

# Rack 'Em Up

I don't think it would be an exaggeration to say that Nissan has had more than their share of power steering rack problems. For a few years during the middle 1980's, they just couldn't seem to keep the fluid on the inside of their racks.

Knowing their soggy reputation, I wasn't all that

surprised when a certain 1985 Stanza of my acquaintance sprung a massive power steering leak after 45,000 miles of trouble-free service. If anything, I was probably more surprised that it had taken eight-and-a-half years to happen.

We detailed a Nissan steering rack overhaul in the

November 1989 issue of *Import Service*. As we pointed out in the article, Nissan power steering racks are fairly easy to overhaul, provided you have the special tools and are willing to wait for the necessary special order parts to arrive at your friendly Nissan dealer.

Considering the Stanza's advanced age, a rack overhaul was ruled out this time around. It was decided that a rebuilt unit would do the job just fine. Due to Nissan's power steering fluid-soaked past, I had no trouble rounding up a rebuilt unit to install. Rebuilders rebuild what sells, and apparently they are still selling a lot of rebuilt Nissan racks.

Everyone and his brother seems to be getting into the steering rack rebuilding business, and they all offer a lifetime warranty. Even if the rebuilt rack was warranted for life, I knew that I didn't want to do this particular job twice. Once we get the leaky old rack out of the car, we'll show you how to evaluate both the leaking original and the rebuilt rack. The Stanza's rack is very similar to the racks on other Nissan models, so many of the removal and installation techniques will also carry over to newer Nissan sedan models.

## Strut Strategies

While none of the Stanza's four original suspension struts were showing any signs of leakage, the quality of the ride and handling they were able to provide had steadily declined over the years. Since we were already in the steering and suspension neighborhood, rebuilding or replacing the struts seemed to be the logical way to cure the Stanza of its reclining lounge chair handling characteristics.

There's nothing particularly remarkable about a strut replacement job on most cars. You've proba-

bly done a few hundred of them by now. The Stanza's strut replacement is a little different than most because it has struts holding the suspension together at the front and rear wheels. The rear struts also incorporate the rear spindles, so a complete rear strut replacement would be very expensive and probably unnecessary.

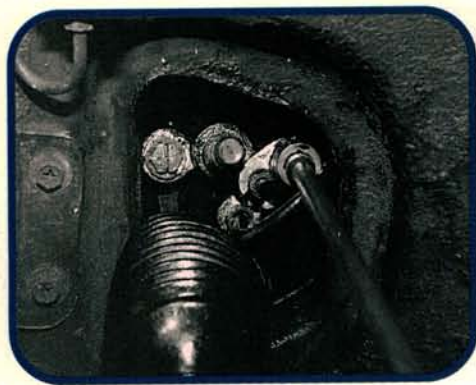
The same basic rear suspension design is also used on later Stanzas, the brand new Altima, and front wheel drive Maximas beginning in 1985. Maximas, later model Stanzas, and Altimas all have a provision for rear toe-in adjustment that our 1985 Stanza lacks.

We checked with several suppliers and, as we suspected, strut cartridges were the only replacement option for the rear struts on the Stanza. Gabriel Ride Control Products provided us with four Gas Ryder strut cartridges (**Gabriel, Circle No. 140**) for installation on the Stanza.

The front strut cartridge replacement procedure held few surprises, but things got interesting when we moved to the rear of this vehicle. The passage of time and eight Ohio winters had conspired to turn what was originally a fully independent rear suspension into a fully dependent, one-piece assembly that didn't like the idea of being taken apart after all those years.

