

Strut Spring Replacement Procedure

Author: mbtoloczko

Pre-job prep

1. About a week before you plan to do the work, pull off all the wheels, clean the exposed threads on the strut-to-knuckle bolts using a wire brush, and put some PB Blaster or Liquid Wrench on the nuts and threads of the bolts securing the struts to the suspension knuckles. Soak them as best as you can. Wipe up excess. This will make life much easier when you try to remove these nuts.
2. You will need a strut spring compressor. You can rent these at many auto parts stores for about \$10 or less.
3. Make sure that you have a wrench or socket that will fit on the bolt heads for the bolts that tighten the springs down on the strut spring compressor.
4. You will need a very deep well (3 inches) 17 mm socket with flats on the outside to turn it with a crescent or box end wrench.
5. You will need a long (4 inches) 6 mm allen wrench or Allen socket.
6. You will need a 1/4" dia rattail file to elongate the strut mount holes in the front strut mount towers to reclaim some of the caster you are going to lose by dropping the front end 1" relative to the rear.
7. You will need about 10 feet of bailing wire to hold the suspension knuckles in place when you disconnect the struts from the suspension knuckles.
8. You will need about 5 minutes of someone's time to help you remove and reinstall the struts when the last nut is removed/attached. They will be removing or installing the last few nuts (which you will have already loosened). They will not get dirty.
9. From the factory, there is no camber control on the rear suspension. There are places that sell generic camber bolts that will replace the upper strut-to-knuckle bolt and permit rear camber adjustment. This can be handy for getting the best alignment for handling. There is a kit made by Specialty Products Company. <http://www.specprod.com/> You can call them to find a local seller. The cost for the kit should be no more than \$30 + shipping.

Front strut springs

1. Put the front end on jack stands and remove the front wheels. Please be sure that the jack stands are supporting the car by the frame and not the control arms.
2. Using a wire brush, again clean the exposed threads on the strut-to-knuckle bolts and then apply more PB blaster.
3. Remove the bolts securing the brake lines (12 mm) and ABS sensor leads (12 mm) to the struts.
4. Remove the nut (14 mm) securing the sway bar links to the struts. You will need to put a 14 mm open end wrench on the sway bar link ball joints to keep them from turning when you loosen the nuts.
5. Match mark the upper strut-to-knuckle bolt face to the strut as this bolt controls the camber of the front wheels.
6. Loosen the nuts (19 mm) securing the strut to the knuckle. They will likely be very tight. If you have access to a powerful air wrench, it should be pretty easy to loosen them. If you only have hand tools, if you pre-soaked nuts and threads with PB Blaster, then you have a good chance of removing them with a standard breaker bar, but an extension may be necessary.
7. Once you loosen the strut-to-knuckle nuts, you can remove them. Don't remove the bolts yet.
8. When you finally disconnect the strut from the suspension knuckle, the knuckle is going to want to flop out and back, and the knuckle along with the control arm will want to drop down. You don't want to let this happen. First, prop up the control arm. I used a milk crate a few 2x4s. Next, using the bailing wire, secure the position of the suspension knuckle by wrapping the wire around the knuckle below the strut

mounting point and then attach the bailing wire to the frame of the car somewhere near the front of the car and inboard of the knuckle position.

9. Open the hood of the car and pop the dust cover off the top of the strut tower. This will expose the strut mounting nuts and the top of the strut mount itself.
10. Loosen the three nuts (12 mm) securing the strut to the strut tower.
11. Now remove the bolts securing the strut to the suspension knuckle. You may have to twist the upper bolt to get it to slide out. The bolts come out easily if you apply a little inward pressure on the strut and tap the bolts with a soft face hammer. Its most probable that friction between the strut and the suspension knuckle will keep the parts from separating.
12. Now get the friend to help you. Have them remove the three nuts securing the strut to the strut tower. You will need to lift up on the strut so that they can remove the nuts by hand.
13. The strut can now be tilted inward somewhat at the bottom and pulled loose from the suspension knuckle. If you properly secured the knuckle with bailing wire, it should not flop much at all.
14. The strut is fairly heavy. As you drop it out from the backside of the fender well, you will need to pull the brake line out of the way.
15. Whew. You've got the strut out the car, and now you can switch out the strut spring. Before you do that, make note of a few things.
 1. Pull up the strut shaft boot and have a look at the strut itself. Is it leaking oil? Might as well replace the strut now if its leaking.
 2. Note the position of the upper spring mount. There should be the words "Outside" on it. This position should line up with the strut-to-knuckle mounting flanges when you look down the strut from the top.
 3. Note the position of the spring in the lower strut mount. Note where the pigtail ends.
 4. Note that the upper strut mount bolt heads do not make an equilateral triangle. This is because the strut mount attaches to the strut tower in a particular orientation.
16. Get that strut spring compressor and use it.
17. Once the springs are compressed so that there is no load on the strut, pop the cap off the top of the upper strut mount, put that deep well 17 mm socket on the nut inside and put the 6 mm allen on the shaft end. Loosen and remove the nut. Please note that there is a bearing inside the strut mount and that you should not let any dirt or debris enter in there.
18. Once the nut is off, you can pull the pieces off the strut. Note how everything comes apart.
19. Pull the spring out, release the strut spring compressor, grab the replacement front spring, and compress it.
20. Reassemble the strut pieces. As you release the spring, make sure that the spring and the upper spring mount are correctly aligned relative to the bottom of the strut.
21. Grab that rattail file. Elongate the strut tower mounting holes in the direction of the rear of the car. You can elongate the holes by about 0.15 inches. This doesn't sound like much, but dropping the front end by 1" relative to the rear will decrease the caster by about 0.5 degrees. Elongating the holes by 0.15" and mounting the strut at the back of the holes will add about 0.35 degrees, so your total caster lose will be only about 0.15 degrees.
22. Reinstall the strut into the car. You will need your friend's help to put on a few of the strut-to-strut tower nuts while you hold the strut in position.
23. Reinstall the strut-to-knuckle bolts. Set the position of the upper bolt as per the match mark.
24. Reinstall remaining nuts and bolts.
25. That's it for the front.

