

1973 914 ENGINE REMOVAL

by

Douglas A. Brownridge

August 15, 2014

I recently removed my 914 engine for the first time. In fact, it was the first time I have ever removed an engine from any car. I used Wayne Dempsey's write-up from the Pelican Parts forum (http://www.pelicanparts.com/techarticles/914_engine_drop/914_engine_drop.htm) and it is excellent. But, as a newbie, I would have benefited from more detailed pictures to take some of the remaining mystery out of the procedure. So, I decided to compile a picture-intensive newbie-rated write-up of my engine removal and post it for anyone else that is removing a 914 engine for the first time. Full credit to Wayne for his write-up. The current write-up is based on his text (verbatim in many places), the steps are very similar (I made some modifications, some steps were not applicable to my car, and I used a lift which meant that I didn't have to remove the rear wheels and deal with jacks and jack stands), and it simply fills in additional pictures and observations from my experience. This write-up should be used as a supplement to Wayne's. Wayne also has a checklist on his site which is terrific for ensuring that nothing is missed. Although Wayne rates this procedure as a 4/10 difficulty level, as with anything there are an infinite number of ways to screw up and such a procedure is undertaken at one's own risk. Also, my car was "messed with" by a previous owner(s), and so may not fully represent other cars (e.g., for some reason unbeknownst to me, a previous owner made their own engine bar, and subsequently I have learned that my engine may be a 1.8l—perhaps out of a 412--using the 1.7l air cleaner and D-Jetronic components).

1. Detach and remove the engine lid. Loosen the two screws that fasten the hinges to the car and ensure that the lid does not fall into the engine compartment.



Note that each screw has a small and a bigger washer.



Note for reinstallation that the hinge of the lid slides under the bracket on the firewall.



2. Disconnect and remove the battery.
3. Separate the starter wire from the positive terminal of the battery wire harness.



4. Empty the fuel tank. Wayne says it's not necessary to do this, but it is safer. I don't have pics of this because I had done it before embarking on this procedure. Due to vapor lock, my fuel pump was moved to the front, under the car in the cavity where the fuel lines route to the tunnel. So, to drain the fuel I disconnected the line at the pump in that location.
5. Once the tank is empty, disconnect the fuel lines from the right side of the car to the injection system. I labelled the lines so I'd know which one goes to the 'in' and which goes to the 'return'.



6. Detach and remove the air cleaner assembly. It is held on with a long screw with a wing nut on the end, and this screw fits into a threaded bracket underneath the air cleaner.



7. Before removing the air cleaner, disconnect the breather line that goes to the oil fill tube.



8. Also disconnect the breather on the air filter assembly that goes to the charcoal canister (which rests on top of the fuel tank in the frunk).



9. Next, while you're at it, disconnect the other charcoal canister line from the engine fan housing.



10. Gently pull the snorkel that goes to the throttle body away from the air filter housing....



...and then remove the air cleaner housing from the engine compartment.



11. Move to the left side of the car and remove the relay board cover. It's held on with a round nut.



12. Disconnect the fuel injection, alternator, and starter harnesses, and leave the primary chassis harness attached (the one at the front of the relay board).



If I recall correctly, the fuel injection is the 4 connector harness (which makes sense given that there are 4 injectors), the alternator is the 3 connector harness, and the starter is the 12 connector harness. The connectors simply pull off, as shown below.