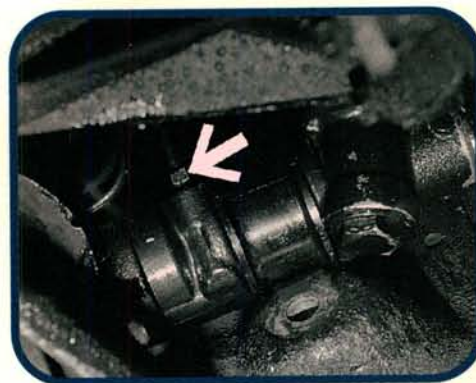
Necessity really is the mother of invention. That's especially true when it's Sunday evening and the car you're planning to drive home also happens to be the car on the lift with its suspension torn apart. We'll wrap this article up by demonstrating the unconventional techniques that were used so the rear strut cartridges could be replaced.

— By Karl Seyfert



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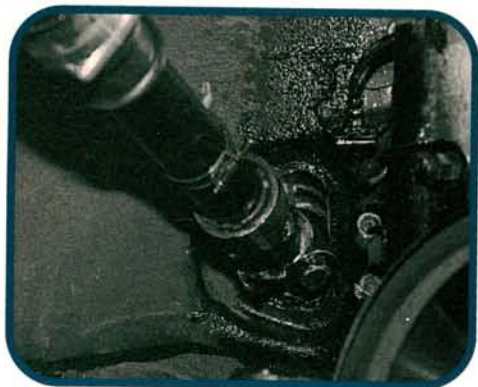
Loosen the power steering rack supply and return lines, as well as the steering column coupler through the tie rod opening in the left inner fender. Use a crow's foot and a long extension on the flare fittings. Turn the steering wheel from lock to lock several times to drain the old fluid.



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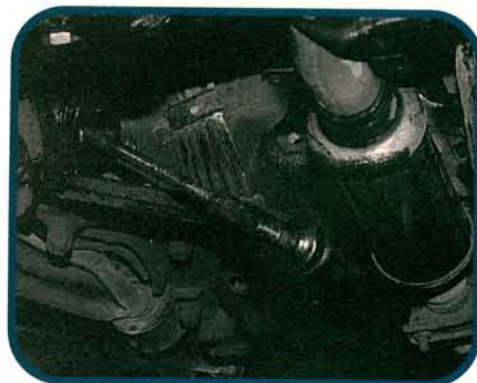
Now remove the smaller lines that feed power steering fluid from the pinion housing to either side of the rack piston. This may seem like an unnecessary step, but there's not enough room to remove the rack if the lines are not removed. Drain more old fluid from the rack by turning the steering wheel.

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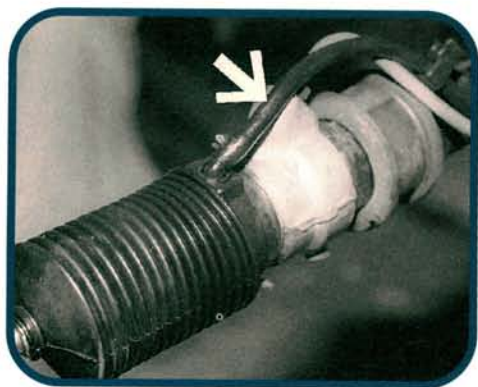
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Disconnect both outer tie rod ends, then remove the rack mounting brackets. Push the rack through the right tie rod opening as far as it will go. The rack looks like it might fit through, but the pinion housing gets in the way (kind of like trying to drag a piano through a key hole).



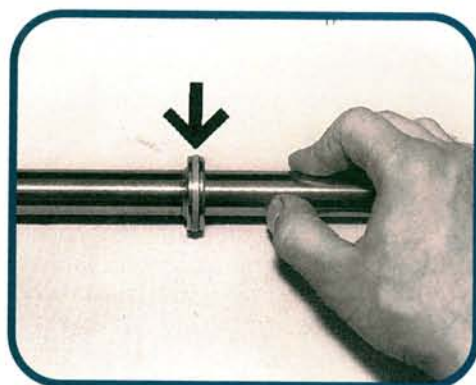
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Now move to the underside of the car. To finish removing the rack, pull the left tie rod end down until it clears the exhaust, then angle the whole steering rack toward the ground. If the tie rod won't clear the exhaust, turn the pinion all the way to the left. It's tight, but it will fit.



