

L300 Head replacement and timing belt DIY, step by step

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Tojo



L300 Head replacement and timing belt DIY, step by step

Fri Mar 06, 2015 4:11 pm

Hello Delica.ca,

The head on the ol' L300 cracked about a year ago and I'm finally ready to tackle the job. My van is parked uncovered in the backyard, no hydraulic lift or air tools. Grungy backyard mechanic! I'll be doing the updates in real-time so it might take awhile. I'll endeavor to be as clear and concise as possible. Let me know if you have questions. Best to download the full service manual and refer to the torque specs there.

The following is a step by step head and timing belt replacement for a 4D56 2.5L turbo diesel as found in my 1993 L300 Delica Super Exceed. It has 140,000 kms on the clock and has had a pyrometer since it was imported in 2009 with 56,000 kms. Timing belts and water pump were replaced on import. It's pretty much stock except for EGR blanking plates, pyrometer, K&N filter and stainless 2.5" exhaust. Turbo cartridge was replaced as well as the turbo seals. This is the first time this motor has been torn down. I'll try to upload as many photos as I can and add as much detail as I can. I'm presuming that you have some basic mechanical knowledge, as well as good "feel". I find that this intuitive mechanical skill that some people have is very important when working on a motor. Knowing when to use force, and knowing when to back off before shearing a bolt is the difference between success and frustration. Although I've wrenched on a lot of vehicles, this is the first time I'm tackling this motor, so if there are constructive comments or suggestions from mechanics who have done this before, it would be appreciated.

- Tool list (\*will be updated as we go\*):
- Metric socket set, 3/8" and 1/2" drive
  - Metric impact sockets
  - Closed end wrenches
  - Ratcheting closed end wrenches
  - Phillips screwdriver
  - Flat head screwdriver
  - Lever bars
  - Breaker bars, 24" and 30", 1/2" drive
  - Trays for collecting parts
  - Trays for collection fluids
  - Funnel
  - Wire brushes
  - Needlenose pliers
  - Bent needlenose pliers
  - Lineman's pliers
  - Wire brushes
  - Soft mallet
  - Soft scraper
  - Torque wrench

- Roloc bristle disc
- Cam/Crank removal tool

Supplies (\*will be updated as we go\*):

- Deep Creep penetrating oil or similar like Liquid Wrench
- Shop rags
- Nitrile gloves
- WD40
- Super Lube silicone grease
- Automotive solvent
- Degreaser
- Brake cleaner, aerosol can

Last edited by [Tojo](#) on Wed Jul 22, 2015 5:04 pm, edited 11 times in total.

1993 Delica L300, SWB, LSD, Super Exceed with Crystal-Lite, mostly stock but it's got a digital EGT!!!  
1995 Delica L400, LWB, Super Exceed with Crystal-lite, Airlift airbags, SS intercooler pipes, soon to be WVO  
1997 Isuzu ELF 2.0Ton Crane truck, 4300cc diesel, NKR66E



Tojo



Re: L300 Head replacement and timing belt DIY, step by step

Fri Mar 06, 2015 4:21 pm

Remove the drivers seat by following this excellent post: [drivers-side-floorpan-removal-2125.html](#)

Then remove the centre console, there are two hidden phillips screws under the power window switches. I did this so it wouldn't get damaged when I remove the passenger seat.



IMG\_20150302\_104229.jpg (119.59 KiB) Viewed 1454 times

Remove the bolts behind the passenger seat. Then remove the seat and engine cover. Don't forget to unplug the cable!





IMG\_20150302\_104421.jpg (166.17 KiB) Viewed 1454 times





IMG\_20150302\_104432.jpg (148.46 KiB) Viewed 1454 times

And now the engine compartment is opened up and ready to go.





IMG\_20150302\_113839.jpg (301.28 KiB) Viewed 1454 times

Last edited by [Tojo](#) on Fri Mar 06, 2015 5:20 pm, edited 3 times in total.

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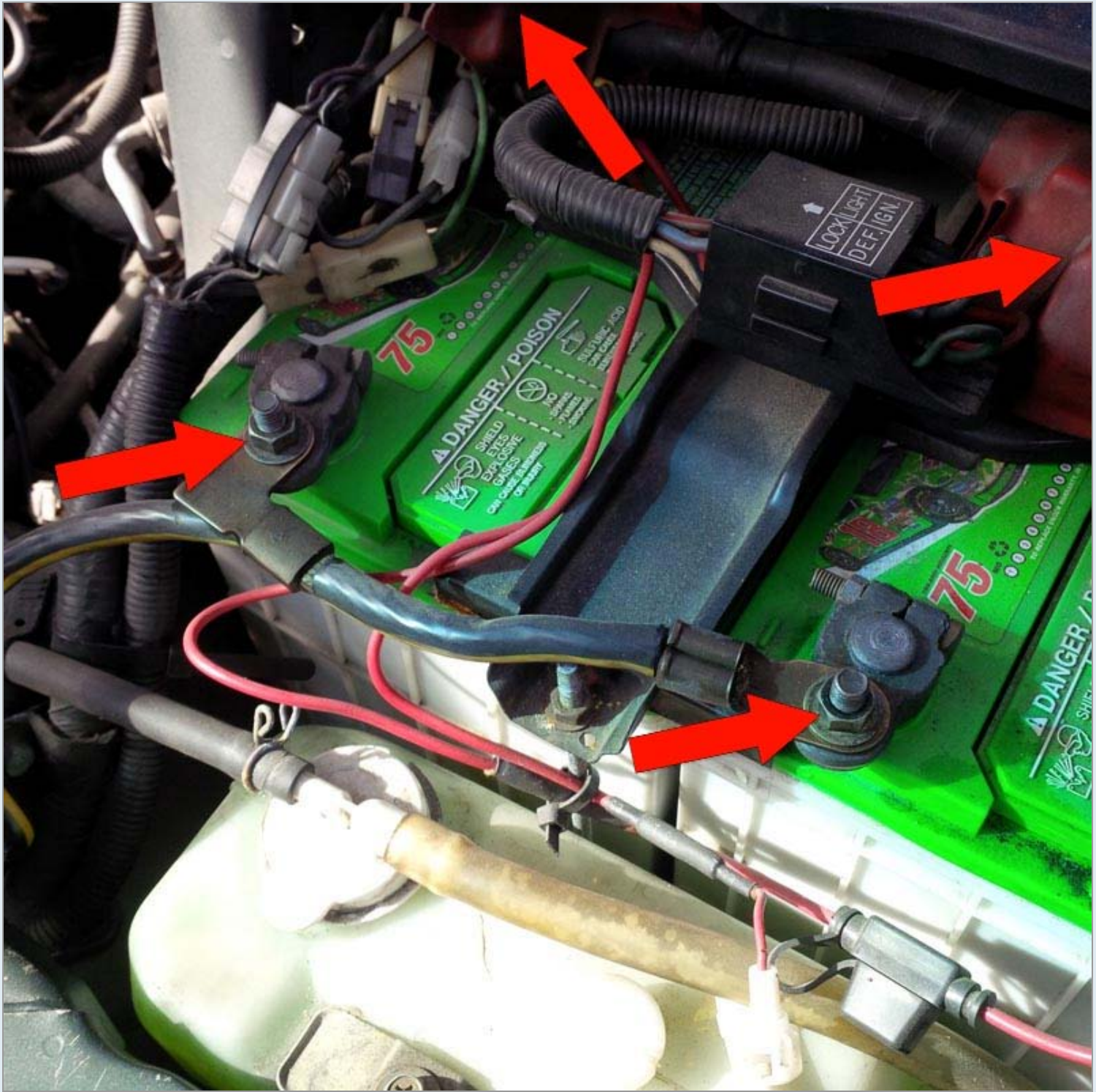
“

Re: L300 Head replacement and timing belt DIY, step by step

□Fri Mar 06, 2015 4:46 pm

Disconnect the battery





IMG\_20150305\_131740.jpg (145.13 KiB) Viewed 1451 times





IMG\_20150305\_131943.jpg (164.03 KiB) Viewed 1451 times

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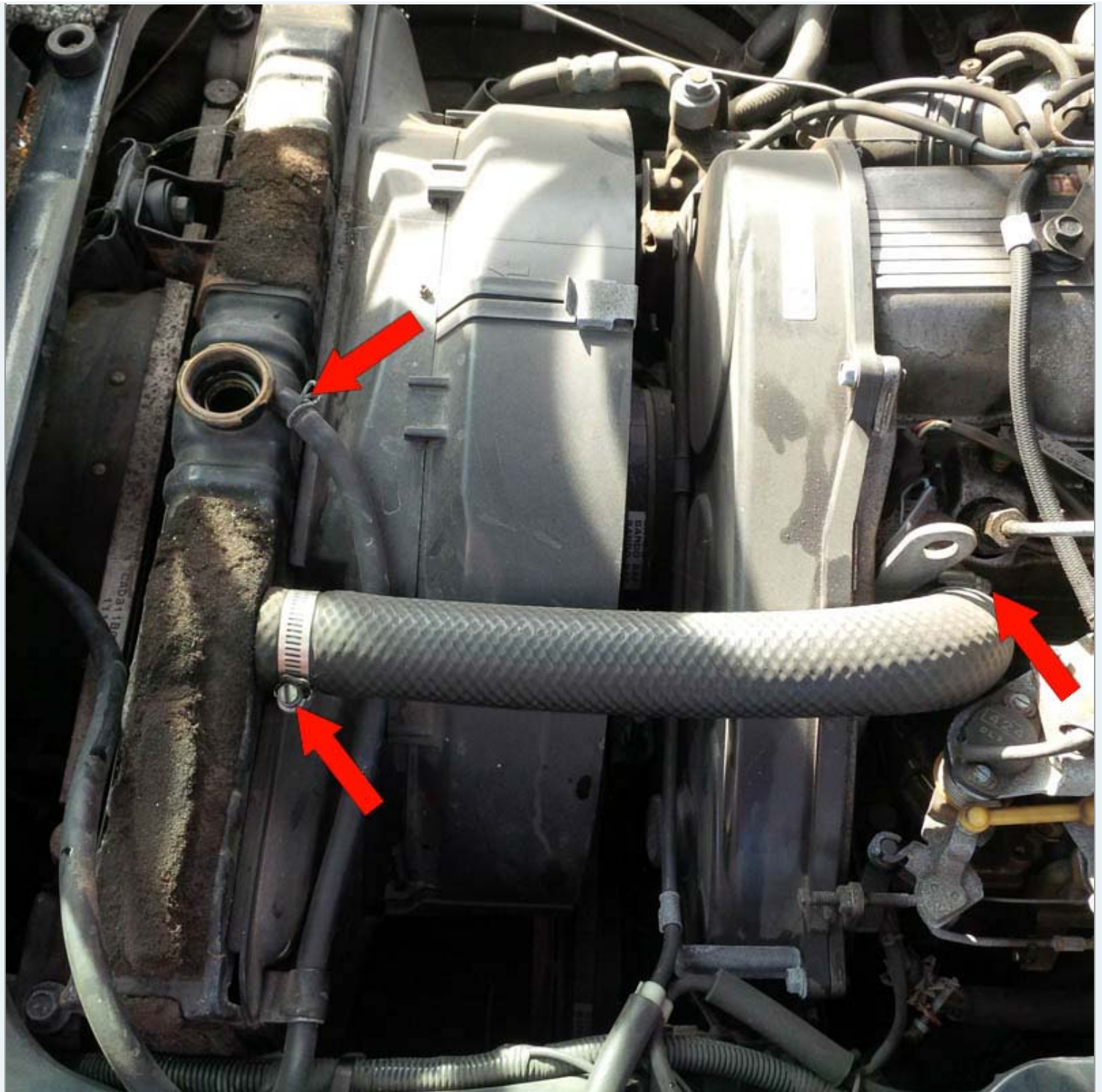


Re: L300 Head replacement and timing belt DIY, step by step

Fri Mar 06, 2015 4:50 pm

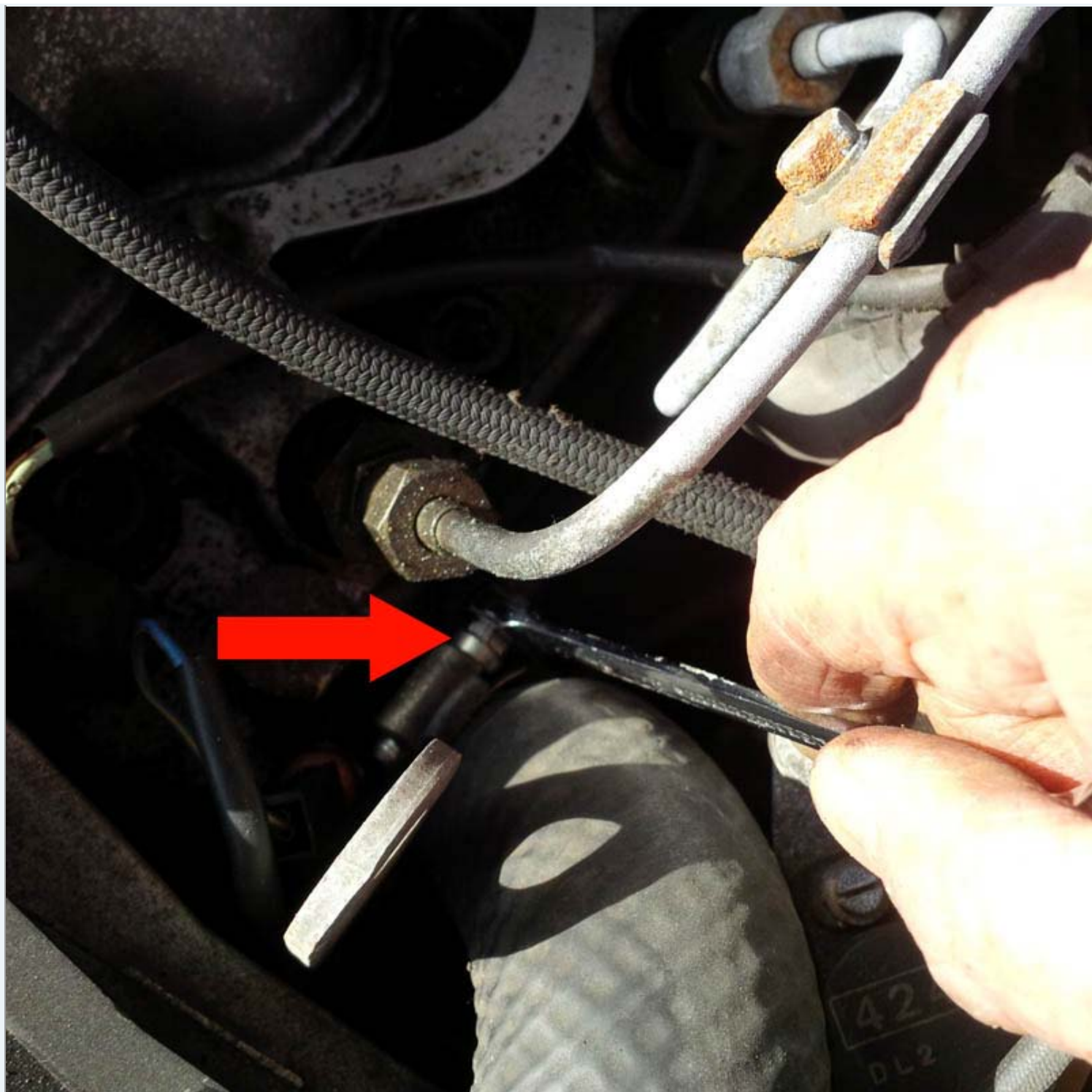
Remove upper radiator hose and coolant overflow hose.





IMG\_20150305\_132501.jpg (129.02 KiB) Viewed 1449 times

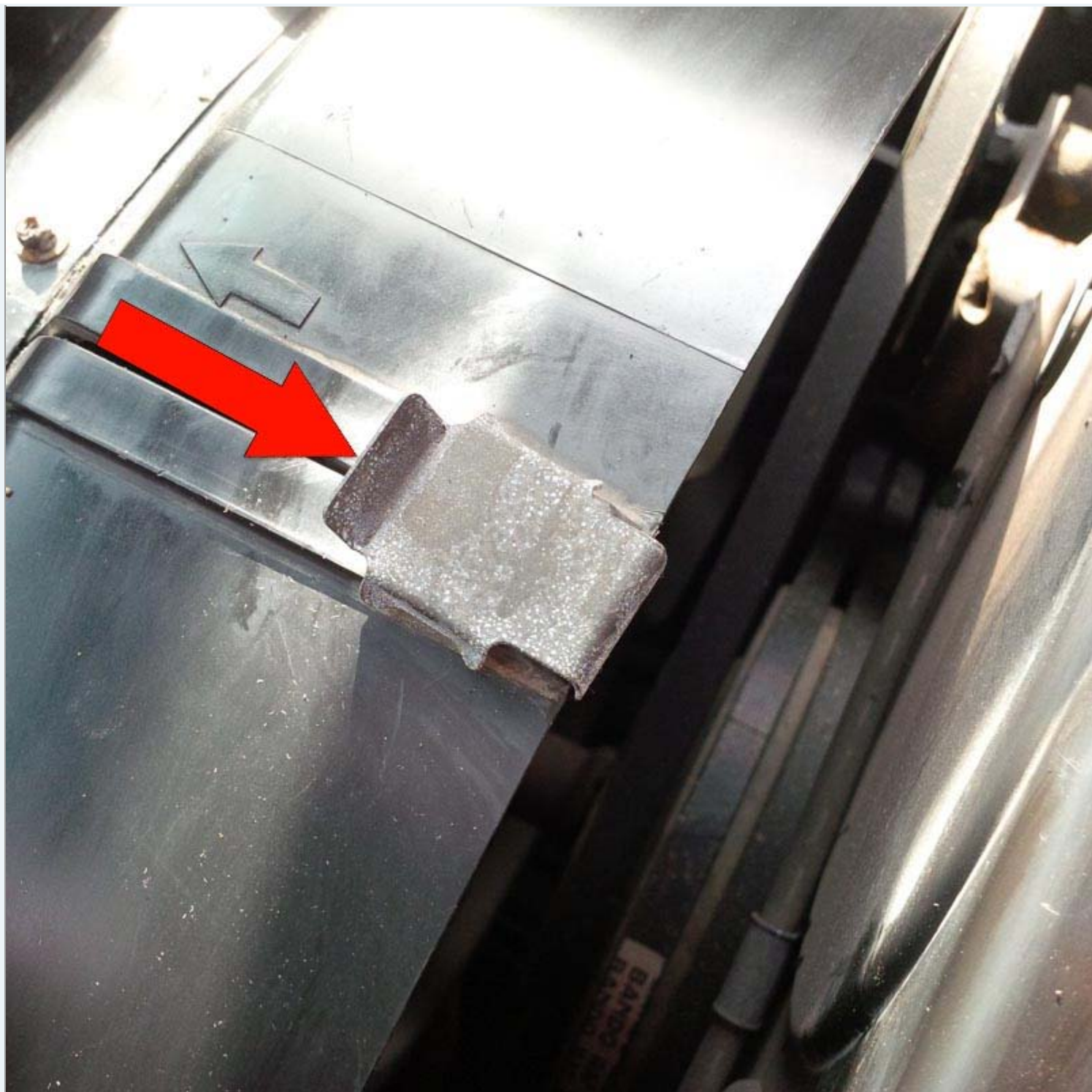
Ratcheting closed end wrenches are handy here to get at the radiator hose clamps.



IMG\_20150305\_132744.jpg (99.39 KiB) Viewed 1449 times

Remove clip for fan shroud by sliding rearward.





IMG\_20150305\_133115.jpg (103.06 KiB) Viewed 1449 times

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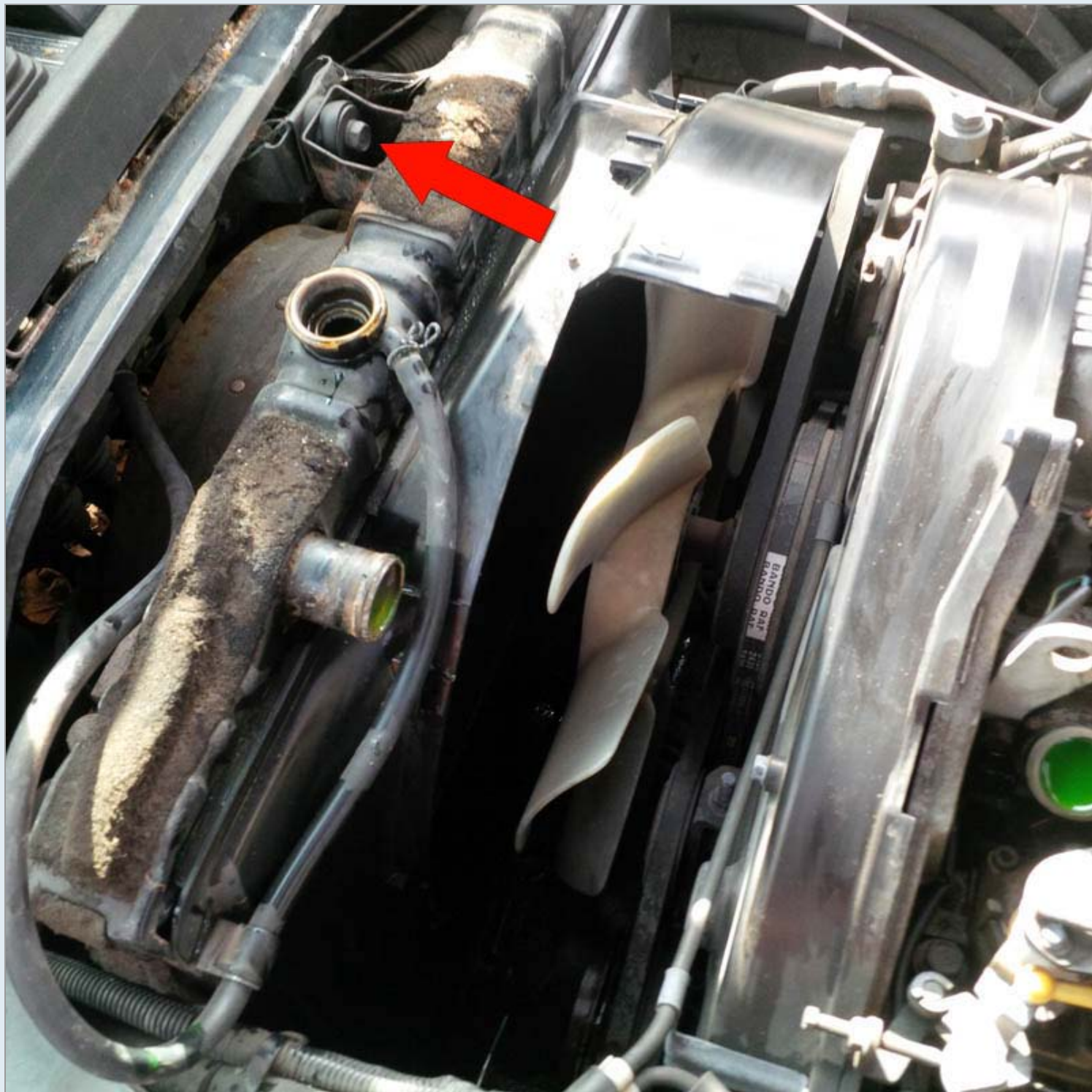


## Re: L300 Head replacement and timing belt DIY, step by step

Fri Mar 06, 2015 4:55 pm

Remove the single bolt that holds the radiator. There is a metal spacer inside the rubber sleeve which I promptly dropped down onto the skidplate somewhere.

Will have to remember to locate that later.



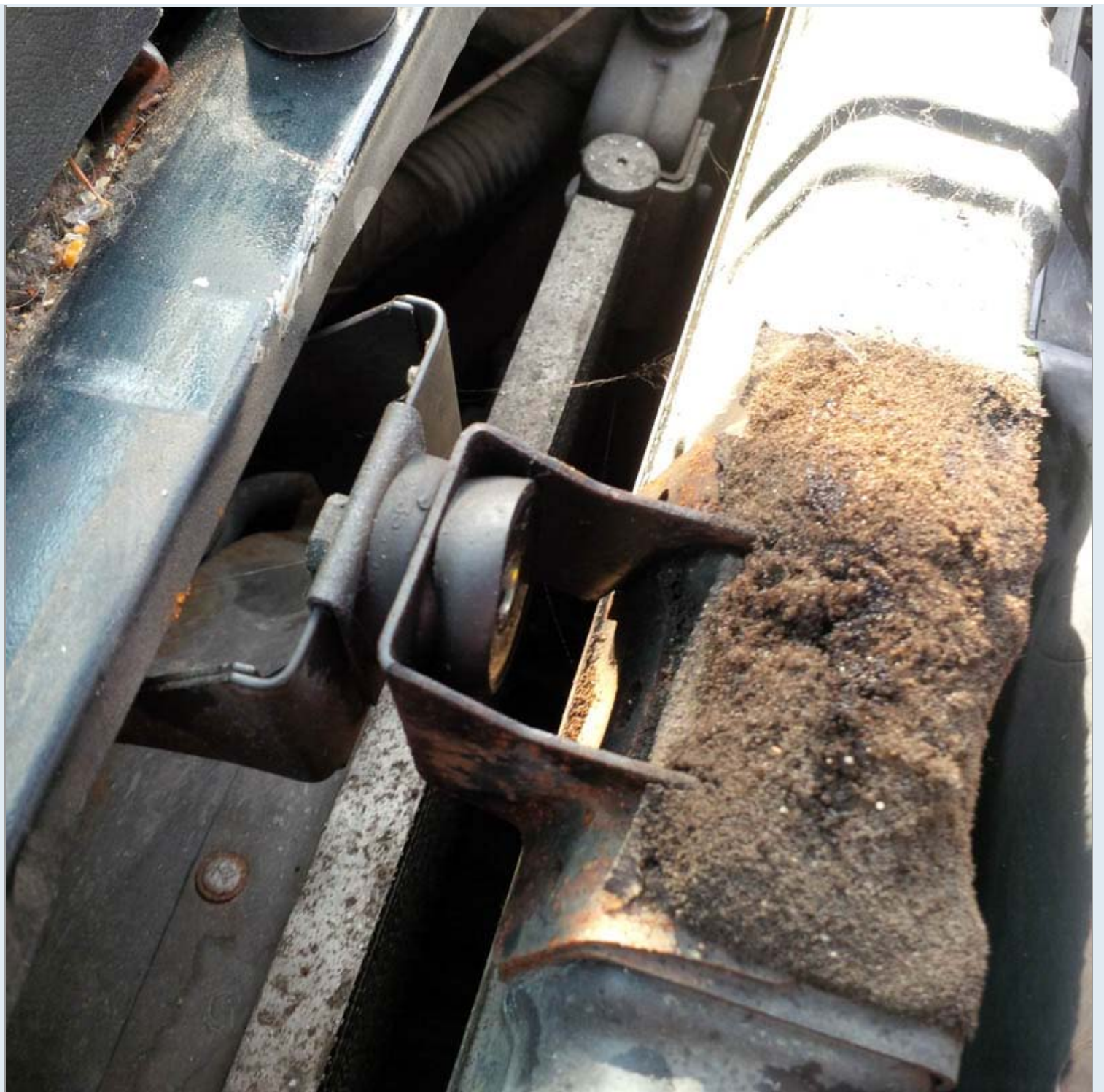
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IMG\_20150305\_135139.jpg (144.32 KiB) Viewed 1449 times





IMG\_20150305\_135143.jpg (140.26 KiB) Viewed 1449 times

This little bugga of a phillips screw was rusted on, so I cut it off. I'll replace it with a new one upon reassembly. It holds the fan shroud on. Now you can slide the other fan shroud off towards the drivers side.



IMG\_20150305\_133422.jpg (96.94 KiB) Viewed 1449 times

1993 Delica L300, SWB, LSD, Super Exceed with Crystal-Lite, mostly stock but it's got a digital EGT!!!  
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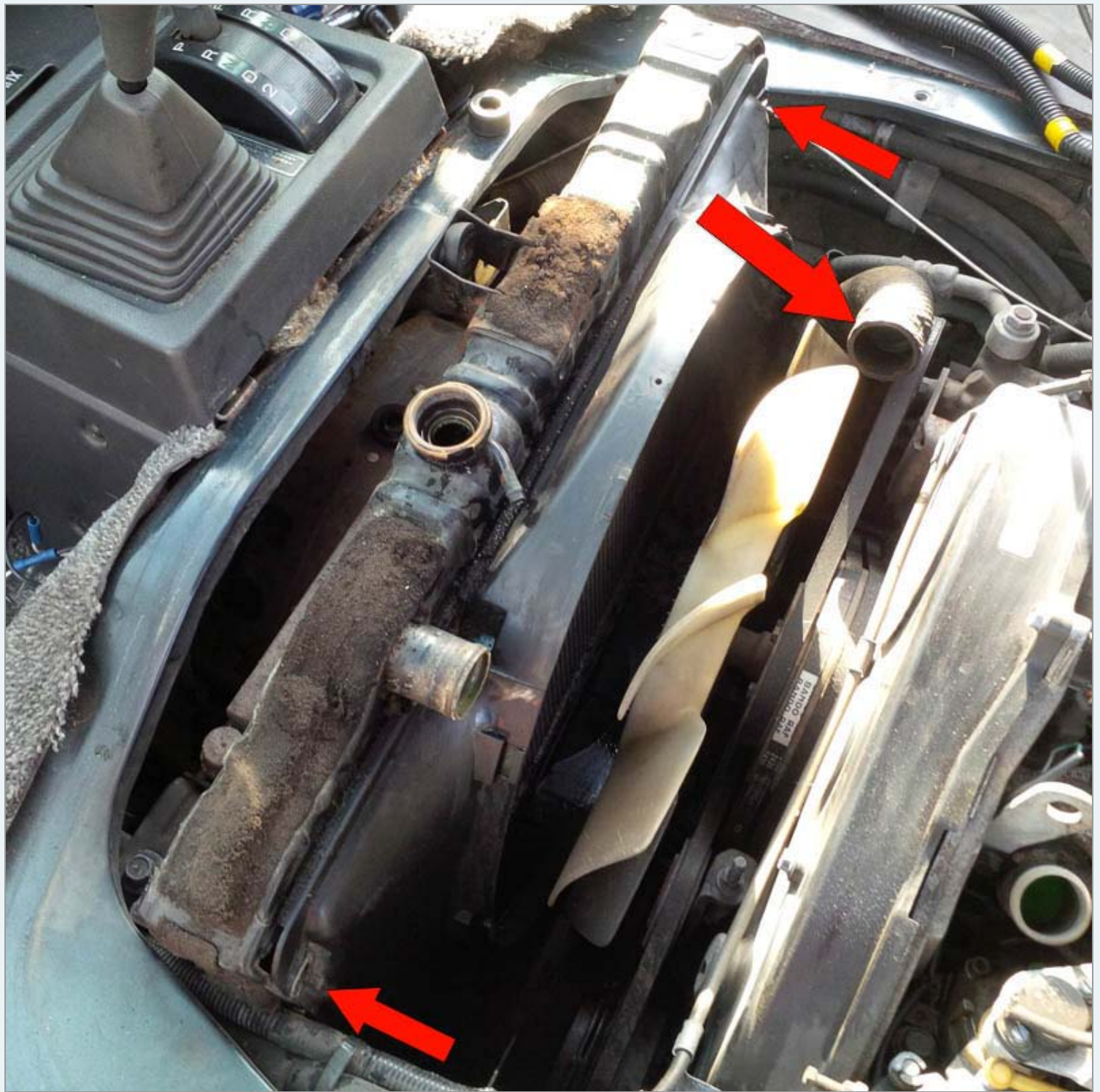


Re: L300 Head replacement and timing belt DIY, step by step

Fri Mar 06, 2015 5:17 pm

Next I removed the radiator hose on the drivers side. It's difficult to access the bottom of the hose, so I just detached the top. Also, remove the rest of the fan shroud by undoing 4 bolts. Two are shown with arrows and two are hidden and are difficult to access as they are deep in there. Use a socket extension or long sockets.

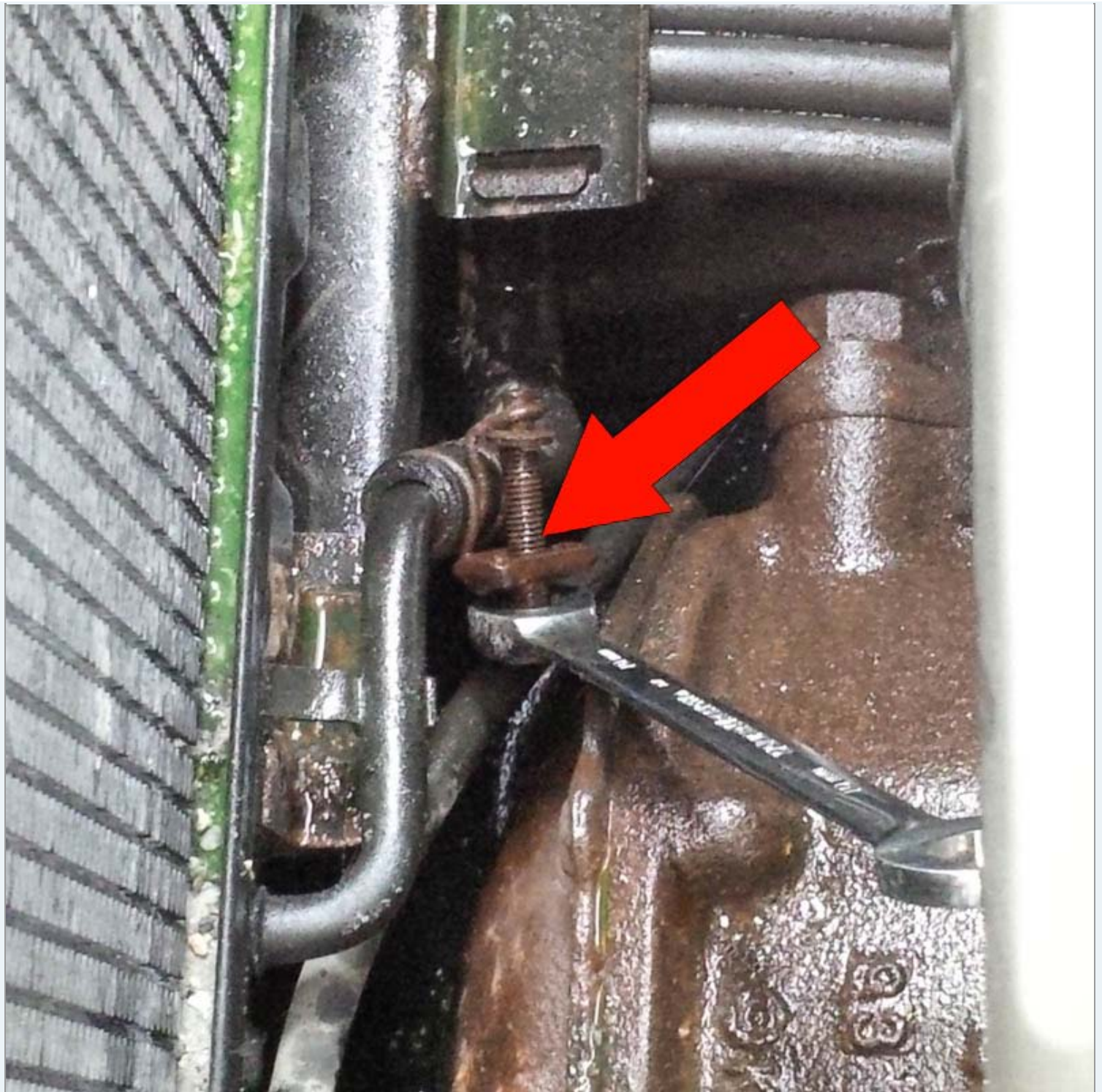




IMG\_20150305\_140359.jpg (146.57 KiB) Viewed 1439 times

Now you can remove the two hoses at the bottom of the radiator. This is where I used some penetrating oil and a wire brush to loosen up the seized clamp.

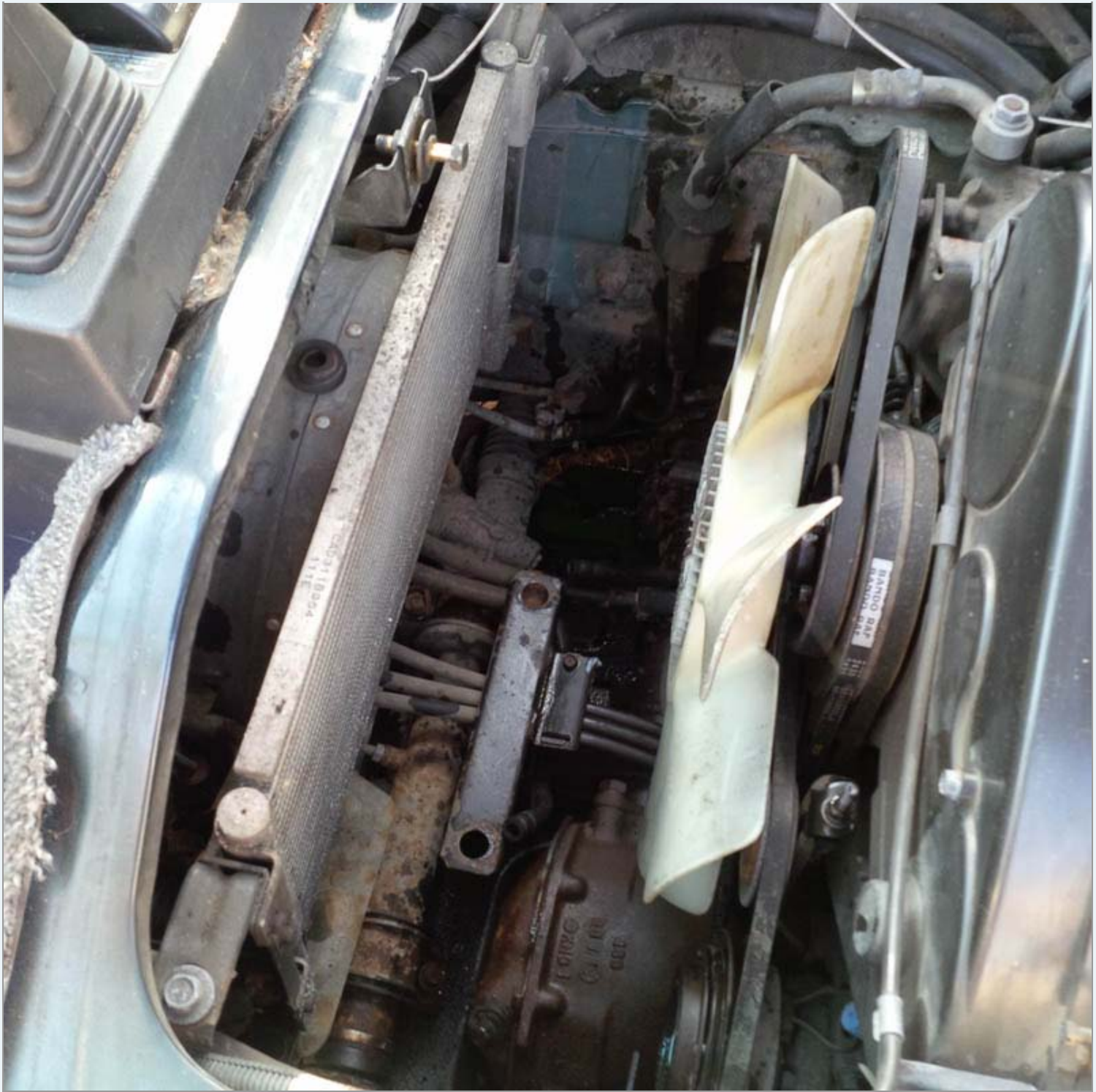




IMG\_20150305\_141625.jpg (144.95 KiB) Viewed 1439 times

And once that's done, pull the radiator upward, carefully so you don't damage the fins. Nice to have a helper for this. You are left with an engine compartment that looks like this.





IMG\_20150305\_143748.jpg (117.07 KiB) Viewed 1439 times

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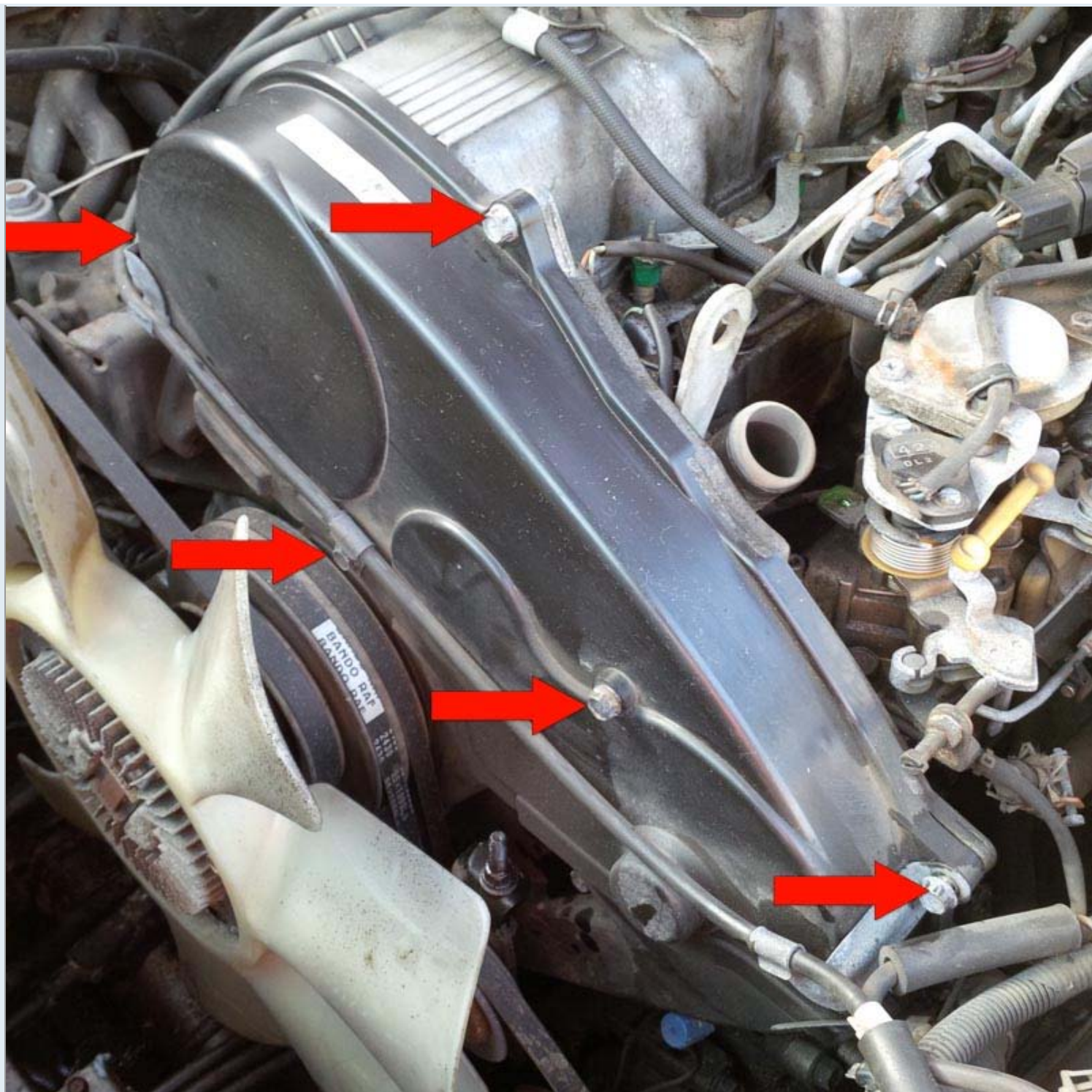


Re: L300 Head replacement and timing belt DIY, step by step

Sun Mar 08, 2015 9:29 pm

Decided to remove the inspection panel on the timing belt so I could see the condition. No oil, nice and dry with a bit of black dust. Could probably have pushed it but I'm replacing it after 80,000 kms which is on the safe side.

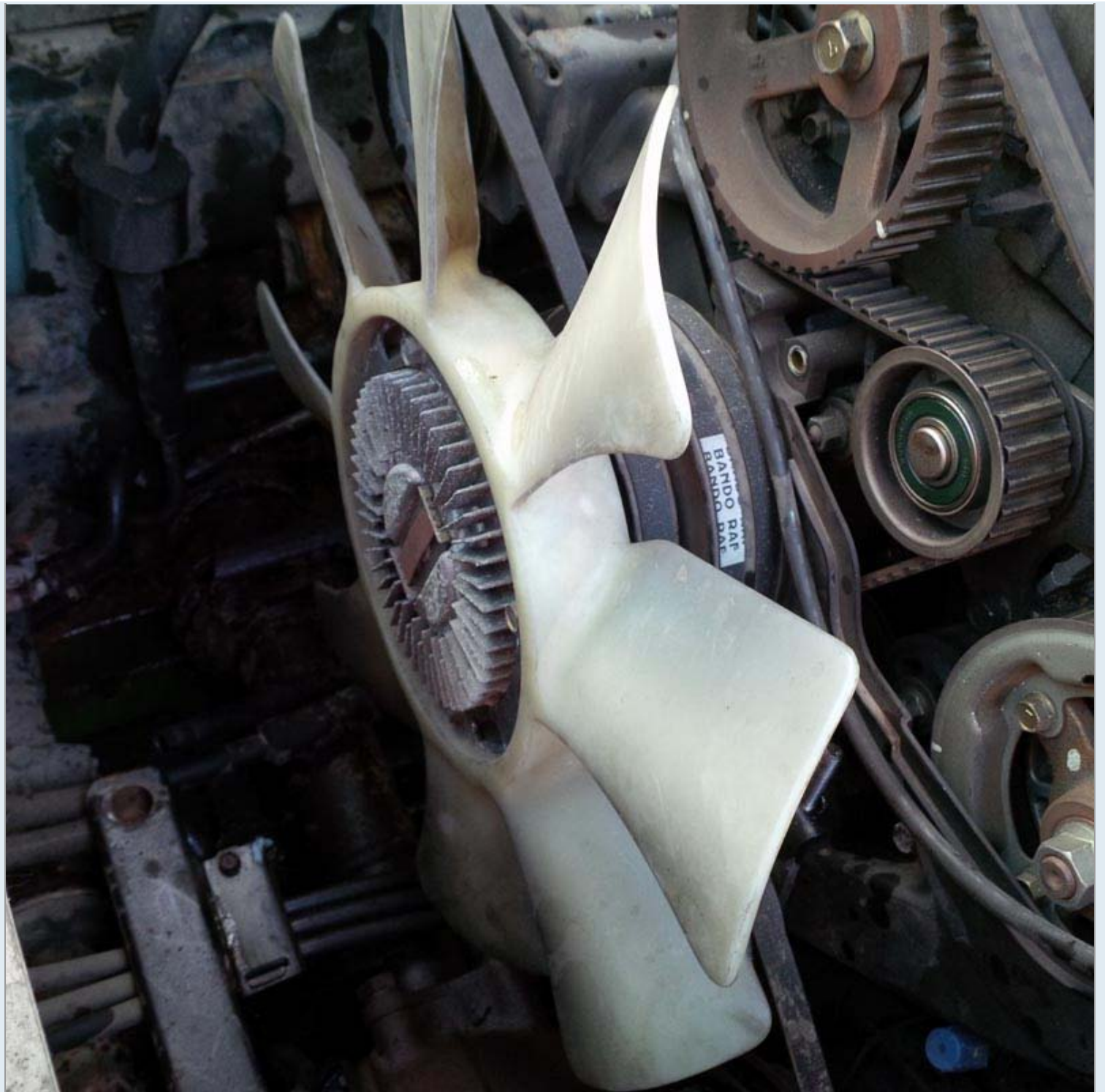




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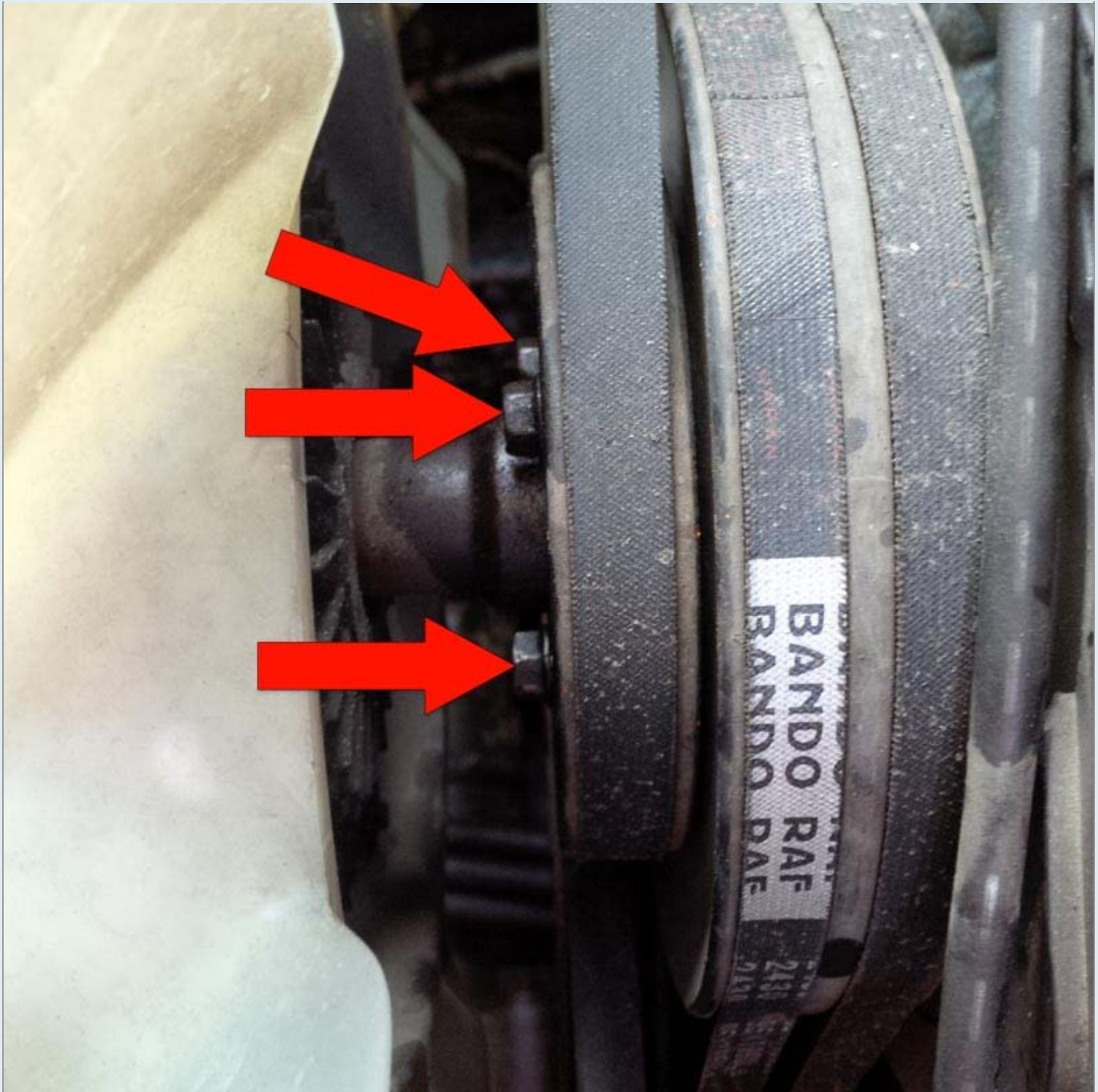
Took off the fan. Awkward but doable. Four bolts hold the fan onto the pulley. I've heard some mechanics call these belts "rubber Bando's" because they are supposed to stretch out.