13. Don't forget to open the retaining tabs that hold the wires in place (check all applicable wires for these).



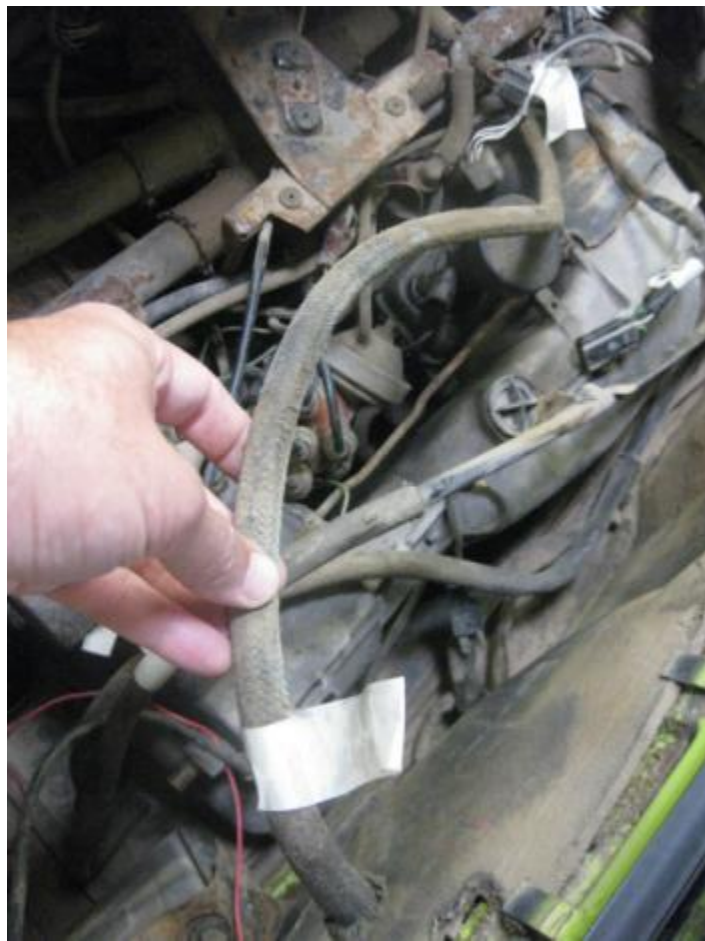
14. Disconnect the oil temperature sender from the main wire harness, if you have one. Mine does not.
15. Disconnect the blower motor hoses from both sides of the car. Mine only had one hose that was located on the left side of the car. It is held on with a hose clamp.



16. On the right side of the car, detach the lines to the air pressure sensor. Make note of where everything goes so you know how to reconnect it.







The long line above connects to a Y by the oil filler.





17. Disconnect the electrical connector and the line on the fuel pressure regulator.





18. I don't recall seeing this step in Wayne's write-up, but disconnect the engine ground. I disconnected mine from the side of the car rather than the engine because I'm hoping to restore the car and will need to clean out the engine bay anyway.



19. Disconnect the fuel injection computer from its mounting location on the firewall





Note for reinstallation that the plate with two slots sits on top of the other plate.





Then the fuel injection brain should wiggle out from its location.



And leave it resting on the engine.



20. Loosen the bolt that holds end of the accelerator cable in place, and then simply slide the end of the cable out as shown below.





Next, lift the cable up and out of its mounting location under the bracket for the air cleaner. Mine was a little bit tight as it hadn't been removed in at least 30 years, but with some pressure it popped out.





Everything that needs to be disconnected on top of the engine should now be disconnected.

21. Rather than using jacks and a furniture dolly, I used my MaxJax and a lift table. Consequently I didn't need to drop the car so low to the ground and I could leave the wheels on. But if you need to remove the wheels, now is the time to loosen the lugs nuts on the two rear wheels with the wheels on the ground so they won't spin. Since the floor

and jack points are rotted-out on my car, I used 1.5" x 1/4" square stock to provide support from one side of each lift arm to the other.



22. With the wheels still on the ground, loosen the CV bolts. I used a triple square (the correct socket) to loosen each one. Regrettably, there was so much grease and dirt on my hands, and everywhere else, that I couldn't take pictures. Ensure to get the socket end in all of the way to reduce the risk of stripping the bolt. I took a hammer and tapped the socket in the bolt to ensure it was fully seated. I had to use some extensions and a universal joint to get to some of them (there are 4 on each CV). Once the bolts are out, simply take a small flat head screwdriver and gently pry the CV apart from where it attaches to the transmission. Place the screwdriver in the groove/separation nearest to the transmission and tap around the outside until they begin to separate. I just wiggled the screwdriver and that worked for me. Ensure not to damage the mating surfaces of the joint. Wayne's write-up has an excellent picture of where to locate the mating surfaces. Place plastic bags over the joints and the transmission mating surface. I secured my bags with zip ties. Below are pics of the CV bolts and the joints removed.



