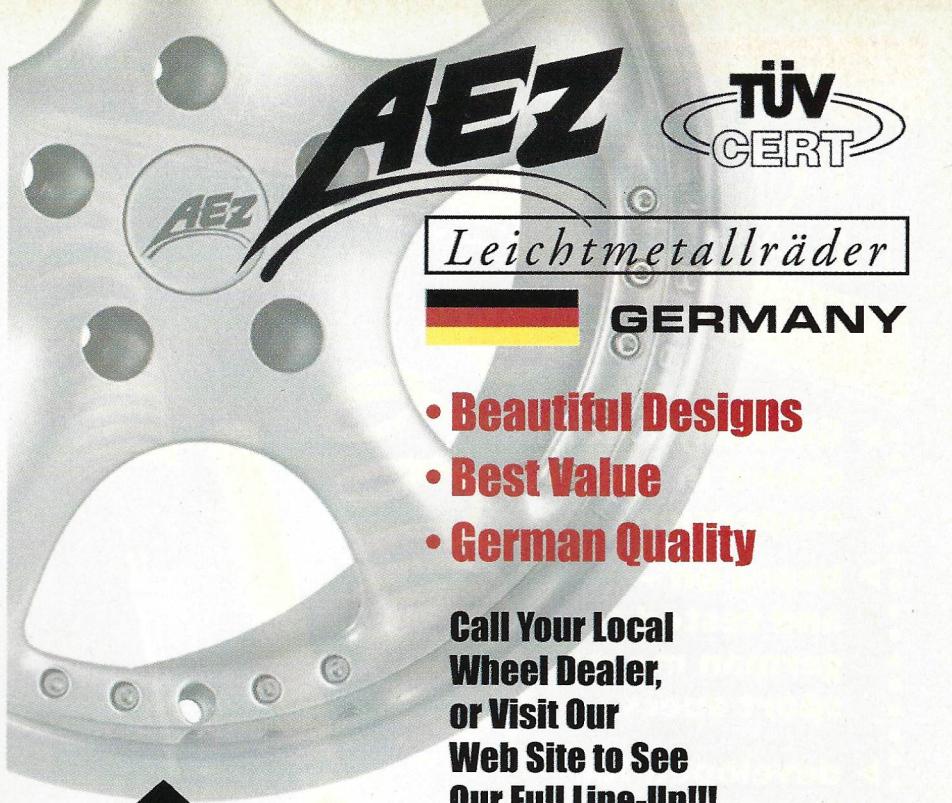
At the rear of the control arm, loosen and remove the torsion bar adjusting cap. The arm and torsion bar can now be tapped forward out of the crossbar.

With the unit out of the car, you may still have trouble removing the torsion bar from inside the arm. What has likely occurred is that rust has formed around the front splines. Secure the control arm vertically in a table vise and spray a liberal amount of WD40® into the torsion tube, allowing it to flow to the corroded area. If this fails to free the bar, it's time for the venerable hammer.

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Control arm with new polyurethane bushing.
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Using a stout piece of wood to protect the rear splines, drive the torsion bar forward into the tube. This will knock out the forward end cap. Once the torsion bar has broken free and is removed from the arm, the splines can be cleaned with a wire brush or by sandblasting.

Reassembly with Purpose

From the very beginning, I planned to build my S into a street/race car with my sights set on slaloms, time trials and ultimately cup racing. I had no disillusion of how the upgrades would affect the car's ride and handling on public roads. Performance and comfort do not go hand in hand. It is a matter of compromise.

If you want to retain the car's original ride quality, then replace the rubber bushings and retain the original torsion bars. If higher performance is your aim, yet not to the extent of creating a track car, there are several changes that can be made to the front suspension that offer heightened response while retaining an agreeable ride.

"The turbo tie rod upgrade gives you very precise steering," said Steve Alarcon of Johnson's Alignment in Torrance, Calif. "It eliminates the rubber bushing in the inner tie rod fork and gives a mono-ball type of effect." As one of the premiere suspension shops servicing Porsche club racing cars, Alarcon has gathered a lot of experience setting up 911s, from the entry-level classes to the upper echelon where the massive turbocharged cars prowl the racing circuit.

Alarcon also suggested that if the car needs shocks, opt for the sport type as opposed to the heavy-duty model. These will add responsiveness, but not at the cost of comfort. "I would check all the ball joints and wheel bearings, make sure everything is in working order and then take the car to the track and have some fun," he added.

Along with the upgraded tie rods, Tweaks also offers polyurethane bushings that replace the original rubber pieces at each end of the control arms. These solid bushings, Alarcon noted, give the suspension a more precise movement but also transfer noise and road shock to the passengers.