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IMG\_20150305\_144723.jpg (114.75 KiB) Viewed 1373 times

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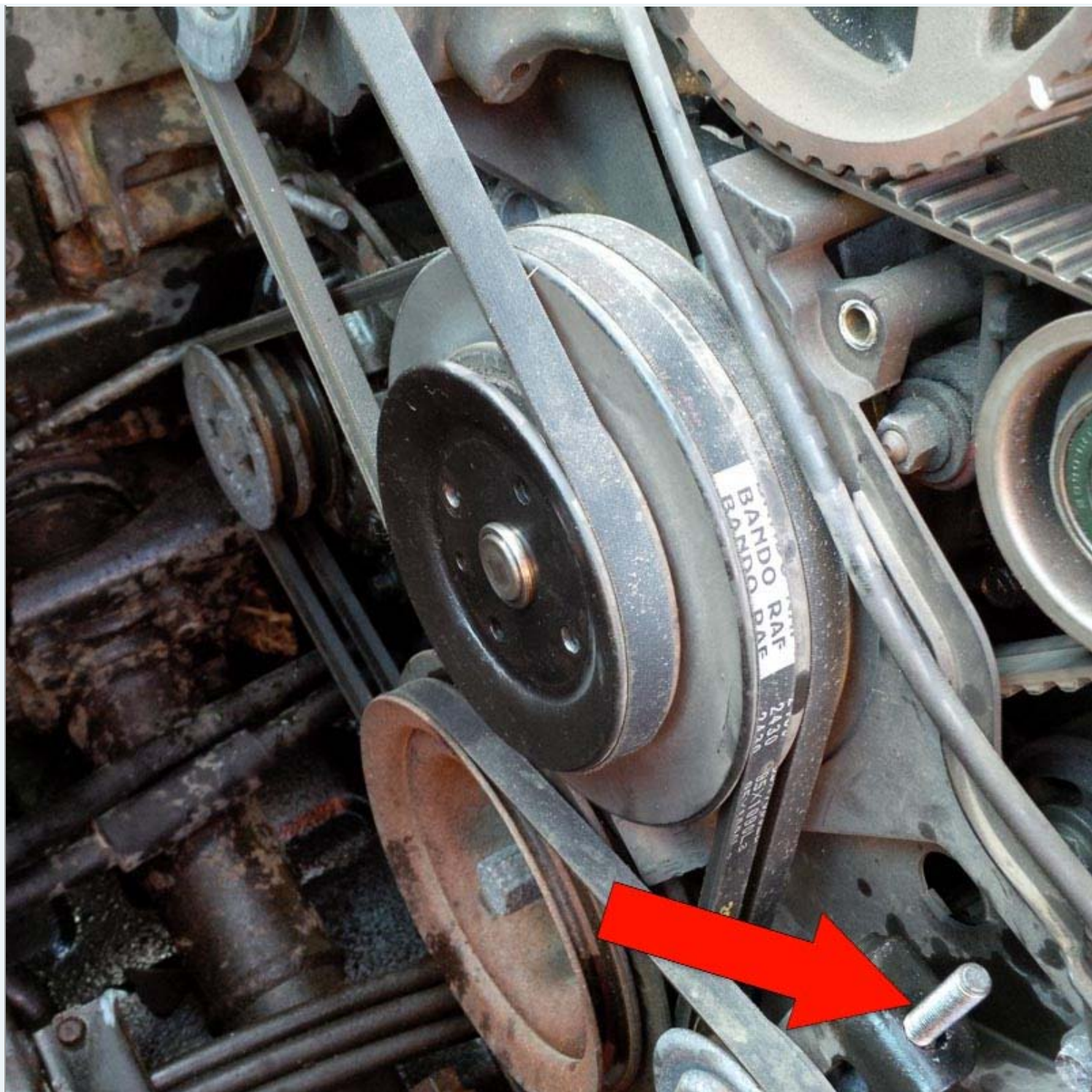


Re: L300 Head replacement and timing belt DIY, step by step

Mon Mar 09, 2015 12:02 pm

Remove the fan, then loosen off the nut that threads onto the rod to tighten the belt tensioning pulley.

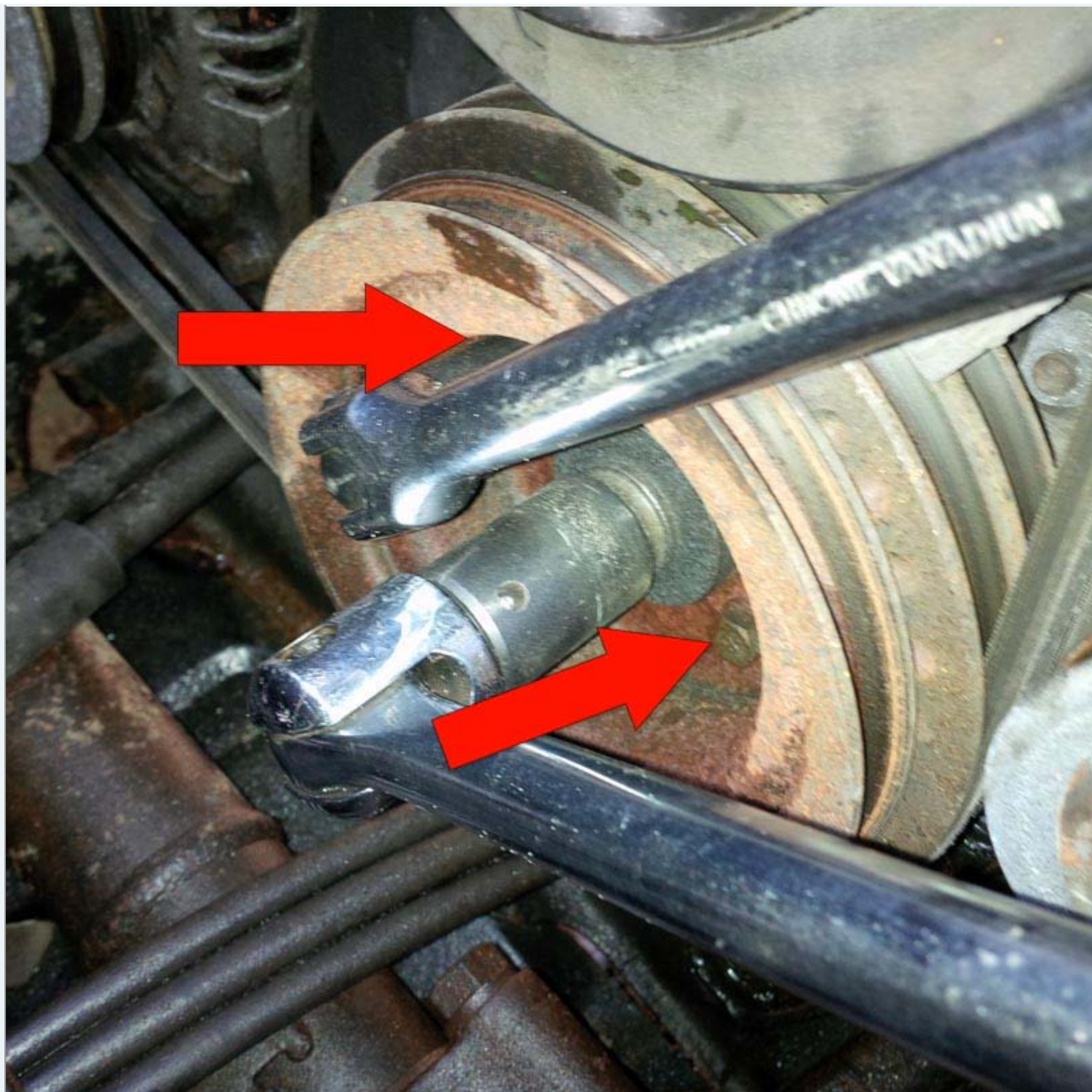




IMG\_20150305\_145250.jpg (147.66 KiB) Viewed 1341 times

I decided to loosen up the 4 bolts that hold together the crank pulley. Still trying to decide how to remove the pulley as there are several ways to do it.

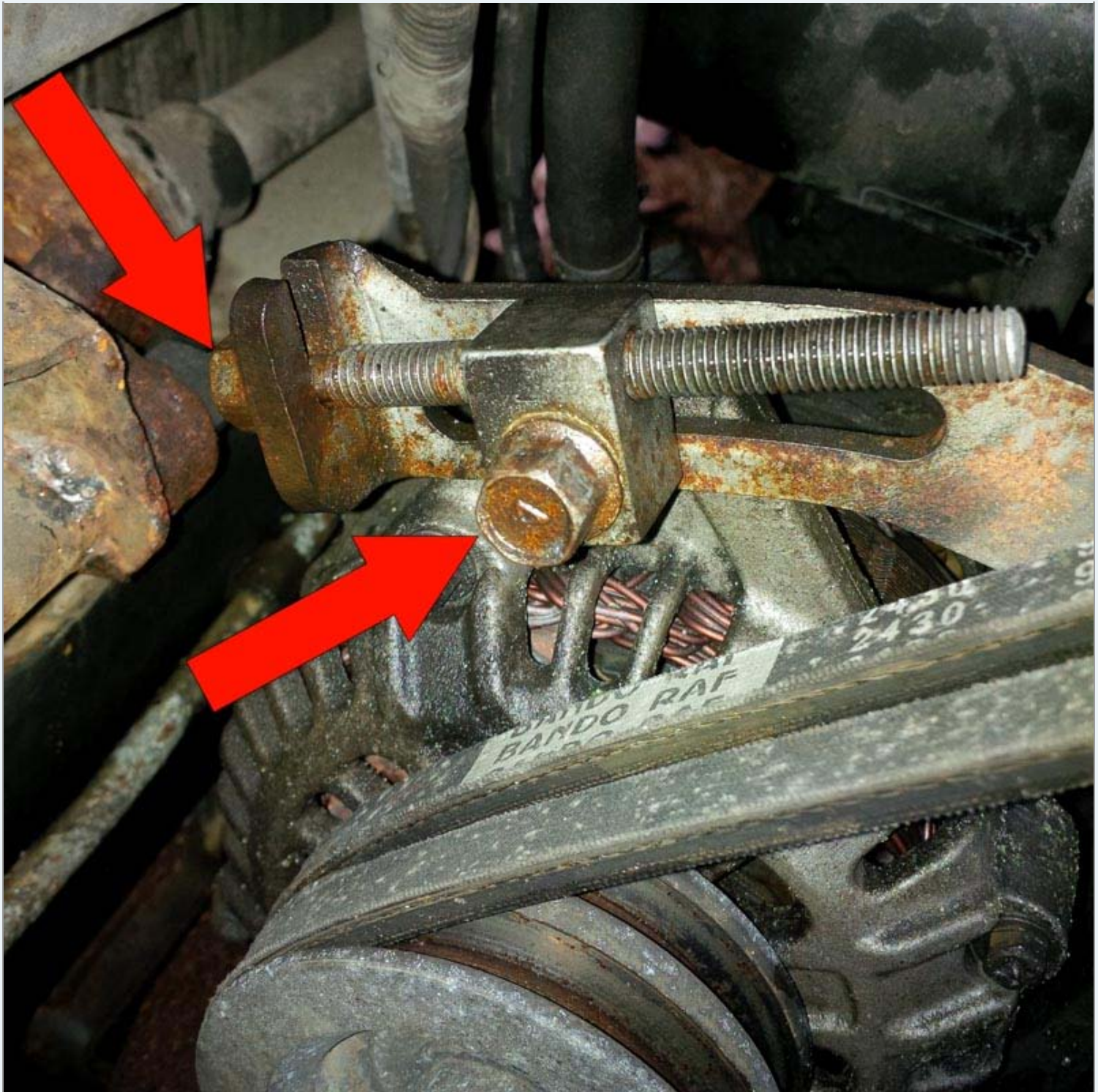




IMG\_20150306\_112636.jpg (132.34 KiB) Viewed 1341 times

Loosen up the bolts that secure the alternator tensioning bracket.





IMG\_20150306\_113541.jpg (163.47 KiB) Viewed 1341 times

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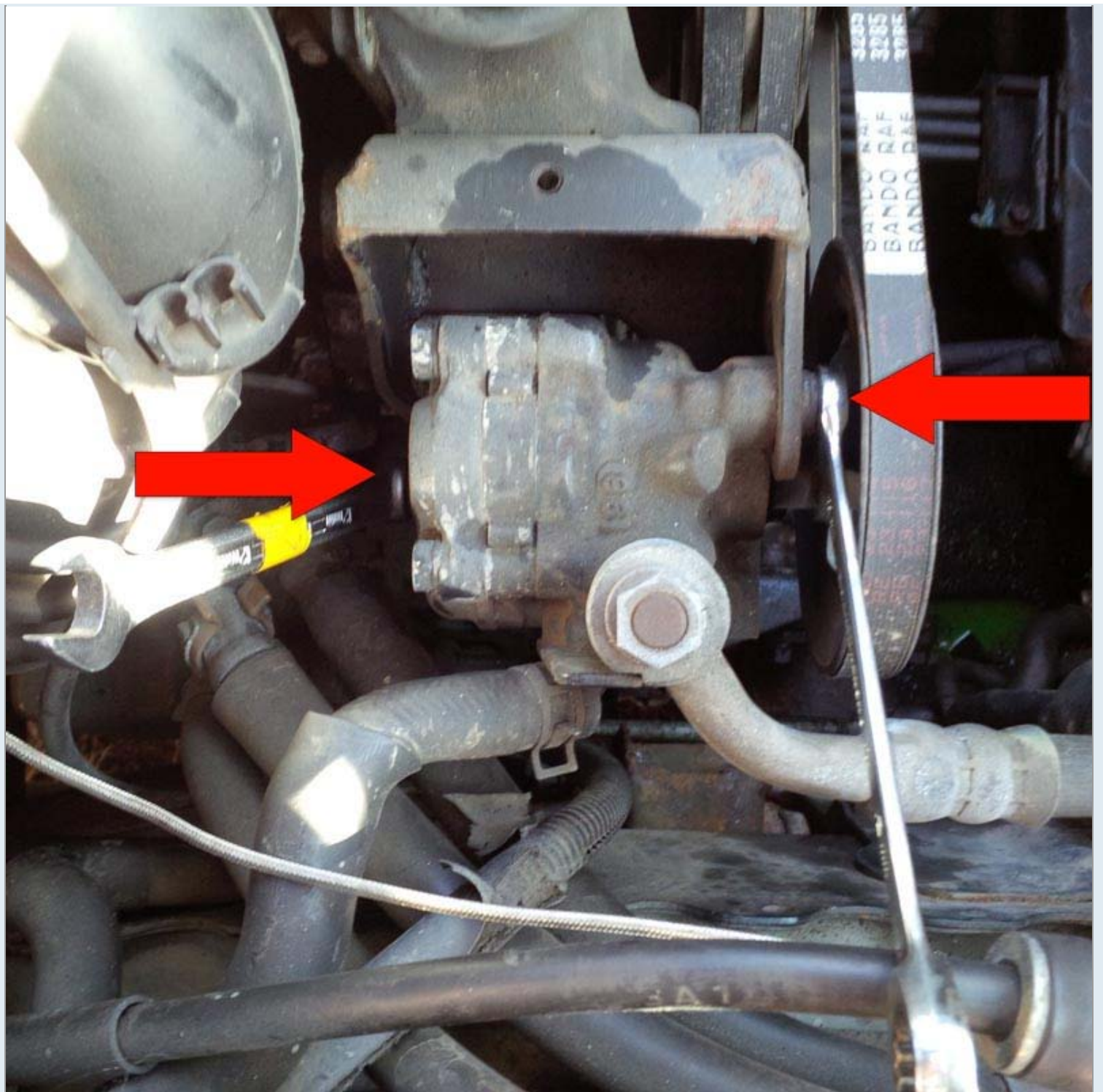


Re: L300 Head replacement and timing belt DIY, step by step

Tue Mar 10, 2015 4:36 pm

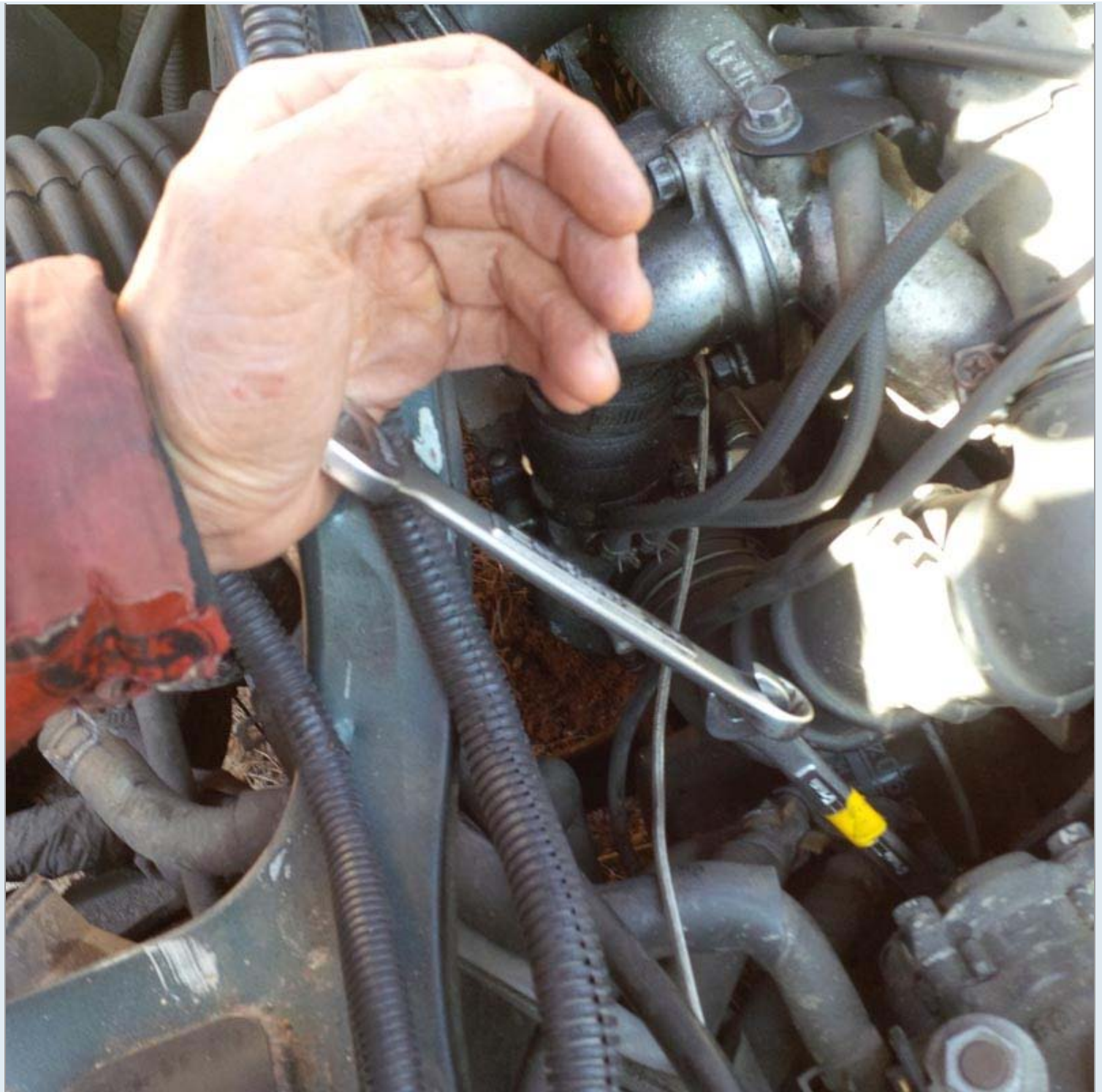
Loosen off the bolts on either side of the power steering pump.





IMG\_20150306\_113811.jpg (114.39 KiB) Viewed 1287 times

Hooking two closed end wrenches together like this gives more leverage in tight places and helps to crack this bolt. Mine was stubborn, used lots of penetrating oil and let it sit for awhile.



IMG\_20150306\_113922.jpg (105.39 KiB) Viewed 1287 times

Now that all the belts are loose, remove them and mark them. Then remove the fan pulley which just slides right off.

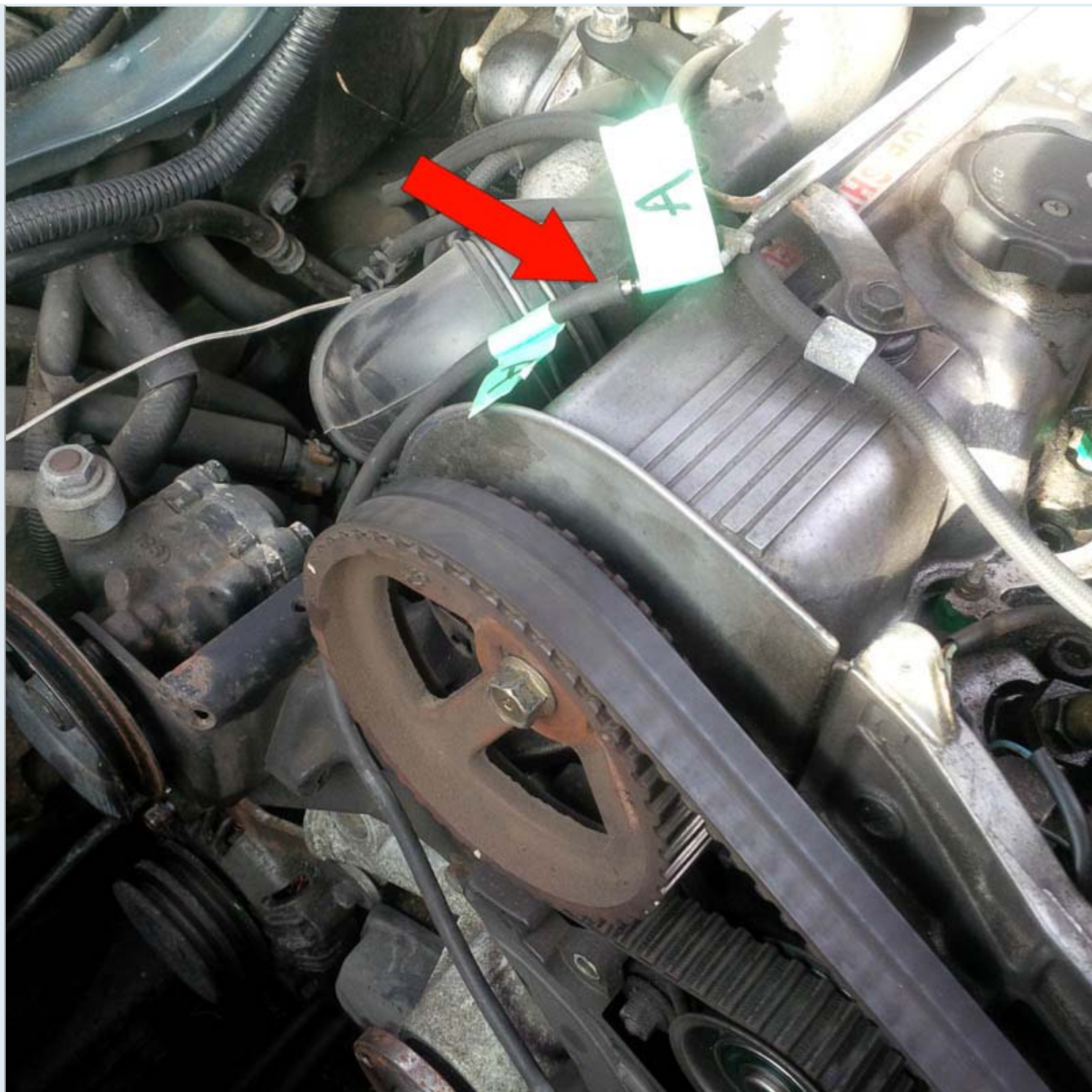




IMG\_20150306\_134458.jpg (118.79 KiB) Viewed 1287 times

Mark and remove the vacuum hose that crosses in front of the timing belt cover.

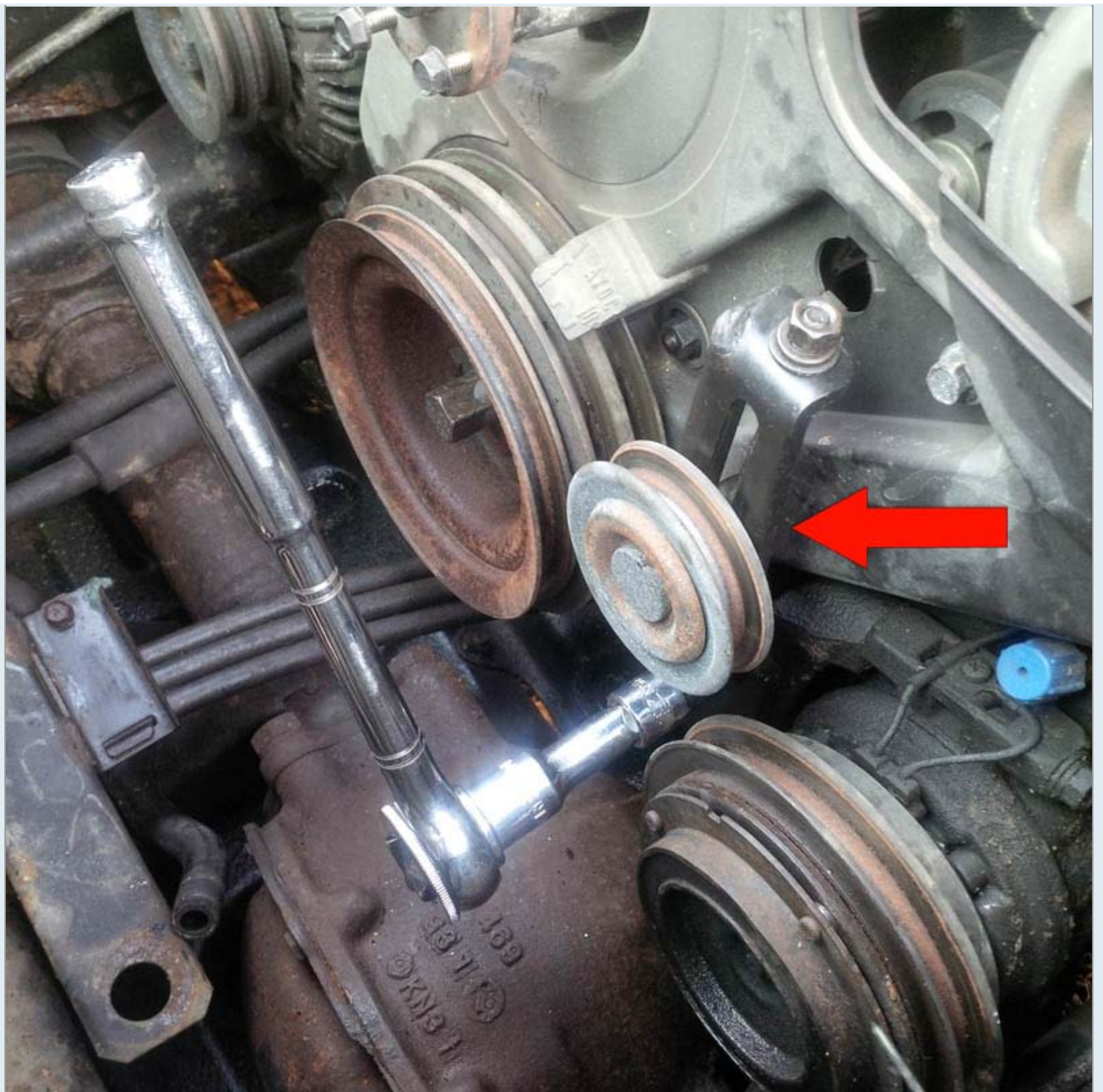




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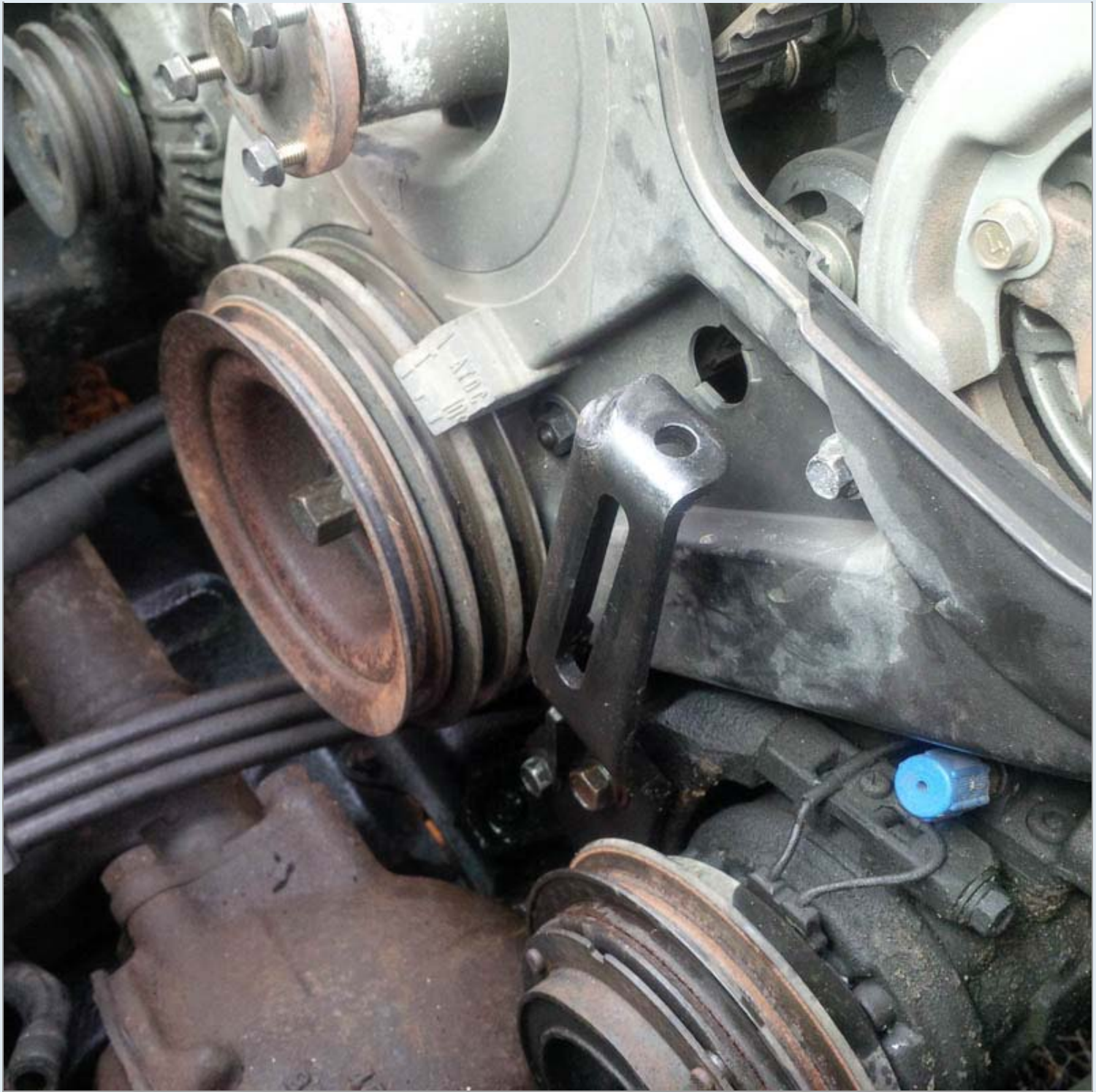
Loosen off the hidden nut and remove the tensioner pulley.





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IMG\_20150309\_104559.jpg (121.29 KiB) Viewed 1287 times

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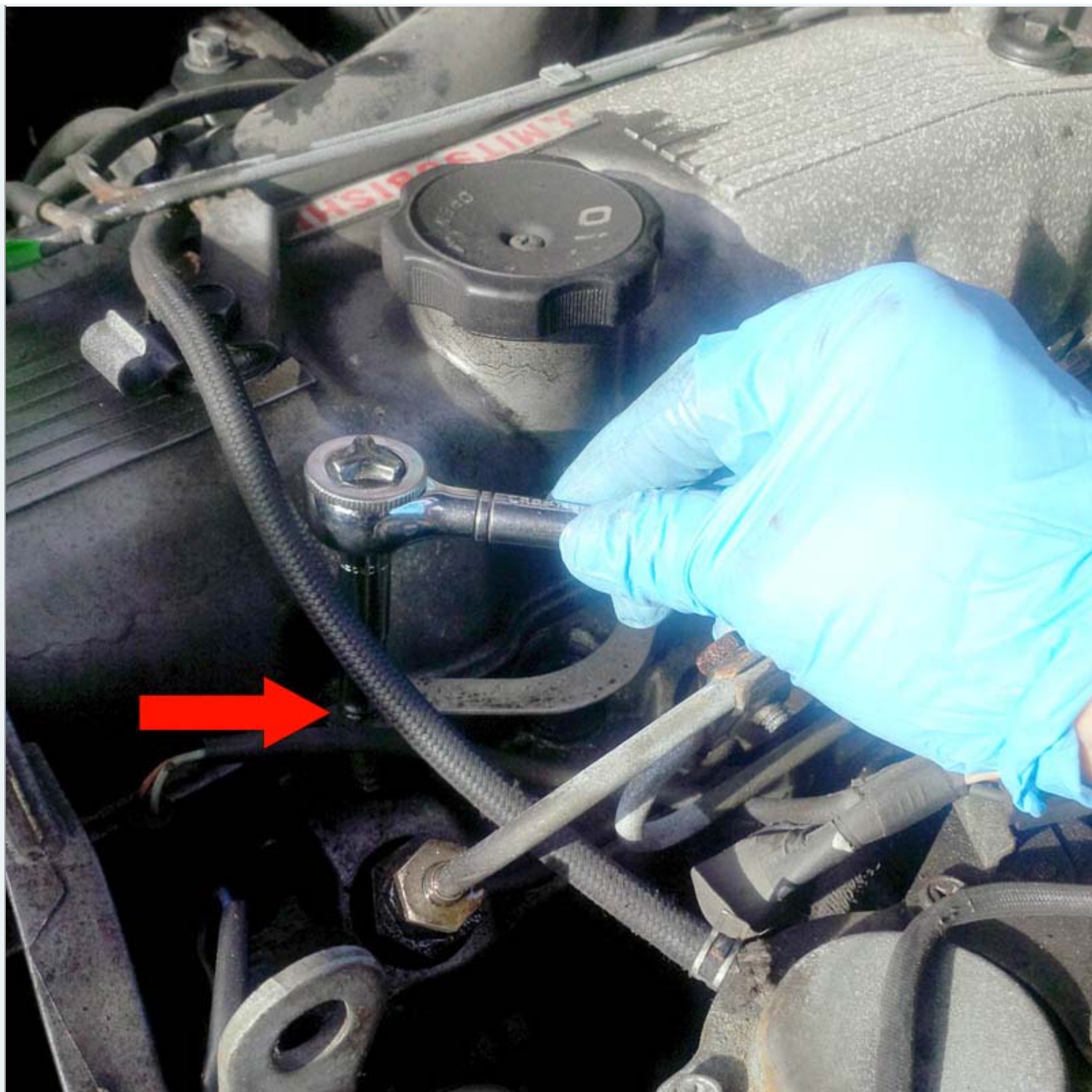


Re: L300 Head replacement and timing belt DIY, step by step

Wed Mar 11, 2015 12:18 pm

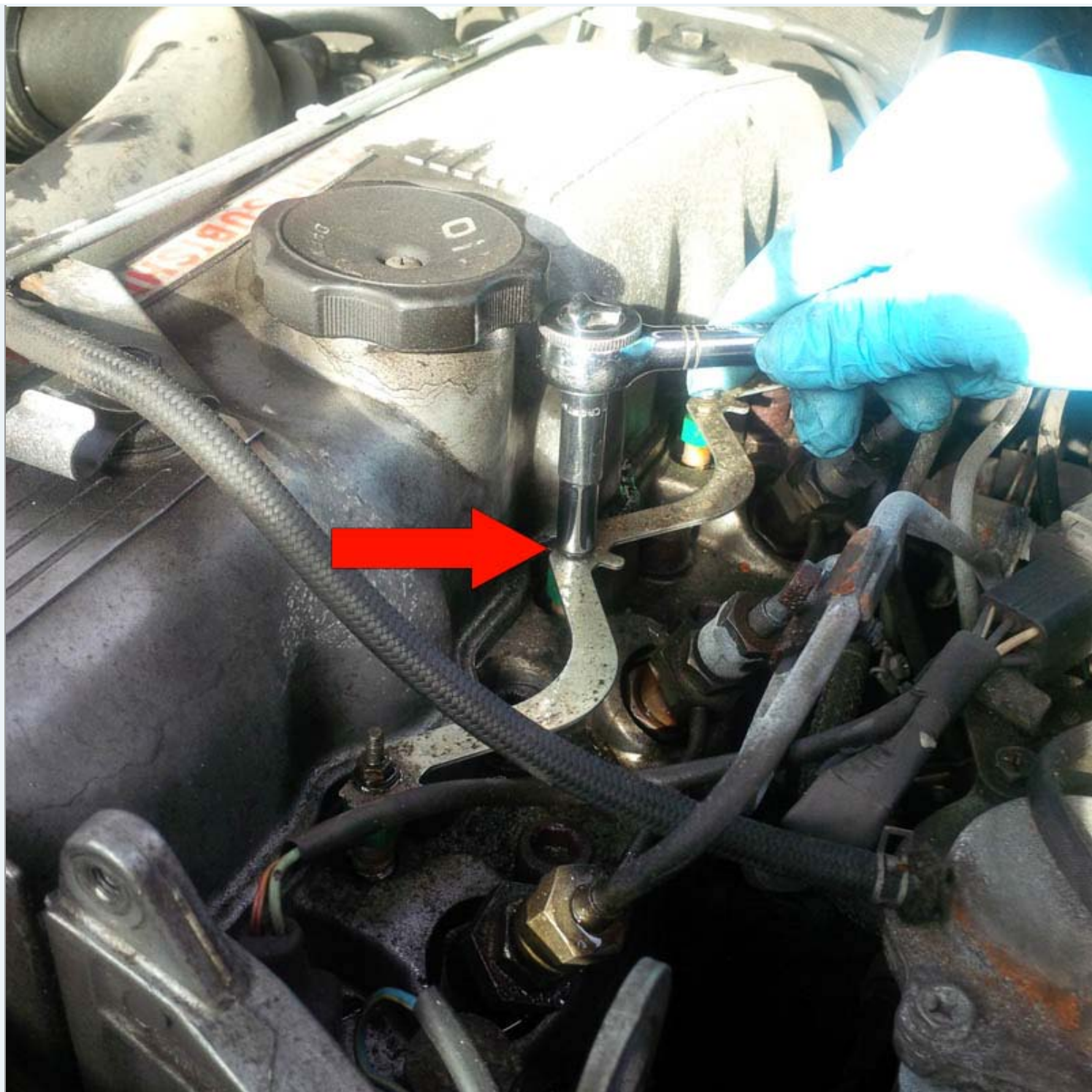
Remove the glow plug rail.





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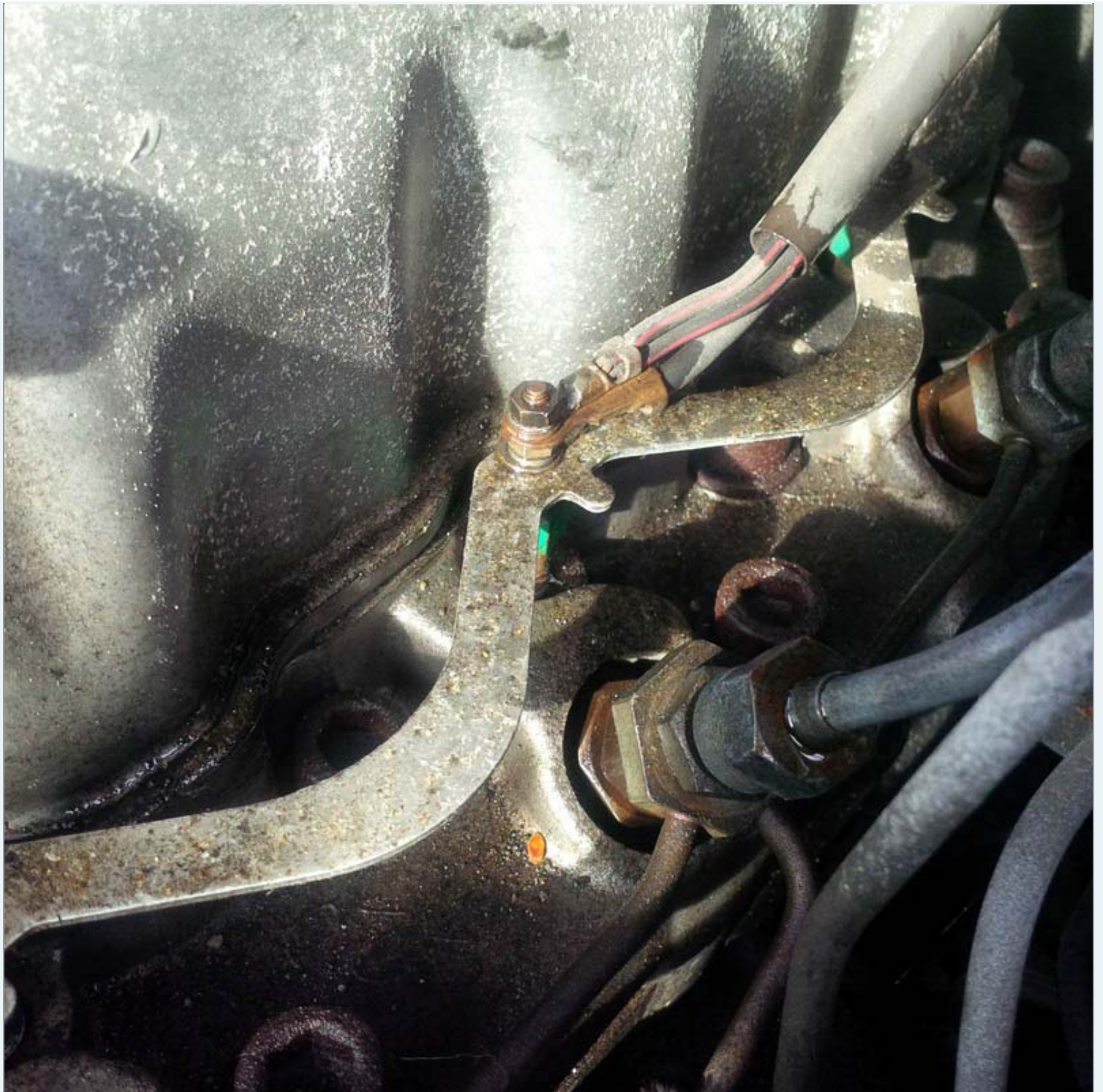




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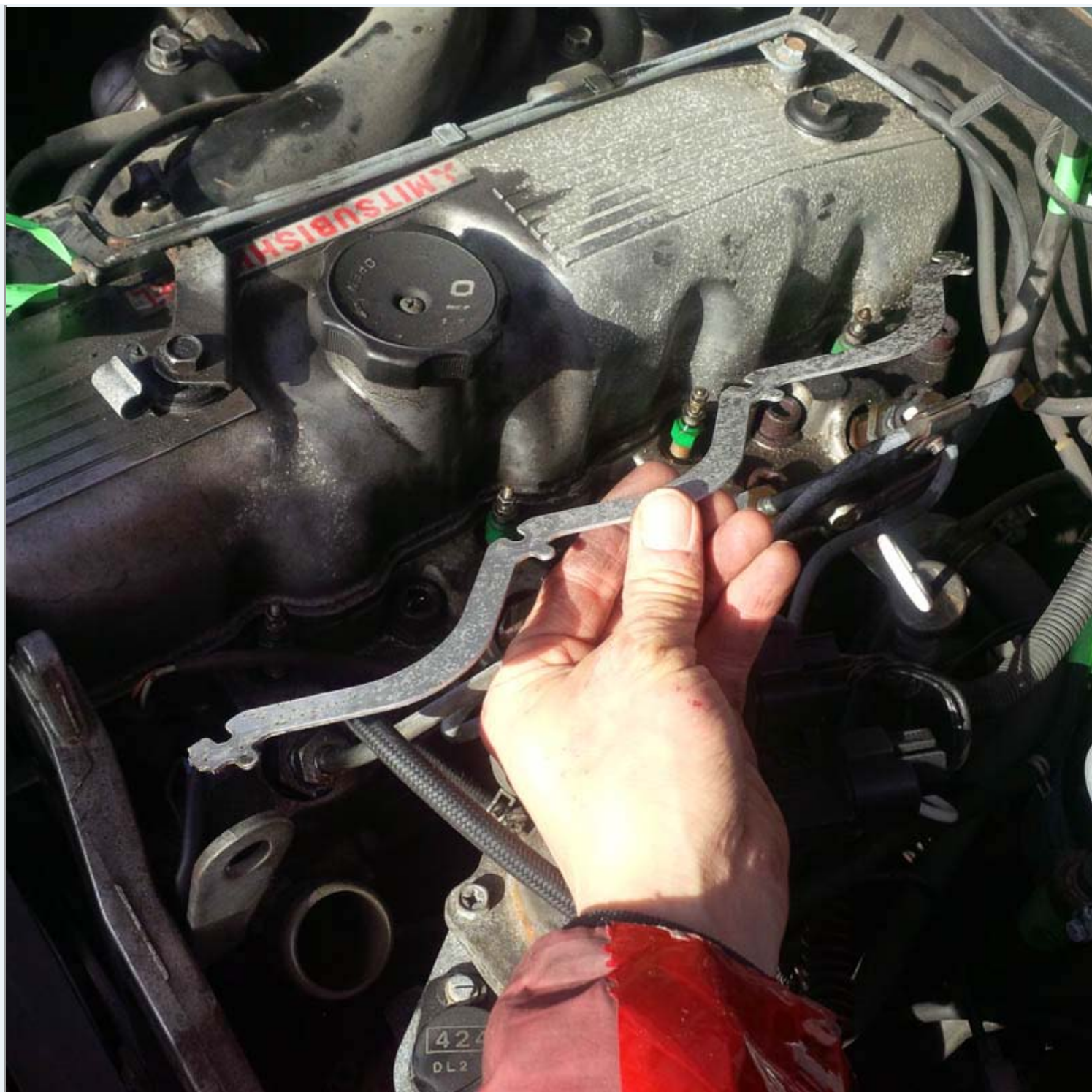
Make a note of where the wire attaches to the third glow plug.