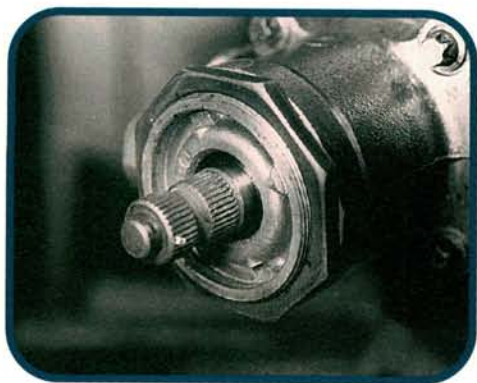
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Both rack boots were filled with fluid. The extra pressure had also caused the left boot to tear. These air tubes interconnect the boots to equalize pressure, but they can also pass fluid back and forth when the rack leaks. This makes it difficult to determine which end the leak is coming from.



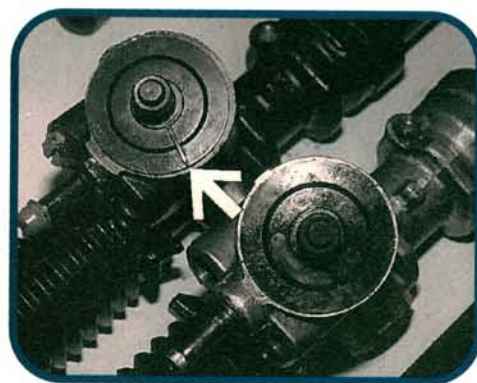
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Even though we were replacing the rack with a rebuilt unit, we decided to take a peek inside. The smallest imperfection or roughness on the rack shaft on either side of the rack piston can result in a fluid leak. A rack that is rebuilt with a worn shaft won't stay dry for long, even with new seals.



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Another spot to check for leaks or damage is the pinion shaft and seals. The plastic pinion shaft cover may trap water, causing a pitted pinion shaft sealing area. Our pinion shaft wasn't pitted, but dirt had worn a groove into the shaft in the sealing area. Here again, new seals won't do the trick.



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The notched plastic pinion shaft cover indexes the pinion shaft to the steering shaft coupler. The gap in the steering shaft coupler will point straight up when the steering wheel is in the straight ahead position. Find the center of the rack's travel, then install the splined cover pointing straight up.



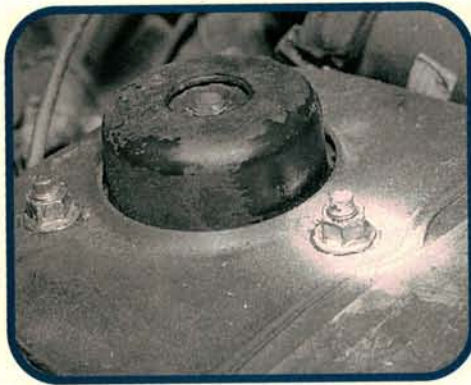
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Someone forgot to install the right side rack mounting rubber on our rebuilt rack. The one piece rubber ring should be installed before the rack is assembled. Rather than disassemble both racks or cut the ring, we used large screwdrivers to stretch the ring over both cylinder end housings.



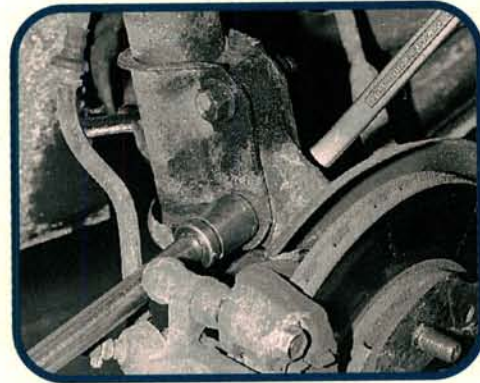
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The left side mounting rubber wraps around the pinion housing. Both rack brackets have an eccentric shape. For the best fit, install the left and right rack mounts in their original locations. When correctly installed, the brackets should nearly touch the frame before the mounting bolts are installed.