23. Disconnect the speedometer cable. To do so loosen the large nut that attaches the cable to the speedometer drive on the rear of the transmission, then the cable simply pulls out.



24. Disconnect the clutch cable. Wayne's instructions say to "start by loosening up the adjusting nut and removing the V-shaped piece at the end of the cable from the throw-out arm." I fumbled a bit with this trying to figure it out. The adjusting nut was a bit seized so I used one wrench to counterhold the cable.



I ended up completely removing the adjusting mechanism.



Then remove the nut and clip that retains the clutch cable pulley. I gently pried the cable from where it mounts with a screwdriver and fiddled with that clip thingy until it came loose.





Then I removed the nut and washer holding the pulley in place.



And the pulley and cable came off.



Here are the detached speedometer and clutch cables.



About this time I noticed that my car was sagging without the support of being on its wheels...yikes!!! Time to get 'digging into hell'.

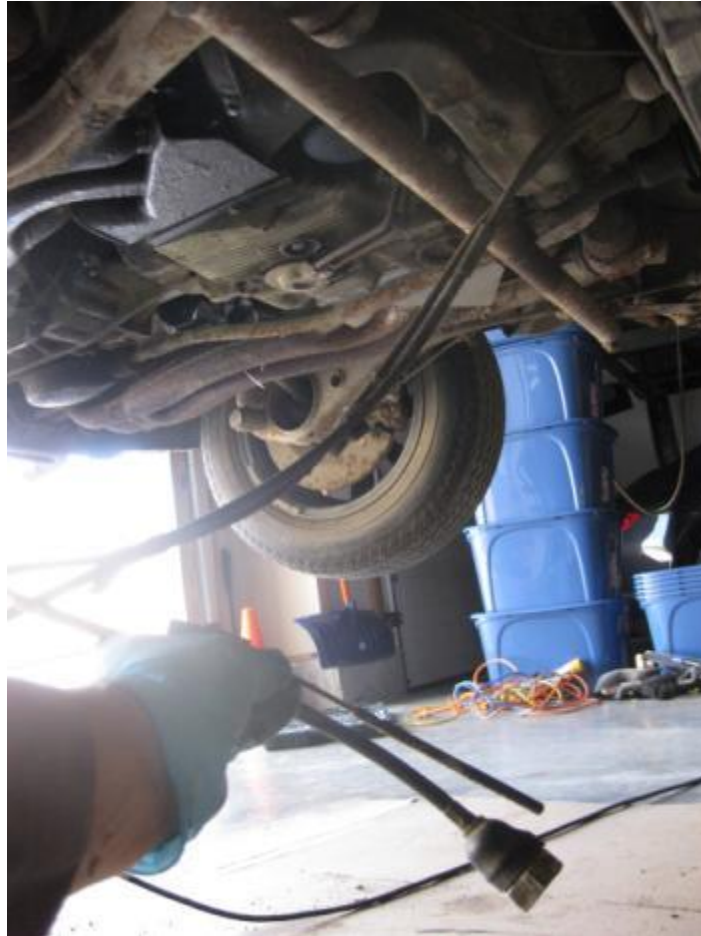


I tried to give it some support by putting jack stands under the wheels...didn't give me much confidence and the gaps didn't close much.



25. Hopefully your car isn't like this, but if it is and you choose to continue then pucker, while you hope that the back end doesn't fall off and land on you, and fish the speedometer and clutch cables through the engine bar.





26. Disconnect the shift linkage. The shift linkage is attached to the front shifter bar by a coupling that is held in place with a cone screw. This is covered by a rubber boot.



I took a screwdriver and gently pried the boot at the back so it would slide away from the firewall.