IMG\_20150309\_105035.jpg (144.14 KiB) Viewed 1262 times

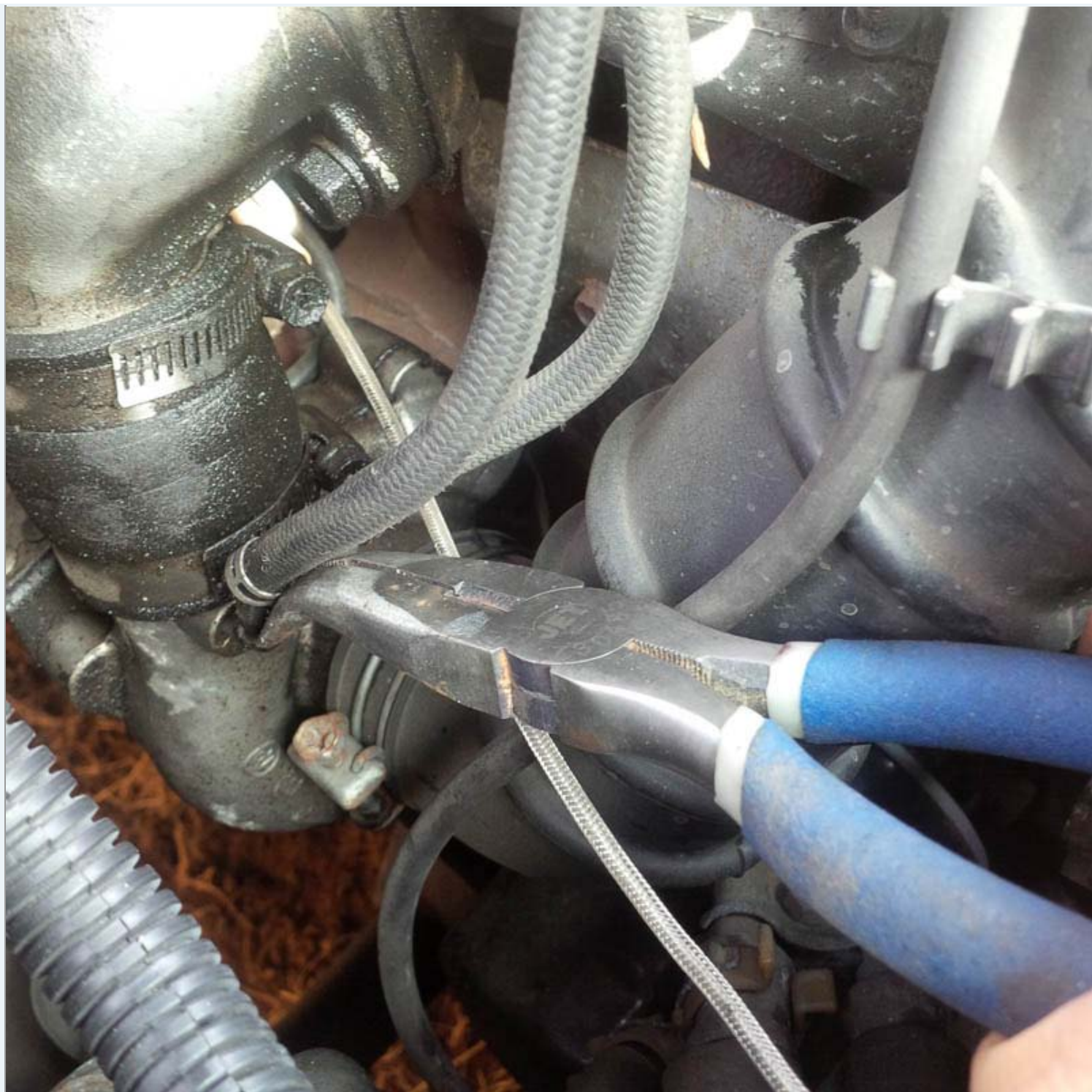




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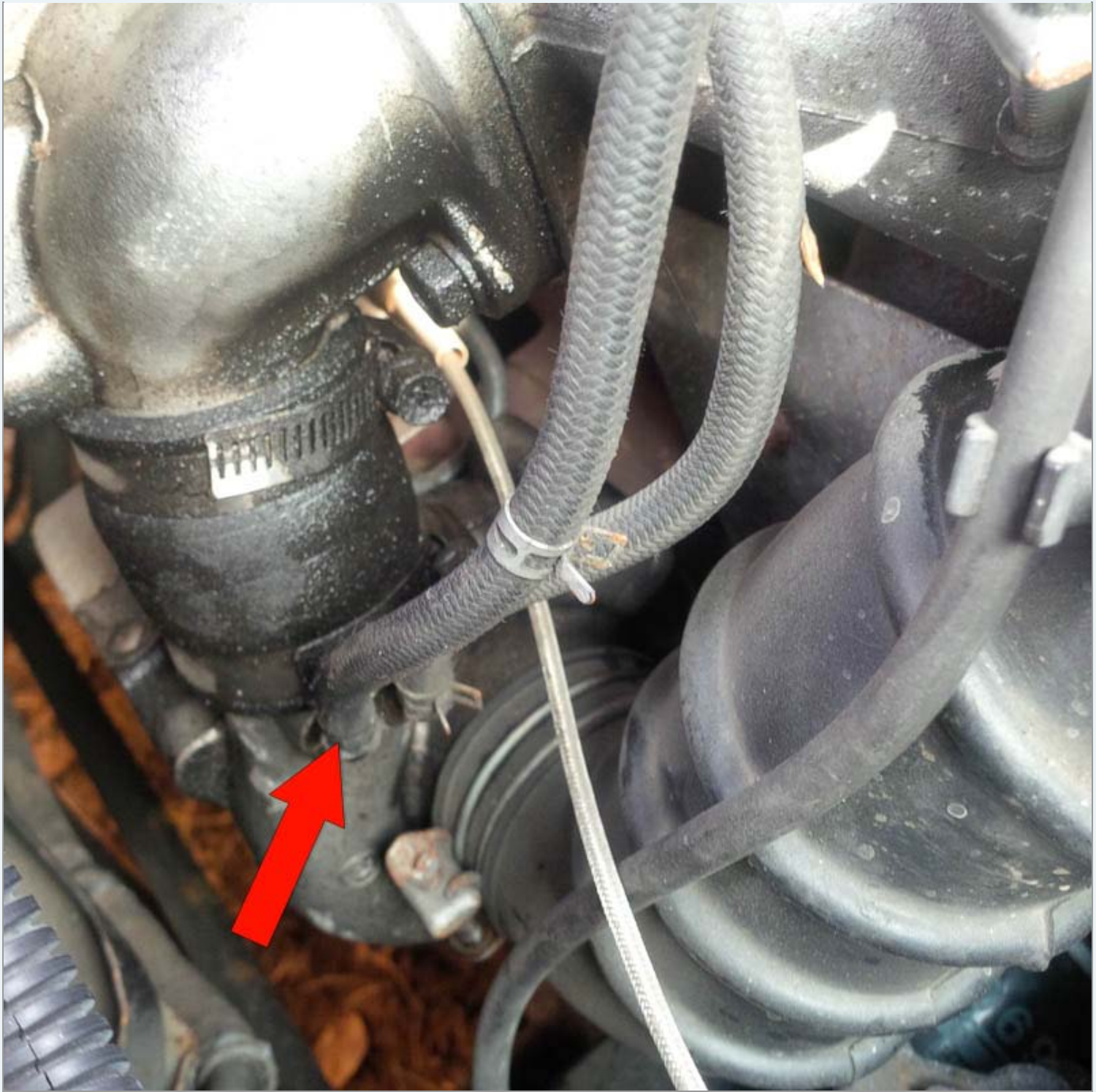
Remove the two small hoses that attach to the turbo. Bent needlenose pliers work well for this.





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IMG\_20150309\_105404.jpg (116.16 KiB) Viewed 1262 times

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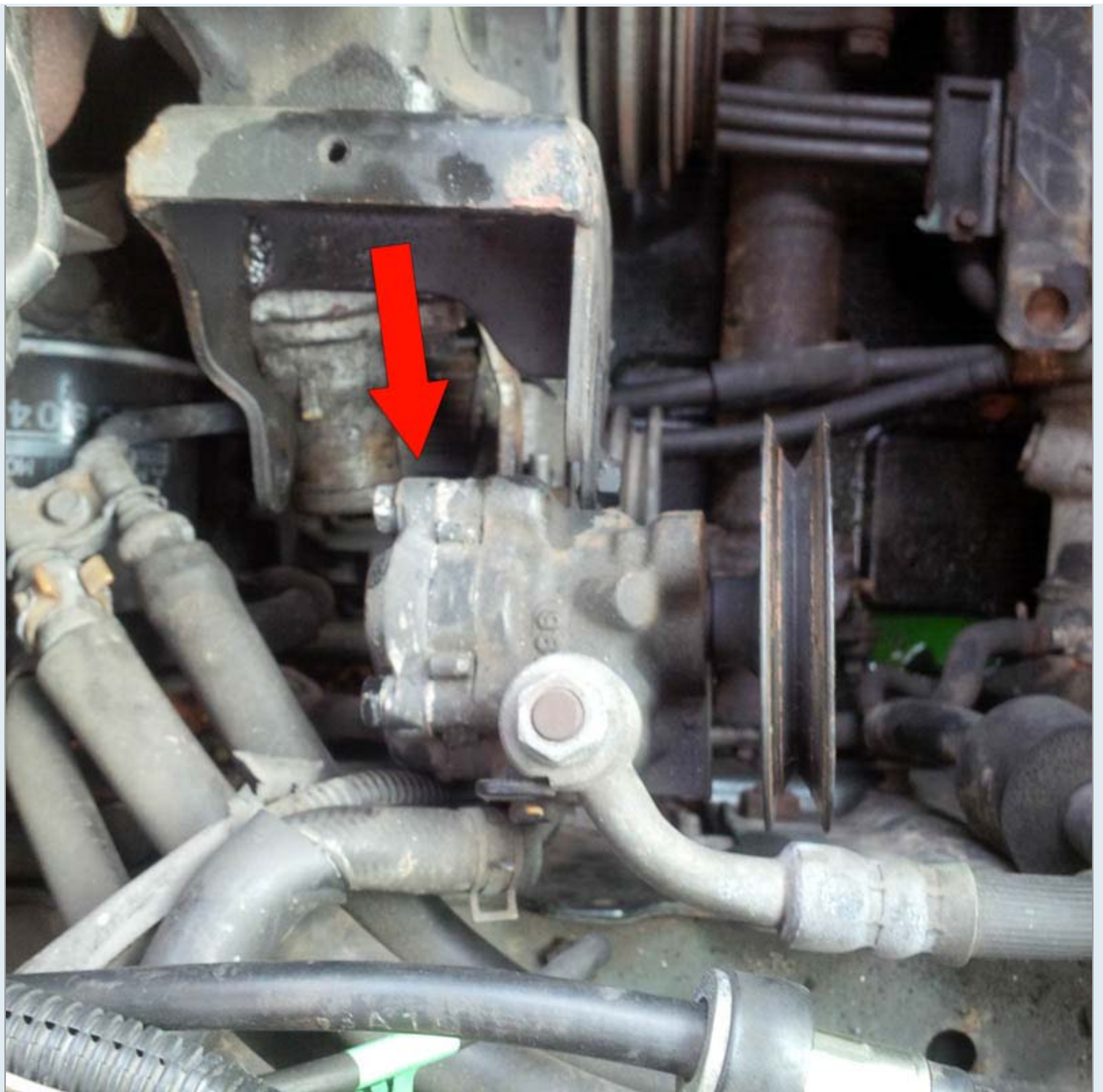


Re: L300 Head replacement and timing belt DIY, step by step

Wed Mar 11, 2015 12:22 pm

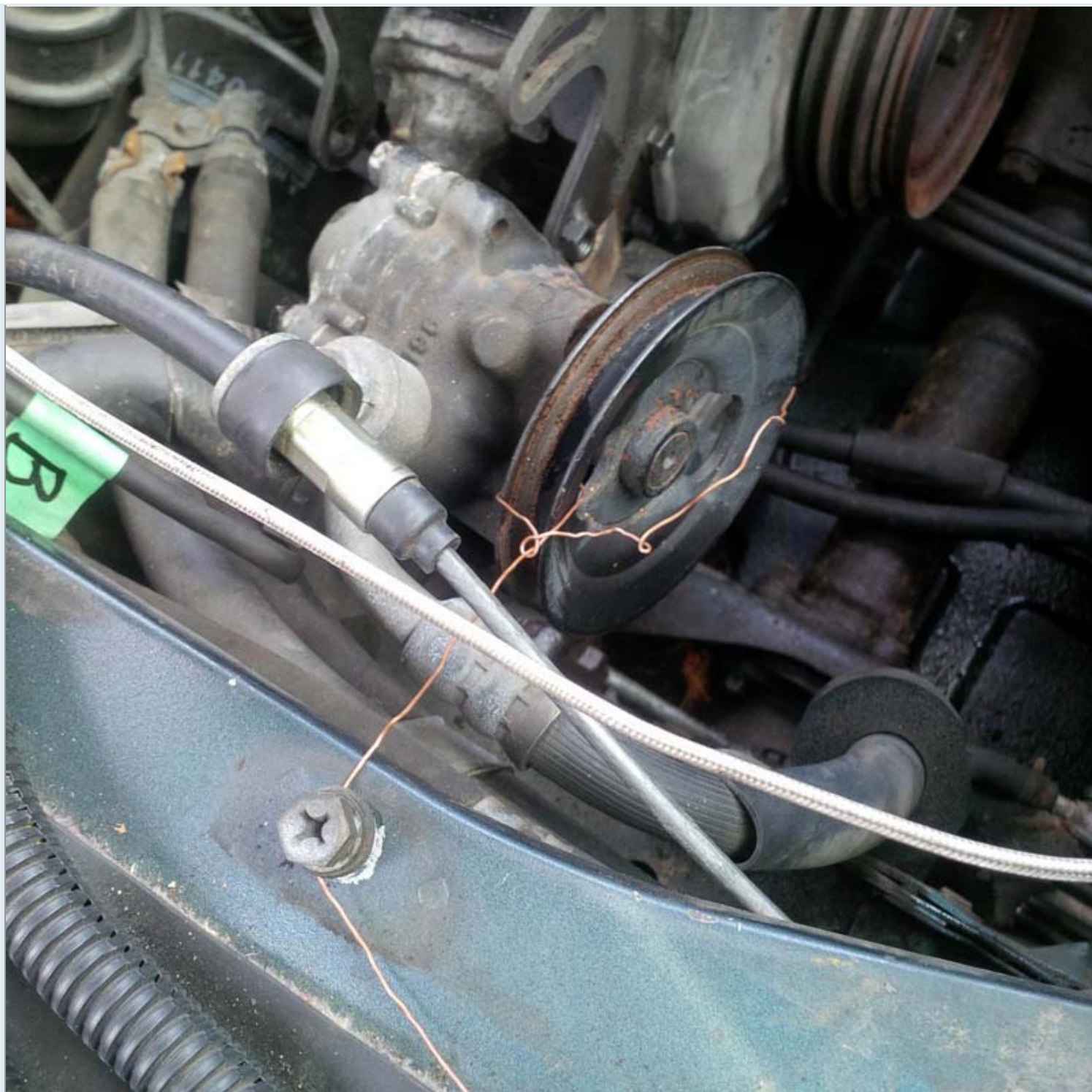
Pull the power steering pump out of the way and wire it to the side of the engine compartment.





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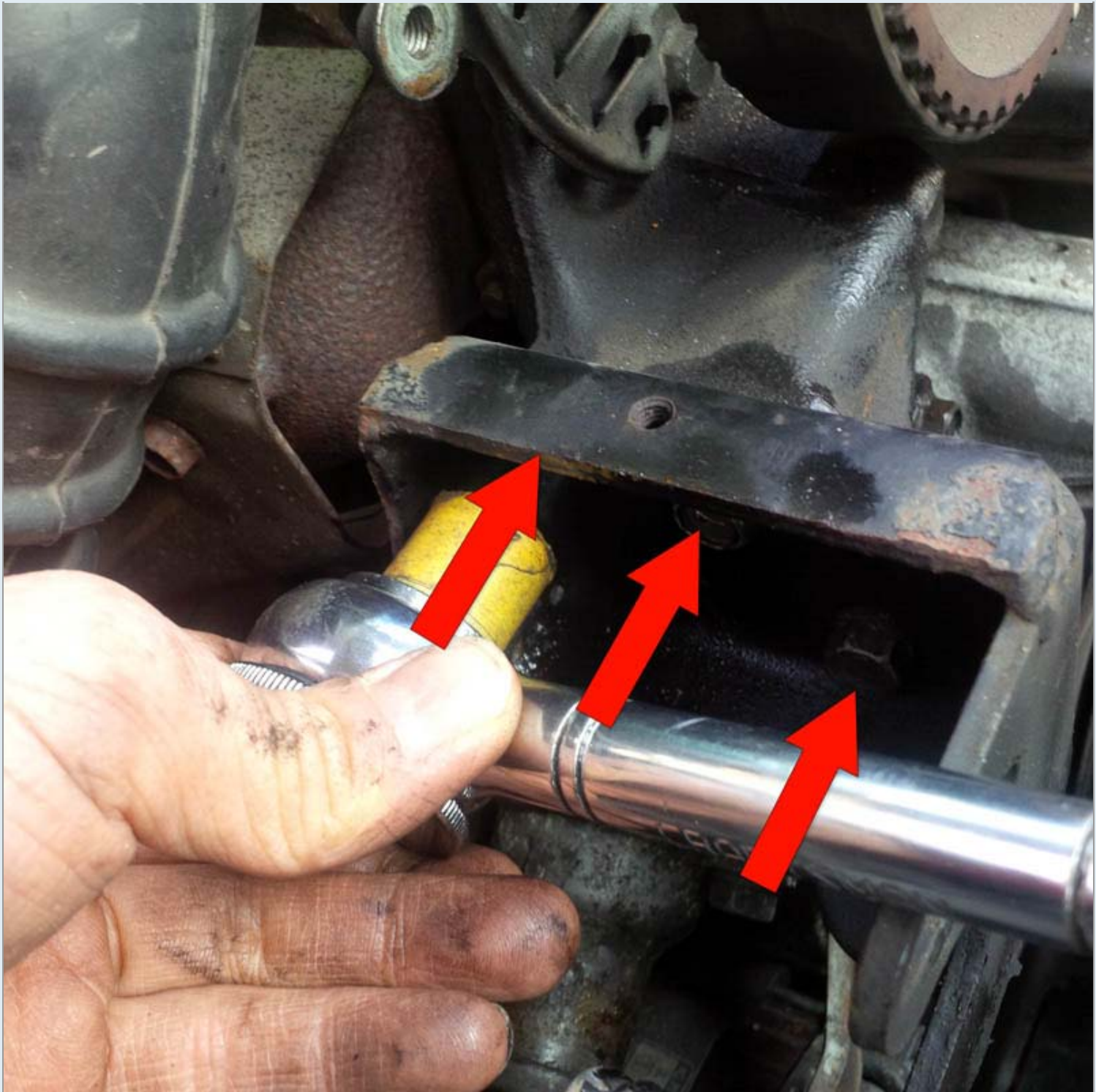




IMG\_20150309\_110532.jpg (125.35 KiB) Viewed 1261 times

Remove the power steering bracket.





IMG\_20150309\_110616.jpg (107.98 KiB) Viewed 1261 times

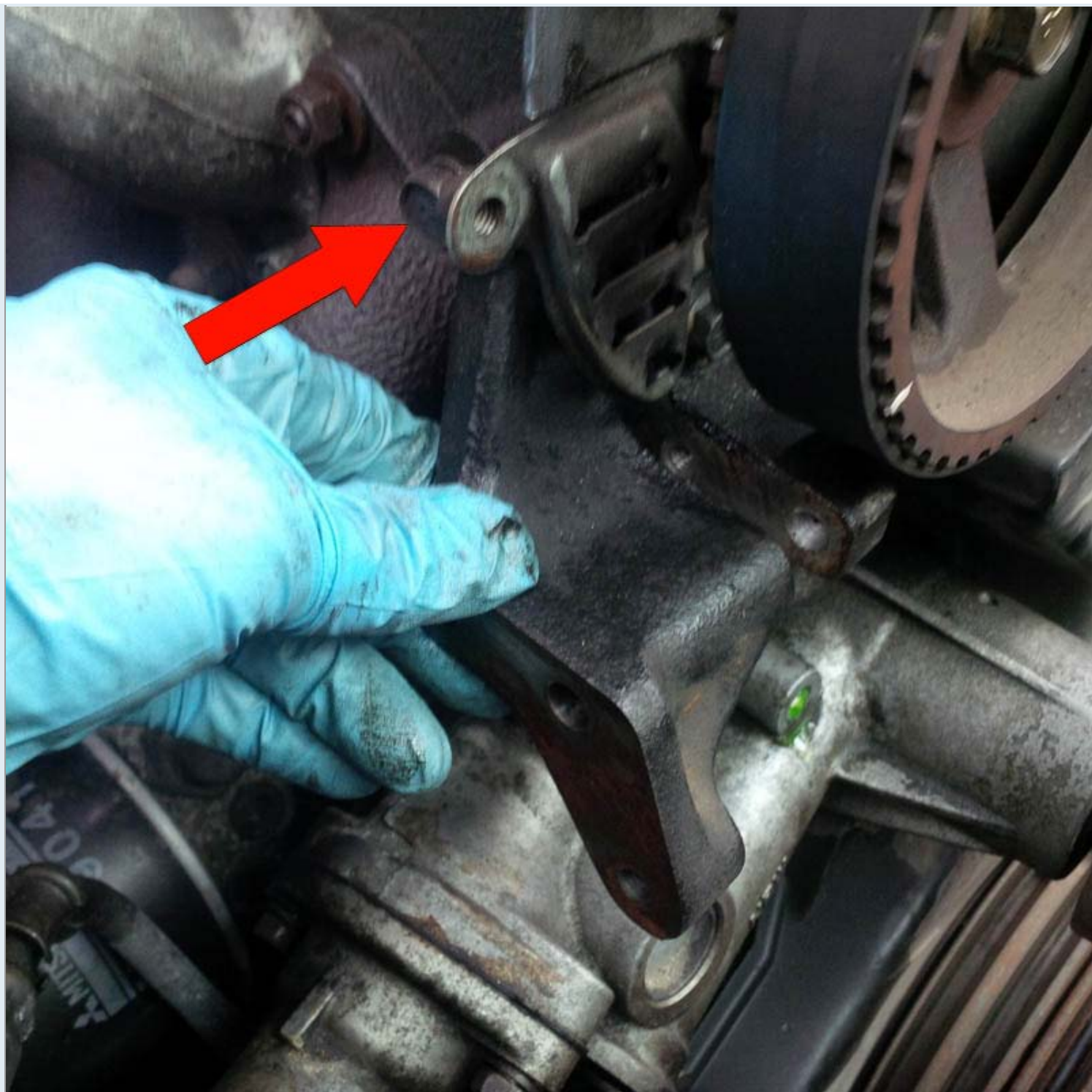




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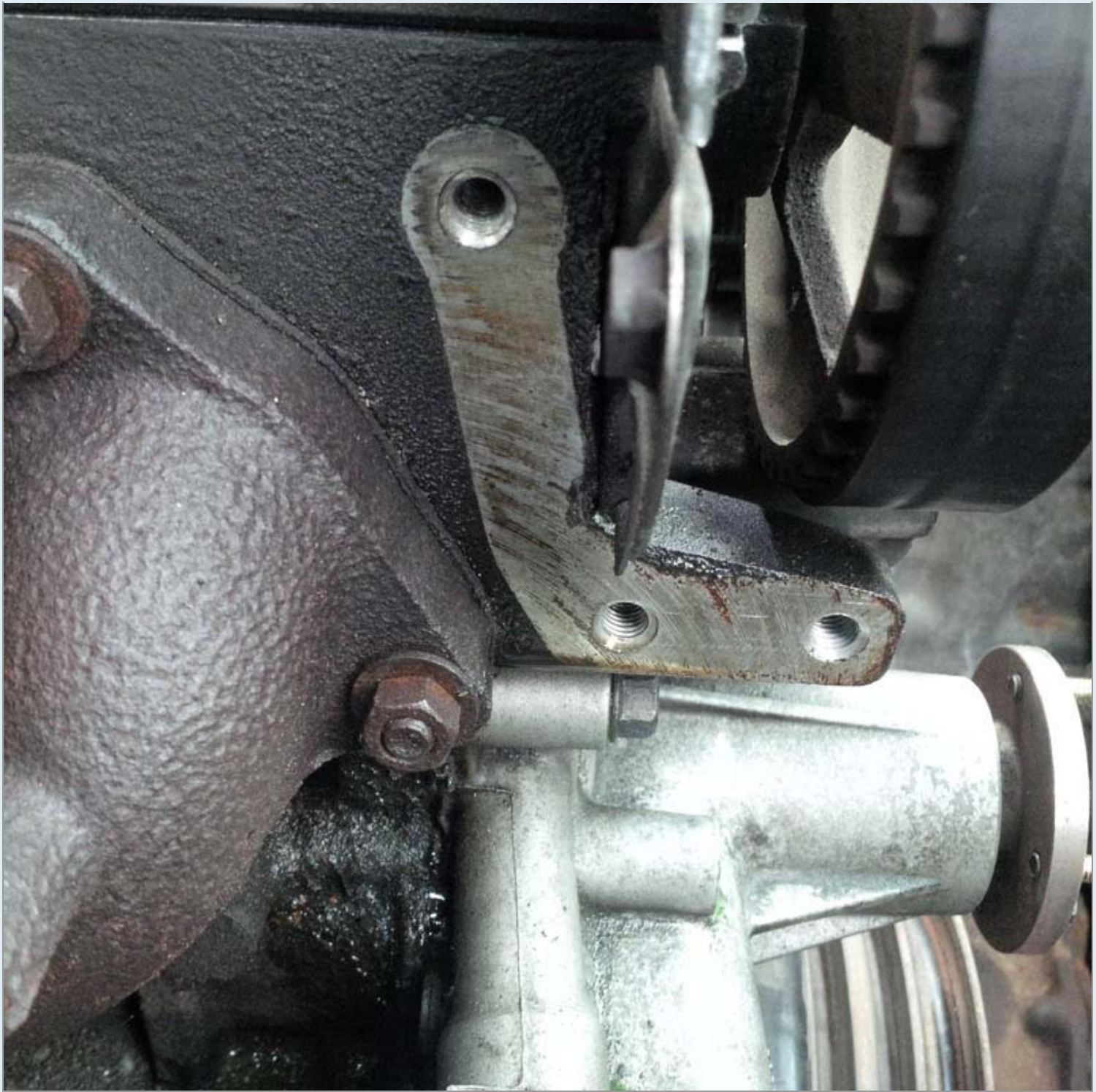
Then remove the second half of the power steering bracket attached to the head.





IMG\_20150309\_111016a.jpg (104.82 KiB) Viewed 1236 times





IMG\_20150309\_111016b.jpg (132.56 KiB) Viewed 1236 times

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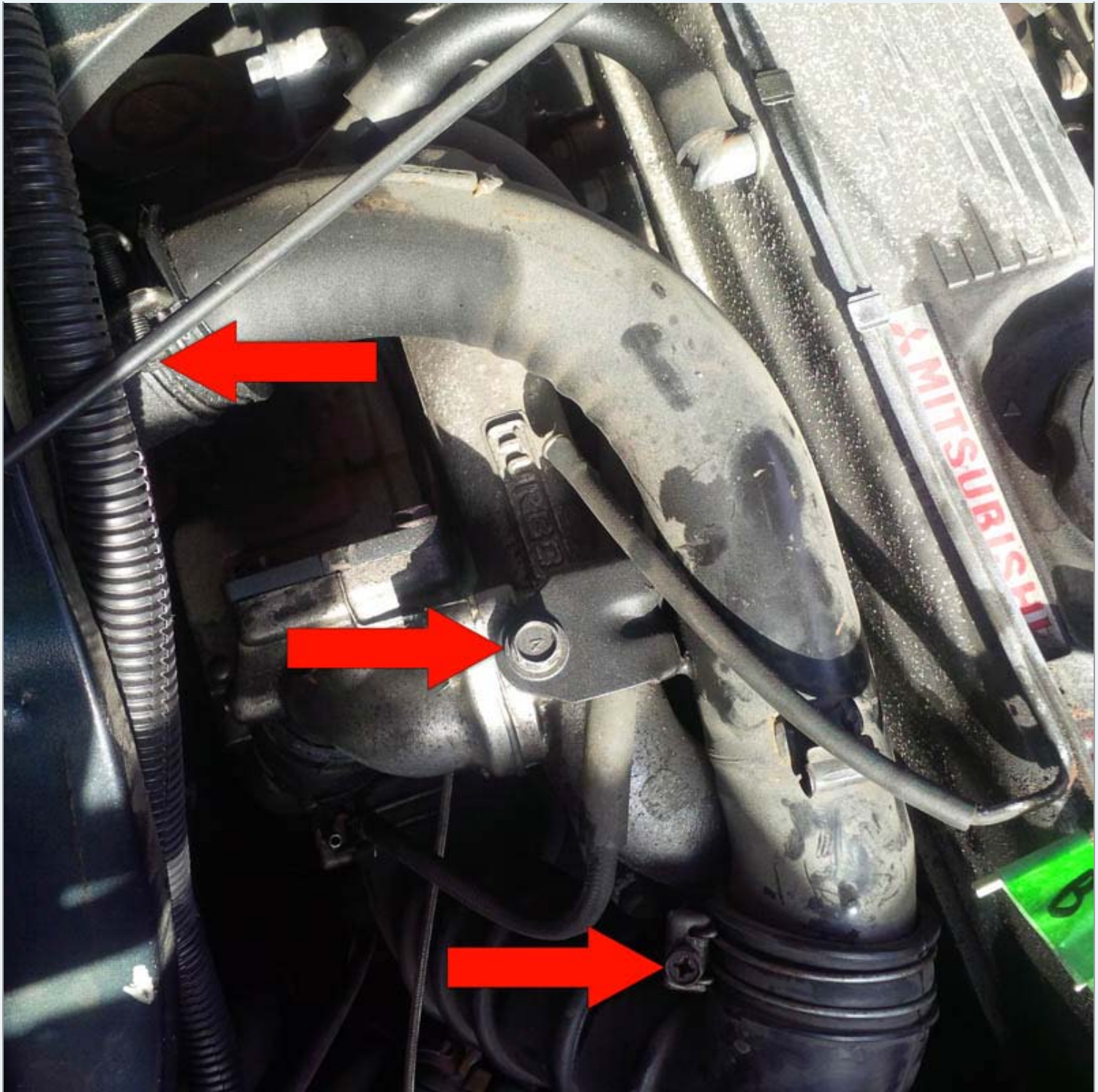


Re: L300 Head replacement and timing belt DIY, step by step

Thu Mar 12, 2015 12:56 pm

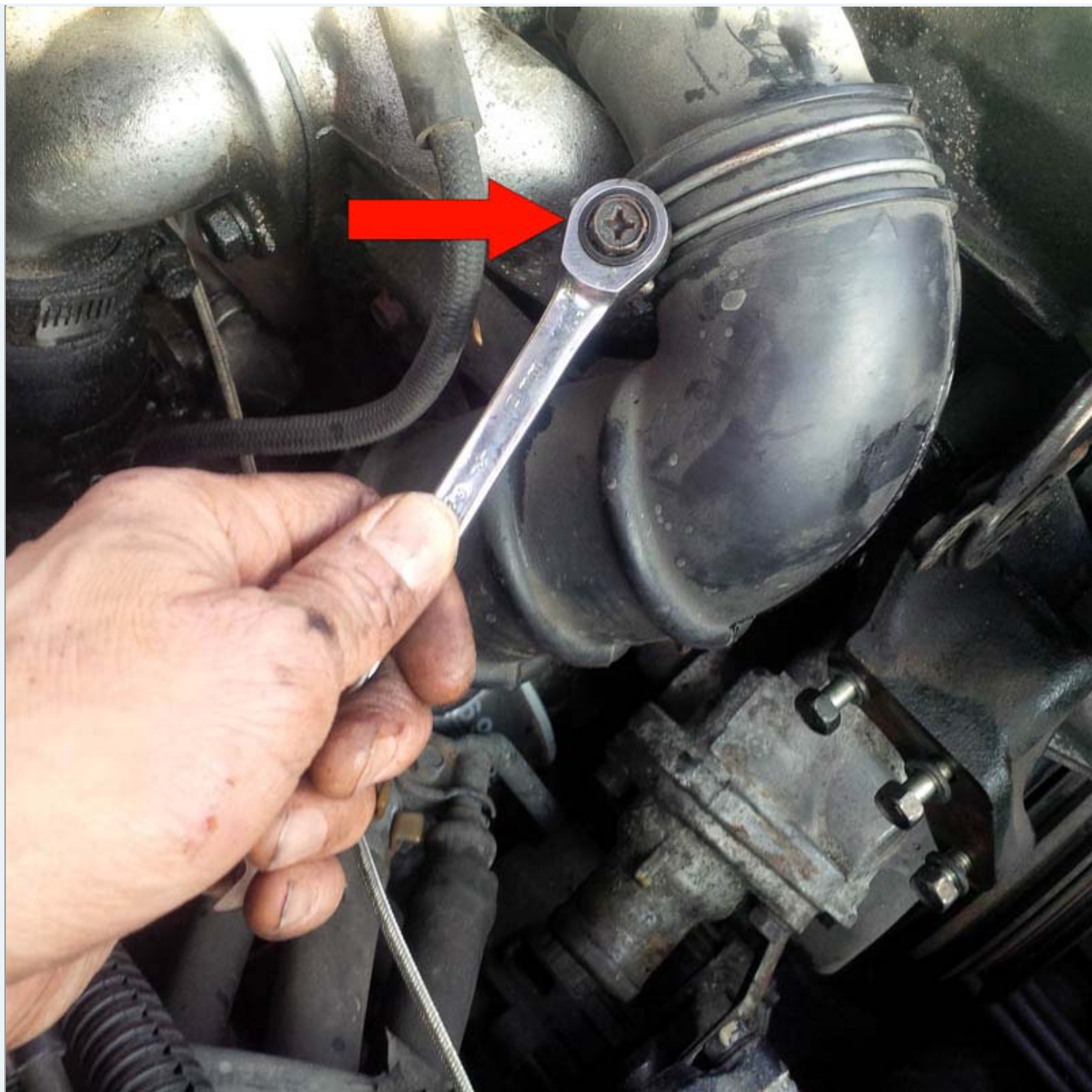
Remove the flexible and metal air intake hoses that lead to the turbo.





IMG\_20150309\_111057.jpg (144.78 KiB) Viewed 1236 times

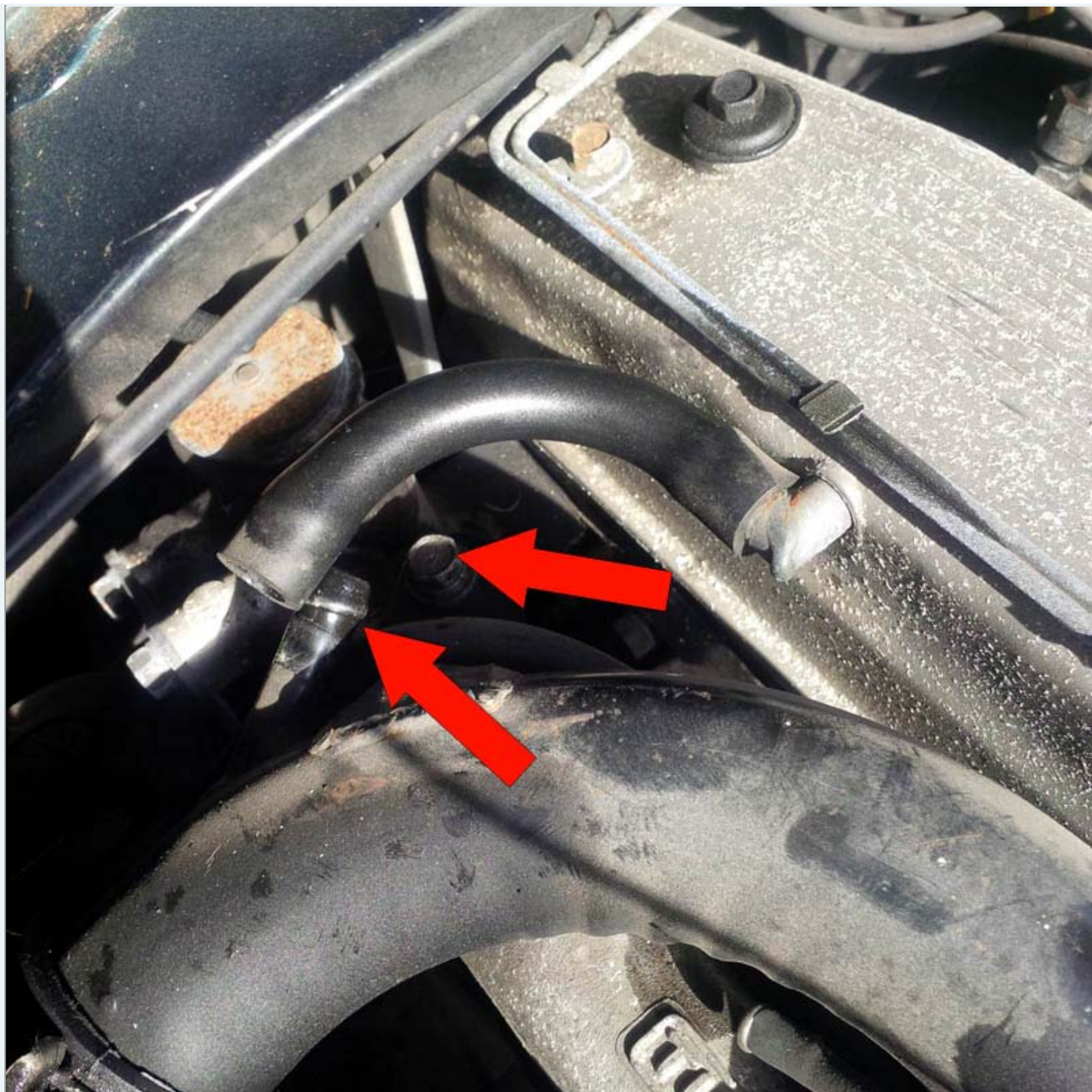




IMG\_20150309\_111342.jpg (111.6 KiB) Viewed 1236 times

Detach the short hose that goes to the valve cover.



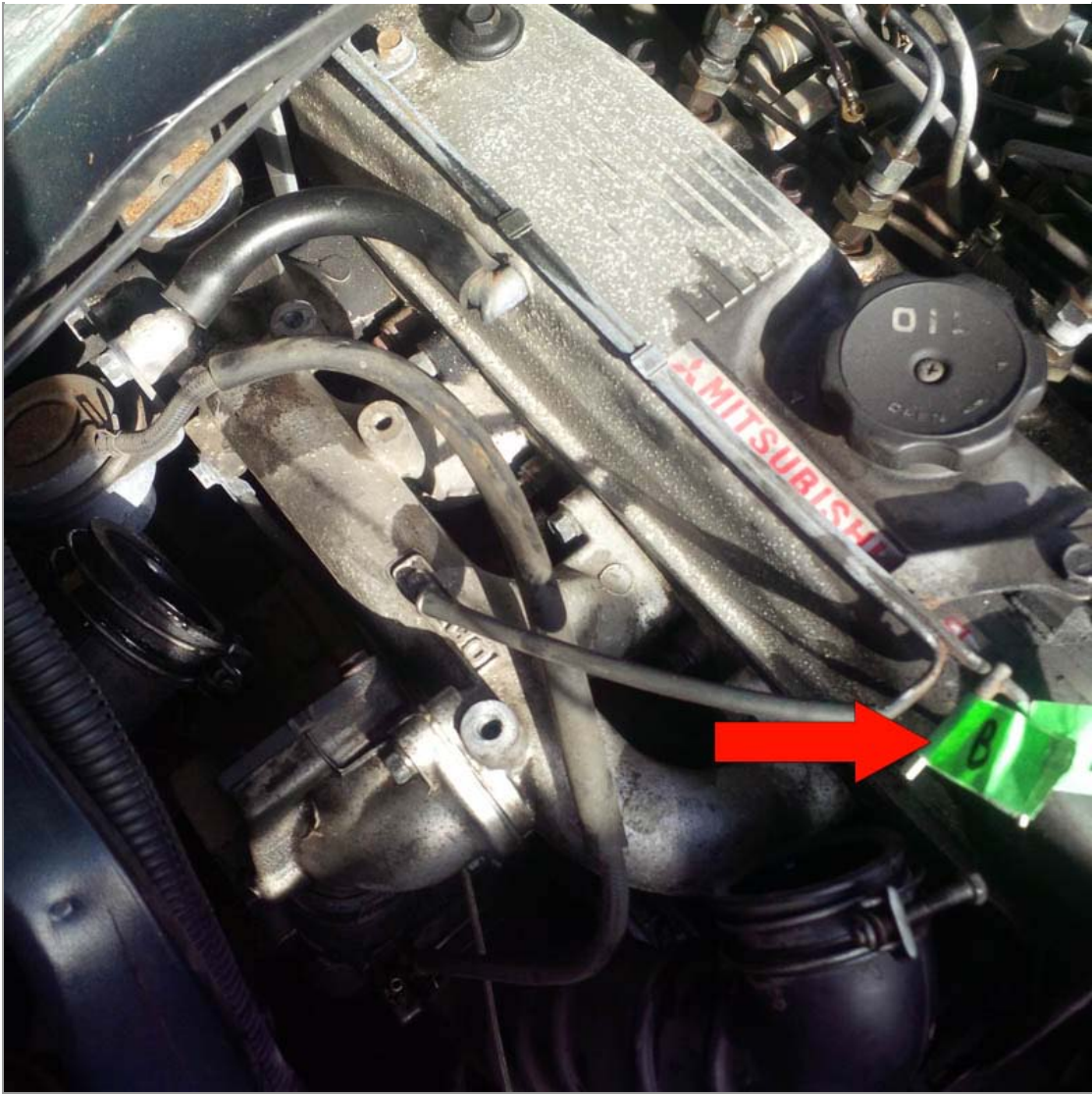


IMG\_20150309\_111508.jpg (158.05 KiB) Viewed 1236 times

Starting to clear out the drivers side of the block, to eventually dig down to the intake and exhaust manifolds. Remove the other vacuum hose marked "B" in this photo that leads to the turbo.