Rear strut spring replacement

1. Disassemble the rear of the car interior.
 1. Pull the rear seat bottom. It is secured by two tabs at the bottom front of the seat.
 2. Pull the side panels. There are 2 fake plastic screws on each panel that need to be removed. You will need to tilt the seat-back forward to see one of these screws. Then the panel just pops off. Some of the buttons securing the panel to the car may stick to the car rather than come off with the panel. You will need to remove those from the car and reinstall them on the panel.
 3. Pull the rear deck cover. There are two Phillips head screws securing it. It slides forward to be removed.
2. Jack up rear of car, put on jack stands, and remove wheels.
3. Using a wire brush, again clean the exposed threads on the strut-to-knuckle bolts and then apply more PB blaster.
4. Remove the bolts securing the brake lines (12 mm) to the struts.
5. Loosen the nuts (19 mm) securing the strut to the knuckle. They will likely be very tight. If you have access to a powerful air wrench, it should be pretty easy to loosen them. If you only have hand tools, if you pre-soaked nuts and threads with PB Blaster, then you have a good chance of removing them with a standard breaker bar.
6. Once you loosen the strut-to-knuckle nuts, you can remove them. Don't remove the bolts yet.
7. When you finally disconnect the strut from the suspension knuckle, the knuckle is going to want to flop out and the knuckle will want to drop down. You don't want to let this happen. The easiest way to prevent this is to just prop up the bottom of the knuckle. It will still flop out slightly. You could also secure the knuckle with some bailing wire as you did in the front, but be sure to leave room to pull the strut out which will come out from the front of the fender well.
8. Climb in the car and loosen the three nuts (12 mm) securing the strut to the strut tower.
9. Now remove the bolts securing the strut to the suspension knuckle. The bolts come out easily if you apply a little inward pressure on the strut and tap the bolts with a soft face hammer. Its most probable that friction between the strut and the suspension knuckle will keep the parts from separating.
10. Now get the friend to help you. Have them remove the three nuts securing the strut to the strut tower. You will need to lift up on the strut so that they can remove the nuts by hand.
11. The strut can now be tilted inward somewhat at the bottom and pulled loose from the suspension knuckle. If you properly secured the knuckle with bailing wire, it should not flop much at all.
12. The strut is fairly heavy. As you drop it out from the front side of the fender well, you will need to pull the brake line out of the way.
13. Whew. You've got the strut out the car, and now you can switch out the strut spring. Before you do that, make note of a few things.
 1. Pull up the strut shaft boot and have a look at the strut itself. Is it leaking oil? Might as well replace the strut now if its leaking.
 2. Is the upper strut mount rusted to all hell? If so, you may want to consider replacing it. They are about \$85/ea from 1stsubaru.com.
 3. Note the position of the upper strut mount relative to the strut. There should be a notch on the outside of the upper strut mount. This notch faces outward and should line up with the strut-to-knuckle mounting flanges when you look down the strut from the top.
14. Get that strut spring compressor and use it.
15. Once the spring is compressed so that there is no load on the strut, put that deep well 17 mm socket on the nut at the top of the strut, and put the 6 mm allen on the shaft end. Loosen and remove the nut.
16. Once the nut is off, you can pull the pieces off the strut. Note how everything comes apart.
17. Inspect the upper spring mount rubber seat. Its metal coated with rubber. If yours is like mine, the metal inside will be rusting badly at the point where the spring coil ends. If so, you can either replace it or reuse it. If you decide to reuse it, you will need to pry the seat out of the upper strut mount and reposition the seat so that it lines up properly with the new spring when you reassemble the strut pieces.

18. Pull the spring out, release the strut spring compressor, grab the replacement rear spring, and compress it.
19. Reassemble the strut pieces. As you release the spring, make sure that the spring, the upper spring seat (if reusing a rusted one), and the upper strut mount are correctly aligned.
20. Reinstall the strut into the car. You will need your friend's help to put on a few of the strut-to-strut tower nuts while you hold the strut in position.
21. Reinstall the strut-to-knuckle bolts. If you purchased the aftermarket camber adjusting bolt, install it now as per the instructions. Set the camber at a neutral position.
22. Reinstall remaining nuts and bolts.
23. Reassemble the interior.
24. That's it for the rear.

Post installation

Take the car in for an alignment. Set front camber to -0.5 deg, front toe to 0". Set rear camber to -1.0 degree, rear toe to 0". Check front caster to see if its within spec.