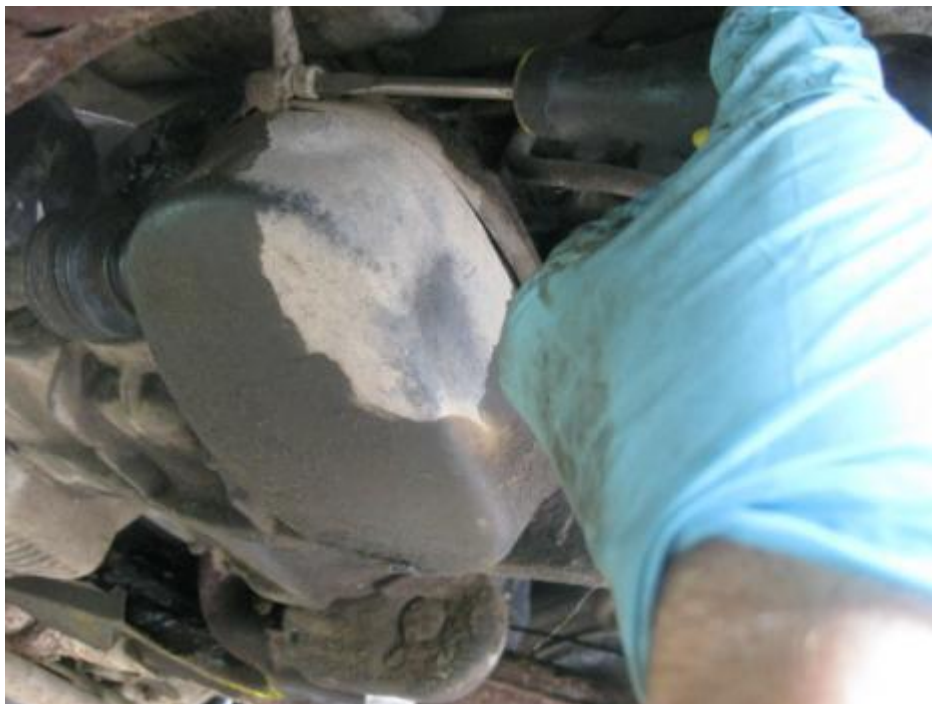
Then I used an Allen wrench to remove the cone screw. Wayne cautions to be careful not to strip these cone screws, so ensure the Allen wrench is fully seated.



Inspect the cone screw to ensure it's in good condition.



27. Move to the rear of the car and remove the cone screw from the rear shift coupling. The housing is held together with an oval-shaped clamp.



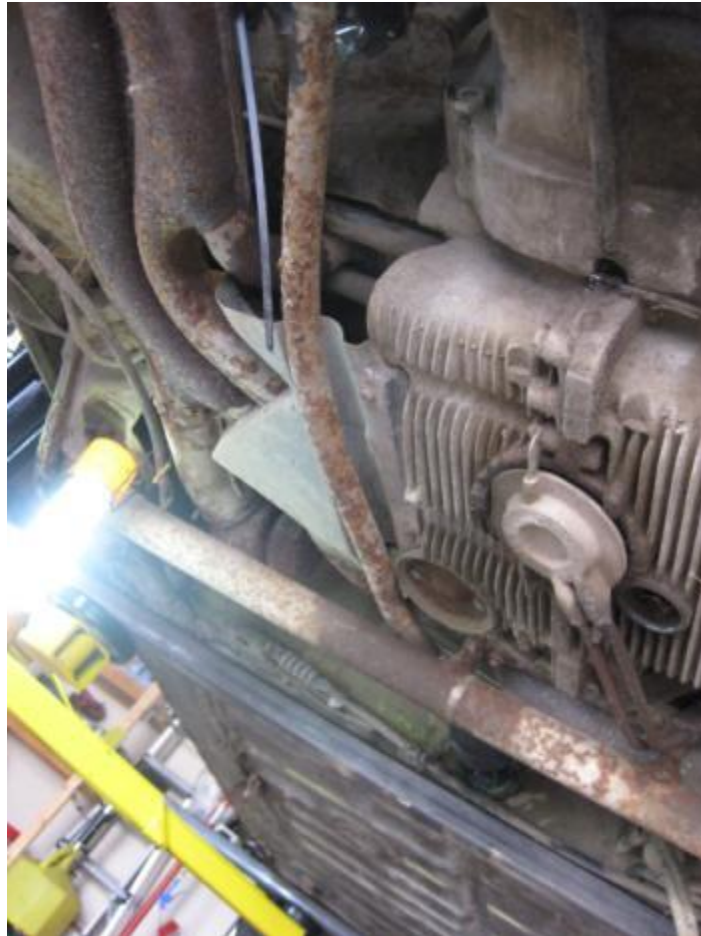
With the clamp removed pull the housing apart.