#### ATTACHMENTS





IMG\_20150309\_111704.jpg (136.93 KiB) Viewed 1236 times

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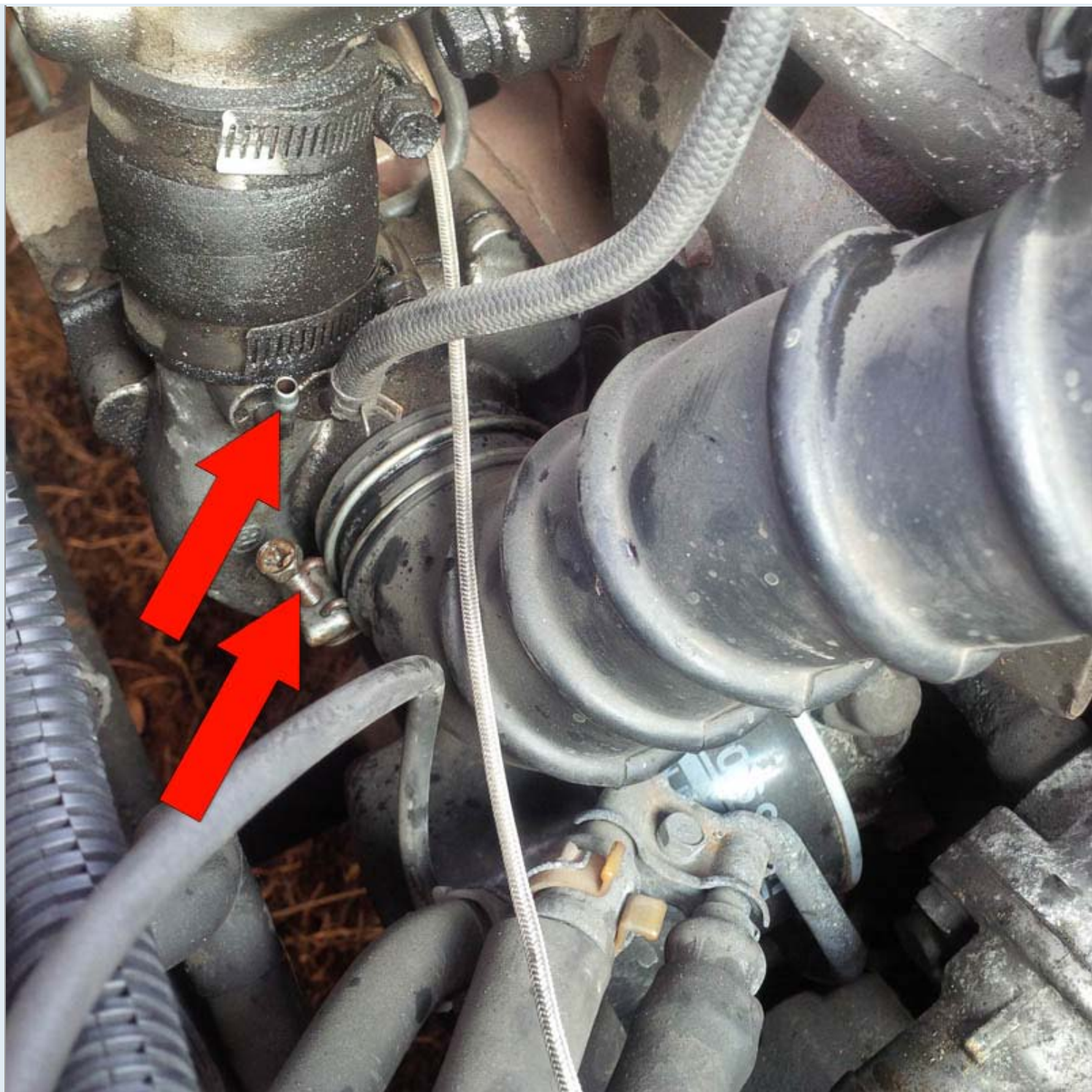


Re: L300 Head replacement and timing belt DIY, step by step

Thu Mar 12, 2015 1:14 pm

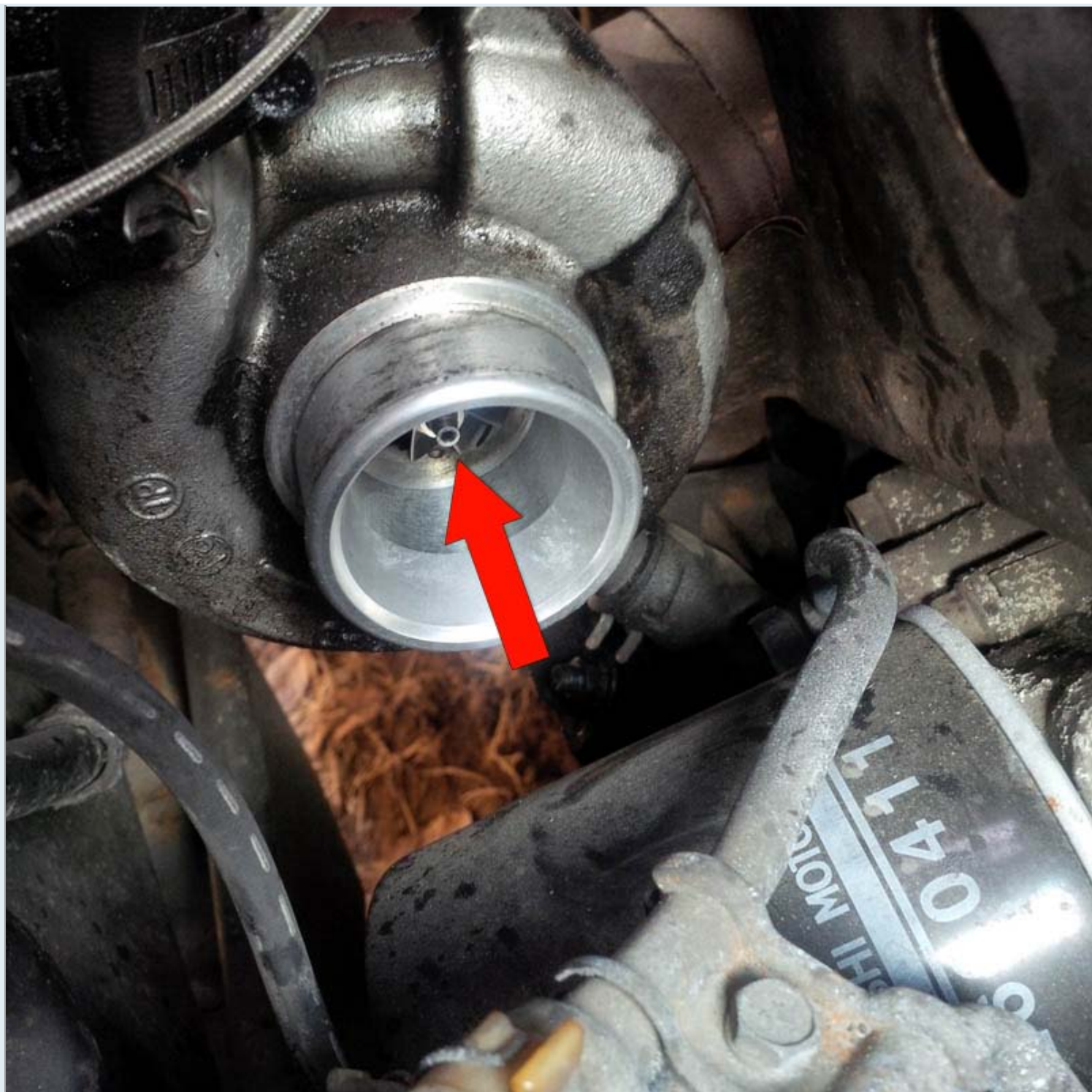
After you've removed the large flexible hose leading to the turbo, as well as the small vacuum hoses, reach in there and wiggle the axle of the turbine to check for excessive play. If there is too much play, then rebuild your turbo by replacing the seals and bushings, or replace the cartridge itself.





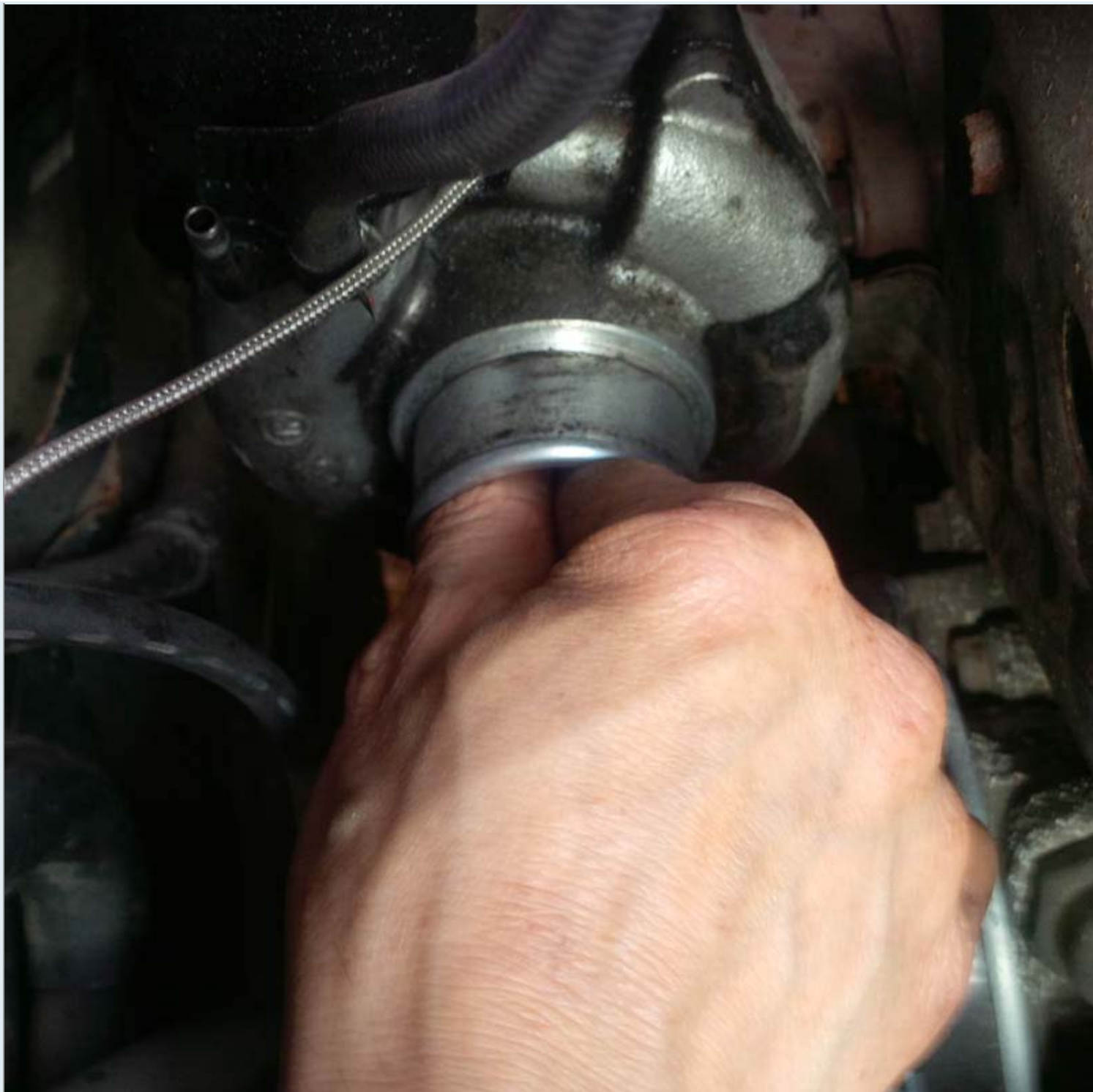
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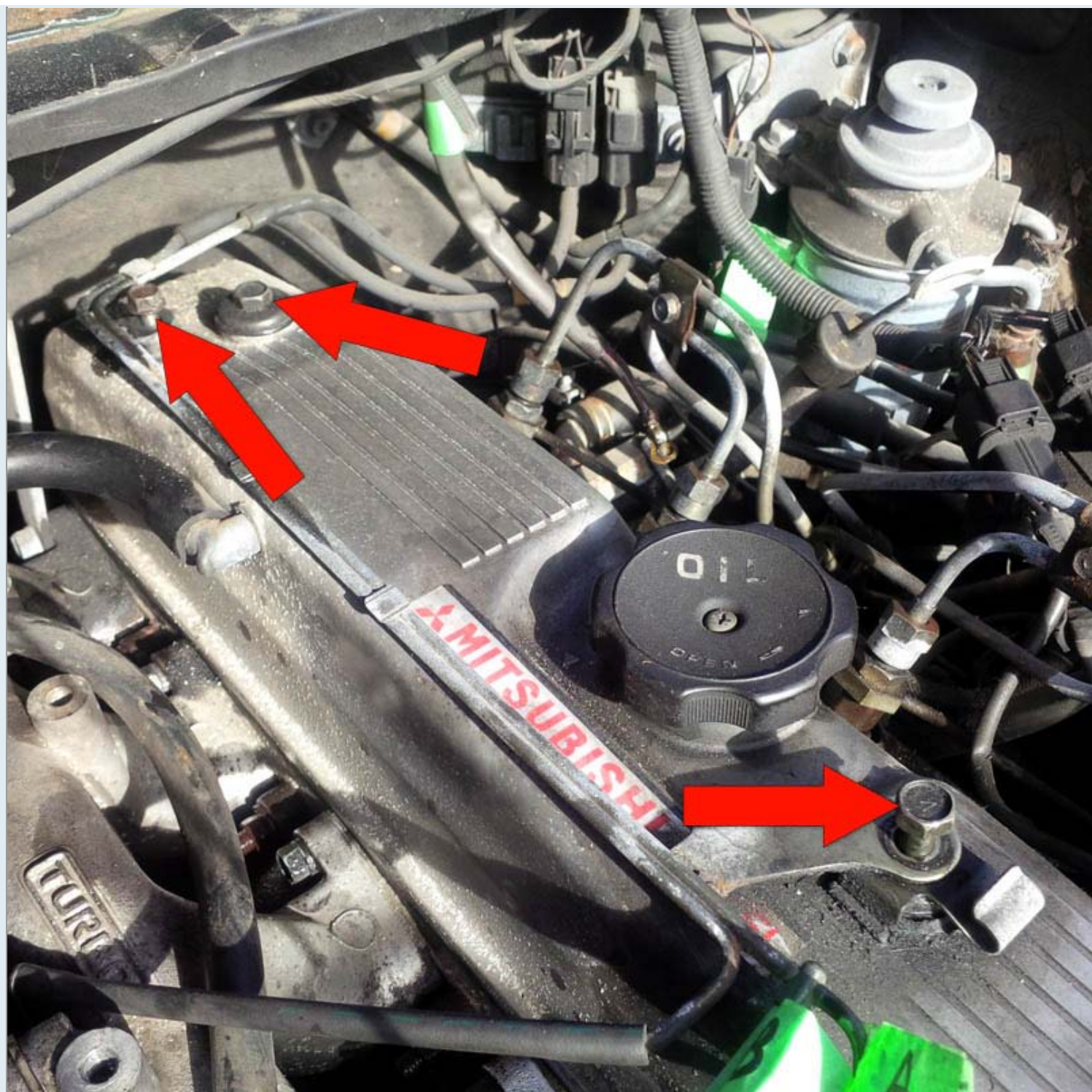




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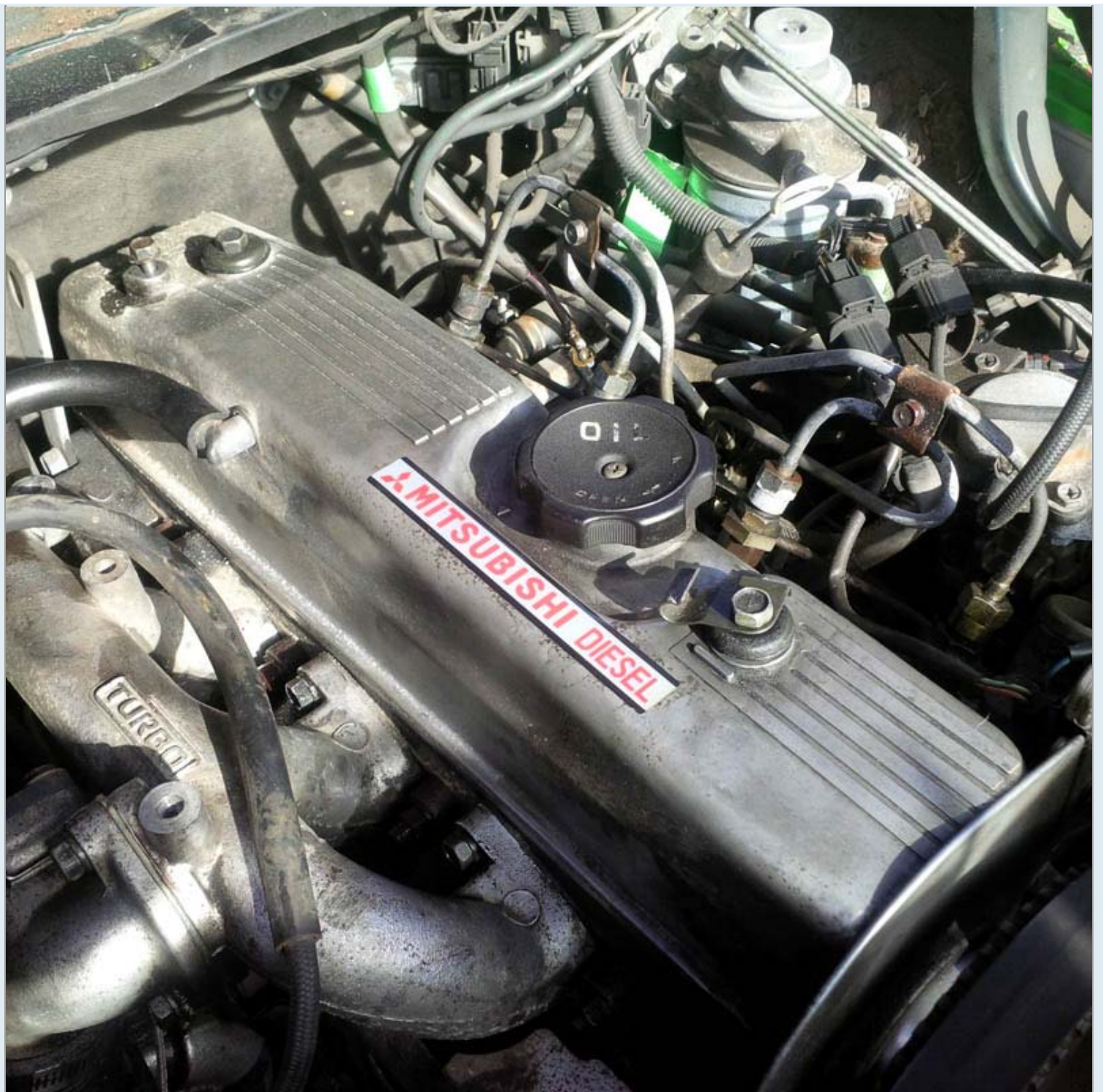
Remove the vacuum rail attached to the top of the valve cover.





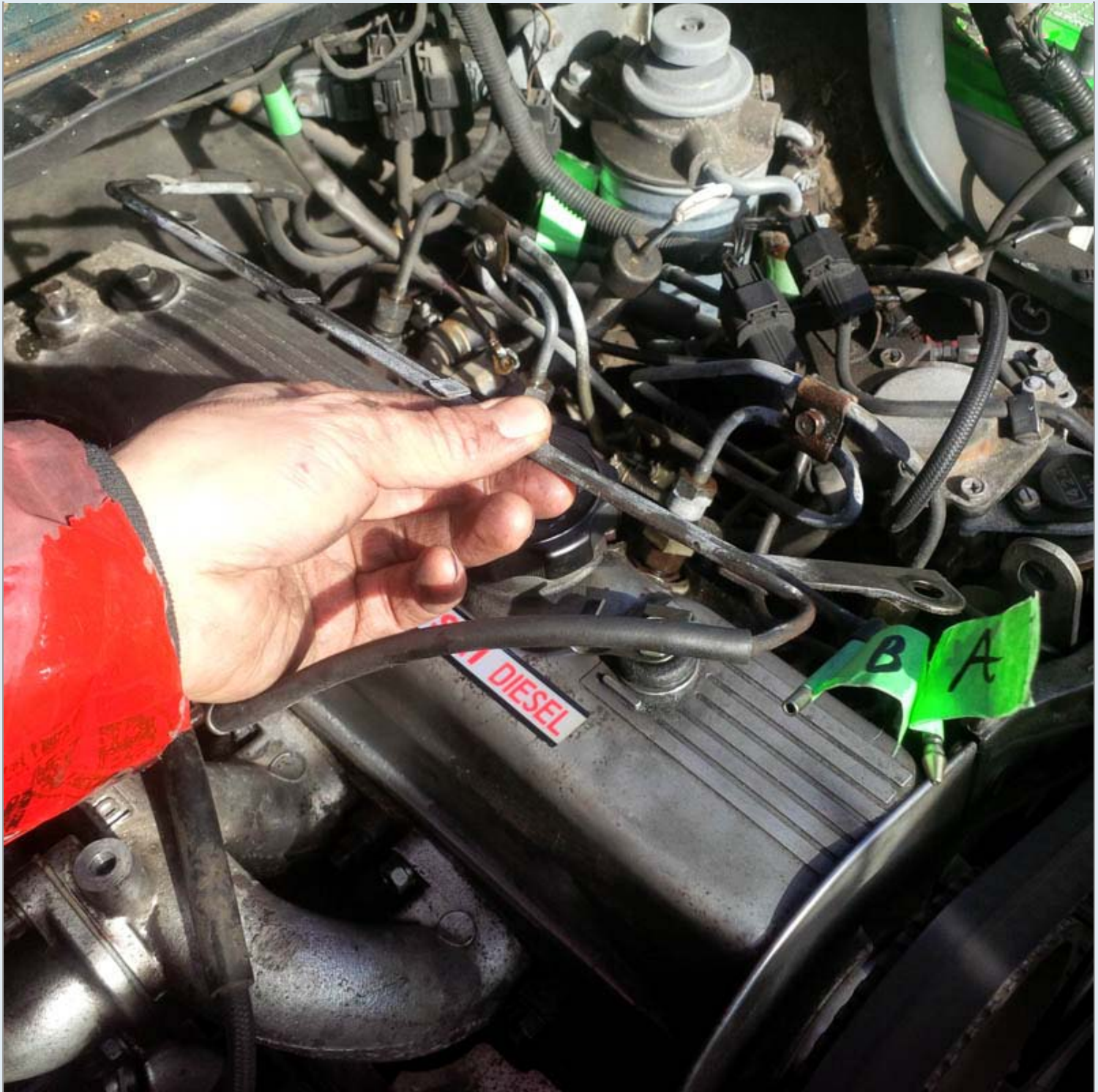
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IMG\_20150309\_112538.jpg (143.94 KiB) Viewed 1234 times

Last edited by [Tojo](#) on Thu Mar 12, 2015 1:34 pm, edited 1 time in total.

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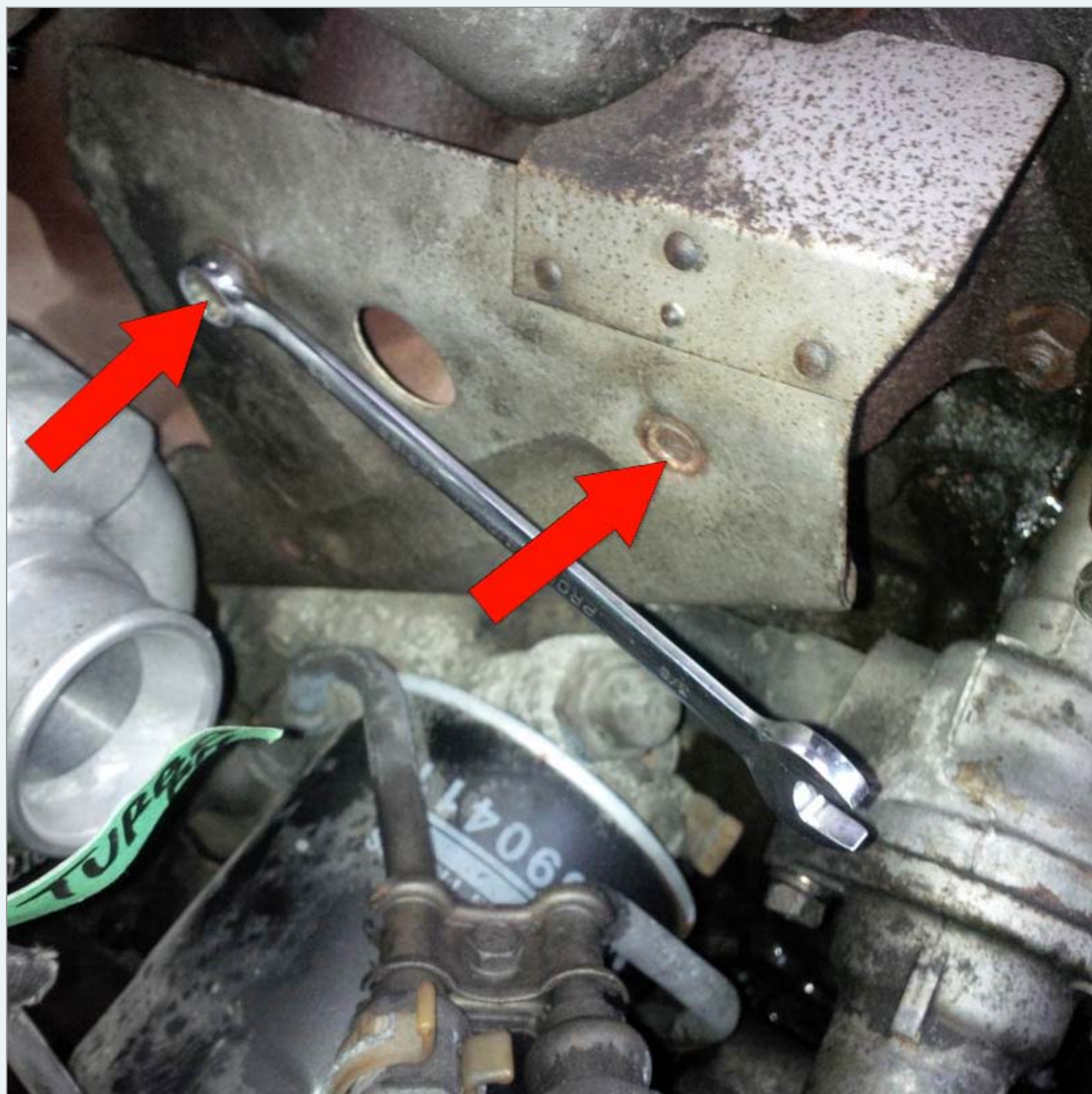
Re: L300 Head replacement and timing belt DIY, step by step

Thu Mar 12, 2015 1:23 pm

Remove the sheet metal heat shield attached to the exhaust manifold. Mine was rusted on there, so I was patient, used lots of penetrating oil. Because the bolt head was getting rounded out, I ended up hammering on a smaller imperial sized 3/8"



closed end wrench and cranking on it. Finally it cracked loose. Last resort would have been to use the torch and heat it up, but didn't have to this time.



IMG\_20150311\_164444.jpg (123.46 KiB) Viewed 1233 times

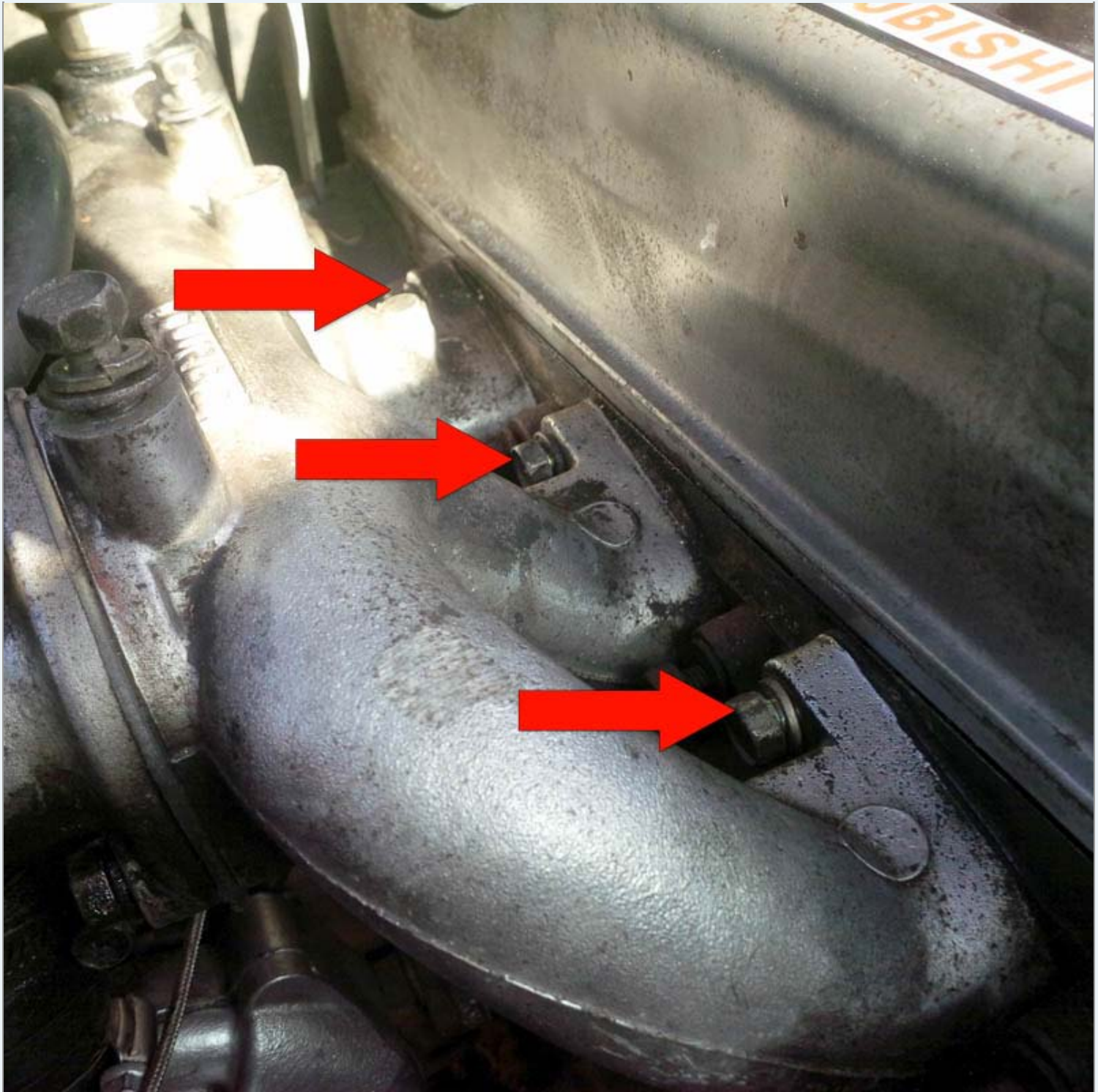




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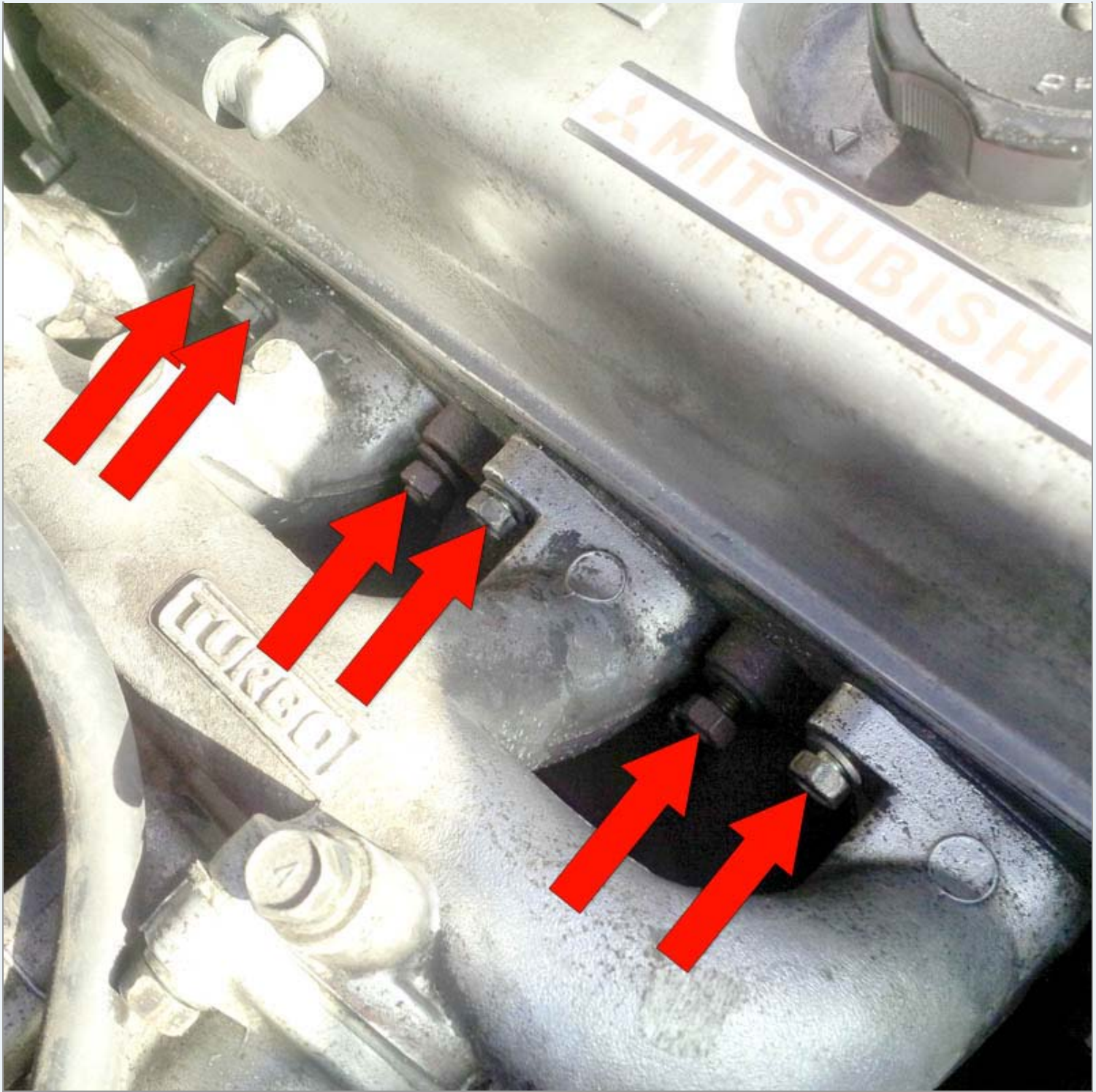
Remove all the bolts and nuts for the intake and exhaust manifolds.





IMG\_20150312\_103030.jpg (122.05 KiB) Viewed 1233 times





IMG\_20150312\_103037.jpg (126.37 KiB) Viewed 1233 times

1993 Delica L300, SWB, LSD, Super Exceed with Crystal-Lite, mostly stock but it's got a digital EGT!!!  
1995 Delica L400, LWB, Super Exceed with Crystal-lite, Airlift airbags, SS intercooler pipes, soon to be WVO  
1997 Isuzu ELF 2.0Ton Crane truck, 4300cc diesel, NKR66E

joebillhill



Re: L300 Head replacement and timing belt DIY, step by step

Thu Mar 12, 2015 7:03 pm

This is great Tojo! Very detailed and loads of pictures to help me and others along. Thanks!





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## L300 Head replacement and timing belt DIY, step by step

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Mazdax605

“

Re: L300 Head replacement and timing belt DIY, step by step


Sun Mar 22, 2015 11:48 am

I did the same thing you are doing (sans the awesome picture diary) on my 1990 US Spec L300 gas model. Only I had to do it twice because the new head I got had the wrong length valves in it that wouldn't close so it wasn't making any compression. The LHD 2.4 litre gas model maybe seemed a lot more simple as it didn't have a turbo, and the hinged engine cover didn't need to be removed, just swung way up. Also had the extra room by Mitsubishi allowing you to unbolt the drivers seat, and the floor it was mounted to to gain more access. Excellent job with including all of these pictures! Keep up the good work. I hope I never have do what you're doing, but chances are I will at some point.

Chris

89 P25W L300 Aero GLX  
74 Mazda REPU  
78 Mazda RX-7 GS





Tojo

“

Re: L300 Head replacement and timing belt DIY, step by step

Sun Mar 22, 2015 9:40 pm

Thanks for the encouragement guys.

Now that the snow has melted, I'm getting back to the task at hand.

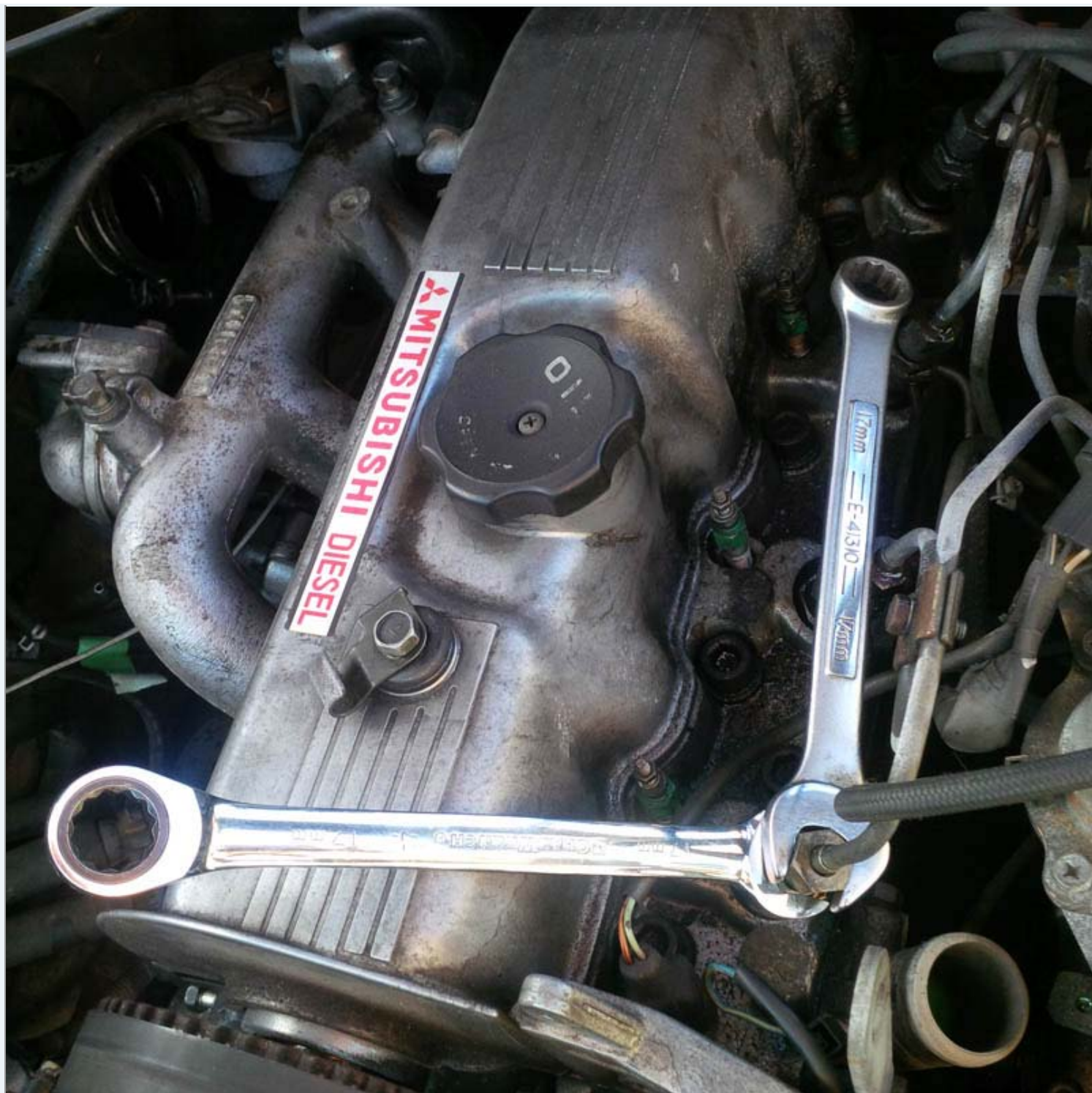
Crossing back to the passenger side of the motor, the next move was to crack loose the glow plugs.



IMG\_20150309\_160040.jpg (101.16 KiB) Viewed 806 times

Then loosen all the unions for the fuel injection pipes, there are 8 in total. Use two wrenches and be gentle! Not a lot of room down in behind the injection pump.





IMG\_20150309\_160909.jpg (128.61 KiB) Viewed 806 times

Remove the two electrical connectors on top of the injection pump.

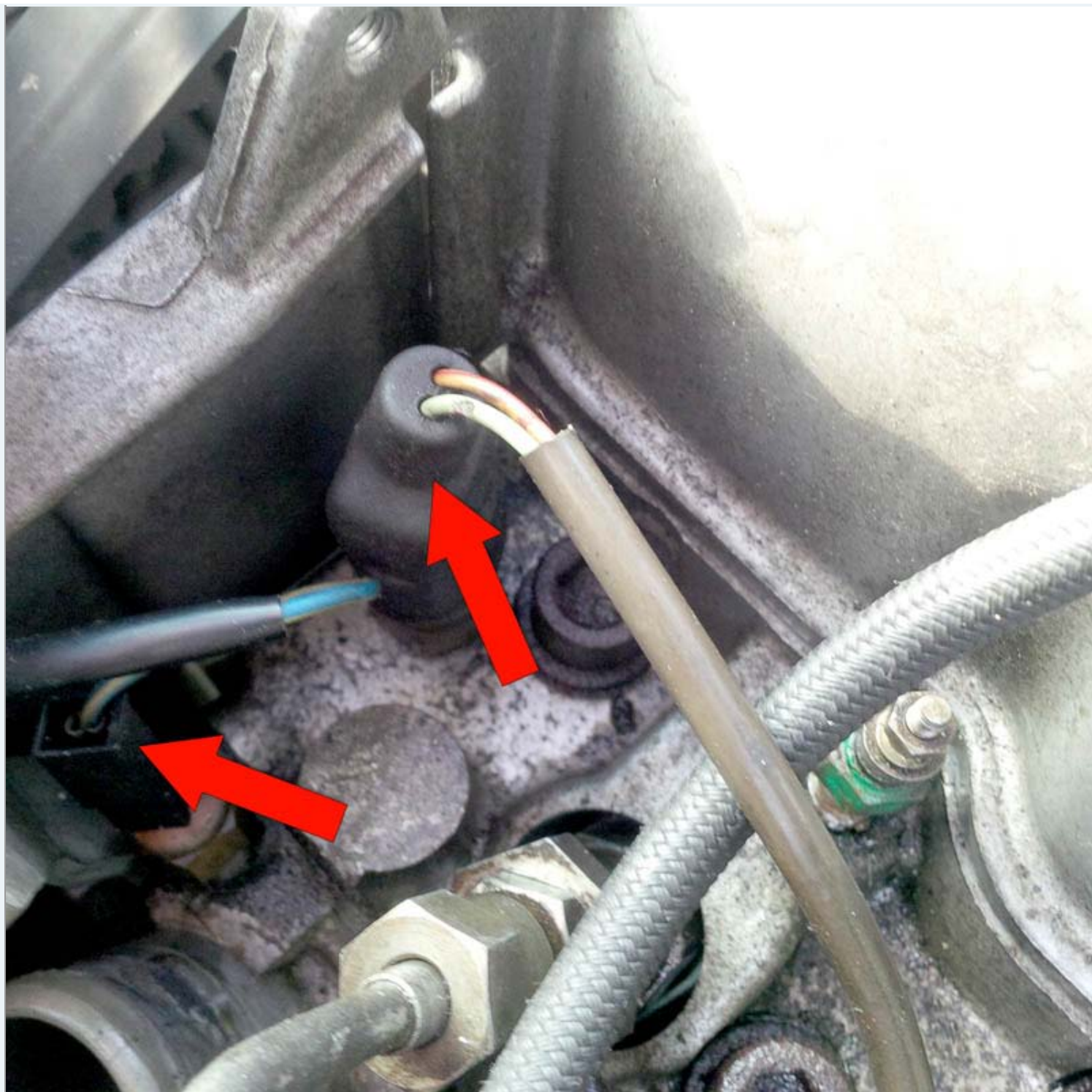




IMG\_20150312\_104927.jpg (137.5 KiB) Viewed 806 times

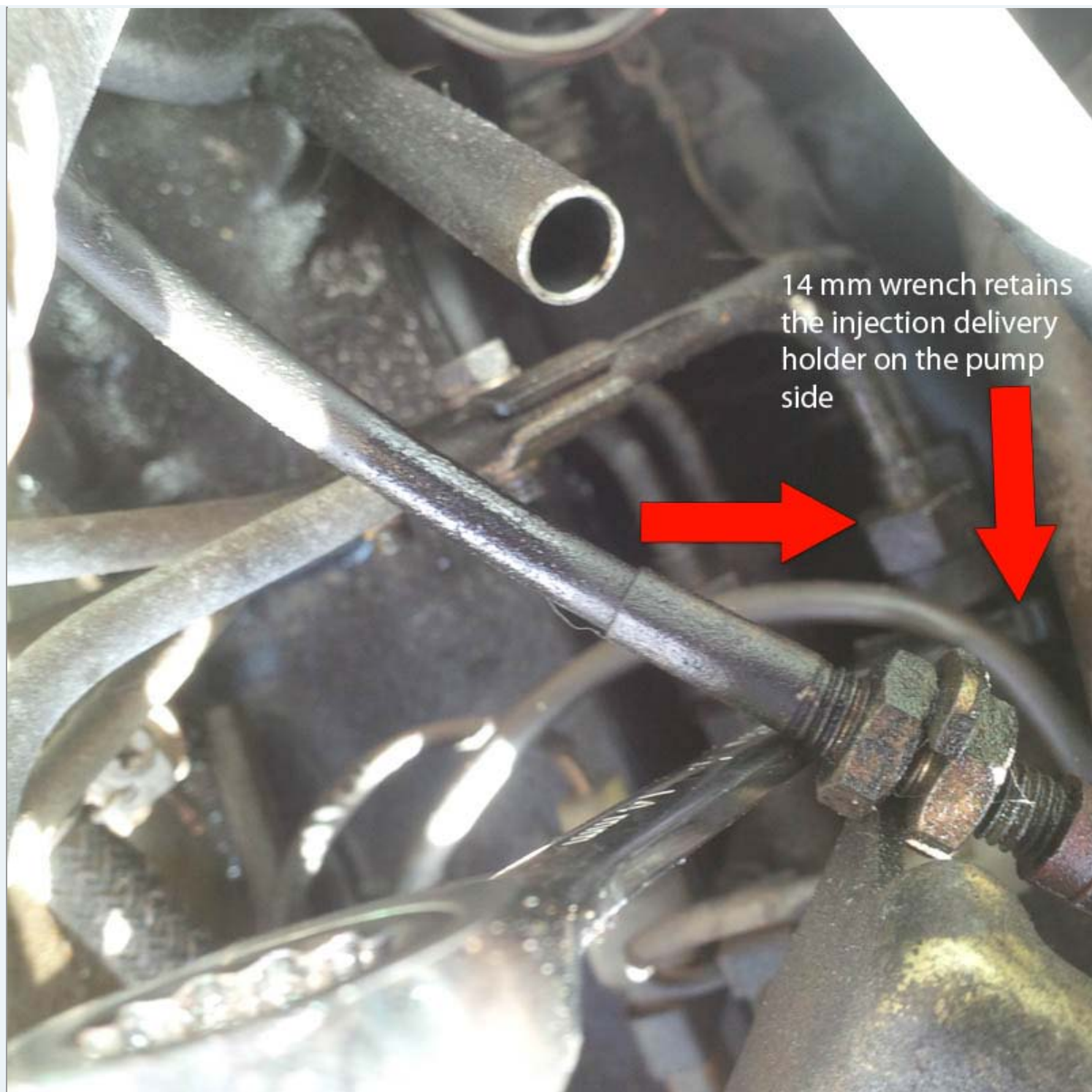
And remove the two connectors near the front of the head on the passenger side, for engine coolant temperature.





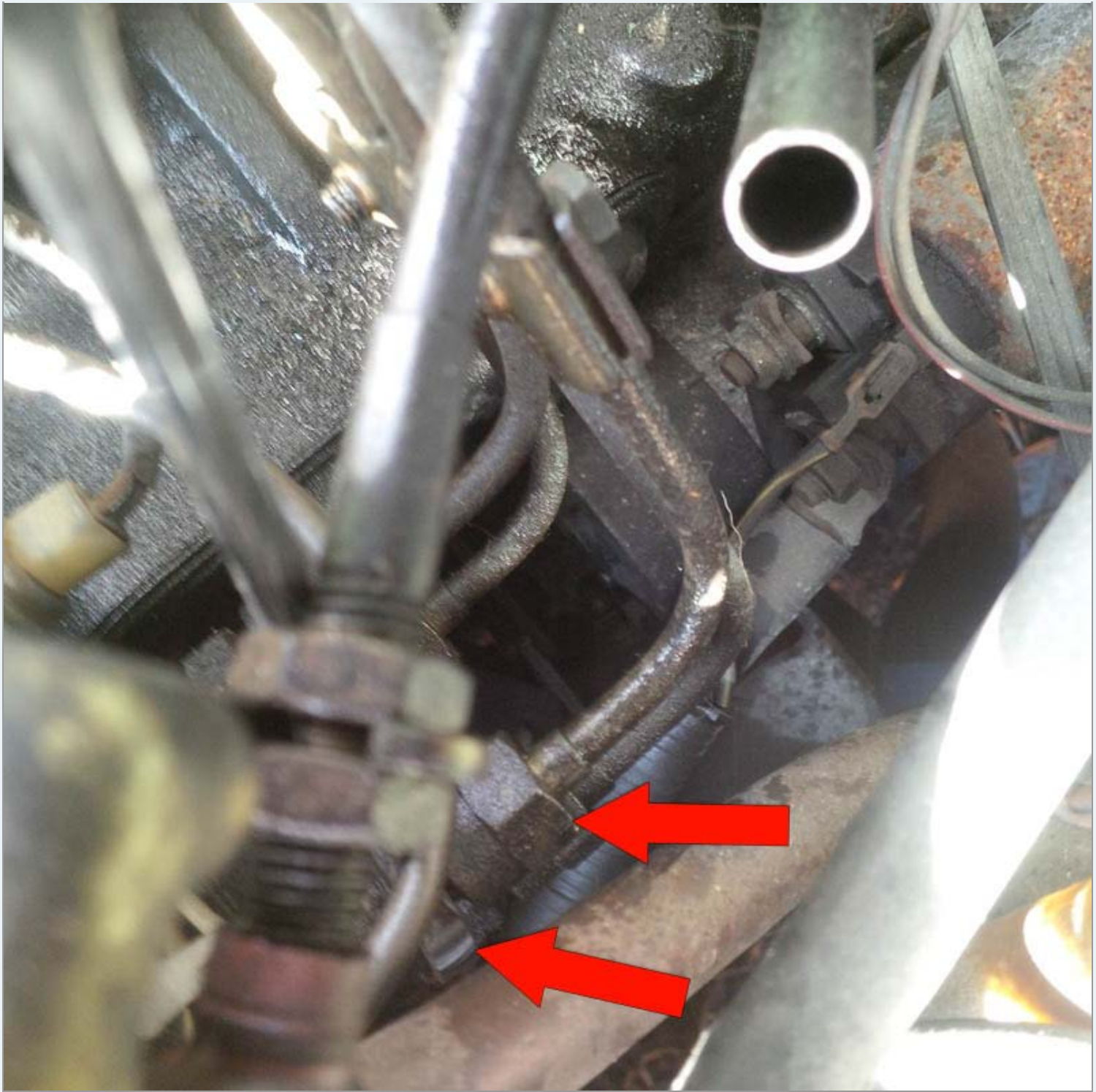
IMG\_20150312\_102110.jpg (120.53 KiB) Viewed 806 times

Here are a couple more pictures of the back of the injection pump. Awkward to get in there, but it's doable with a bit of patience. Personally I get nervous around the IP. Try not to break anything!