If you use these bushings, be sure to fit them properly to your control arms and use a liberal amount of a Teflon™-based lubricant such as Formula 5 Prelube offered by Tweaks. This helps eliminate squeaks and chatter often associated

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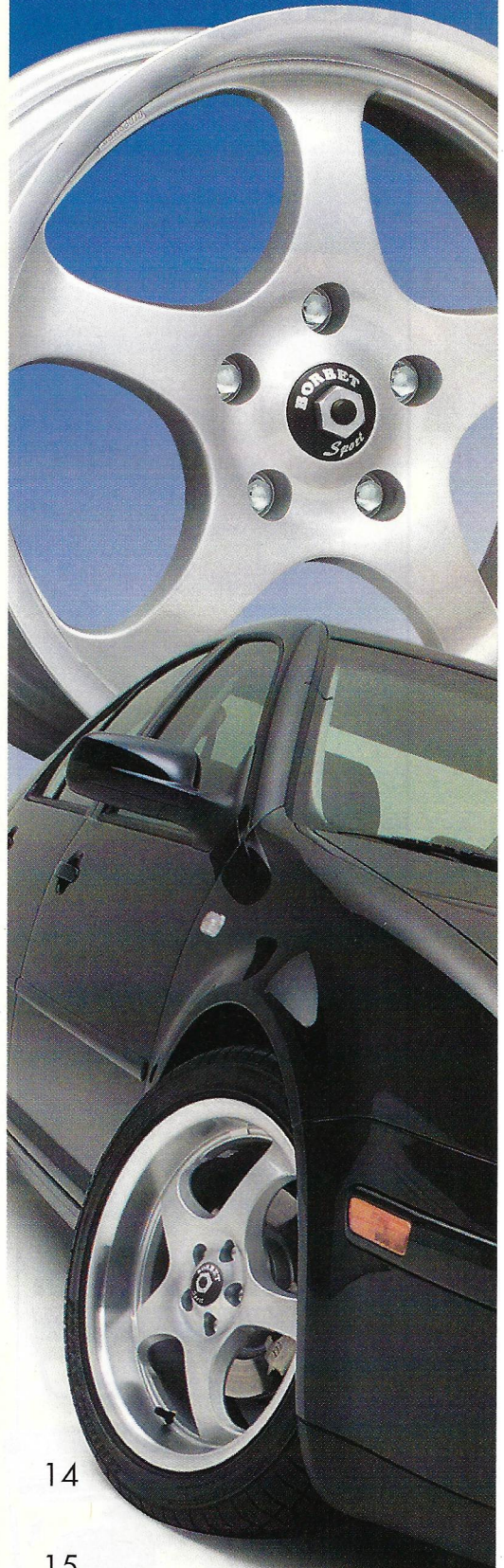
Restored control arms and Bilstein struts.

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Started in 1976 by Peter and Brett Johnson (Dr. Brett Johnson is the author of many Porsche books and restoration guides and a long-time contributor to *europaean car*), the company was originally known as P.B. Tweeks Ltd. A parts and accessories supplier specializing in Porsche cars, Tweeks has a long history in the market. The company was sold in 1988 to a distributor in Dayton, Ohio, but Tweeks' personalized service waned under corporate ownership.

Acquired in 1999 by Mid America Direct Inc., the largest supplier of aftermarket accessories for Corvettes, Tweeks has been given a fresh focus and is expanding its vast products list to include high-performance and racing equipment.

Mid America Direct Inc. has also renewed the Tweeks annual swap meet, expanding it into "FunFest for Porsche." This year's celebration not only included the swap meet but a car show, live entertainment and technical seminars about the beloved marque.