# 11

Before we removed the front struts, we marked the position of the upper strut mounting studs with paint. There's no camber or caster adjustment on the Stanza, but there's no way of knowing whether the upper mount is really concentric. Why introduce an extra variable if it's not necessary?



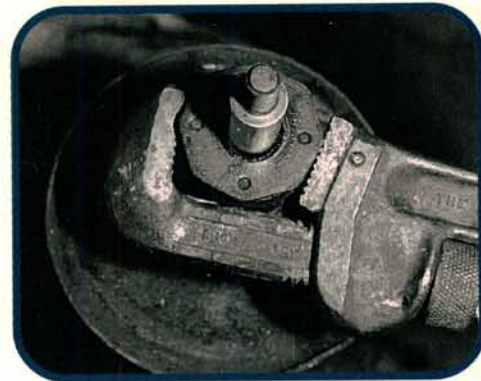
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The lower strut mounting is attached to the steering knuckle. We decided there was no point in marking the bolt locations here. Unlike some cars, the holes in the knuckles are large enough for the bolts to pass; but not large enough to allow a measurable change in the camber angle.



# 13

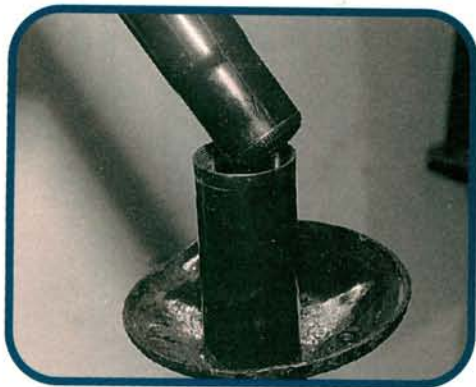
Someone at Nissan was thinking about us. The brake hose mounting bracket is slotted. Remove the spring clip, then slide the brake hose out of the way. Before removing the strut, make sure the caliper and brake hose are properly supported with mechanic's wire while the suspension is disassembled.



# 14

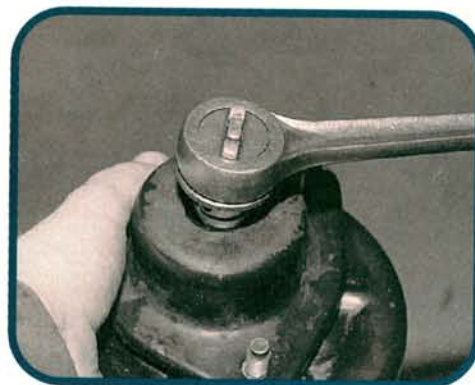
Secure the strut in a vice, then use a coil spring compressor to remove the coil spring (refer to the spring compressor sidebar beginning on page 14). We used a "dedicated" pipe wrench to remove the hex-headed gland packing nut, then removed the internal strut components and drained the fluid from the strut tube.

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We took the empty strut tube over to the parts cleaner to remove all rust and dirt before installing the new cartridge. After drying the tube, we added 50 cc of fresh motor oil to cushion and cool the new strut cartridge. The new strut nut is slotted and should be torqued to 69-127 Nm (51-94 ft-lb).



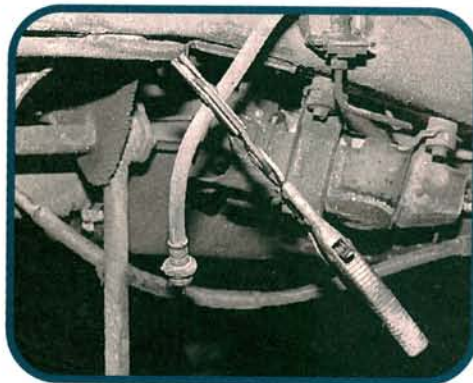
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Check the condition of the strut bearing, strut insulator, and spring seat, then place the spring and spring compressor over the assembled strut tube. Tighten the new strut piston rod lock nut to 59-74 Nm (43-54 ft-lb). Position the spring on the spring seats, then slowly relieve the spring compressor.