IMG\_20150312\_104946.jpg (98.28 KiB) Viewed 806 times





IMG\_20150312\_105005.jpg (114.3 KiB) Viewed 806 times

- 1993 Delica L300, SWB, LSD, Super Exceed with Crystal-Lite, mostly stock but it's got a digital EGT!!!
- 1995 Delica L400, LWB, Super Exceed with Crystal-lite, Airlift airbags, SS intercooler pipes, soon to be WVO
- 1997 Isuzu ELF 2.0Ton Crane truck, 4300cc diesel, NKR66E

Tojo

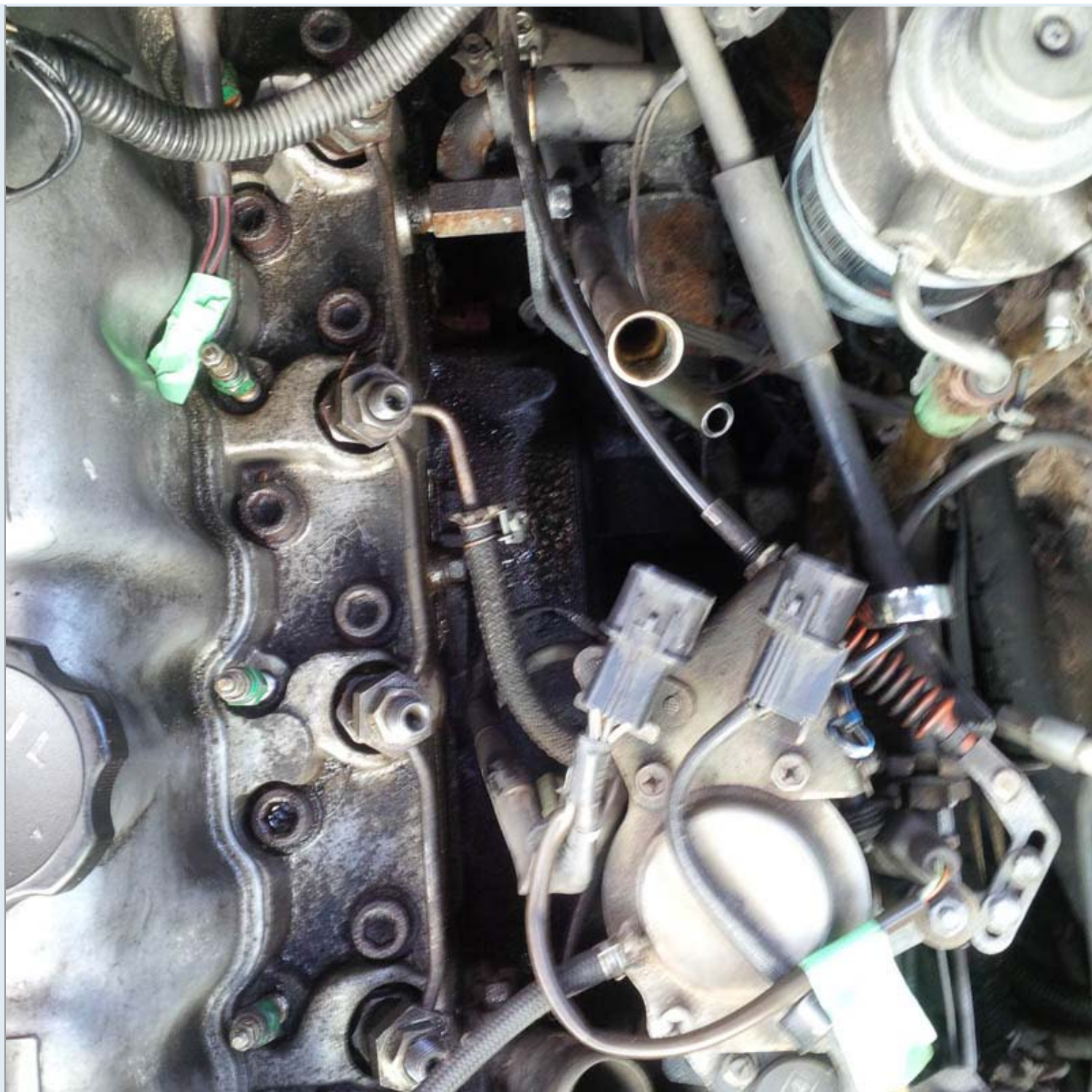


Re: L300 Head replacement and timing belt DIY, step by step

Sun Mar 22, 2015 9:52 pm

With the fuel pipes removed, it looks like this:

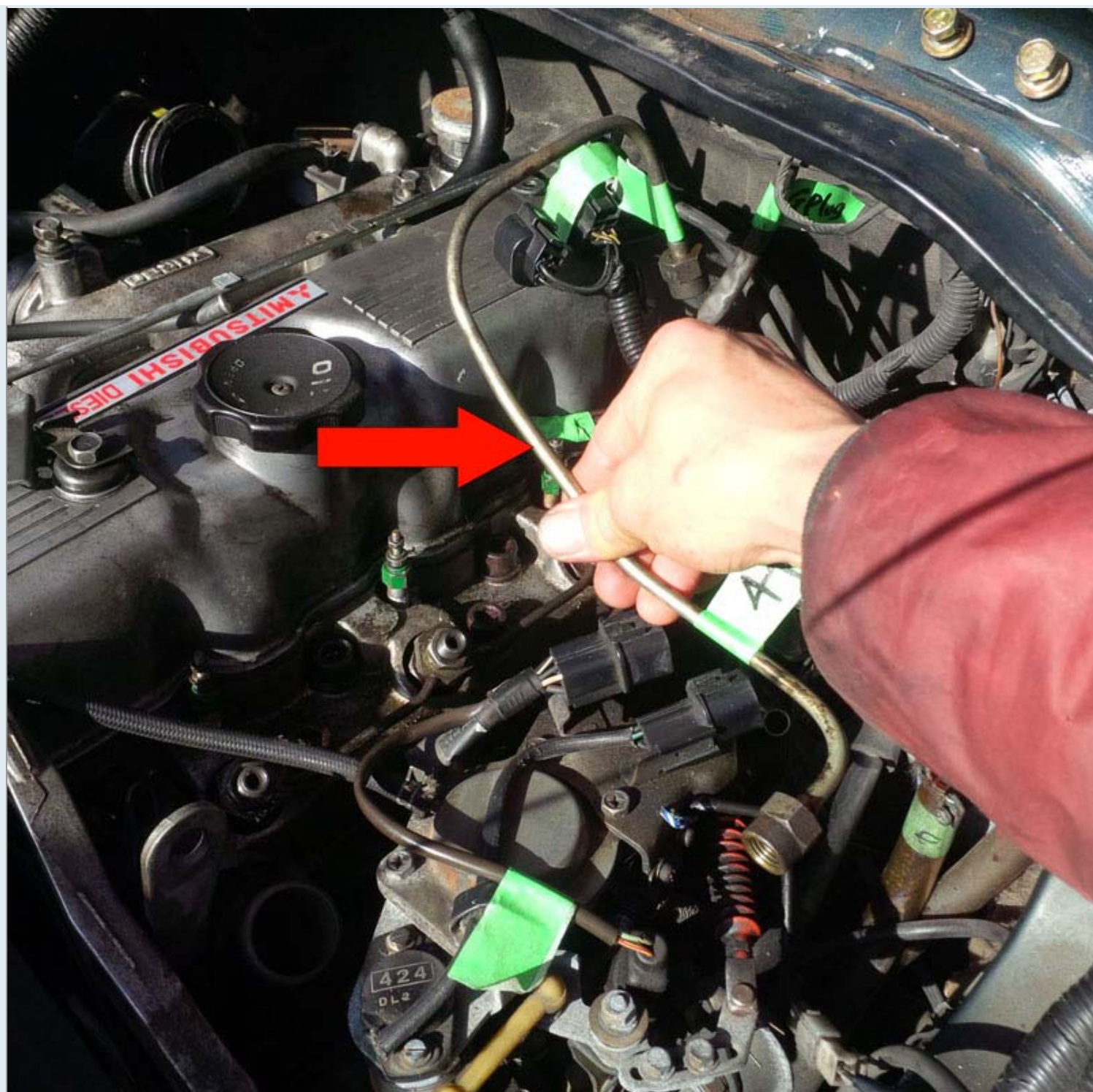




IMG\_20150312\_111445.jpg (143.4 KiB) Viewed 806 times

Make sure you've marked where everything goes for reassembly.

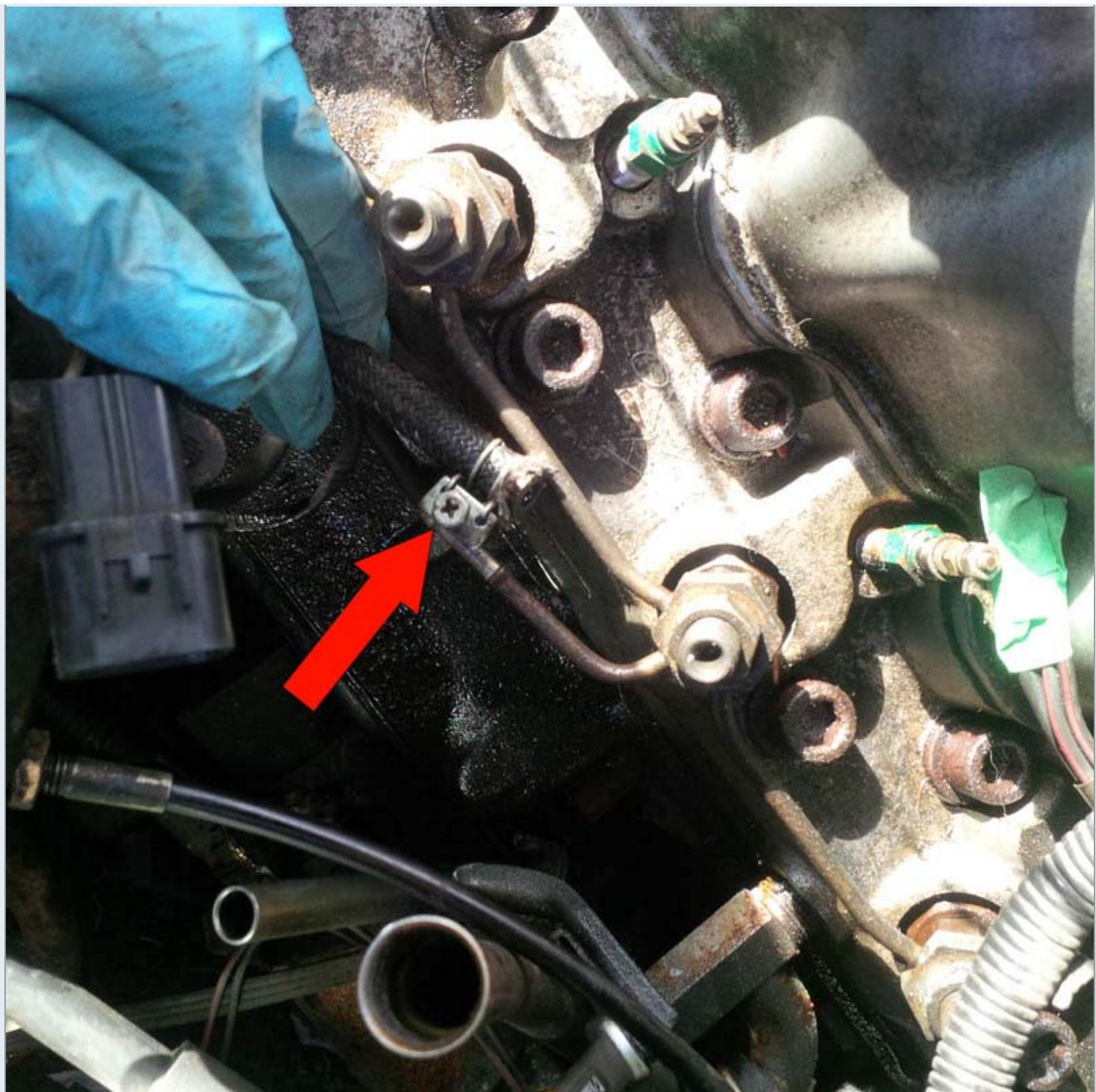




IMG\_20150312\_112152 (2).jpg (188.43 KiB) Viewed 806 times

Remove the small rubber return fuel line.

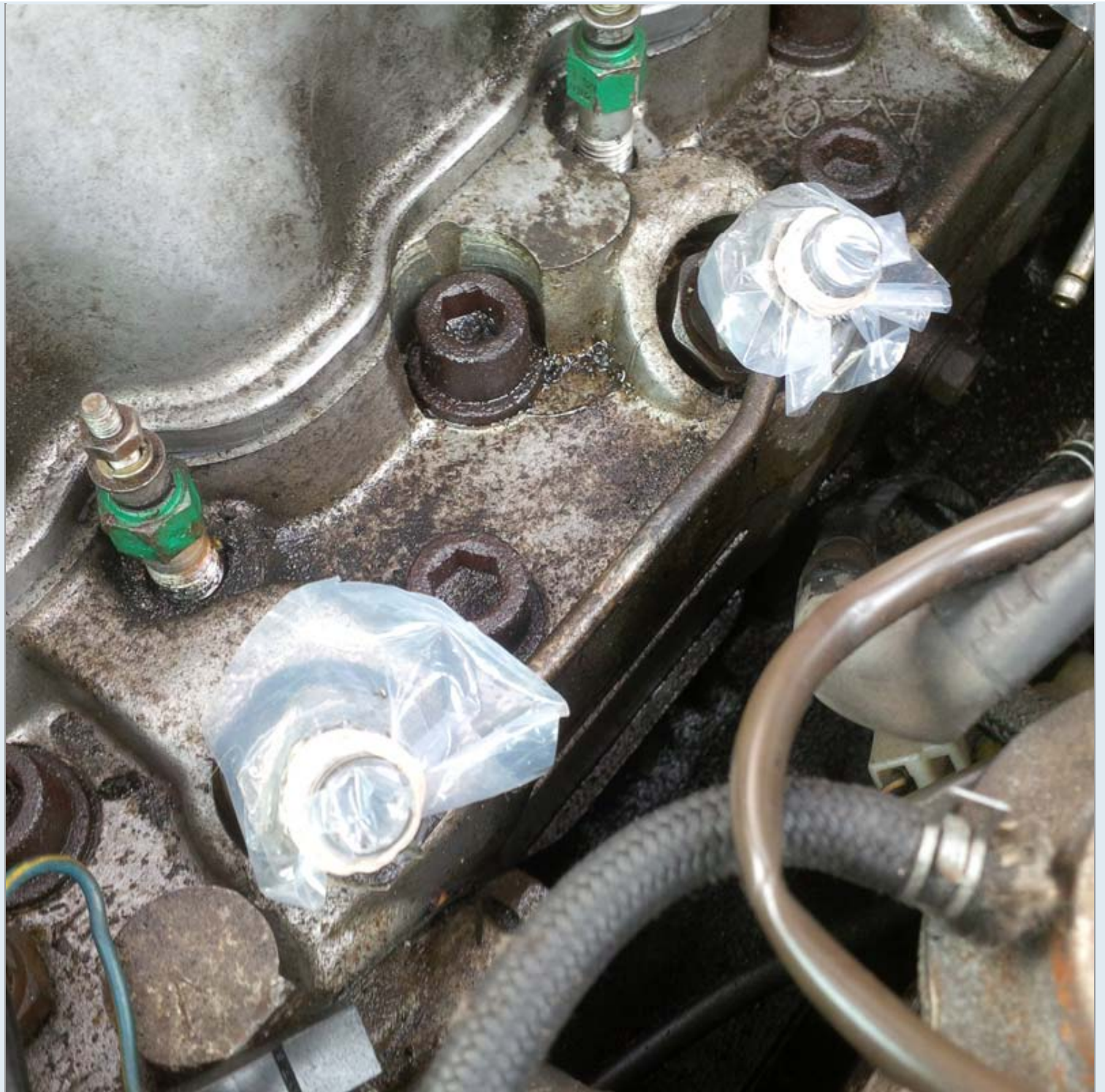




IMG\_20150312\_111737.jpg (134.63 KiB) Viewed 806 times

Now make some fuel injector condoms!

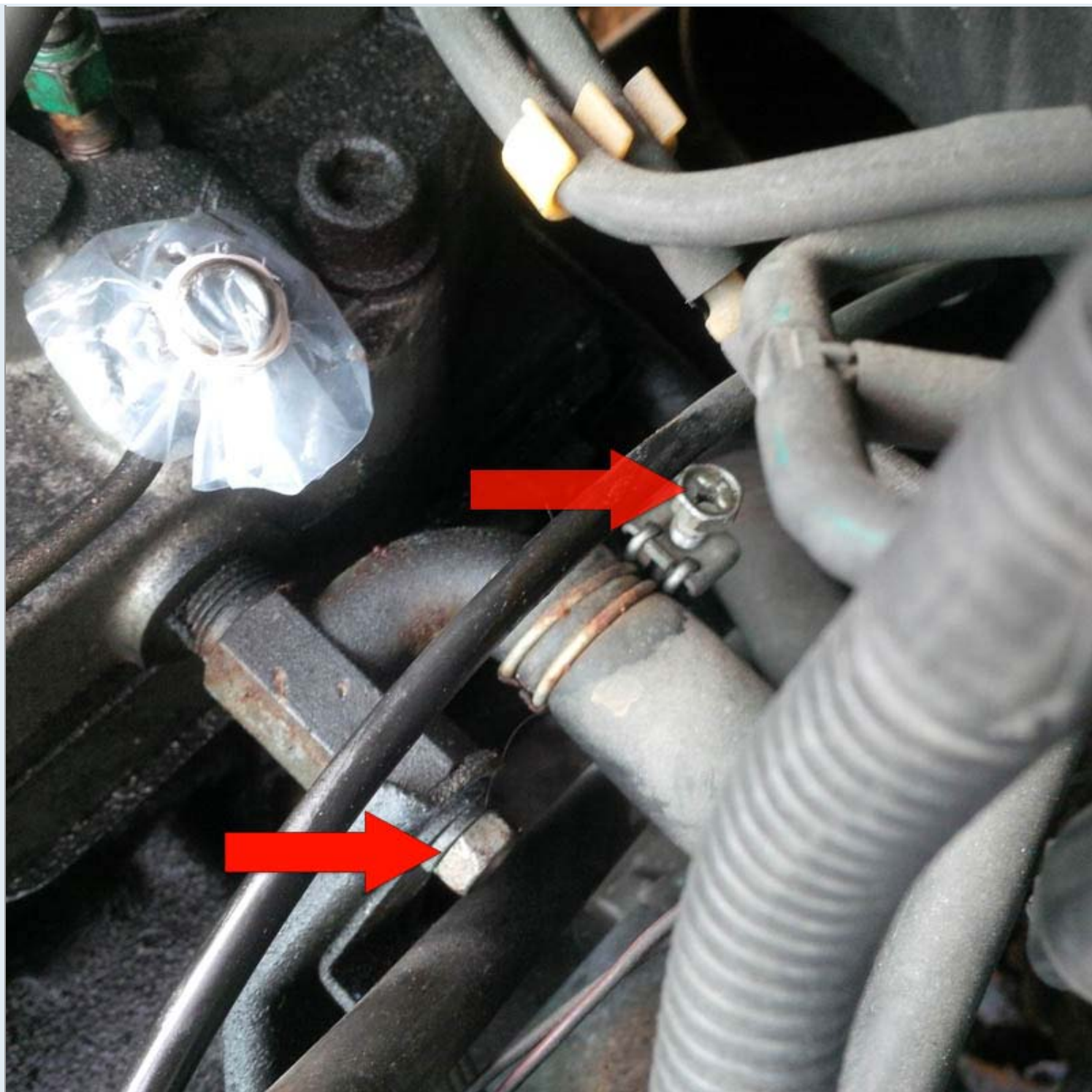




IMG\_20150320\_153724.jpg (237 KiB) Viewed 806 times

And remove the bolt that holds the transmission dipstick, and the rubber hose off the back of the head.





IMG\_20150320\_153743.jpg (103.89 KiB) Viewed 806 times

Remove the hoisting bracket at the front of the head.





IMG\_20150320\_154644.jpg (110.07 KiB) Viewed 806 times

1993 Delica L300, SWB, LSD, Super Exceed with Crystal-Lite, mostly stock but it's got a digital EGT!!!  
1995 Delica L400, LWB, Super Exceed with Crystal-lite, Airlift airbags, SS intercooler pipes, soon to be WVO  
1997 Isuzu ELF 2.0Ton Crane truck, 4300cc diesel, NKR66E



Re: L300 Head replacement and timing belt DIY, step by step

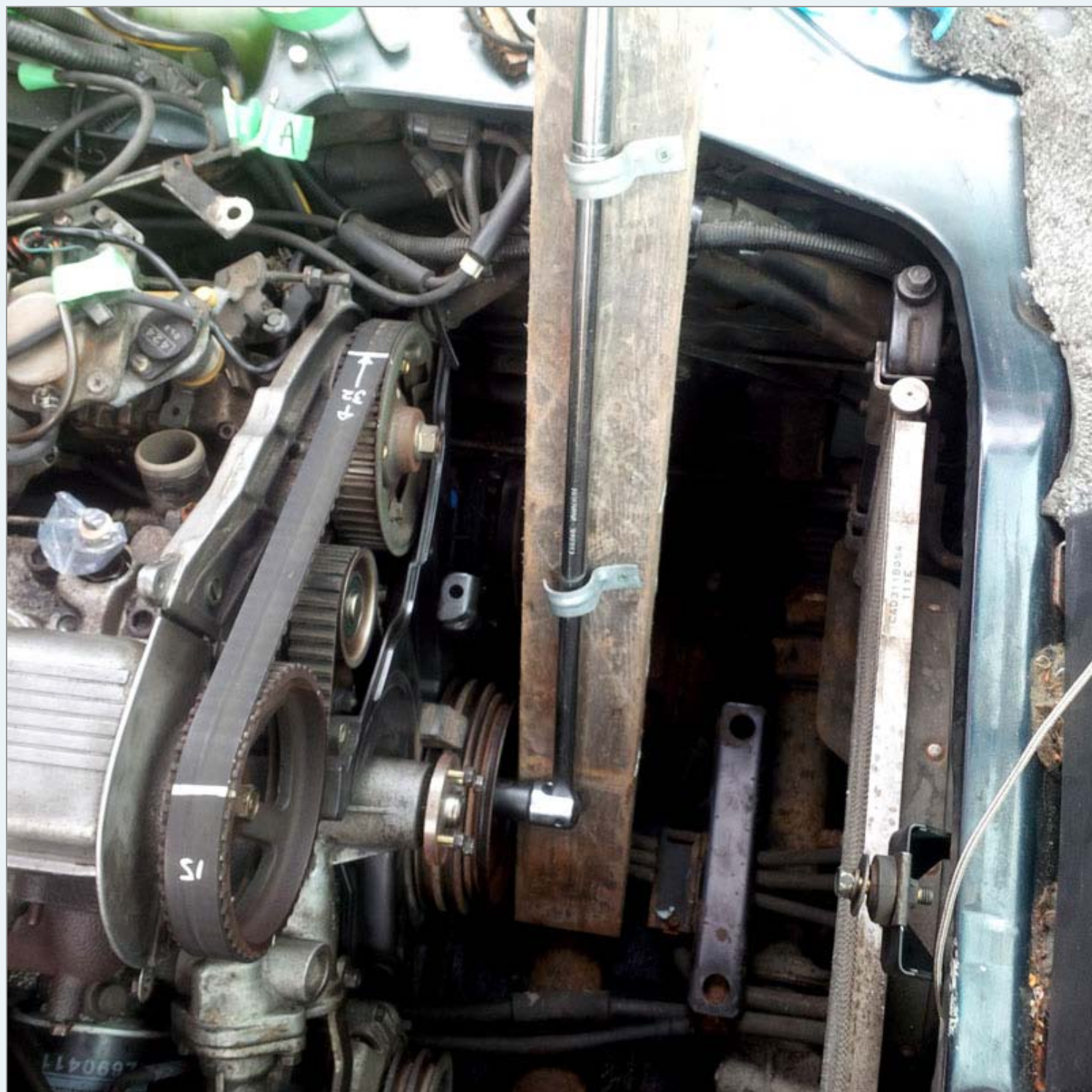
Sun Mar 22, 2015 10:04 pm

Well, I've put this off for long enough. Time to finally remove the crankshaft pulley. There are a few ways to do this. If you have the proper tool, then by all means use it! I've decided to do the starter motor blip method. Remove the glow plugs (if you are really paranoid like me) reattach the battery leads, put a long breaker bar and impact socket on the crank bolt,



then turn over the starter motor for a fraction of a second just to get it to turn. You DO NOT want compression ignition due to a bit of fuel being left over in the system cause that would be bad m'kay.

Here is a picture of my setup. I took a piece 2 x 4 and attached the breaker bar to it. My thought was that if something fails, it won't fly around the inside of the van and puncture something, like me. The 4D56 is a clockwise turning motor, so ground your breaker bar on the passenger side. Crank turns clockwise, bolt stays put, that's the theory.



IMG\_20150320\_160548.jpg (172.58 KiB) Viewed 806 times

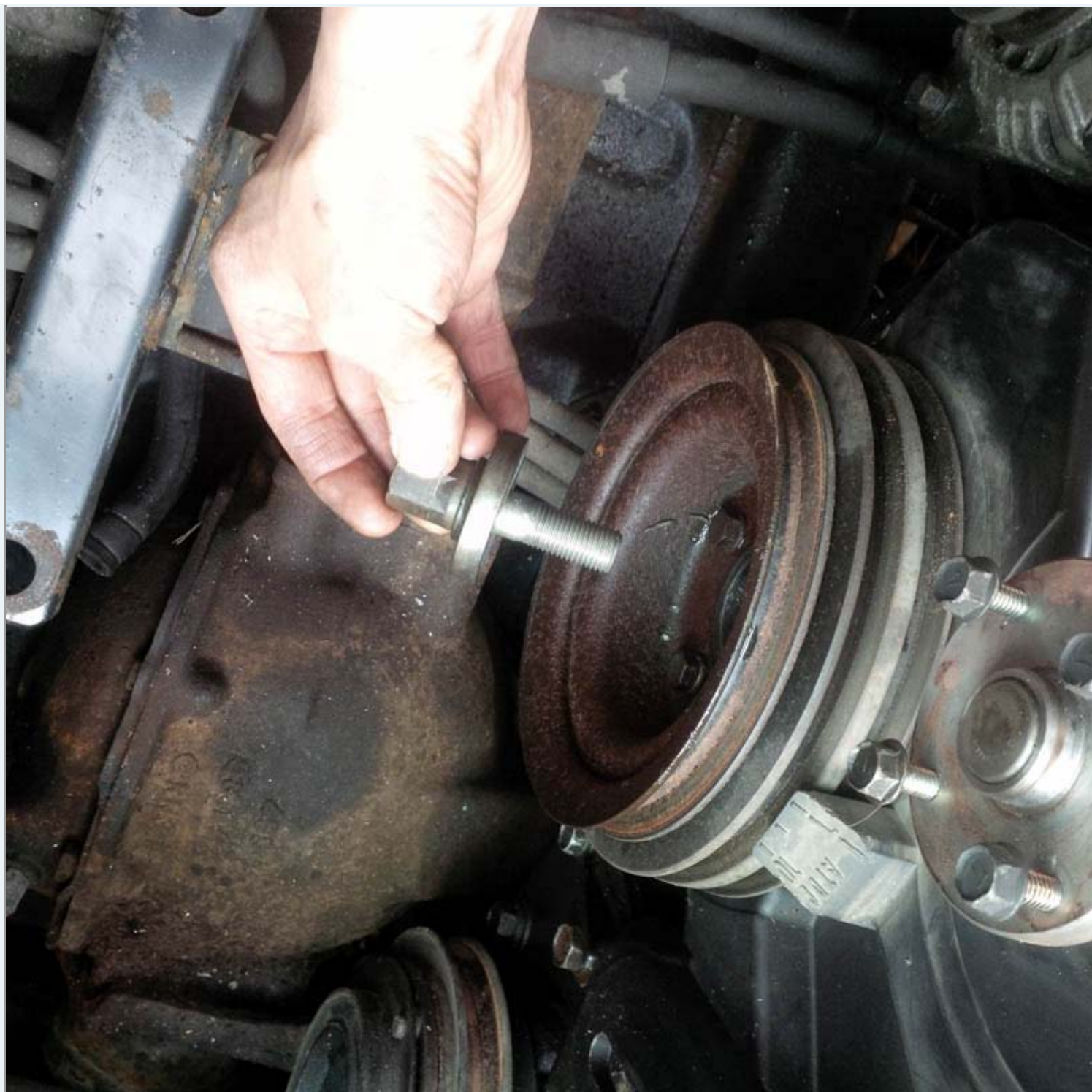
Something I should add. Before removing the crank pulley I counted teeth on the timing belt. This will just help to verify that I've got it right upon reassembly.





IMG\_20150320\_160605.jpg (126.19 KiB) Viewed 806 times

Et voila! Crank pulley bolt came loose! Then removed the pulley. Mine was snug, but I could still pull it out by hand. If yours is stuck then you'll have to use a puller tool.



IMG\_20150320\_161336.jpg (111.3 KiB) Viewed 806 times





IMG\_20150320\_162623.jpg (113.63 KiB) Viewed 806 times

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1997 Isuzu ELF 2.0Ton Crane truck, 4300cc diesel, NKR66E



Re: L300 Head replacement and timing belt DIY, step by step

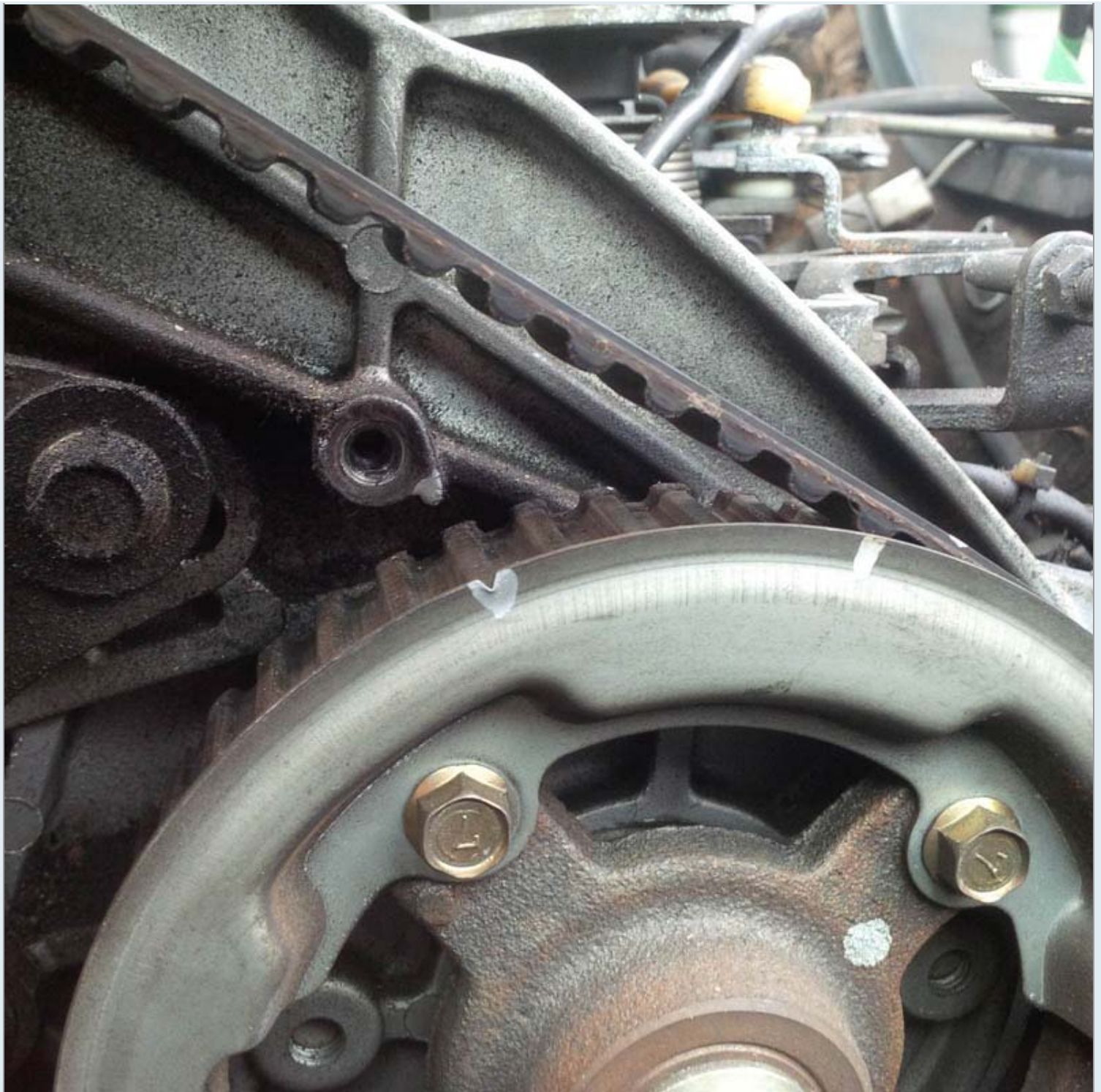
Sun Mar 22, 2015 10:17 pm

Now replace the crank bolt just finger tight and rotate the motor back to TDC (top dead centre) and the arrows will align on the cam pulley and injection pulley. Then remove the crank bolt again. Always turn the motor from the crank in a clockwise direction only, never turn it from the injection pump or camshaft pulley.



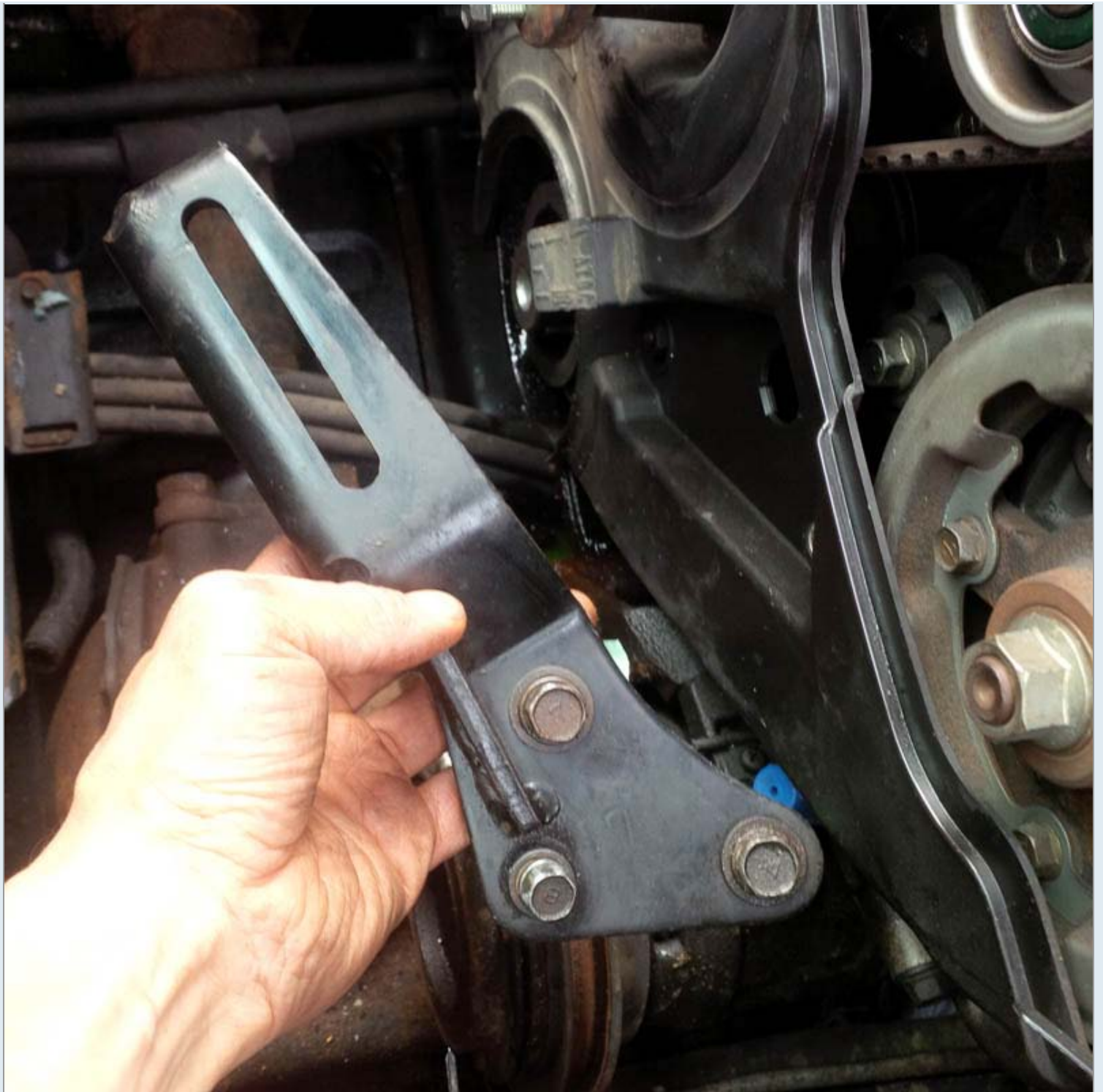
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IMG\_20150320\_163827.jpg (133.56 KiB) Viewed 806 times

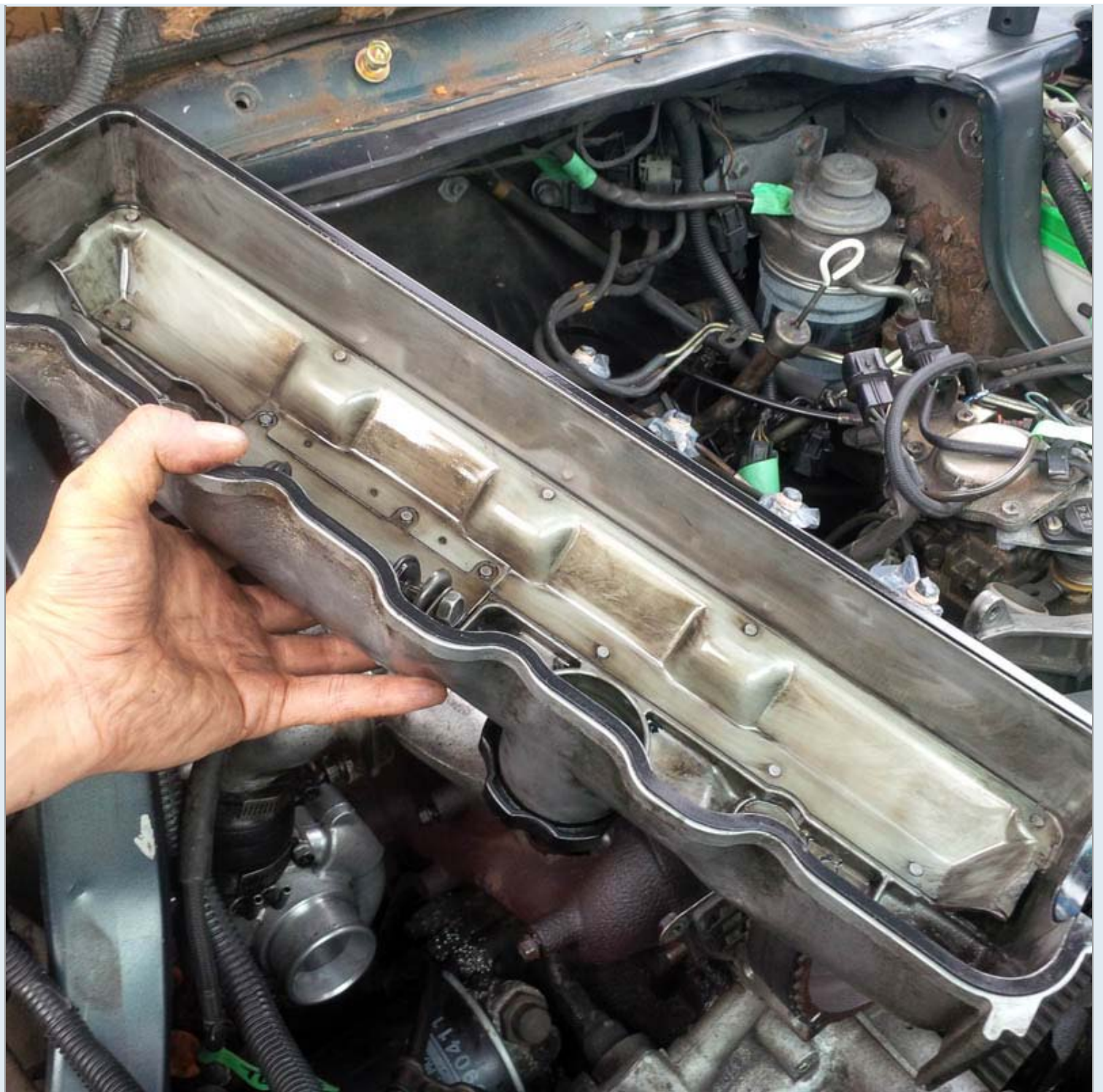
Remove the rest of the belt tensioner and the last plastic timing cover.



IMG\_20150320\_163454.jpg (99.63 KiB) Viewed 806 times

Remove the valve cover.

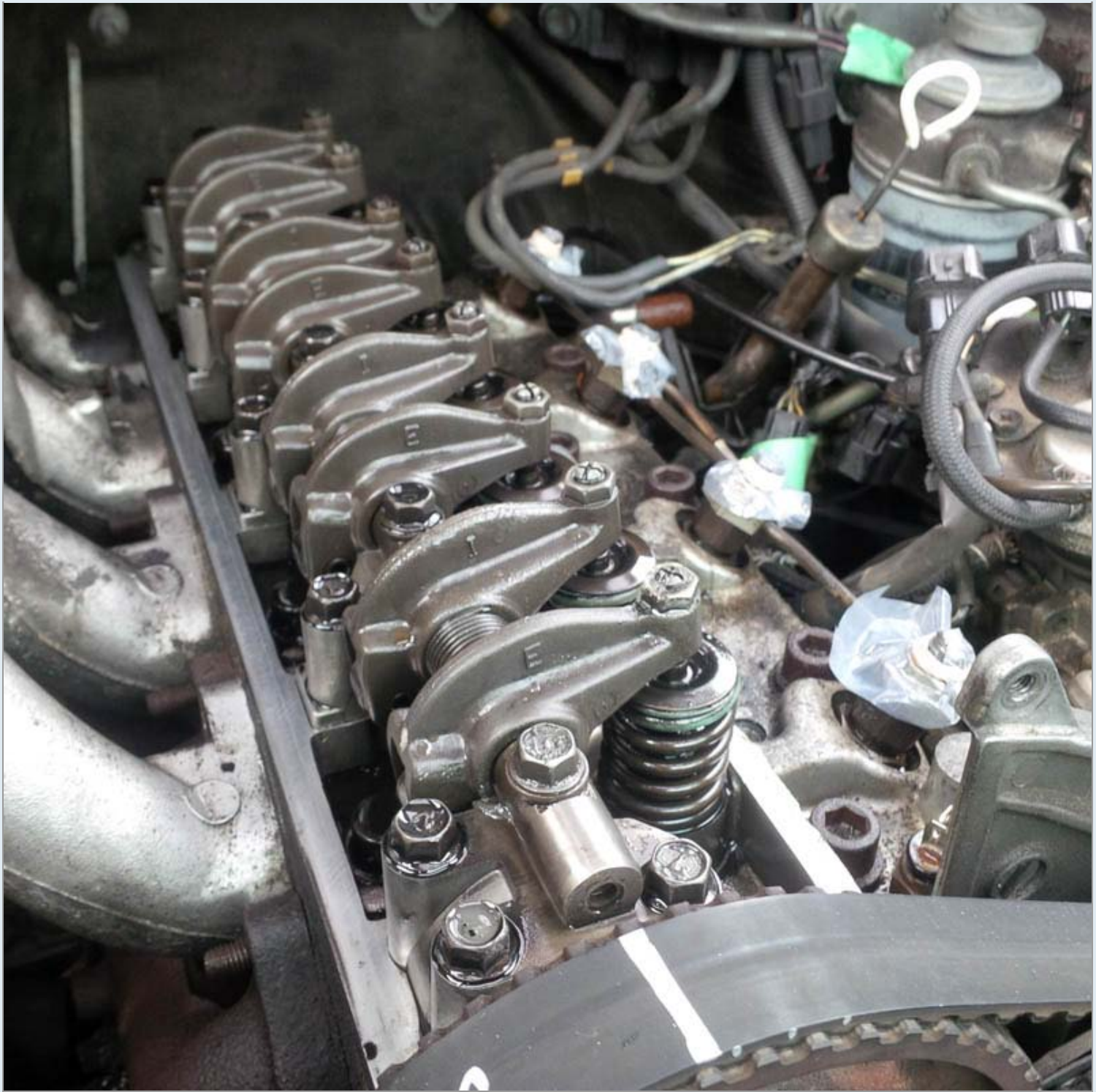




IMG\_20150320\_164404.jpg (145 KiB) Viewed 806 times

And there you have it. Ready to take off the head, well almost.





IMG\_20150320\_164413.jpg (127.73 KiB) Viewed 806 times

1993 Delica L300, SWB, LSD, Super Exceed with Crystal-Lite, mostly stock but it's got a digital EGT!!!  
1995 Delica L400, LWB, Super Exceed with Crystal-lite, Airlift airbags, SS intercooler pipes, soon to be WVO  
1997 Isuzu ELF 2.0Ton Crane truck, 4300cc diesel, NKR66E



Re: L300 Head replacement and timing belt DIY, step by step

Tue Mar 24, 2015 9:58 pm

Today was a good day, and now I'm at a turning point and start to see the journey back home.