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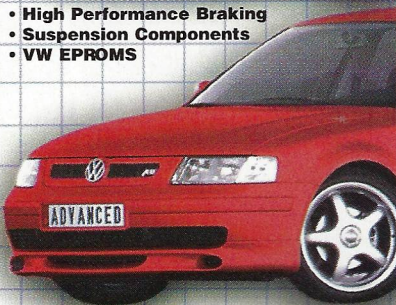
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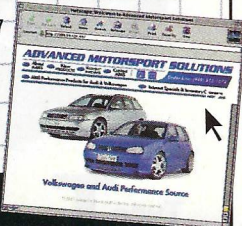
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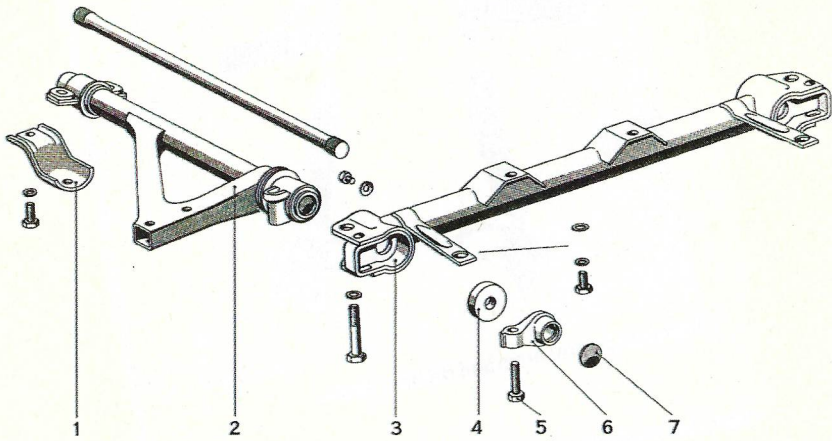
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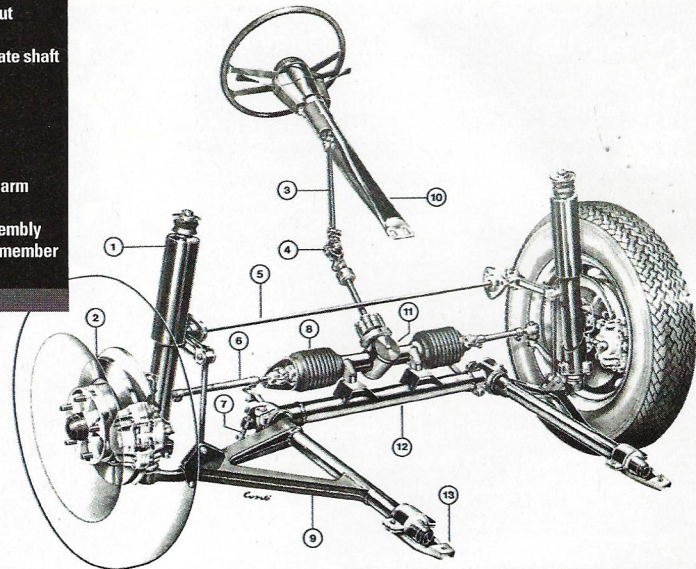


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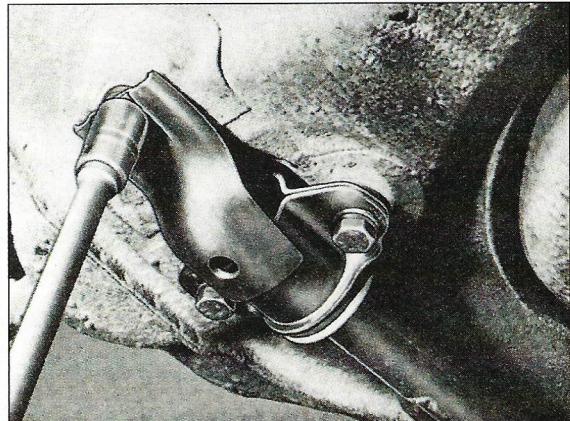


- | | |
|----------------------------------|--------------------|
| 1. Cover bracket | 5. Adjusting screw |
| 2. Transverse control arm (left) | 6. Adjusting lever |
| 3. Reinforcing crossmember | 7. End cap |
| 4. OWA-seal | |

1. Shock absorber strut
2. Brake disc
3. Steering intermediate shaft
4. Universal joint
5. Stabilizer
6. Steering tie rod
7. Adjusting screw
8. Bellow
9. Transverse control arm
10. Steering post
11. Steering gear assembly
12. Reinforcing crossmember
13. Bearing support



- a. Control arm, torsion bar and crossbar
- b. Complete front suspension
- c. Removing cover bracket.



With the control arms already out of the car, I could hardly rationalize reinstalling the stock 19mm torsion bars. I decided on 22mm bars, a size suggested for time trials and racing. Ultimately, the ride was a bit harsher, but the improved response was well worth the minor discomfort.

Attending several of the POC's events while the S was under reconstruction, I discovered that Bilstein struts were favored among many of the early 911 drivers. Thus, my car's original red Konis quickly found themselves in the discard bin and replaced by Bilsteins with RSR-valved inserts.

Finally, with the control arms clean and repainted and the new struts ready to reattach, remounting the front suspension became a simple process of reversing the dismantling steps. A note: Be sure to lavish the torsion bar splines with an anti-seize molybdenum-based lubricant. This will protect against corrosion and aid in their later removal when you are ready for huskier torsion bars.

While the new front suspension looks great under the fenderwells, the car's alignment is now as out of tune as a classical quintet sitting down with Fender guitars and a Ludwig drum set. But, until the rear suspension is complete, there is little use in going through the rigors of a full suspension alignment and tuning. Thus, next month's focus of the Project 911 will be tackling the rear suspension system. ❧

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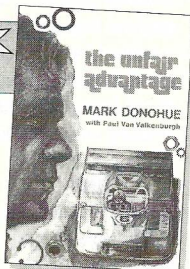
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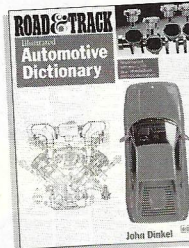
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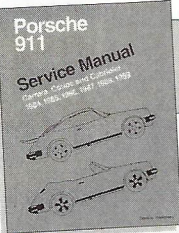
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