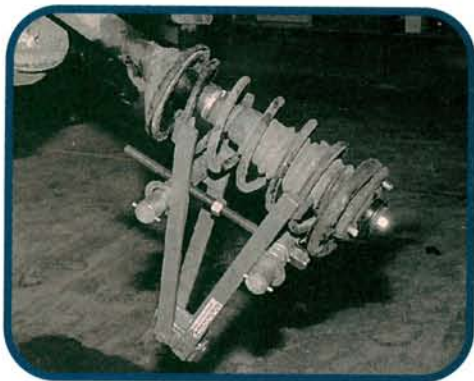
17

The rear strut upper mounting nuts can be reached through the rear speaker openings on this hatchback; they're inside the trunk on sedans. Once again, we marked the position of the strut insulators with paint. This helps line everything up when we're fishing the rebuilt strut into position.



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A different engineer must have designed the rear struts. The brake hose brackets aren't slotted. We disconnected the brake line at the strut bracket to avoid stretching the brake hose. These hose pliers prevent extra fluid loss and save time when bleeding the system.



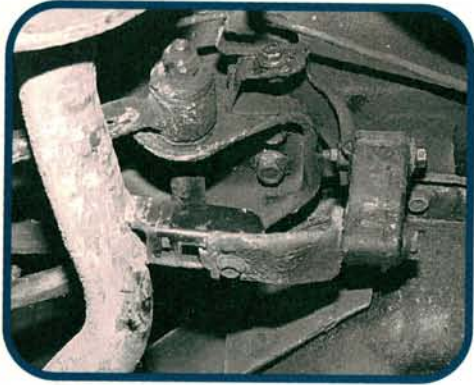
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Rust had seized most of the bolts to the suspension bushings, preventing disassembly. On the right side, we disconnected the radius rod and parking brake cable, then swung the strut assembly and parallel links downward. With the strut parallel to the ground, there's enough room to use the spring compressor.



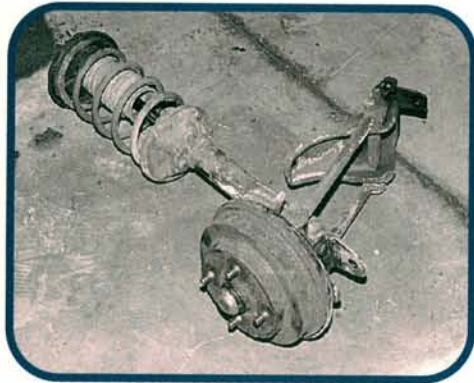
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After removing the coil spring and strut internal parts, we cleaned the exterior of the strut and drained the rest of the fluid out of the strut tube. Temporarily tilt the strut upward to add the 50 cc of oil and the new strut cartridge, then reassemble the coil spring and upper strut insulator.



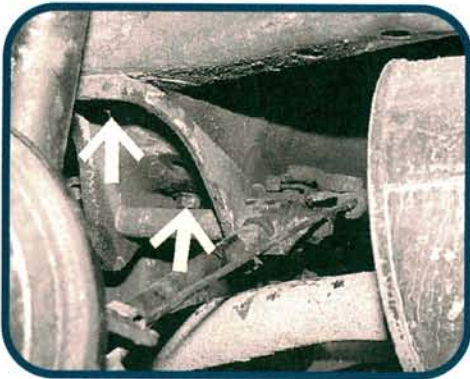
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We had the same problem on the left side. However, the exhaust gets in the way and prevents the swing down technique we used on the right side. Disconnect the brake line, parking brake cable, exhaust and parking brake mounts, and parallel link bracket bolts, then remove the entire suspension as a unit.



# 22

This may seem like a lot of work just to replace a strut cartridge. We decided that it was probably quicker in the long run, rather than wrestling with (and probably damaging) the seized bushings and bolts. Securely mount the whole mess in a vice before attempting to compress and remove the coil spring.