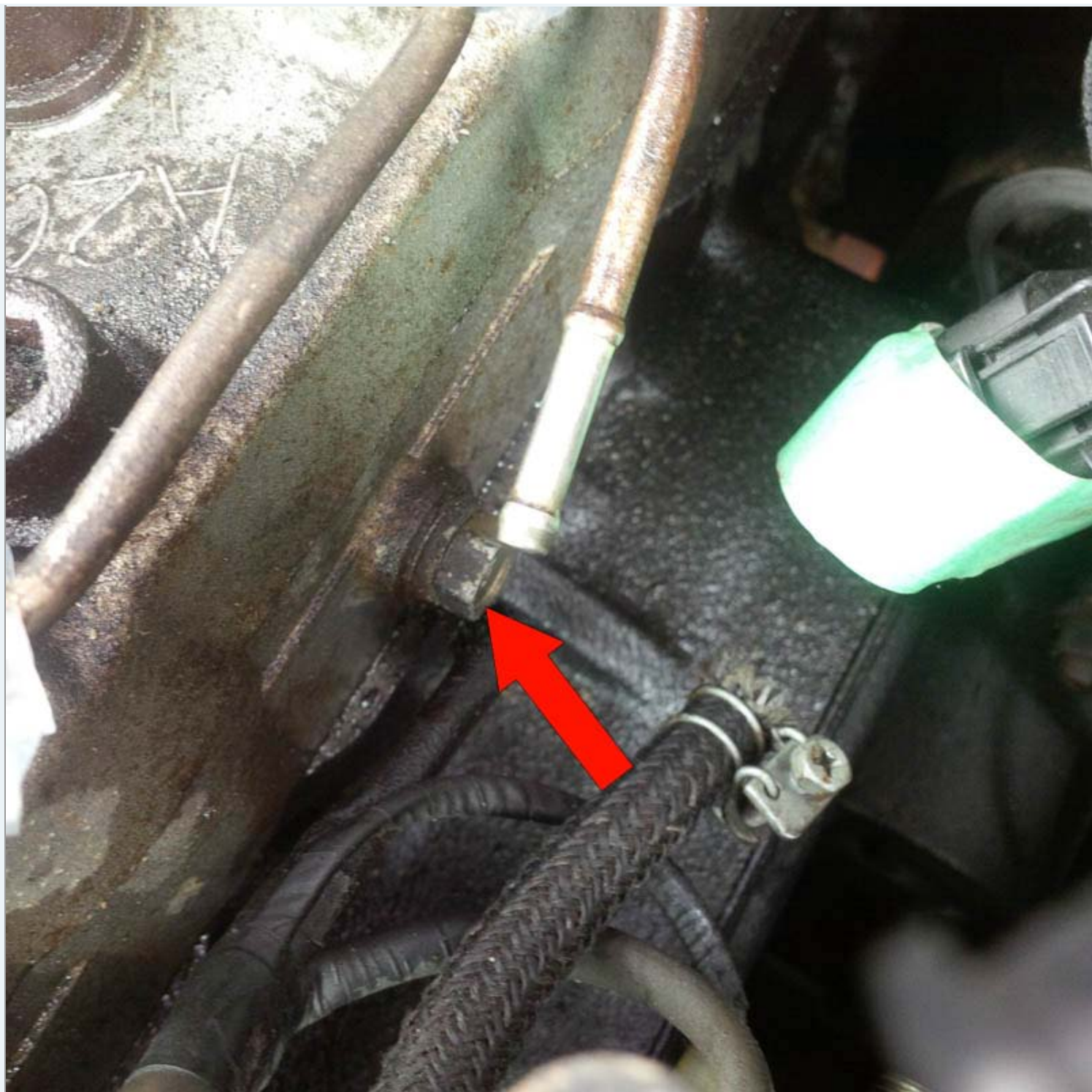
Remove the other hoist bracket at the back of the head, drivers side.





IMG\_20150324\_120054.jpg (110.32 KiB) Viewed 794 times

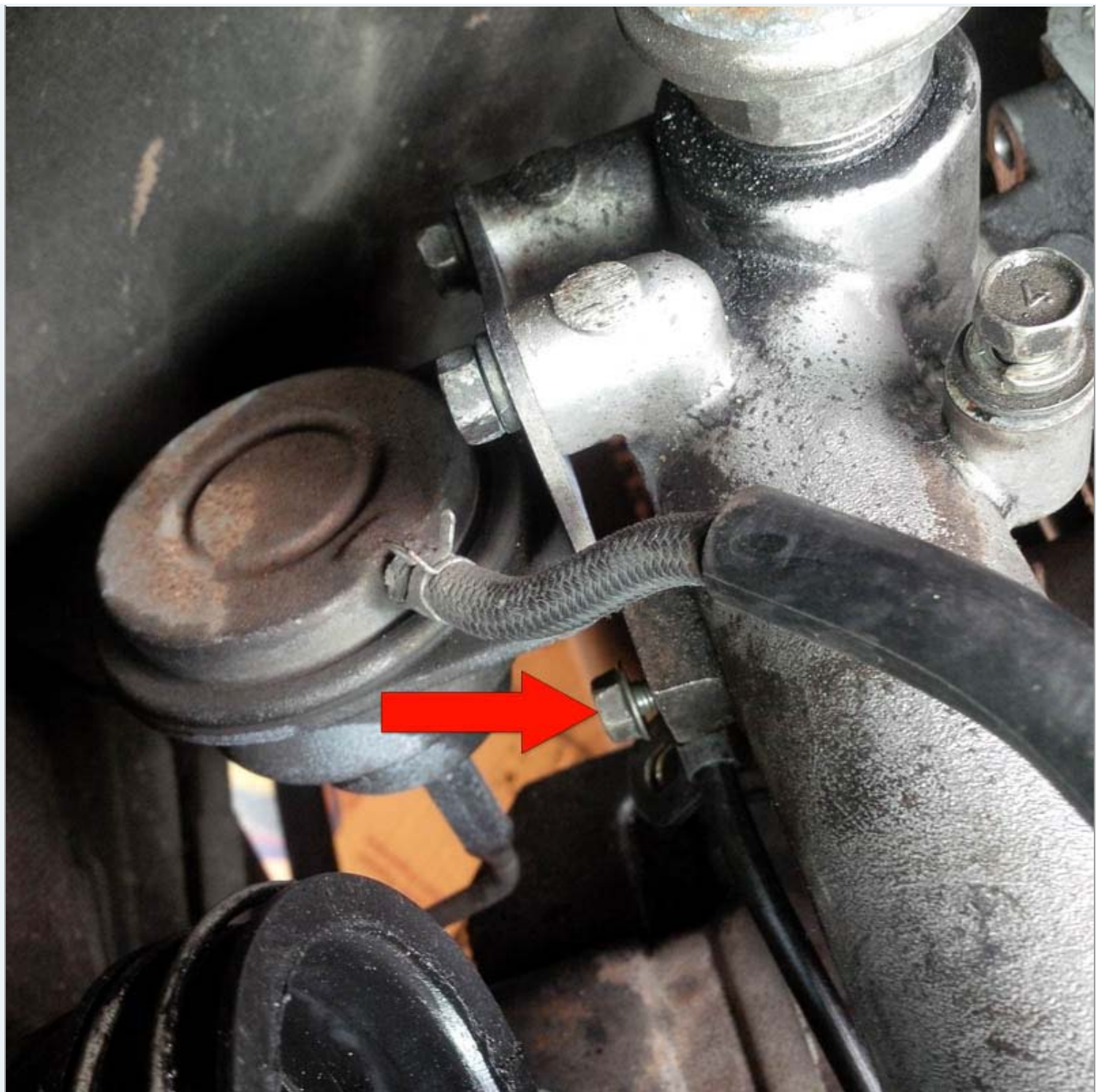
Remove the ground terminal on the passenger side.



IMG\_20150324\_121410.jpg (112.9 KiB) Viewed 794 times

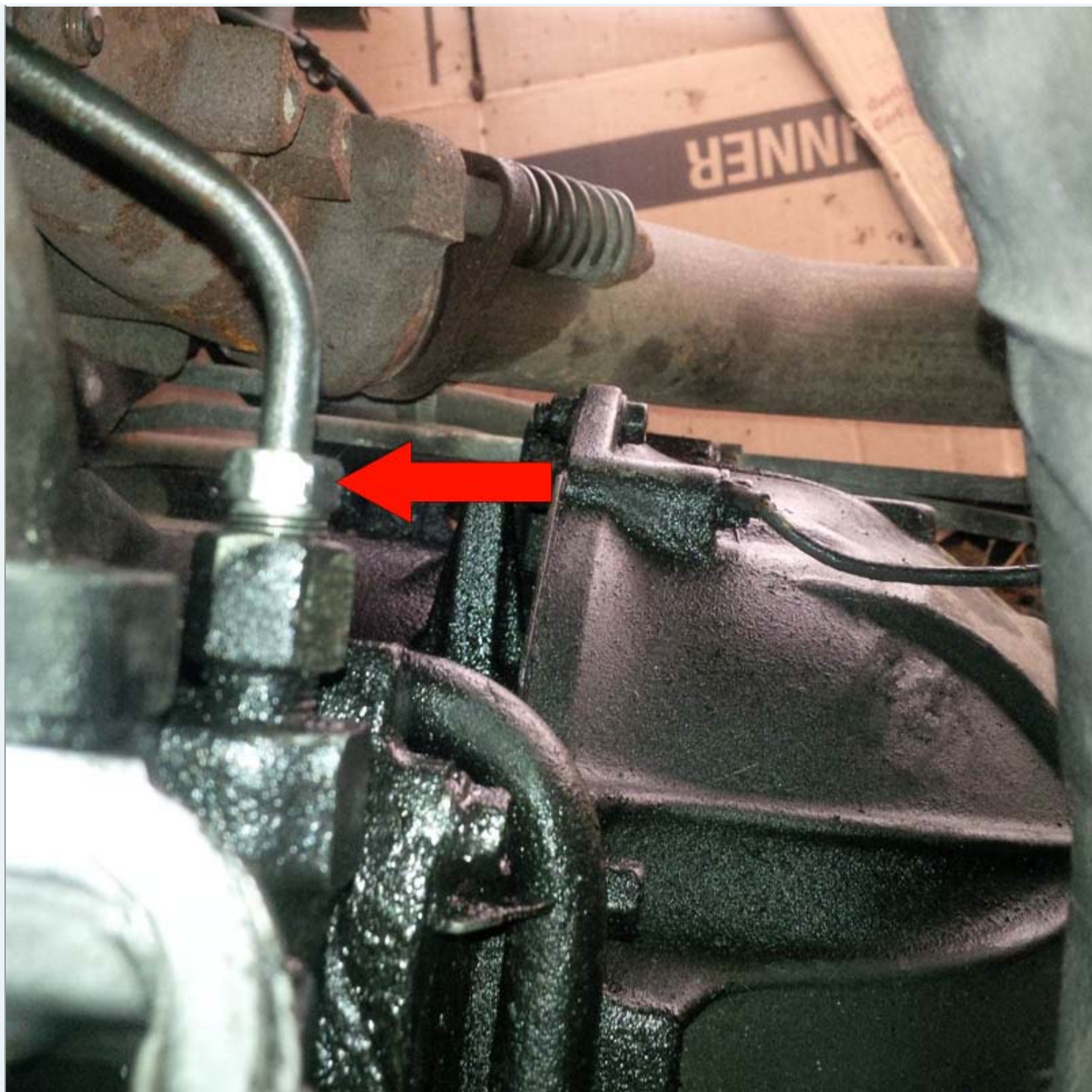
Detach the oil line from the turbo by undoing the bracket on the intake manifold and following the line to the back of the head where there is a hard to get at connector. I got in there from underneath. As you can see from the photo, the infamous half moon seal on the back of the valve cover was leaking oil back there. This will get fixed on reassembly.





IMG\_20150324\_122212.jpg (120.34 KiB) Viewed 794 times





IMG\_20150324\_122228.jpg (134.81 KiB) Viewed 794 times

Remove the intake manifold by undoing the two bolts to the turbo. You'll have to get under there and remove the split pin that holds on the linkage for the turbo waste gate.





IMG\_20150324\_160106.jpg (120.9 KiB) Viewed 794 times

Last edited by [Tojo](#) on Tue Mar 24, 2015 10:07 pm, edited 1 time in total.

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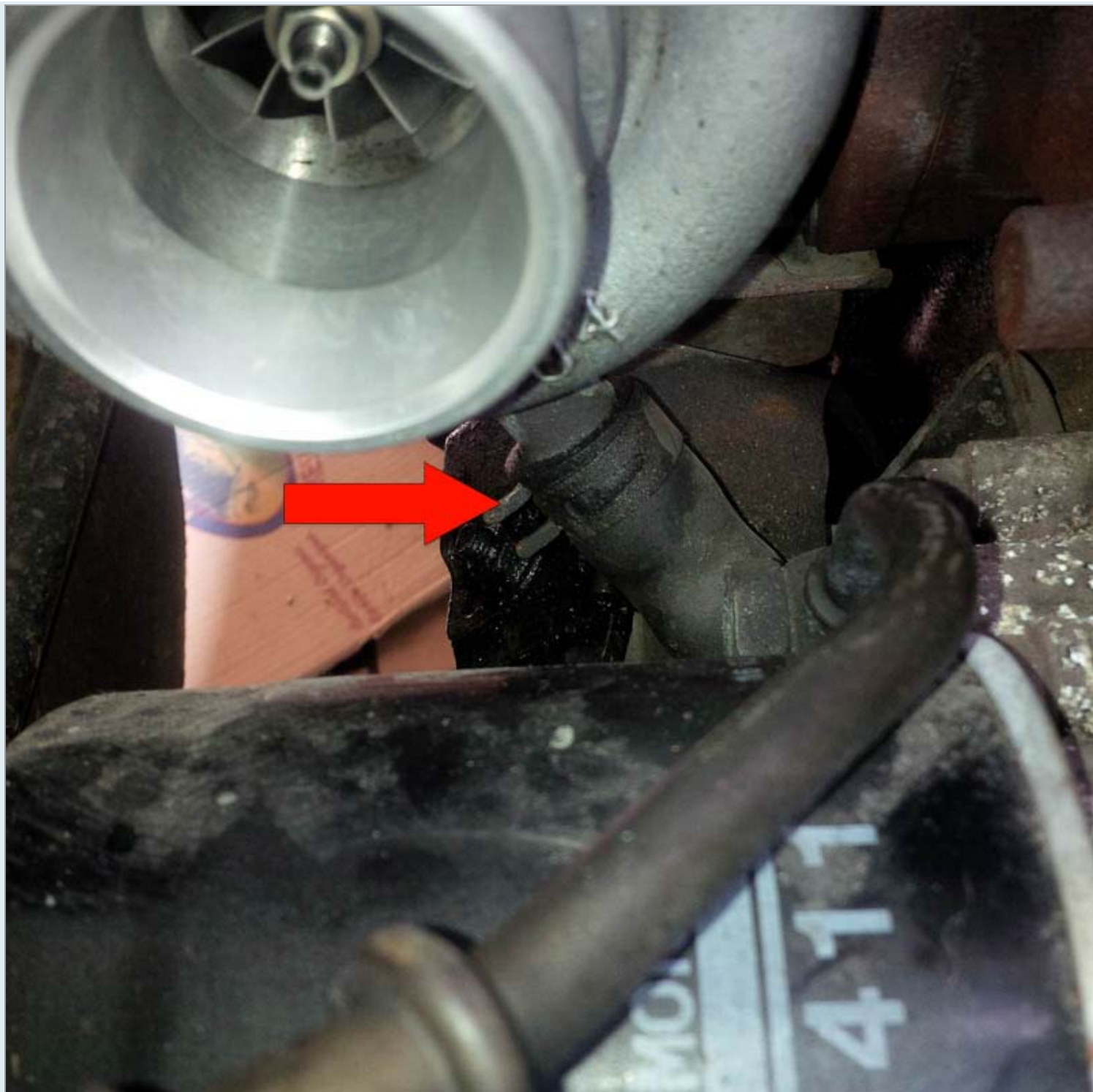
Tojo

“

Re: L300 Head replacement and timing belt DIY, step by step

Tue Mar 24, 2015 10:06 pm

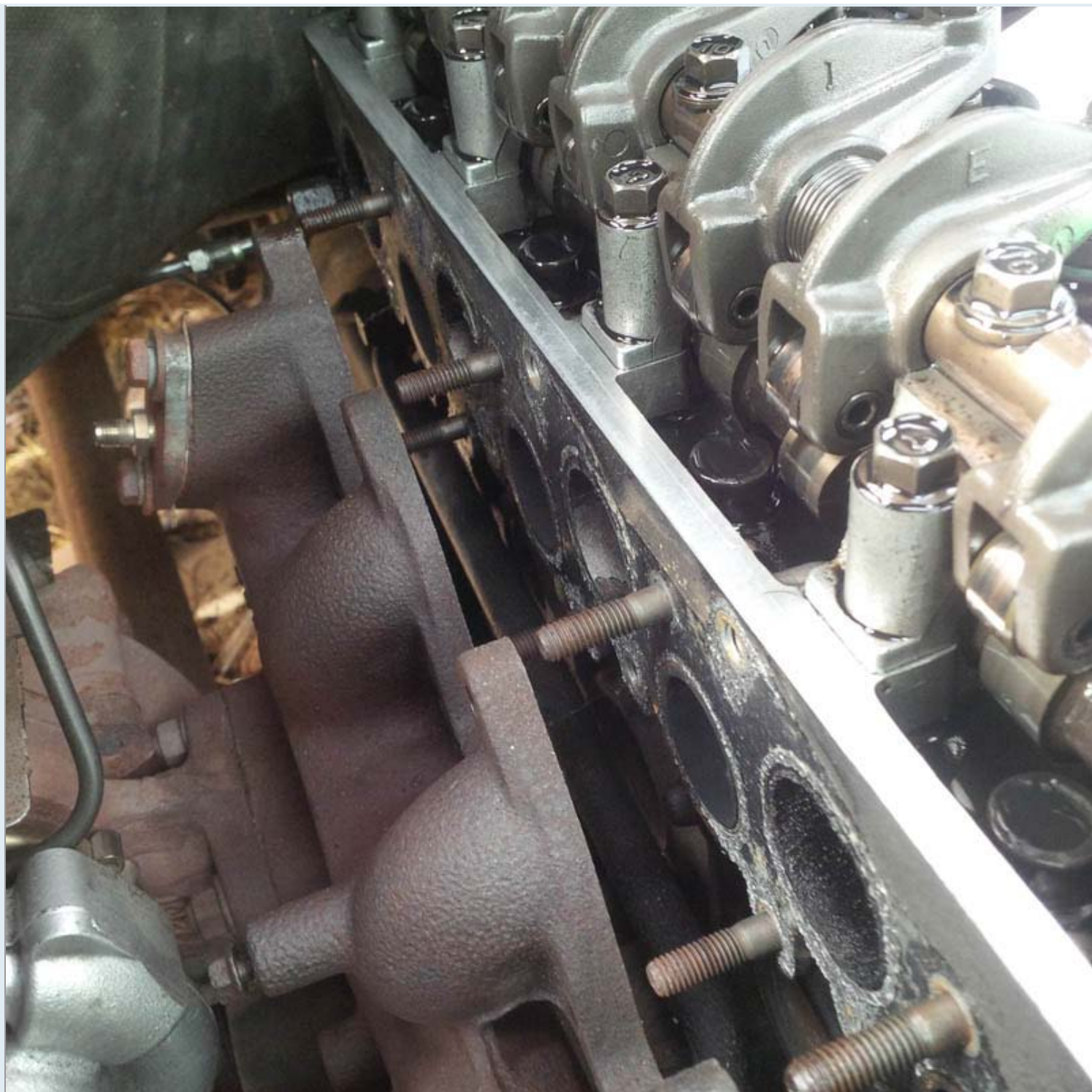
Remove the hose on the bottom of the turbo.



IMG\_20150324\_160141.jpg (85.55 KiB) Viewed 794 times

Pull the exhaust manifold to the side and remove the gasket.





IMG\_20150324\_160627.jpg (123.16 KiB) Viewed 794 times

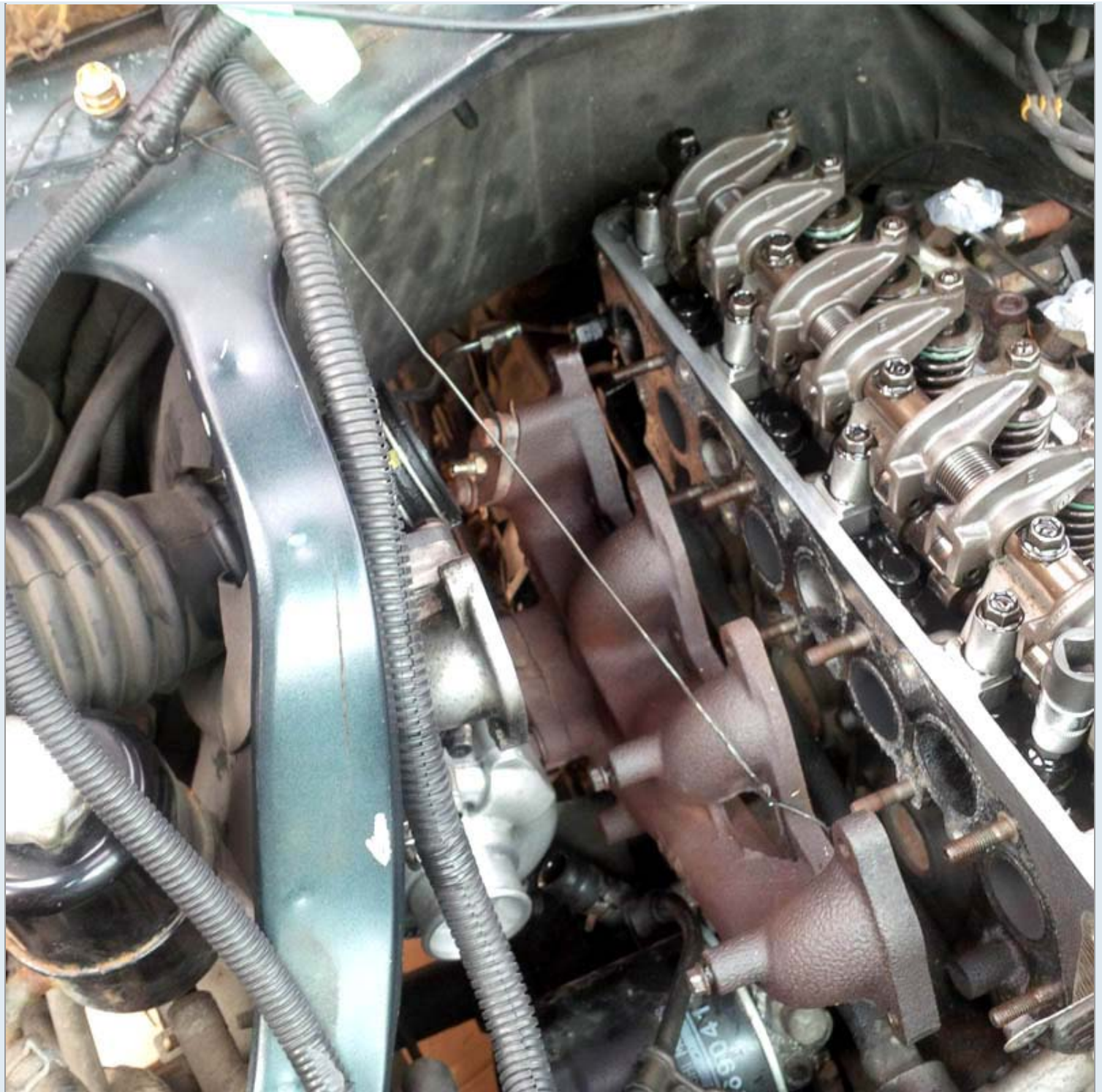




IMG\_20150324\_160559.jpg (136.08 KiB) Viewed 794 times

Then wire the manifold to the side of the engine compartment, pulling it out of the way.

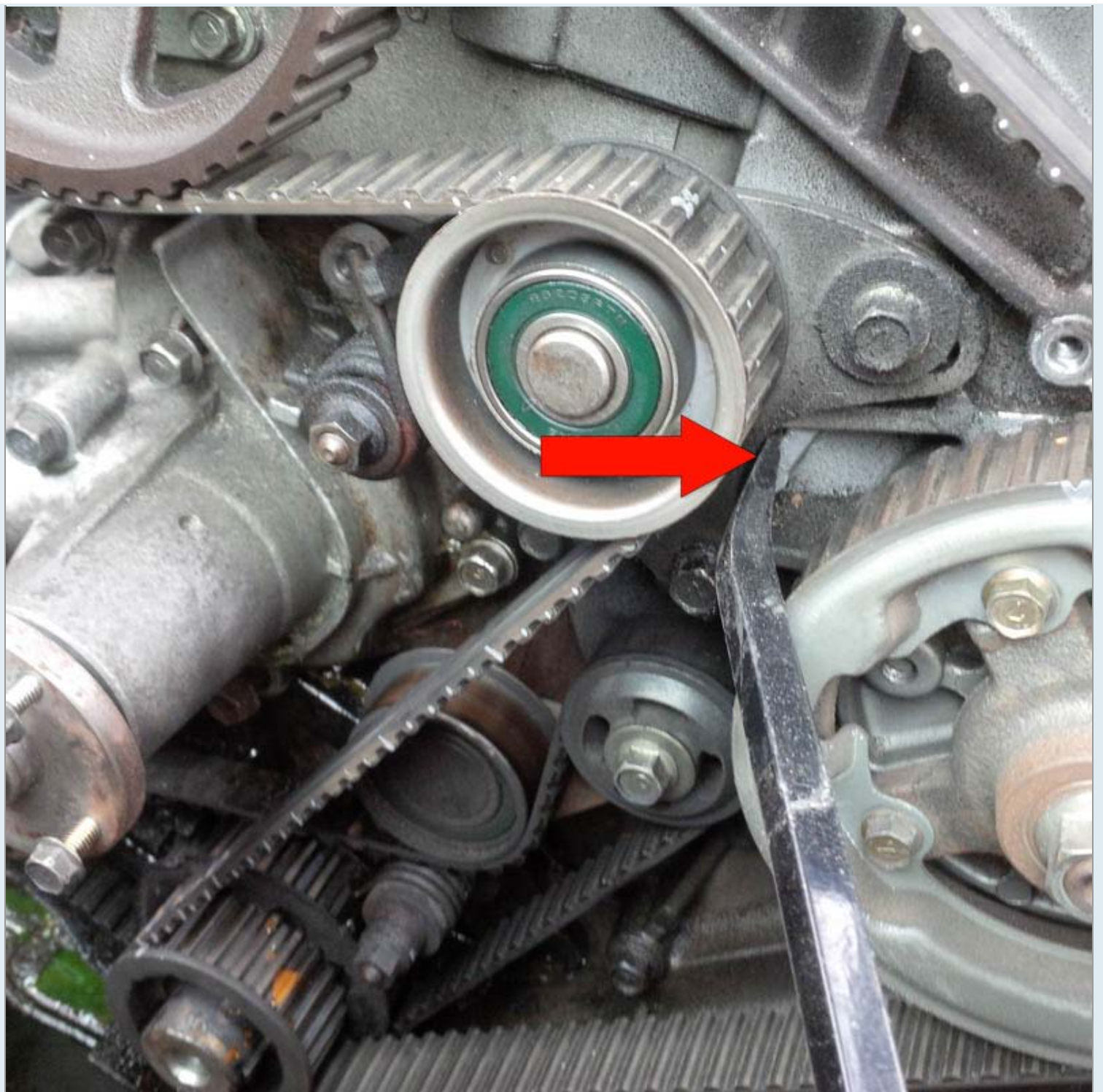




IMG\_20150324\_161225.jpg (139.31 KiB) Viewed 794 times

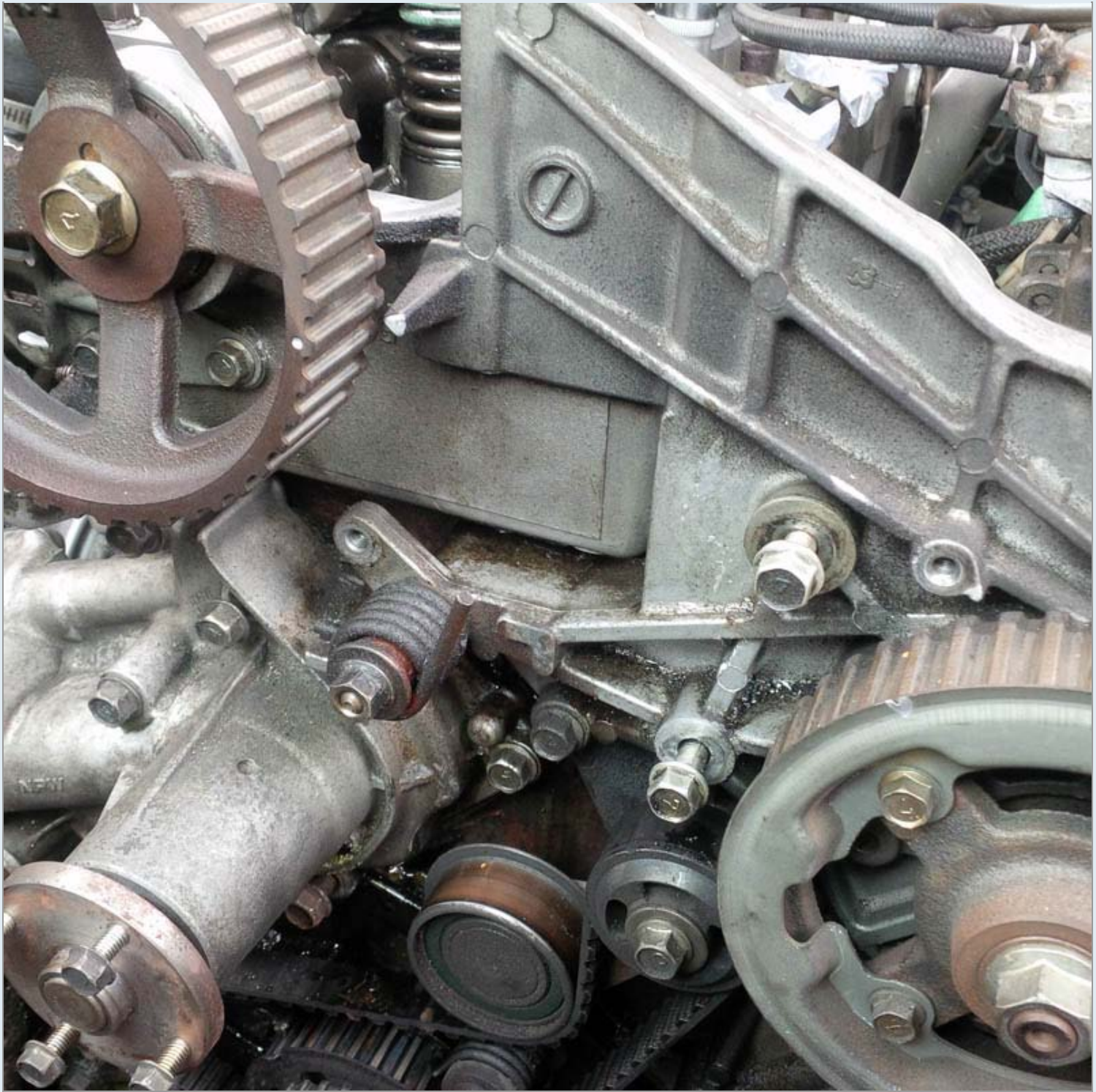
Back to the front of the motor to remove the timing belt tensioning pulley and bracket.





IMG\_20150324\_154713.jpg (135.3 KiB) Viewed 794 times





IMG\_20150324\_155437.jpg (158.06 KiB) Viewed 794 times

1993 Delica L300, SWB, LSD, Super Exceed with Crystal-Lite, mostly stock but it's got a digital EGT!!!  
1995 Delica L400, LWB, Super Exceed with Crystal-lite, Airlift airbags, SS intercooler pipes, soon to be WVO  
1997 Isuzu ELF 2.0Ton Crane truck, 4300cc diesel, NKR66E



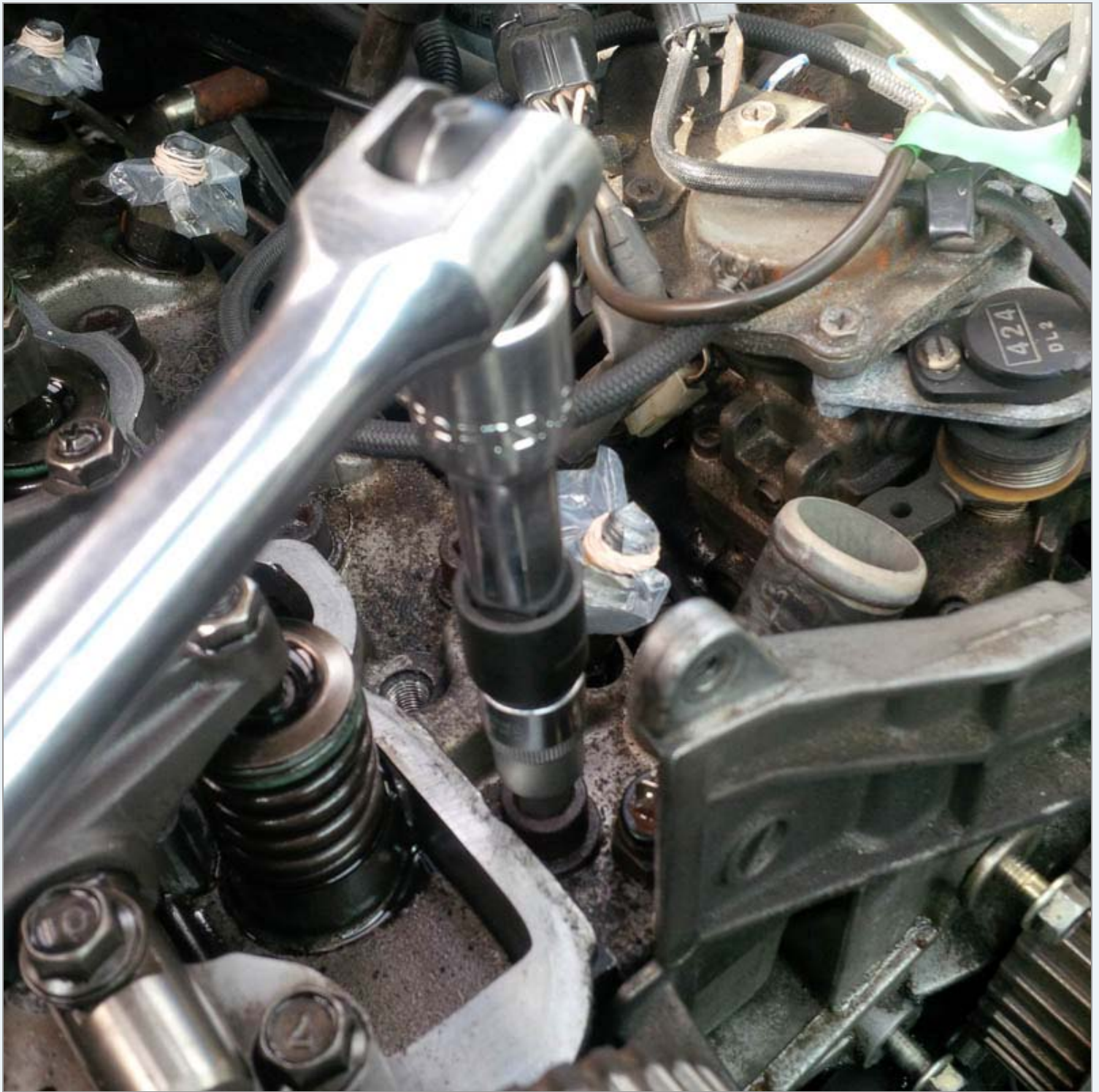
### Re: L300 Head replacement and timing belt DIY, step by step

Tue Mar 24, 2015 10:21 pm

Here are a couple of images of removing the head. It required the longer breaker bar. The bolts were under a lot of torque, and some were stubborn. Just make sure that your 10mm hex head socket is well seated in the head of the bolt. Corrosion might cause the hex to lift and this will round out the fastener. Also, do yourself a favour and buy a high quality hex head

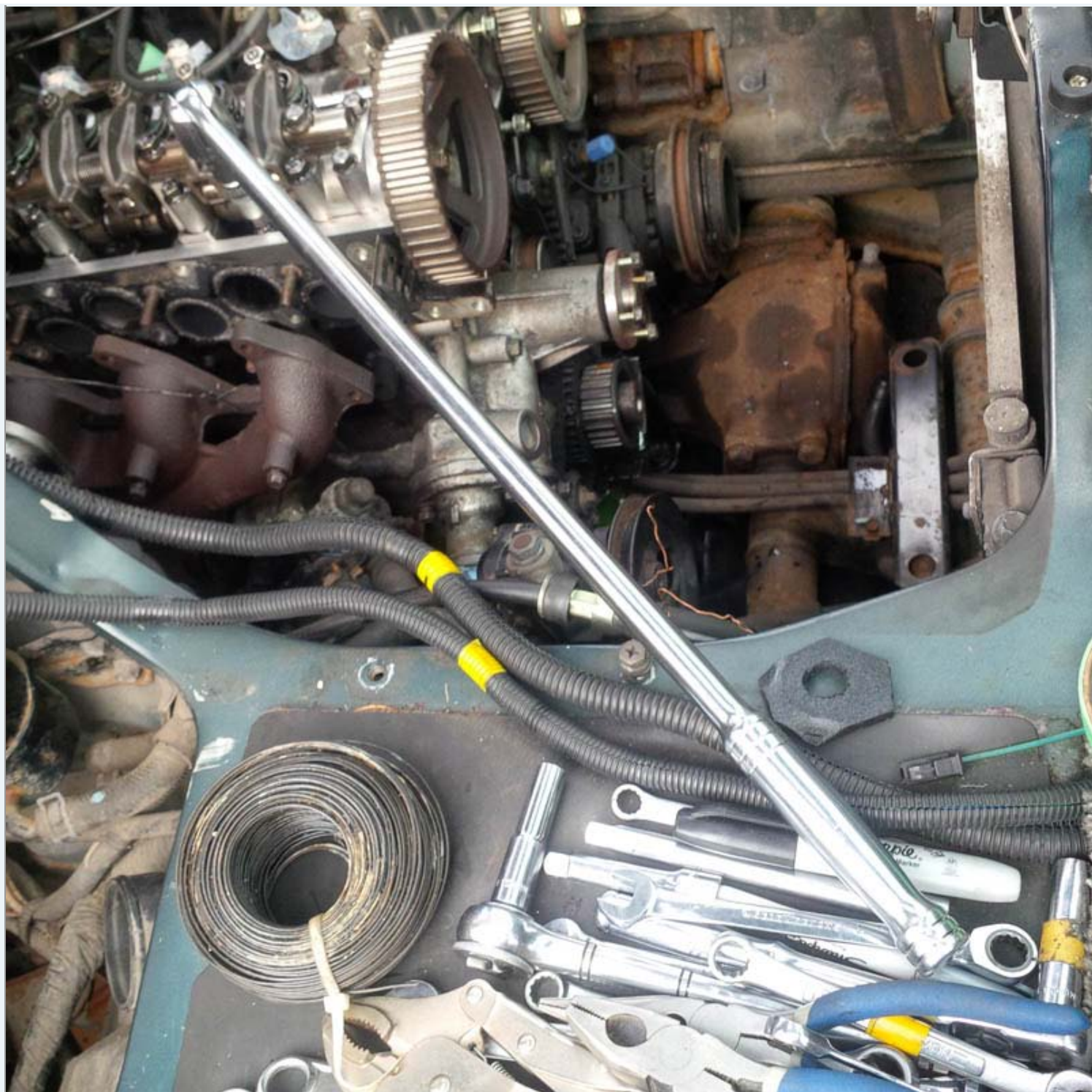


socket. Follow the pattern laid out in the service manual, attached below.



IMG\_20150324\_161013.jpg (131.09 KiB) Viewed 792 times

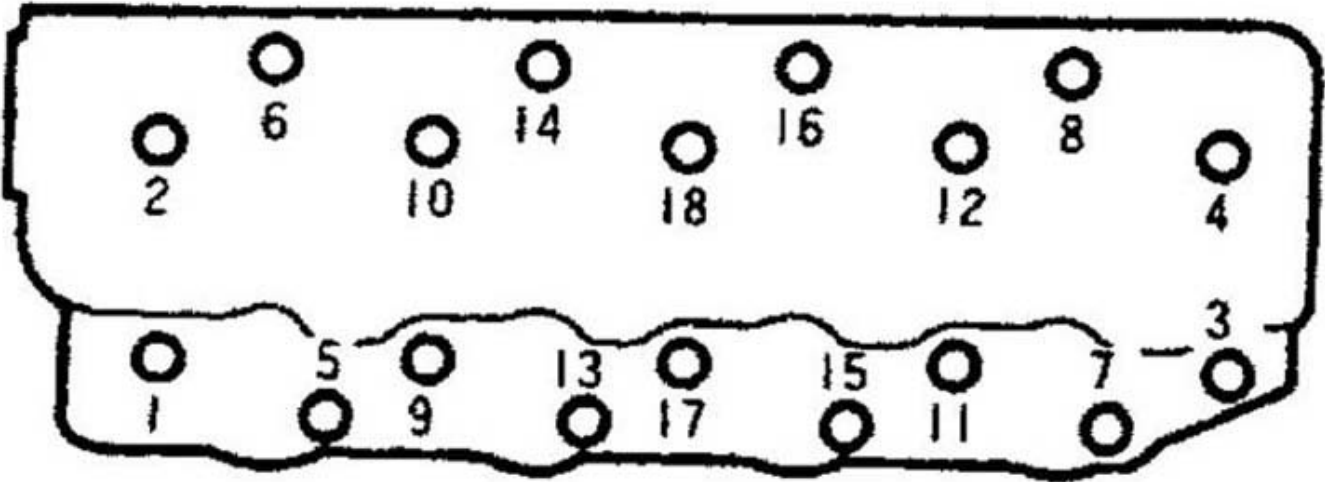




IMG\_20150324\_161204.jpg (152.03 KiB) Viewed 792 times

This is the pattern for disassembly. It's the opposite pattern for reassembly.

← Front

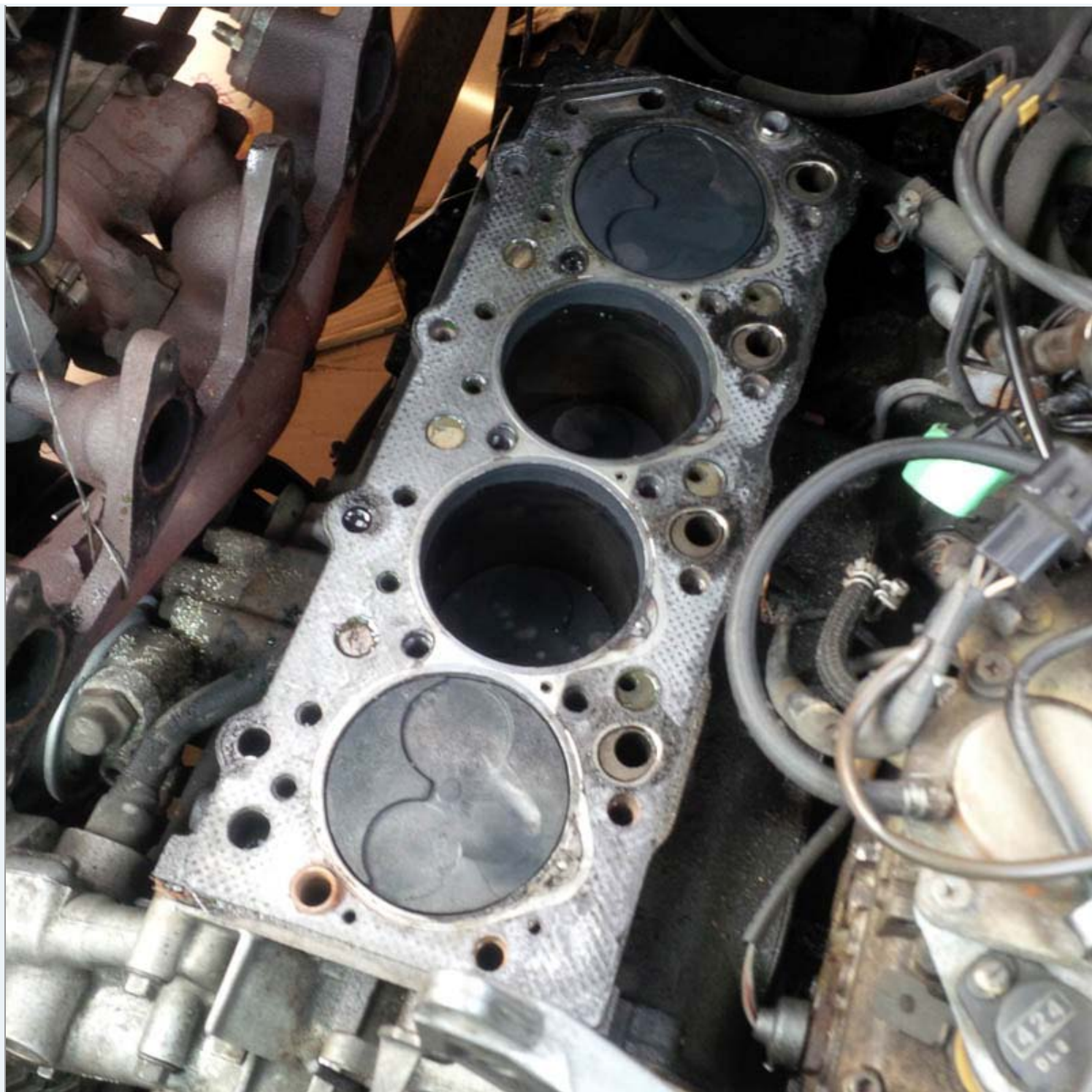


DGE033  
00000848

Capture1.JPG (55.63 KiB) Viewed 792 times

I ended up standing in the engine compartment, grabbing the head and placing to the side. And there you have it!





IMG\_20150324\_165806.jpg (127.31 KiB) Viewed 792 times





IMG\_20150324\_165814.jpg (130.85 KiB) Viewed 792 times

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1997 Isuzu ELF 2.0Ton Crane truck, 4300cc diesel, NKR66E



lrp374




## Re: L300 Head replacement and timing belt DIY, step by step

Wed Mar 25, 2015 8:39 am

I've been following your progress and must say this is the most detailed, best picture, logical DIY I've ever seen. It will make a lot of people realize this job is not magic but an orderly operation with a lot of attention to detail. Thanks for taking all the extra time for the pictures and write-up. This post will be used for years. I can't wait for the reinstall.



Larry

Tojo

Re: L300 Head replacement and timing belt DIY, step by step

Fri Mar 27, 2015 12:25 pm

Thanks for the vote of confidence Larry! I've enjoyed working on this motor. All mechanical with very few electronic parts, and most of it comes apart with just a 10 mm, 12 mm or 14 mm socket. I really like the design philosophy that Mitsu had with these L300's. Strong, versatile, with a long service life. I see the head as a maintenance item that anyone can tackle with a bit of patience. I have to give a shout out to all the posts made on this site as well as the MDOCUK which I've consolidated here.