Locate the cone screw and remove and inspect it.



Note the orientation of the shifter bar for reinstallation.



The shifter bar slides out of the coupling at the back.



Wayne cautions not to lose the couplings because they can now slide off of the shaft. He also suggests to inspect the shifter bushings and replace as needed (see the Pelican article 914 shifting improvements). The front of the bar took some gentle persuasion with a large flathead screwdriver to get it off.





My car had a spring from the engine bar going around the shifter bar (doesn't look to be stock, nor is the engine bar!). So I disconnected the spring.





Then I fished the shifter bar through the engine bar and out it came.



28. Remove the transmission ground strap. It is located on top of the transmission and attaches to the underside of the trunk.



29. Move to the front of the engine and disconnect the lower heater hoses from each side of the car (there was only one hose on mine).



30. Disconnect the heater cable from each of the flapper boxes. Over the whole procedure, this was the most difficult component to take apart. The bolts were rusted on and it was difficult to counter hold the mechanism without breaking it. In the end I snapped one of the cables.





31. Disconnect the oil temperature sender, if you have one. I don't.
32. Feed the accelerator cable through the engine tin. Pull the cable through while underneath the car.





33. Loop the cables toward the front of the car so that they are out of the way.



34. If you're using jacks, stands and a furniture dolly, refer to Wayne's write-up. Place your cart under the engine. (note: in the picture below I have a piece of 2 x 6 on the cart for supporting the back of the engine and the transmission, but I later switched that to a 2 x 4 so there would be more clearance for the clutch cable pulley bracket.)



Here are some pictures from after the engine and transmission were dropped to illustrate how the 2 x 4 provides support while clearing the rear shifter housing and clutch pulley bracket.



Here's a pic looking from the side showing how the 2 x 4 is under the rear supporting area of the crankcase.



Of course, the engine bar rests on the cart at the front.



35. Lower the car until the engine is about $\frac{1}{2}$ " from the top of the cart. Double-check that nothing unintended will be resting on the cart (e.g., clutch pulley bracket, throw-out fork, heat exchangers).
36. With great caution, because you have to be under the engine to do this, loosen and remove the two long bolts on the engine bar on either side of the car. As the bolts loosen

the engine bar will, hopefully, slowly drop down onto the cart. Be careful because as the bolts come out the engine may drop with a thud, which is why it needs to be so close to the cart. I had to counterhold the nut on top of each bolt. That was a bit tricky on the right side. I needed to use a universal joint and extension to counterhold the nut.



The bolts on my car were quite bent...scary!



37. Disconnect the transmission mounts. Two bolts hold each transmission mount in place. Mine required an impact gun to break free. When the last of these was removed the transmission dropped onto the cart.



38. Ensuring that nothing is in the way/catching, raise the car 1 inch. The car will rise but the engine shouldn't. If you see it move then it's catching on something. Once free, raise the car another inch and check again. Check to ensure the engine compartment seals aren't catching on the sheet metal. If so, use a screwdriver (never your finger!) to pry them apart. I thought my fuel rails were going to catch, but they didn't. I did have an issue with the engine tin catching on the suspension ear on the left side. I used a pry bar to get the tin to clear.





Ensure that the rear axles are not catching. The left one on mine needed to be fished through the wiring by the starter.



Once everything is clear the car can be raised to the height needed to be able to roll the engine out.



39. With the engine away from the car, the car can be lowered (of course with wheels replaced if they were removed) to the ground and the job is done.





Version 1, August 15, 2014