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This early Stanza has no provision for rear wheel alignment adjustments. However, there is enough "slop" in the parallel link bracket holes to allow slight camber and toe changes. During reassembly, use the washer markings on the bracket to return it to its original location, then recheck the rear wheel alignment.

## Coil Spring Compressor Basics

Unless you just fell off the proverbial vegetable truck, I probably don't have to tell you how helpful a good coil spring compressor can be during a strut or strut cartridge replacement job. That spring compressor sure makes the job easier, but have you ever considered just how dangerous the same tool can be when used carelessly or incorrectly?

A tightly compressed coil spring holds a lot of pent-up energy. There's enough energy there to turn the spring, strut, compressor, and any related parts into unguided missiles if you're not careful. Use the following guidelines whenever you are working around coil springs or a coil spring compressor:

- Before dismantling the strut assembly, always secure the strut assembly in a vice or dedicated strut mounting fixture. It's easier, less awkward, and safer to use the coil spring compressor if you aren't trying to balance two things at once. Also, if something unexpected happens, the number of flying parts will be kept to a minimum.
- Never clamp the strut in an area of the strut that may be damaged by the vice or strut clamp. If you're using a vice, chose a reinforced area of the strut assembly that won't be damaged or collapse when the vice is tightened down.

The strut should be securely mounted in the vice, allowing you to turn all of your attention to the operation of the coil spring compressor. A strut that falls out of the vice at the wrong moment can spell disaster.

- Is your coil spring compressor clean and in good working order? Inspect the drive screw threads. Are they damaged? Are they properly lubricated with high pressure grease? Are there any damaged welds, loose hardware, or bent clamp arms?
- Take your time when hooking up the compressor clamp arms. The upper and lower compressor arms should be spaced as far apart as possible to allow for maximum coil spring compression. Each pair of clamps should have a high and a low side. Make sure the upper and lower clamps in each pair follow the spiral of the coil spring. Careful positioning of the clamp arms helps the coil spring compressor compress the spring evenly, without binding. This is especially important on eccentric or variable rate coil springs.

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- Never use air tools to compress or relax the coil spring compressor. An impact wrench moves too quickly and may damage the spring compressor's drive screw threads. This can be very dangerous if the coil spring compressor begins to bind, becomes cocked, or slips off balance. Tighten the drive screw with hand tools, while watching for signs of binding or misalignment.

- Continue compressing the coil spring until all pressure has been relieved from the upper strut bearing and lower spring perch. The coil spring should be compressed until it has separated from these upper and lower mounting points. Never compress the spring until the coils are "stacked" or touching one another, as this may cause coil breakage.

- Some coil spring compressors have an extra set of "jam nuts" on the compressor drive screw threads. These jam nuts are designed to take the strain off the drive screw after the coil spring has been fully compressed. If you're going to set the compressed coil spring aside for any length of time, lock the jam nuts on either side of the compressor assembly to relieve the strain.

- While it might be considered acceptable to zap off the old strut rod lock nut with an impact wrench, never use an impact to install or tighten the new strut rod lock nut. Spinning the strut piston may damage the strut internals and you'll probably overtighten the lock nut to boot. Use hand tools and a torque wrench to tighten the lock nut to specs.

- During reassembly, gradually relieve the tension on the coil spring compressor while watching the position of the coil spring. The top and bottom loops of the spring must line up in the proper place on the upper and lower spring perches and the strut bearing must go back together without binding. Once again, no air tools.

- Some technicians still favor single-sided coil spring compressors. If you use this tool design, make sure you have the style with broad-based claws. Earlier "widow-maker" designs with narrow claws have a tendency to slip sideways at the worst possible times. Always use these tools in pairs (three is even better), and tighten and loosen each of the compressor screws in equal amounts to avoid lopsided spring compression.

If you observe these simple precautions, using the coil spring compressor shouldn't be any more difficult, but it will be a whole lot safer.