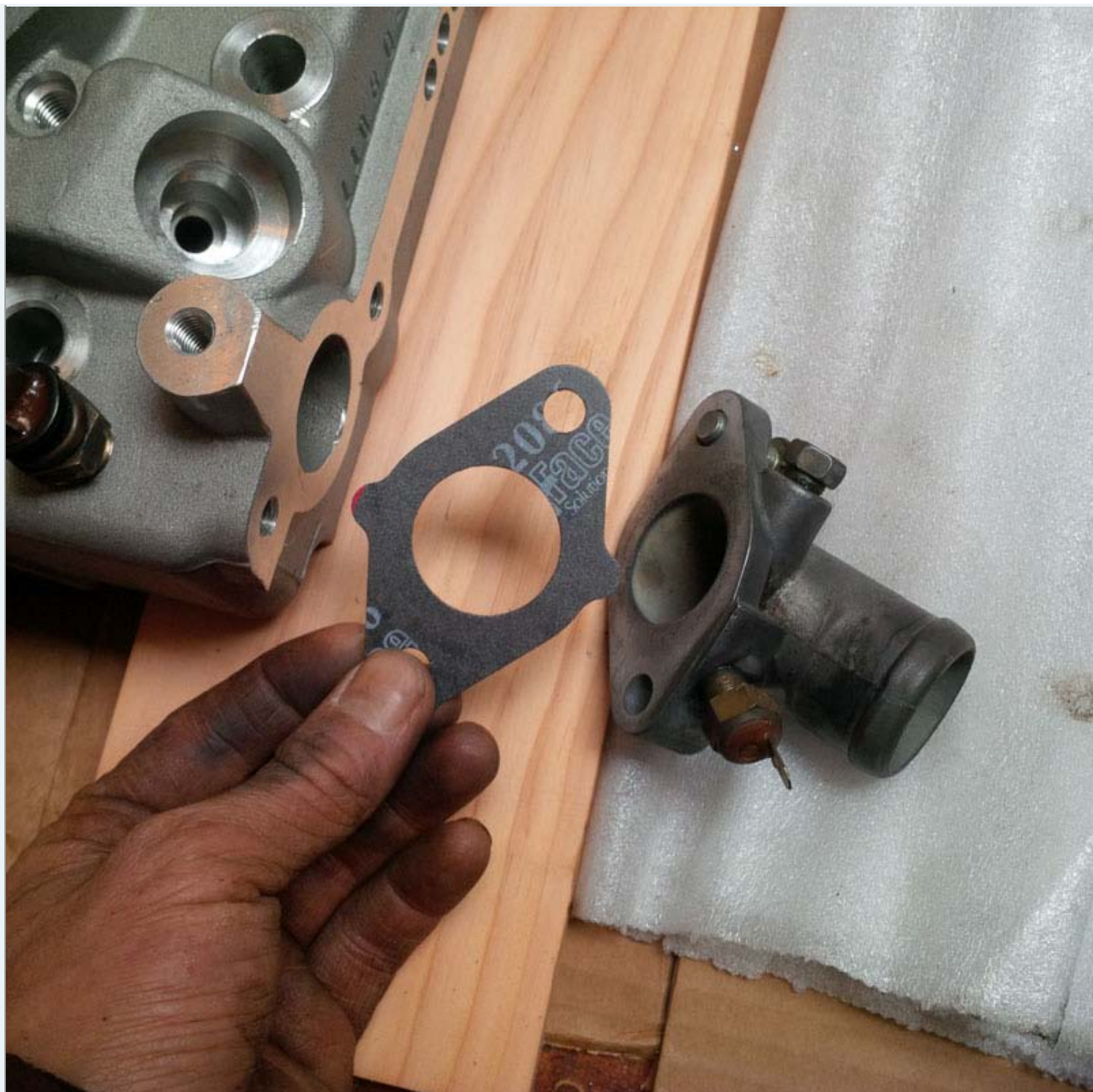
The new head and the old head are laid out on the bench and I've started to transfer all the bits and pieces. If you've got a 1993 or earlier head with protruding valves like I do, then raise up the head on blocks of wood to avoid damaging the valves.



IMG\_20150325\_123448.jpg (142.22 KiB) Viewed 750 times

New gasket for the coolant outlet fitting.





IMG\_20150325\_130453.jpg (141.8 KiB) Viewed 750 times

The exhaust studs are a little finicky to remove. Either buy some fresh ones, or remove the old ones using two M8 steel nuts. DO NOT use the nuts that came off of the studs as they are soft metal and will fail. Spin both nuts on and tighten them against each other, then reverse out the stud using the inside nut. Some of the studs were really stuck in there, so again I just soaked it for a day with the penetrating oil and eventually worked them loose.



IMG\_20150325\_135803.jpg (84.83 KiB) Viewed 750 times





IMG\_20150325\_135817.jpg (104.05 KiB) Viewed 750 times

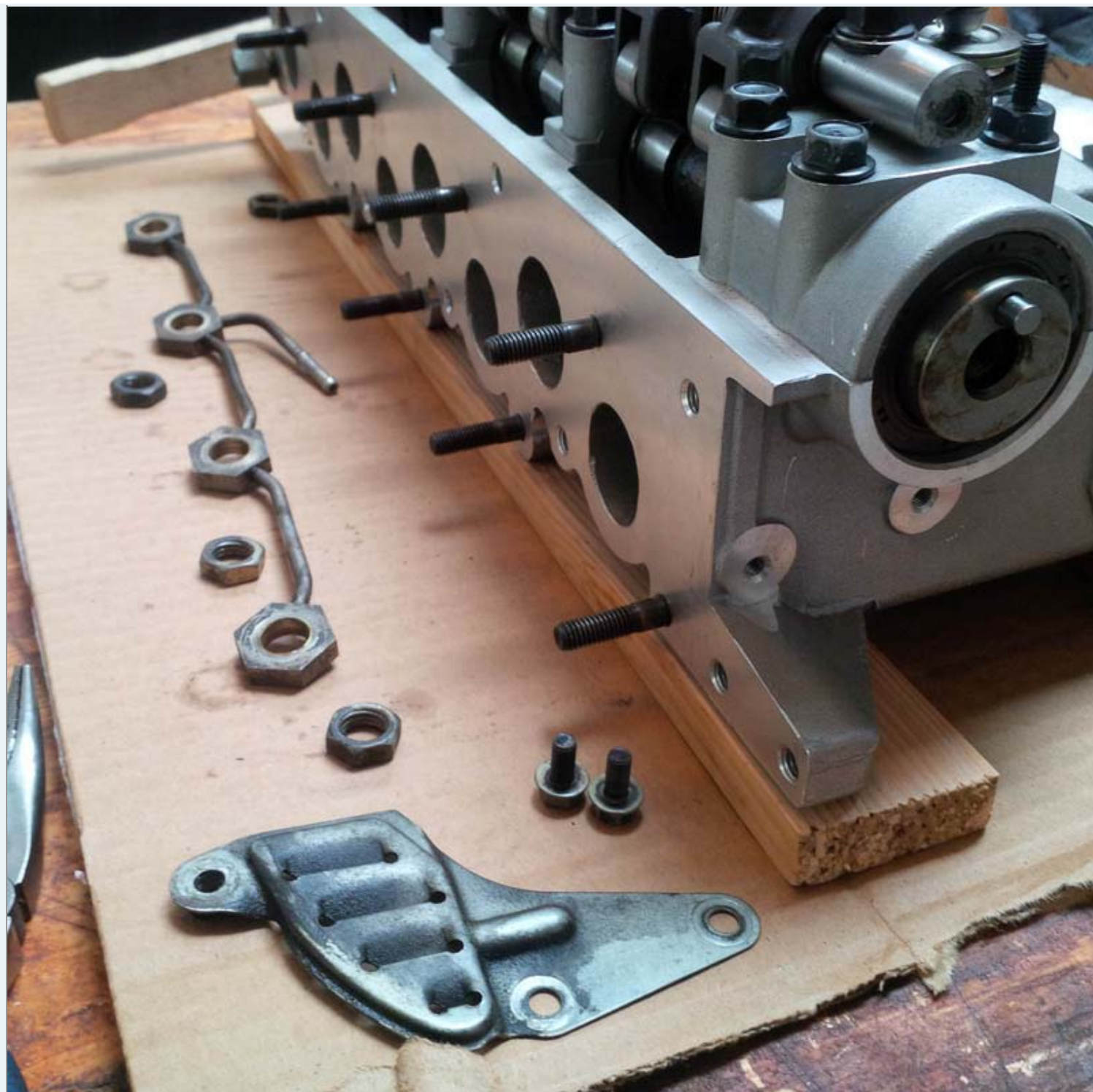
Removed the return fuel rail.



IMG\_20150325\_143802.jpg (553.98 KiB) Viewed 750 times

And this is where I'm at. Reattached the glow plugs, sheet metal shield on the front, temperature sensors, tapered oil fitting on the back, heater pipe on the passenger side, and ground bolt. Going to pause for a few days as I've ordered some waterjet cut parts for a combination cam and crank pulley tool that I'll be using for reassembly. If it actually works, then I'll post all the design files and drawings for y'all.





IMG\_20150325\_154924.jpg (114.63 KiB) Viewed 750 times



IMG\_20150327\_110617.jpg (503.7 KiB) Viewed 750 times

1993 Delica L300, SWB, LSD, Super Exceed with Crystal-Lite, mostly stock but it's got a digital EGT!!!  
1995 Delica L400, LWB, Super Exceed with Crystal-lite, Airlift airbags, SS intercooler pipes, soon to be WVO  
1997 Isuzu ELF 2.0Ton Crane truck, 4300cc diesel, NKR66E

Deliwagon



Re: L300 Head replacement and timing belt DIY, step by step

Sat Apr 11, 2015 2:09 pm

Up to now a great post that many will follow.. Thanx for all the time and effort you're putting into this and,as was said earlier, i'm looking forward to the rebuild pics and description too...







## Re: L300 Head replacement and timing belt DIY, step by step

■ Fri Apr 17, 2015 10:28 am

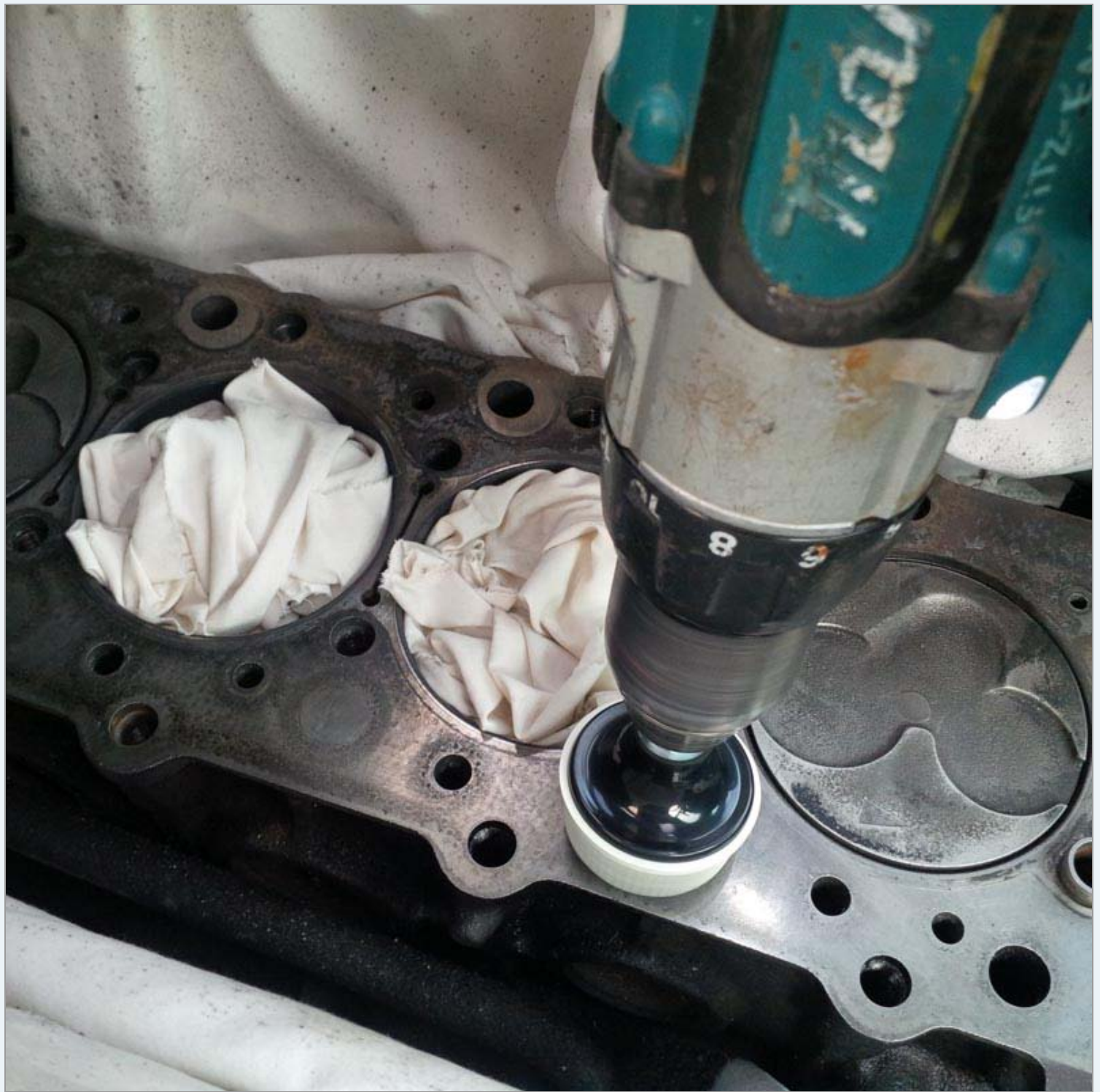
It's been a few weeks, but winter came back so I had to go and sample some powder in the backcountry! Also, some waterjet cut parts came in the mail and I sourced some fasteners and assembled my custom L300 crank/cam tool. Now to test it out...

First, back to the block to clean up the mating face with a 3M Roloc, 120 grit, 2" bristle disc #07528

These will work on steel, but if you are polishing up aluminum then be very careful not to dig in to the metal. Clean off any residue with brake cleaner.



IMG\_20150330\_152752.jpg (93.6 KiB) Viewed 685 times



IMG\_20150330\_152813.jpg (116.76 KiB) Viewed 685 times

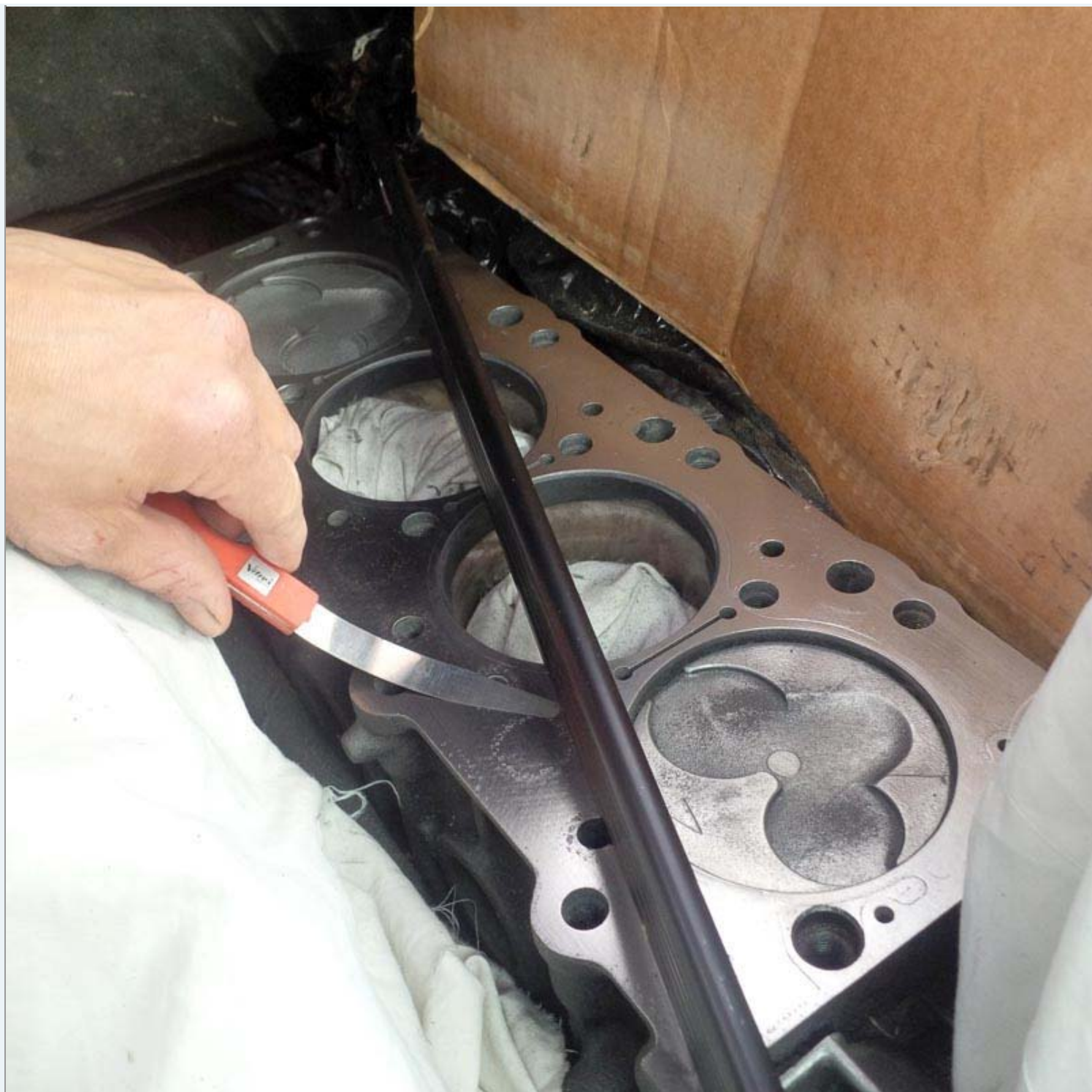
It does a fine job of cleaning, and I'm happy with the look of the mating surface. Note the area around the fire ring needs to be perfectly smooth with no pitting as in this photo. If it's badly pitted, then you're pulling the block and having it decked at a machine shop.





IMG\_20150330\_164424.jpg (84.48 KiB) Viewed 685 times

Check to see if the surface is perfectly flat with a high quality straight edge (I'm using the Veritas one from Lee Valley) and a feeler gauge. I couldn't get a 0.001" feeler under the ruler, so I'm happy about that.



IMG\_20150401\_100712.jpg (106.38 KiB) Viewed 685 times

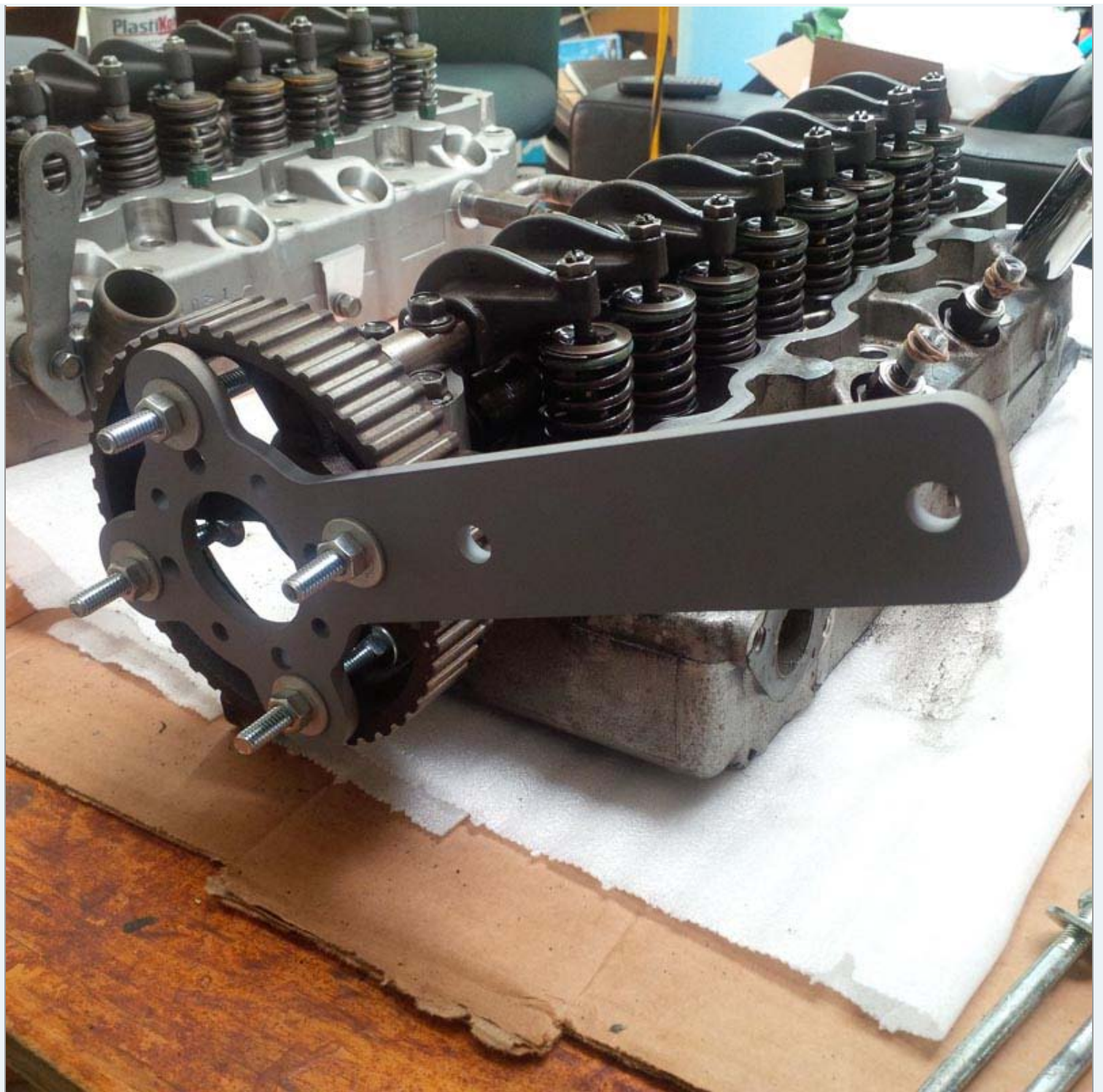
Back to the head, and I assembled my cam and crank pulley removal tool using 4 of 2.5" long, 1/4"-20 carriage bolts and it looks like this:





IMG\_20150402\_112403.jpg (126.76 KiB) Viewed 685 times





IMG\_20150402\_112346.jpg (133.85 KiB) Viewed 685 times

Then attached a 30" long steel bar. NOTE: The cam pulley can be removed while the head is still on the vehicle!





IMG\_20150402\_113436.jpg (148 KiB) Viewed 685 times

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- 1997 Isuzu ELF 2.0Ton Crane truck, 4300cc diesel, NKR66E

Tojo

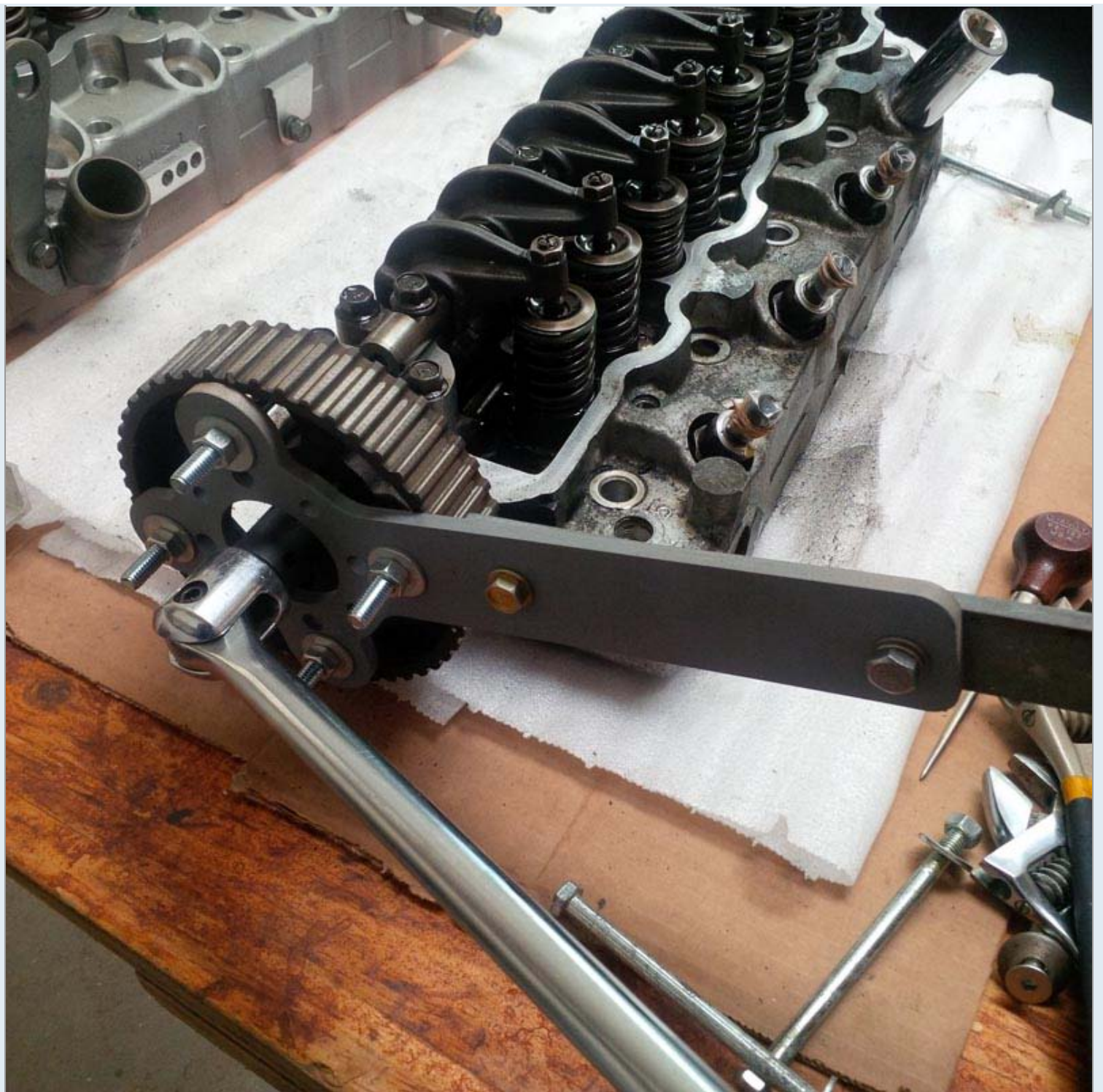


Re: L300 Head replacement and timing belt DIY, step by step

Fri Apr 17, 2015 10:41 am

Crack loose the cam pulley bolt, it takes quite a bit of force unless of course you have a rattle gun.

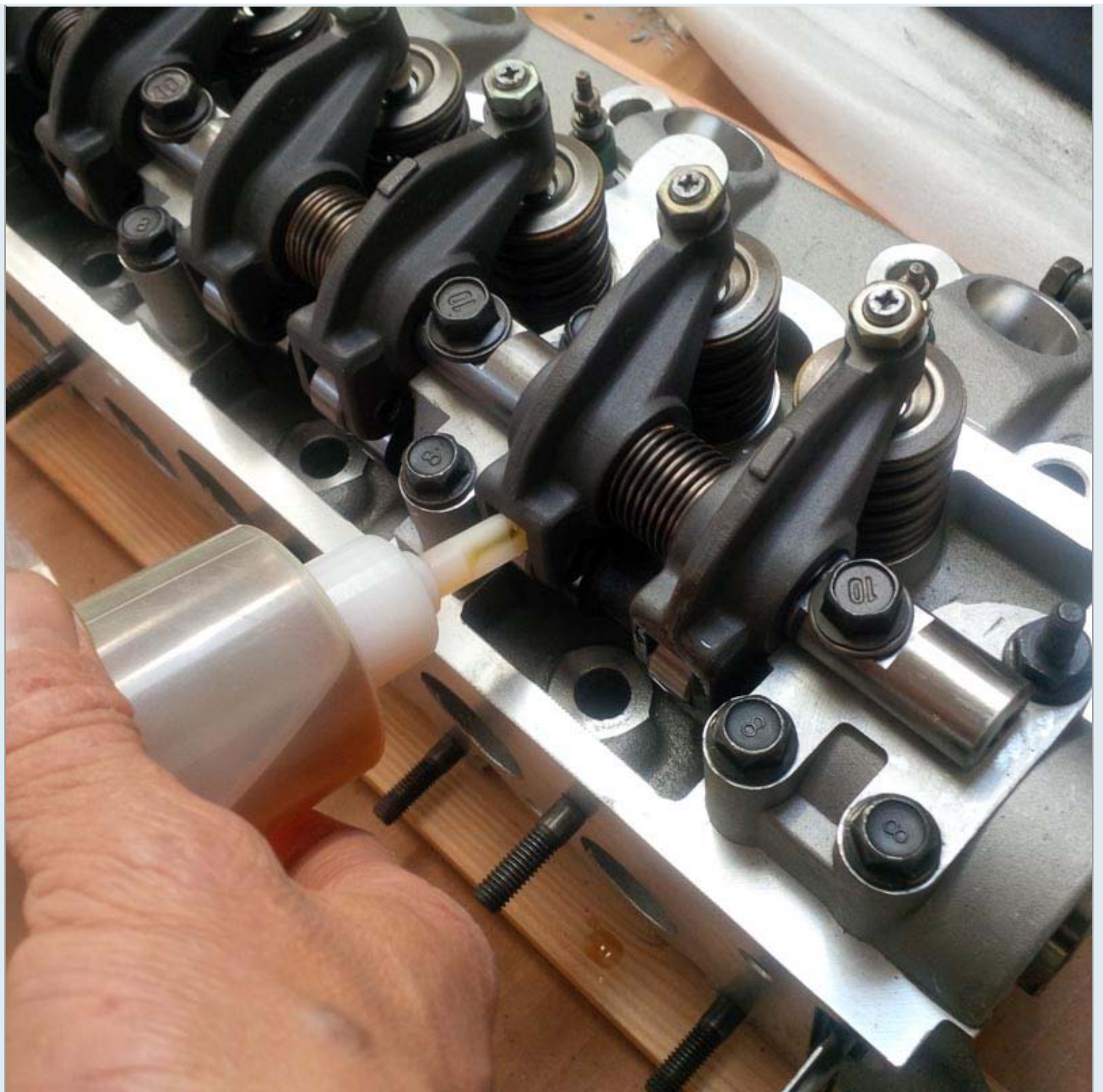




IMG\_20150402\_113554.jpg (146.53 KiB) Viewed 685 times

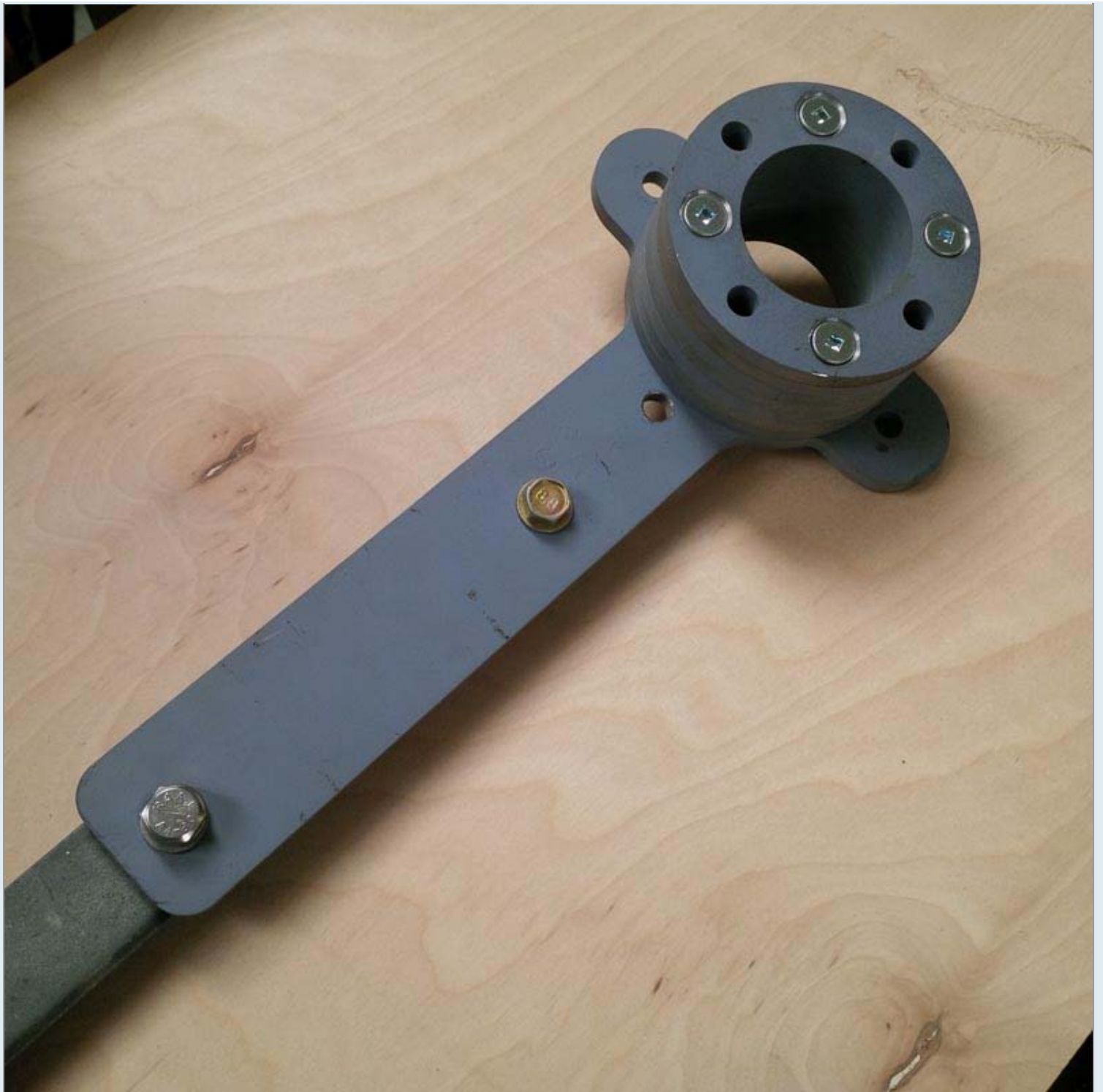
Dabbed some oil on all the moving parts on the new head. This will help during initial start-up.





IMG\_20150409\_125525.jpg (117.83 KiB) Viewed 685 times

I also had seven 1/4" discs made which I stacked together and fastened to the cam tool to convert it to a crank tool.



IMG\_20150413\_105628.jpg (64.05 KiB) Viewed 685 times





IMG\_20150413\_105635.jpg (64.6 KiB) Viewed 685 times

Test fit it to the crank pulley. Looks like it should work, and if it does I'll post up technical drawings and a DXF outline so you can fabricate your own. I'll be the guinea pig.



IMG\_20150413\_110012.jpg (90.36 KiB) Viewed 685 times

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1997 Isuzu ELF 2.0Ton Crane truck, 4300cc diesel, NKR66E

Tojo



Re: L300 Head replacement and timing belt DIY, step by step

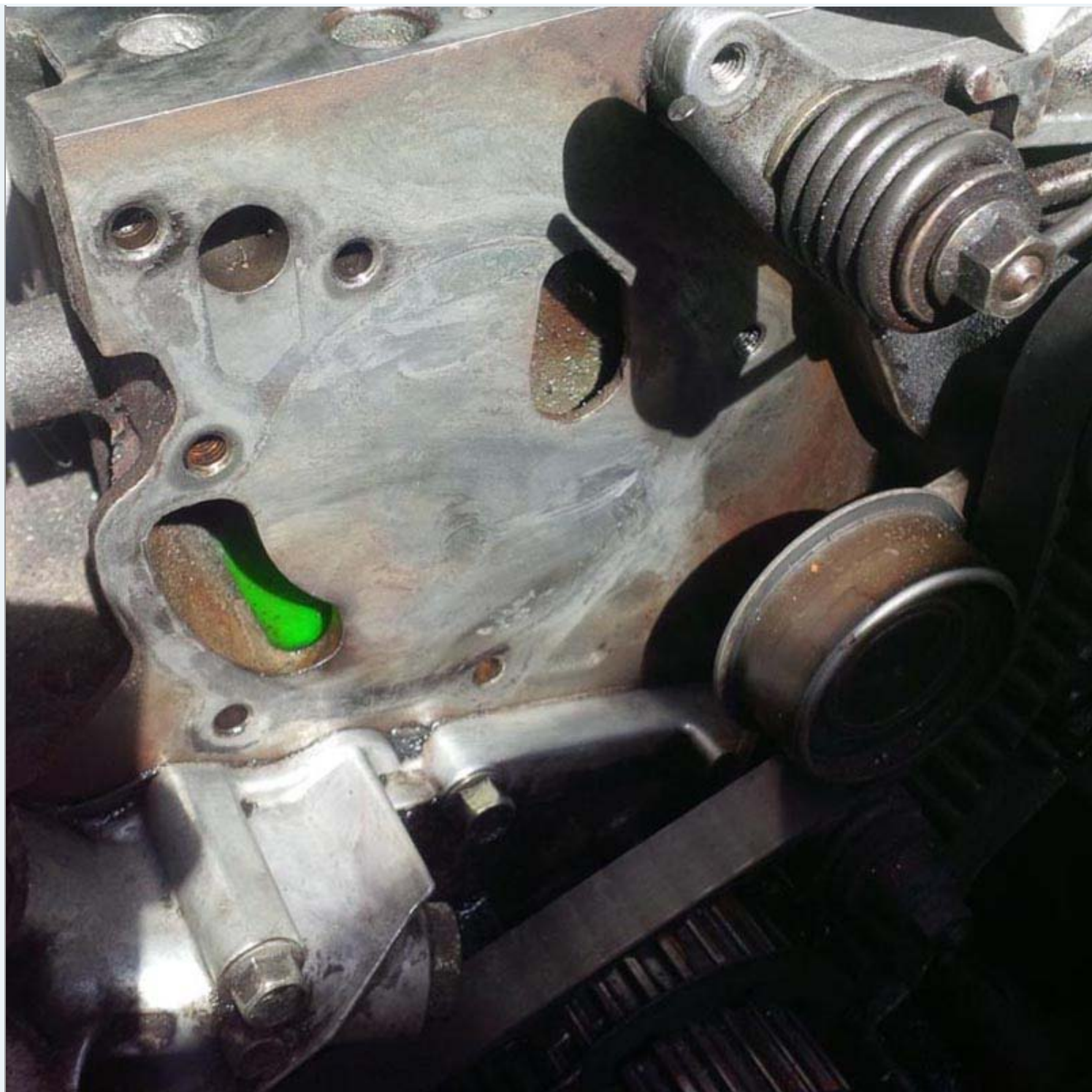
Fri Apr 17, 2015 10:52 am

Removed the water pump, gross. Cleaned up the mating surface.





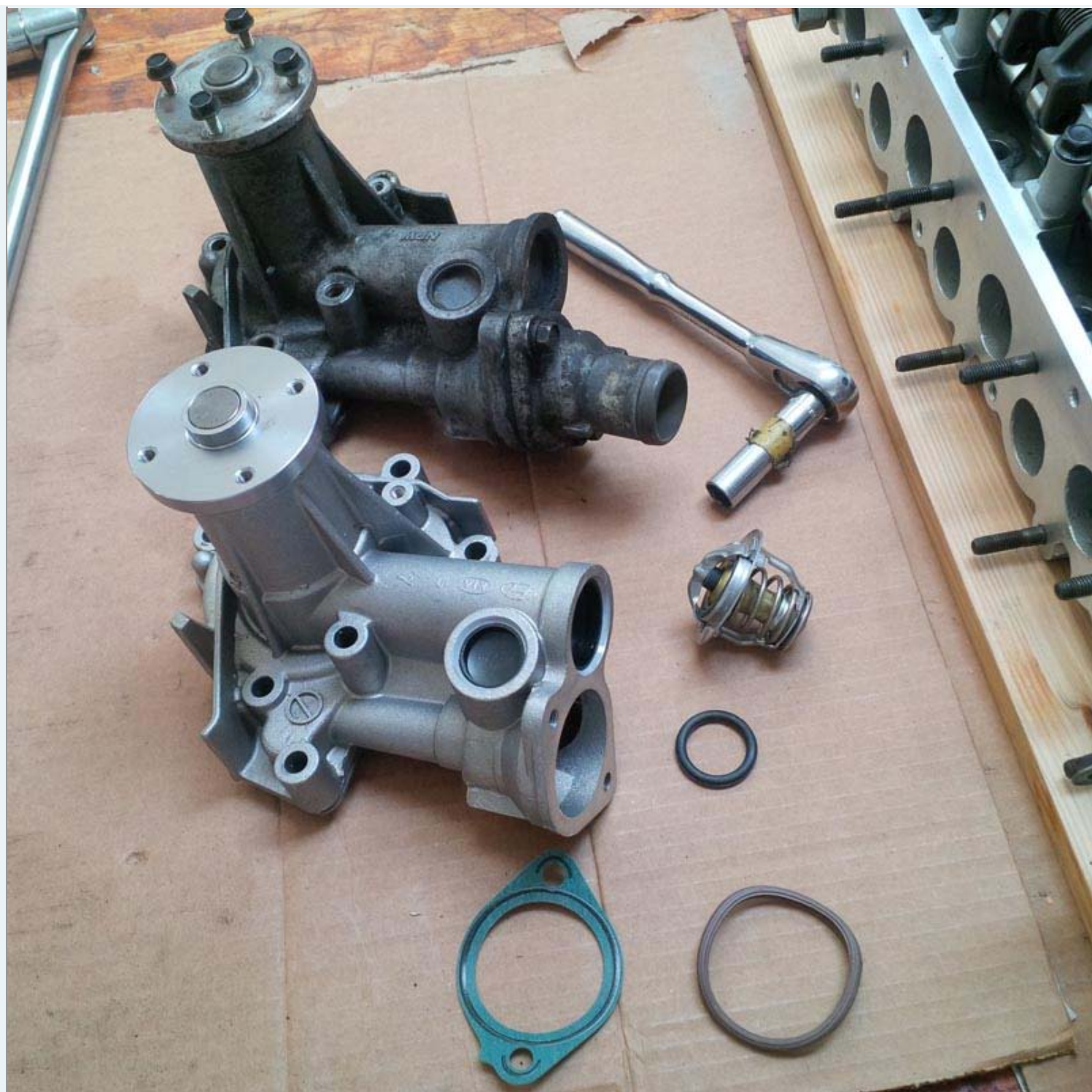
IMG\_20150416\_112632.jpg (108.66 KiB) Viewed 685 times



IMG\_20150416\_114200.jpg (108.63 KiB) Viewed 685 times

Move the inlet pipe over to the new water pump and replace the thermostat and gasket. Using an 82 degrees Mitsu part. Torque to 15 Nm or 11 ft lbs.





IMG\_20150416\_115202.jpg (124.67 KiB) Viewed 685 times





IMG\_20150416\_121042.jpg (123.63 KiB) Viewed 685 times





IMG\_20150416\_121100.jpg (109.96 KiB) Viewed 685 times

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 **FalcoColumbarius**  
Site Admin

“

Re: L300 Head replacement and timing belt DIY, step by step

📅 Sat Apr 18, 2015 11:47 am

Which brand of water pump did you use?

Falco.

Sent from my smart pad, using a pen.



Seek Beauty...

Good Ship Miss Lil' Bitchi

..... *Vision without action is a daydream. Action without vision is a nightmare.* ~ Japanese Proverb



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L300 Head replacement and timing belt DIY, step by step

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DexterH

“

Re: L300 Head replacement and timing belt DIY, step by step

Sat Jul 11, 2015 8:54 pm

Hi Tojo. I was hoping to catch your reassembly and timing on this project, but it doesnt seem I will. Well, not when I need it most that is. I have to admit this is the best instruction diy project on this topic Ive seen. The photos are exceptional as well. The thing is, Tomorrow morning Im hoping to get that crank bolt off and prepare for reassembly/timing. Got some cleaning up on the head to do and replacing the old rocker arm assembly with a new one. I doubt I'll complete this job by end of the day but hoping to get as much done as possible. Oh! I have to thank you for the pic on how you rigged up the breaker bar using the 2x4 😊. I took out my starter hoping to find a threaded bore on the flywheel to lock it in place but was surprised there wasnt any. Your method has put a smile on my face man 😊

Hope you get going on this project again soon. It sure is extremely helpful and very comprehensive.

Thanks Tojo!

🗨

Tojo

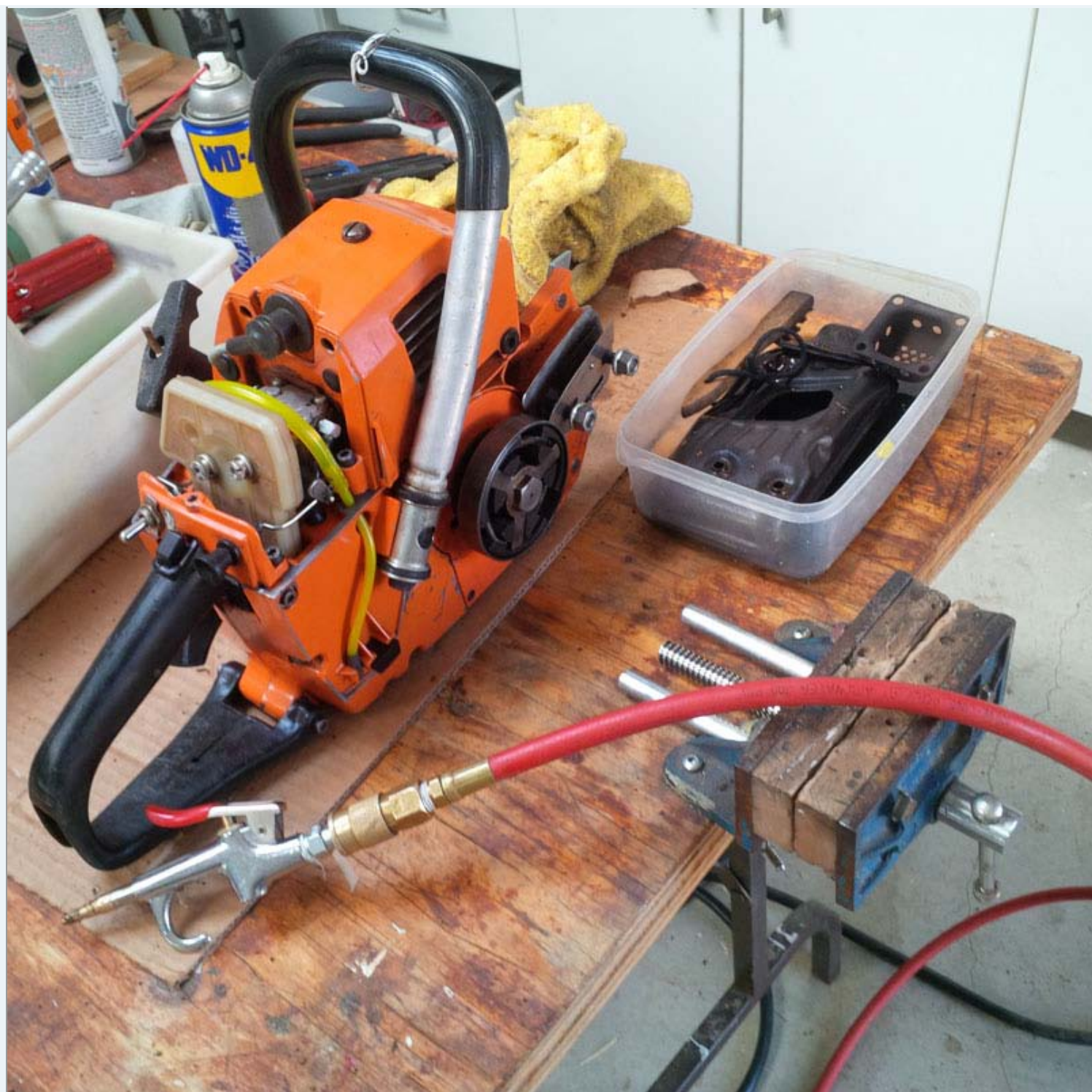
“

Re: L300 Head replacement and timing belt DIY, step by step

Wed Jul 15, 2015 4:09 pm

I'm back! Thanks for the comments. Needed to take a break to work on the house, rebuild a 1974 Husqvarna L65 and some chill out time in this heat wave we're having.

A very old but sturdy saw. Something about these older saws, they are heavy with all metal parts and don't have a safety brake, but they have great torque and are ideal for chainsaw milling.

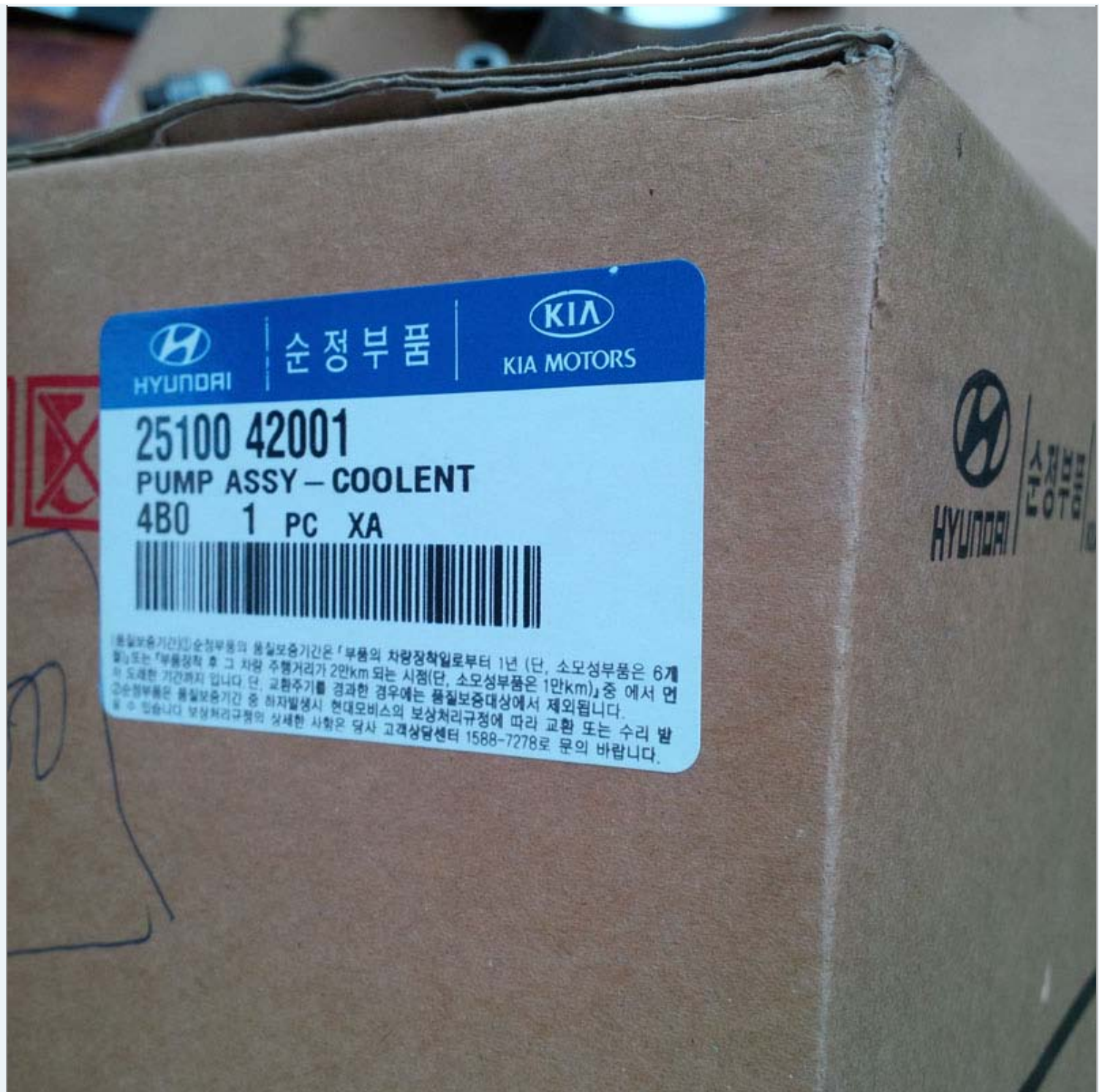


IMG\_20150504\_134541.jpg (480.46 KiB) Viewed 369 times

But I digress. Now, onwards and upwards!

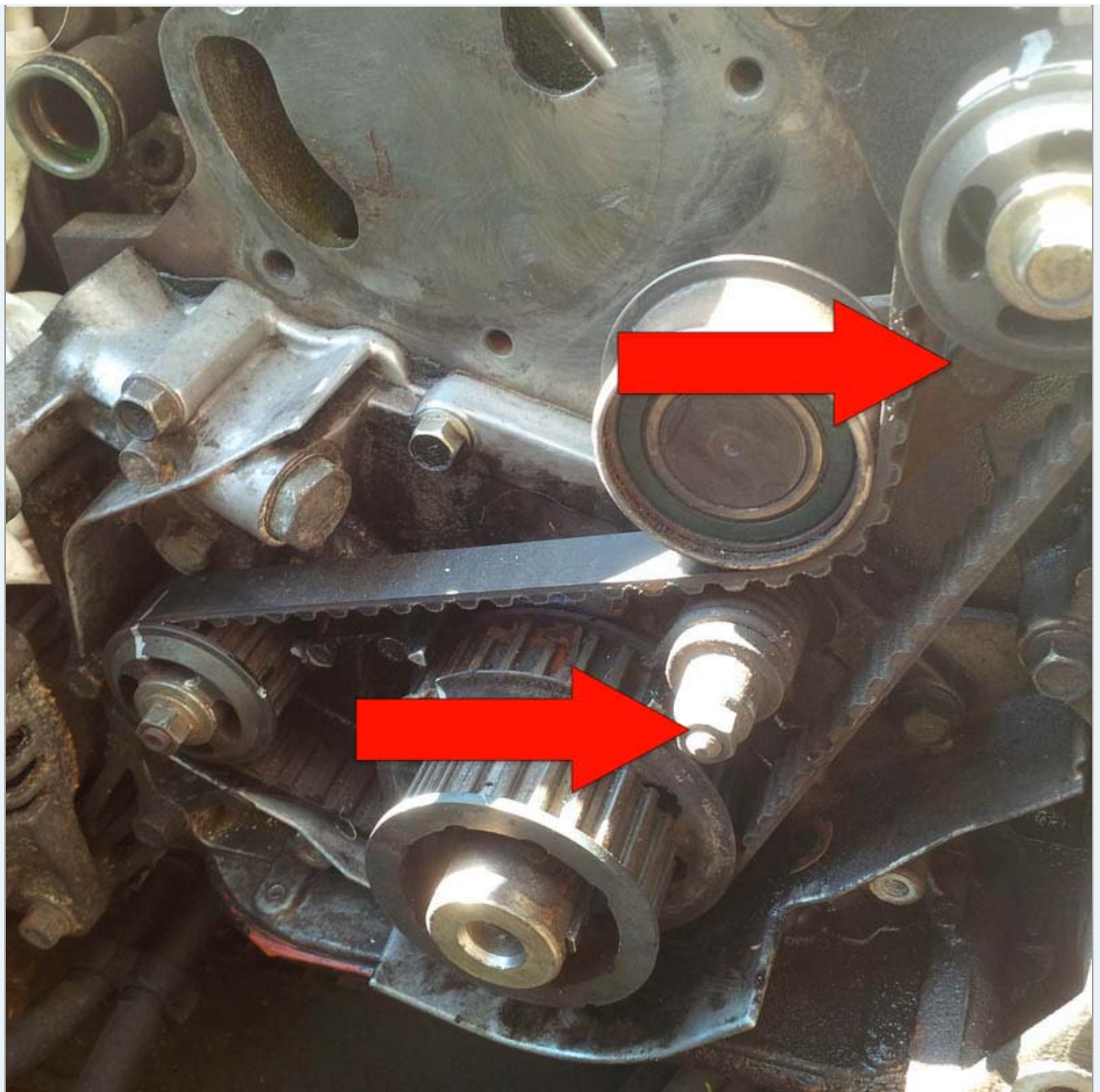
Water pump is Hyundai OEM.





IMG\_20150421\_090114.jpg (367.92 KiB) Viewed 369 times

Time to deal with the balancer belt. Remove the two bolts that hold the tensioner and remove it.



IMG\_20150714\_160658.jpg (328.95 KiB) Viewed 369 times

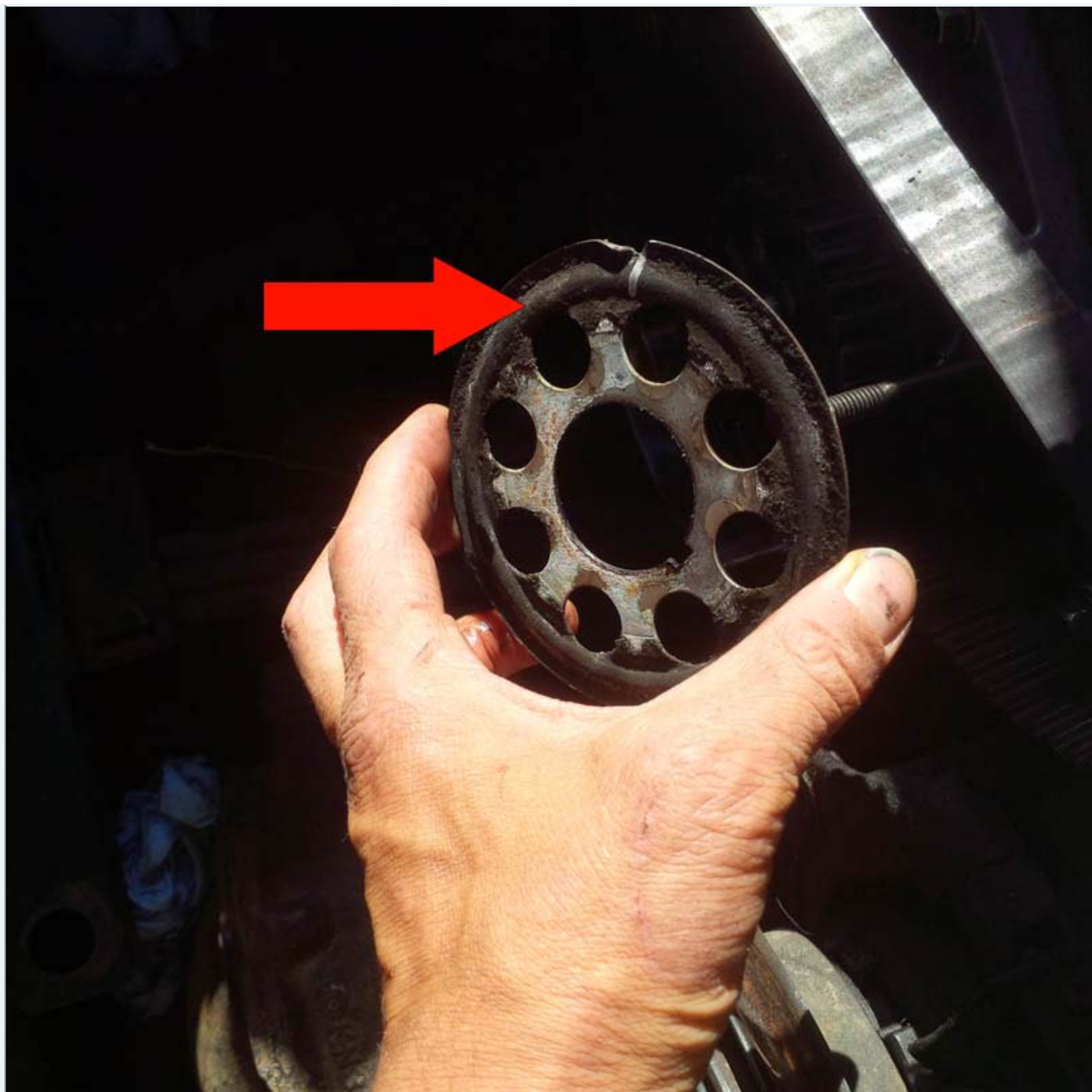
Pull off both crank gears. Here is a picture of the outer one which the timing belt goes around.





IMG\_20150714\_161455.jpg (328.4 KiB) Viewed 369 times

Note that there is a spacer between them where the convex profile faces outwards.



IMG\_20150714\_161528.jpg (242.63 KiB) Viewed 369 times

You can see that there is a bunch of oil around the crankshaft, so it's a good time to replace the seal.





IMG\_20150714\_161716.jpg (385.88 KiB) Viewed 369 times

Last edited by [Tojo](#) on Wed Jul 15, 2015 4:56 pm, edited 1 time in total.

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Tojo



Re: L300 Head replacement and timing belt DIY, step by step

Wed Jul 15, 2015 4:21 pm

I made my own balancer gear removal tool. Just two bolts with a larger hole in the middle for the socket.



IMG\_20150714\_162911.jpg (279.26 KiB) Viewed 369 times





IMG\_20150714\_162920.jpg (253.47 KiB) Viewed 369 times

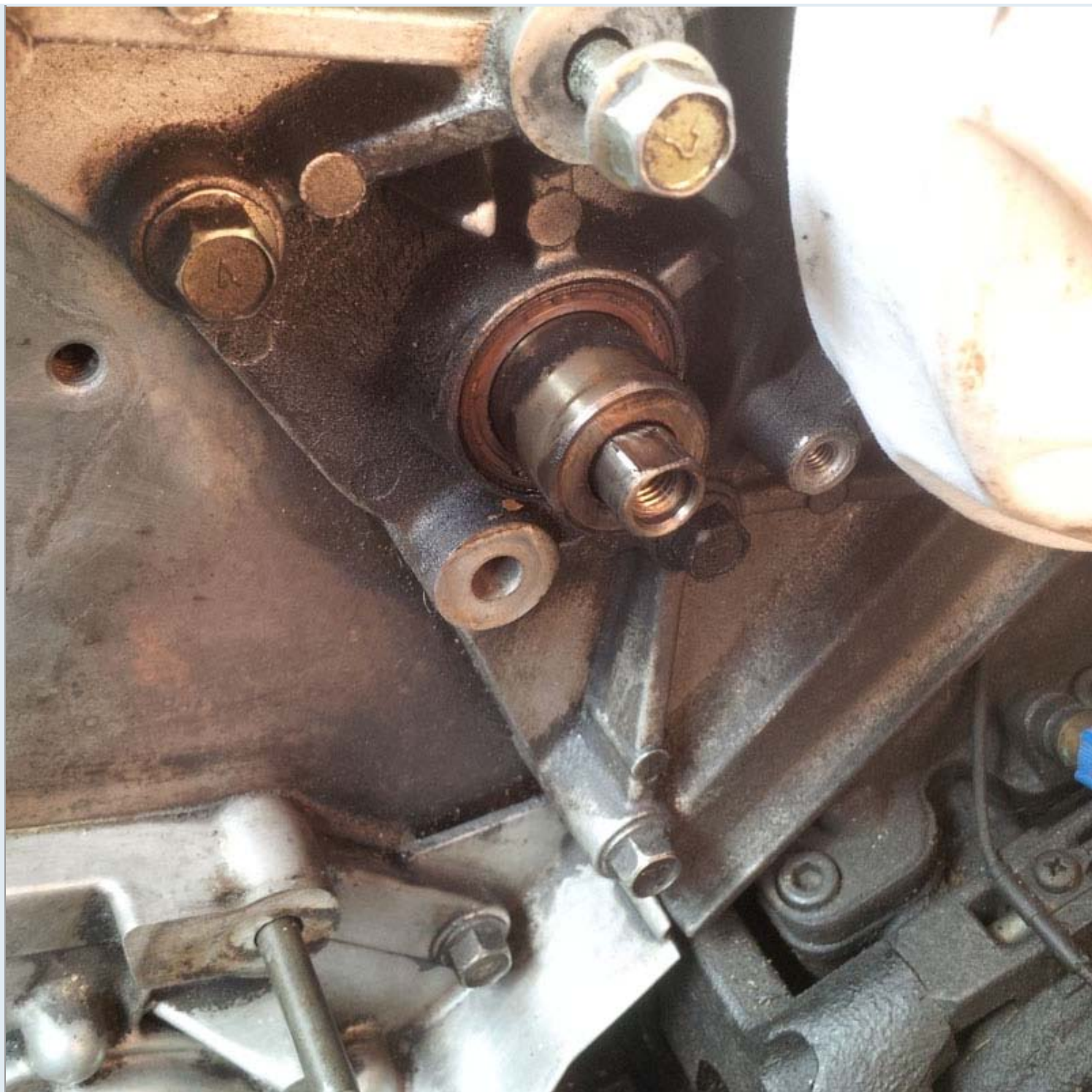
Use the improvised tool and cranked the upper balancer shaft gear loose.



IMG\_20150714\_165136.jpg (304.56 KiB) Viewed 369 times

And this is what it looks like underneath.

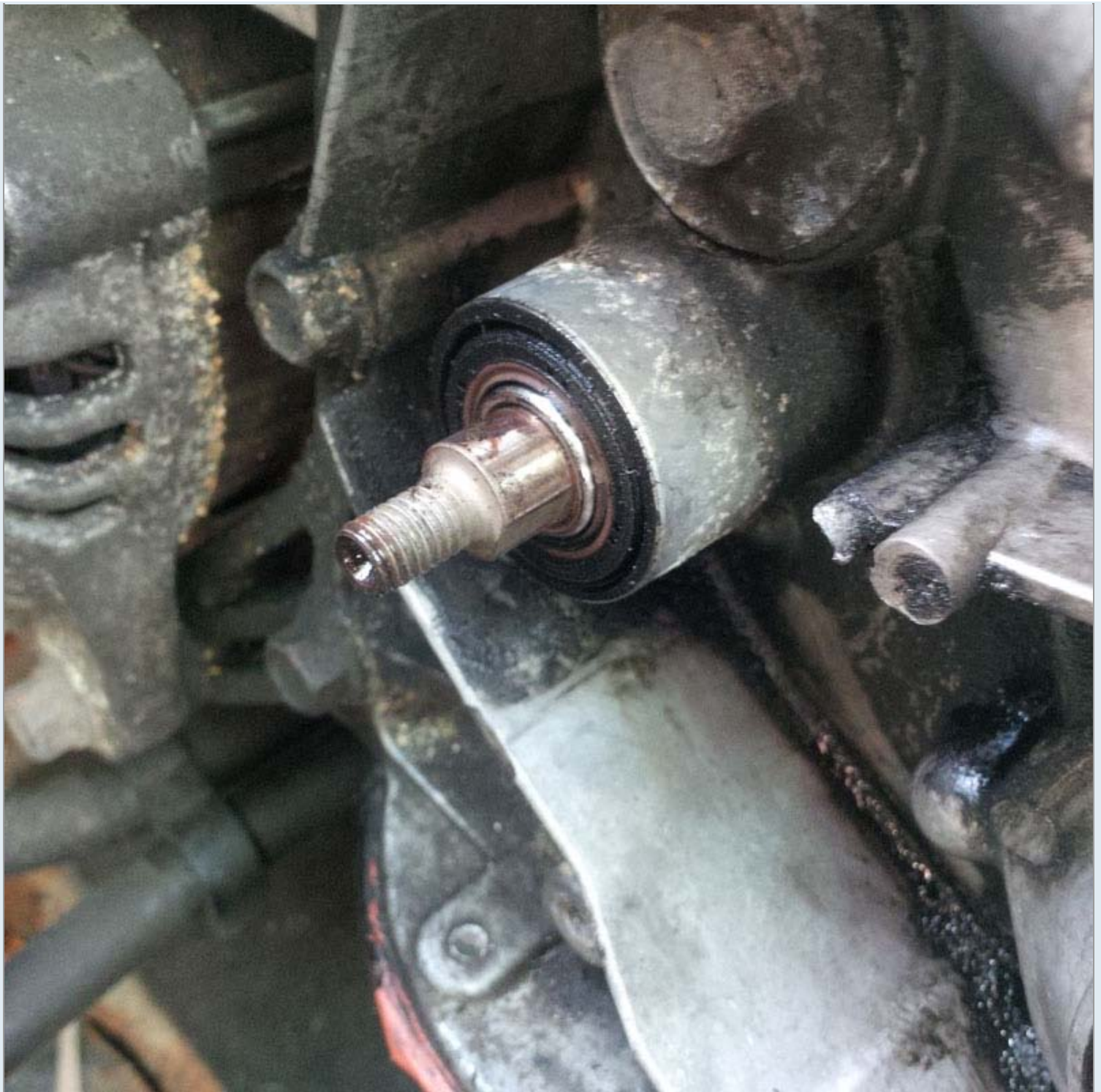




IMG\_20150714\_165400.jpg (388.91 KiB) Viewed 369 times

Used the tool again to remove the lower balancer shaft gear.

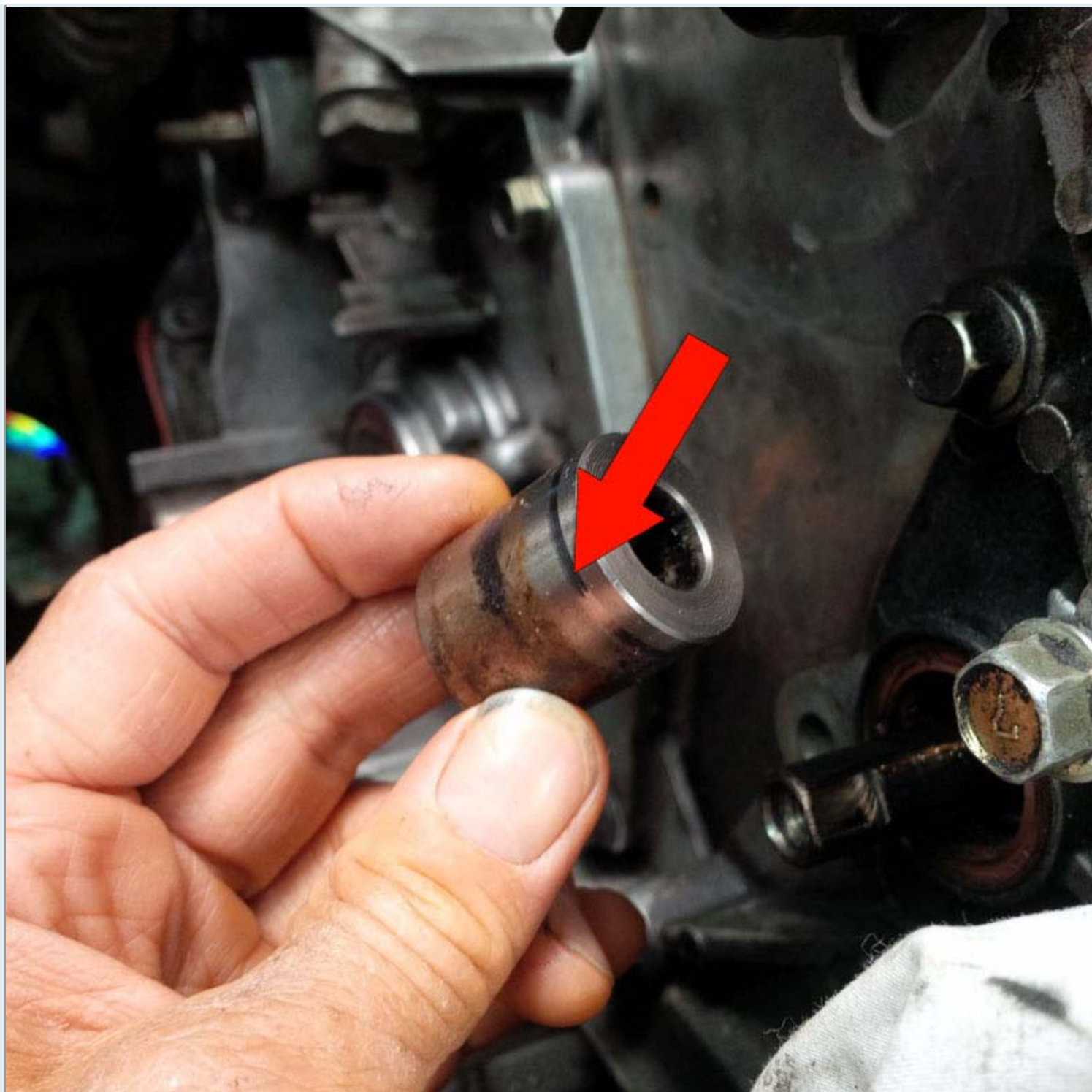




IMG\_20150714\_165408.jpg (354.79 KiB) Viewed 369 times

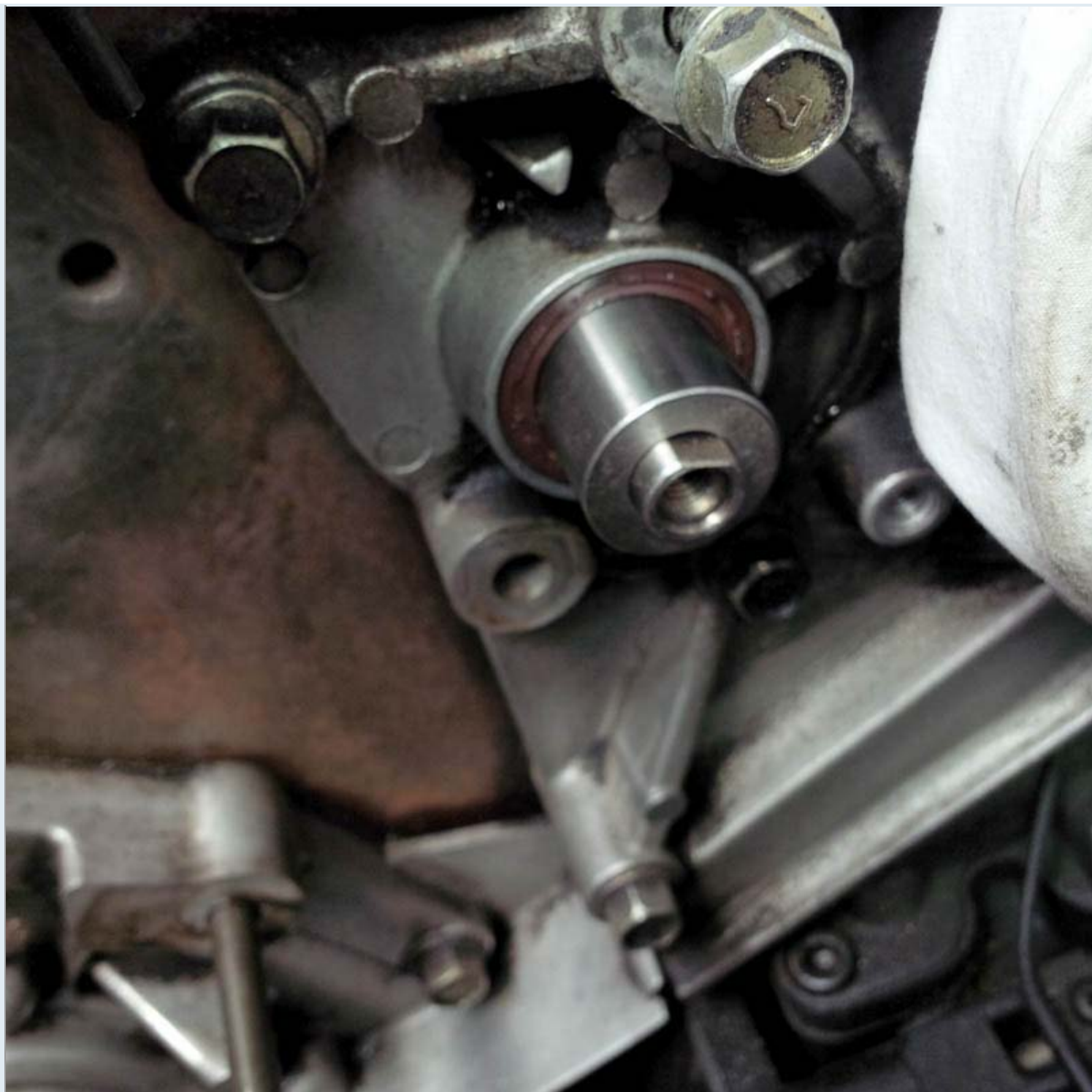
Pull off the upper balance shaft bushing and remove the oil seal, then replace with new ones. The reason to do this is because a groove gets worn into the bushing over time and causes a slow leak. Even if you just replace the oil seal the chances of it leaking are high if you decide to re-use the old bushing. My philosophy with this entire rebuild is to replace everything critical because the reality is that the major cost is your time. The parts themselves are small and relatively cheap for the most part, except for the timing belt and water pump (and the head of course!).





IMG\_20150715\_133713.jpg (316.26 KiB) Viewed 369 times

Nice and shiny! Used a large socket to press in the new oil seal.



IMG\_20150715\_135342.jpg (230.98 KiB) Viewed 369 times

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Tojo

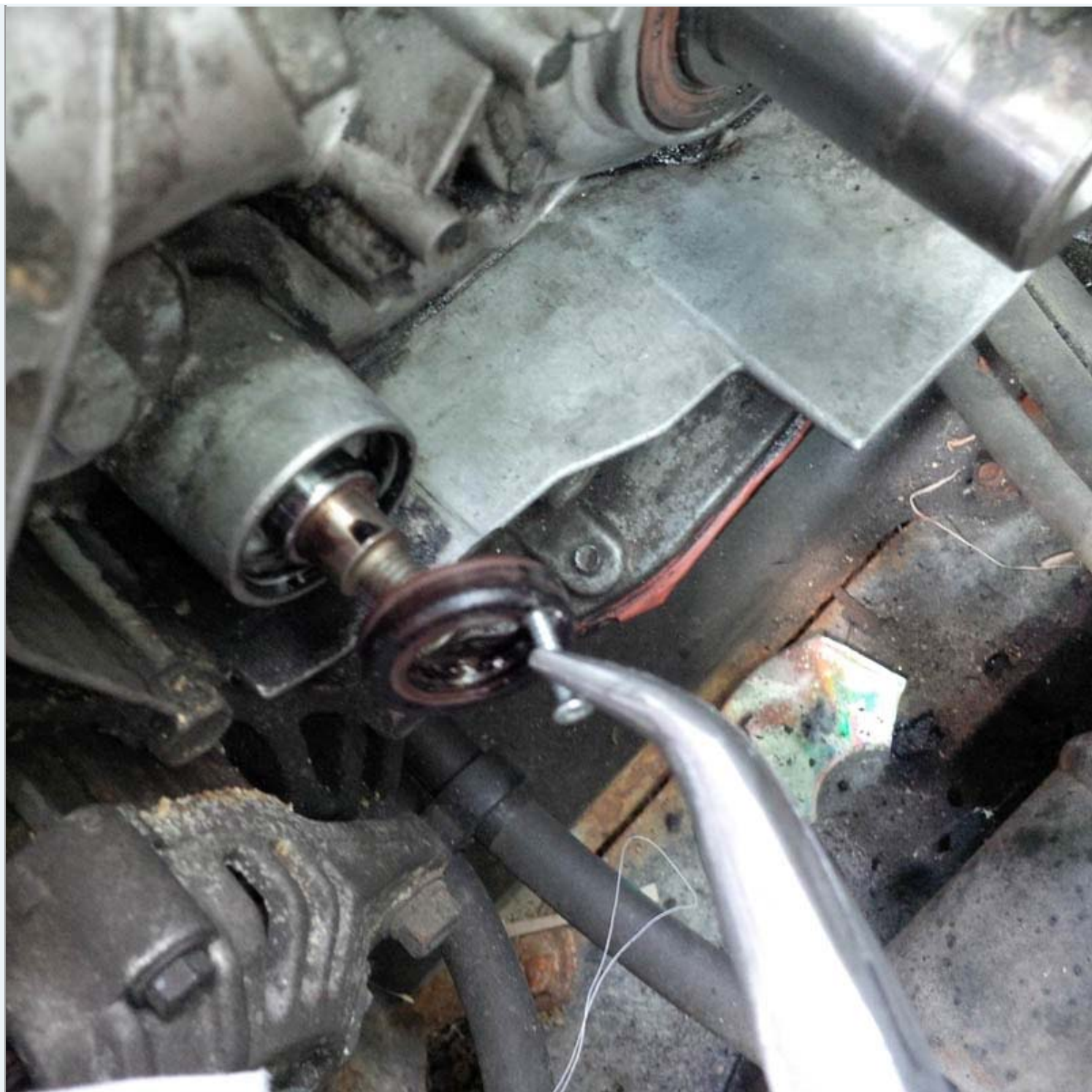


## Re: L300 Head replacement and timing belt DIY, step by step

Wed Jul 15, 2015 4:41 pm

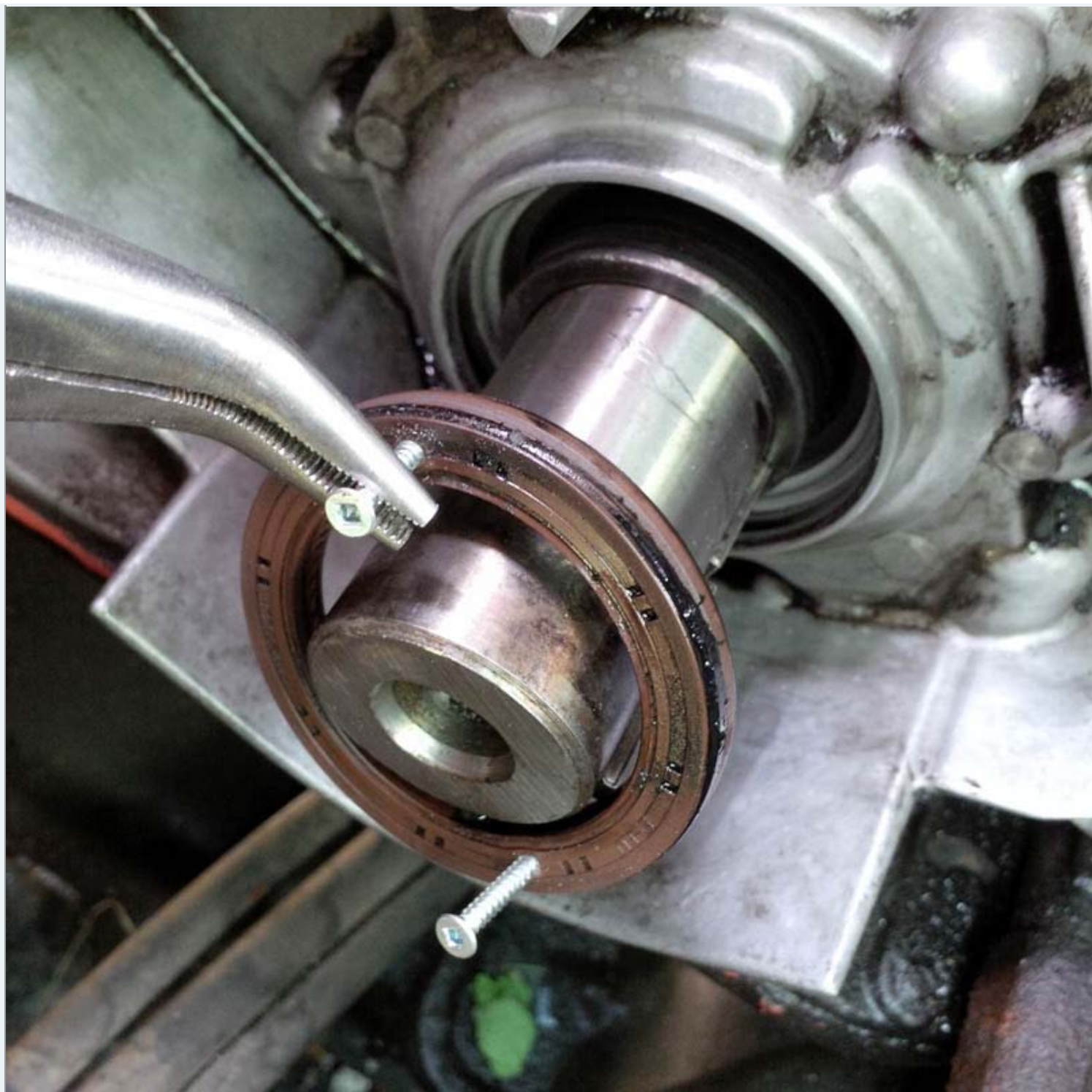
By the way. Use a small 1/16" drill bit to make holes in the oil seals then drive a tiny screw into the hole and use needlenose pliers (bentnose preferred) to remove the seal. Just don't drill into the shaft or aluminum housing!





IMG\_20150715\_135913.jpg (302.61 KiB) Viewed 366 times

Use the same method to remove the crank oil seal.



IMG\_20150715\_141420.jpg (309.19 KiB) Viewed 366 times

Pull out the oil pump drive gear sleeve. Again because of the worn in groove that lets oil past as well as the teeth can get worn out. In this case the gear teeth look fine, but whatever, I replace anyways.





IMG\_20150715\_141543.jpg (350.72 KiB) Viewed 366 times

New oil pump drive gear sleeve.



IMG\_20150715\_141656.jpg (505.12 KiB) Viewed 366 times

An ABS fitting works really well for press fitting that crank oil seal. 2" to 2.25" outer diameter sleeve is what you're looking for.

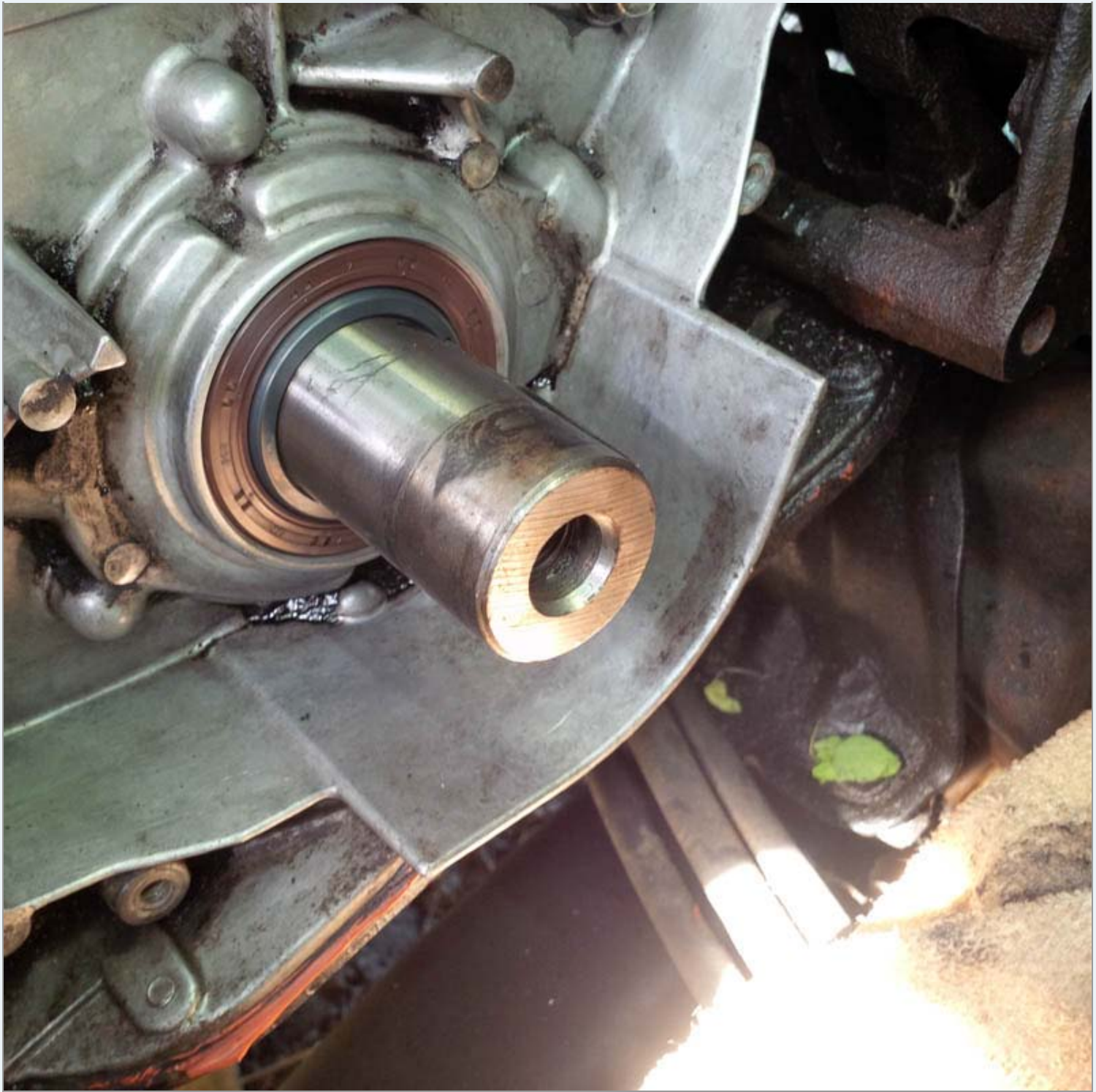




IMG\_20150715\_142417.jpg (397.37 KiB) Viewed 366 times

Looking freshened up.





IMG\_20150715\_142833.jpg (318.97 KiB) Viewed 366 times

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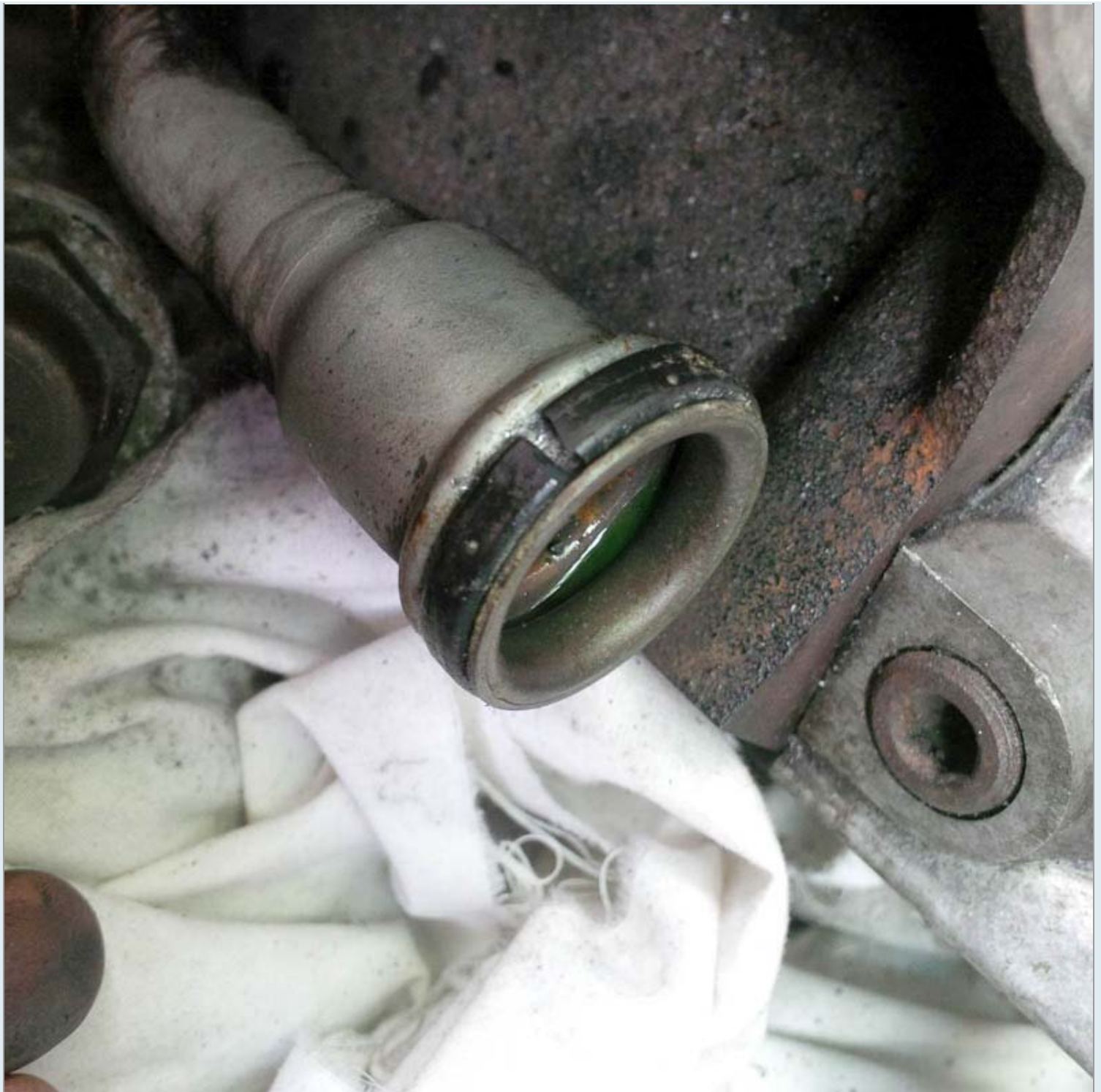


Re: L300 Head replacement and timing belt DIY, step by step

Wed Jul 15, 2015 4:55 pm

Replace the o-ring on the water pump outlet.





IMG\_20150715\_143132.jpg (267.35 KiB) Viewed 364 times

Look at the difference between the old and new. The old one was hard, brittle and flattened. New one is soft, pliable and rounded profile.



IMG\_20150715\_143240.jpg (335.07 KiB) Viewed 364 times

Done. Ready to install the water pump.





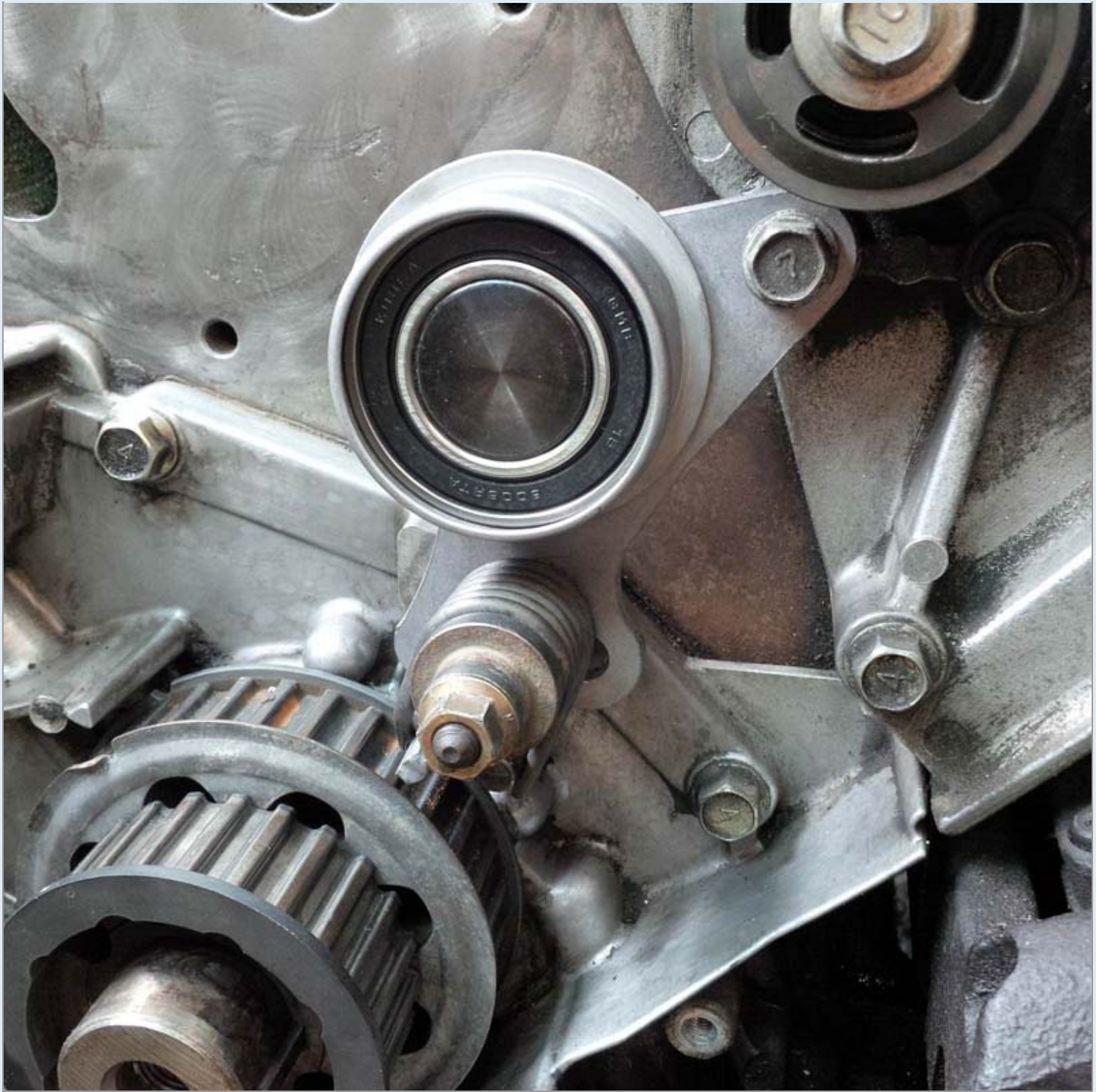
IMG\_20150715\_143306.jpg (251.48 KiB) Viewed 364 times

Attach the new balancer belt tensioner.



IMG\_20150715\_143429.jpg (289.54 KiB) Viewed 364 times





IMG\_20150715\_164905.jpg (350.77 KiB) Viewed 364 times

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Re: L300 Head replacement and timing belt DIY, step by step

Tue Jul 21, 2015 4:29 pm

Just to backtrack and highlight a few details.

On the upper balance shaft bushing the chamfered edge faces inwards.



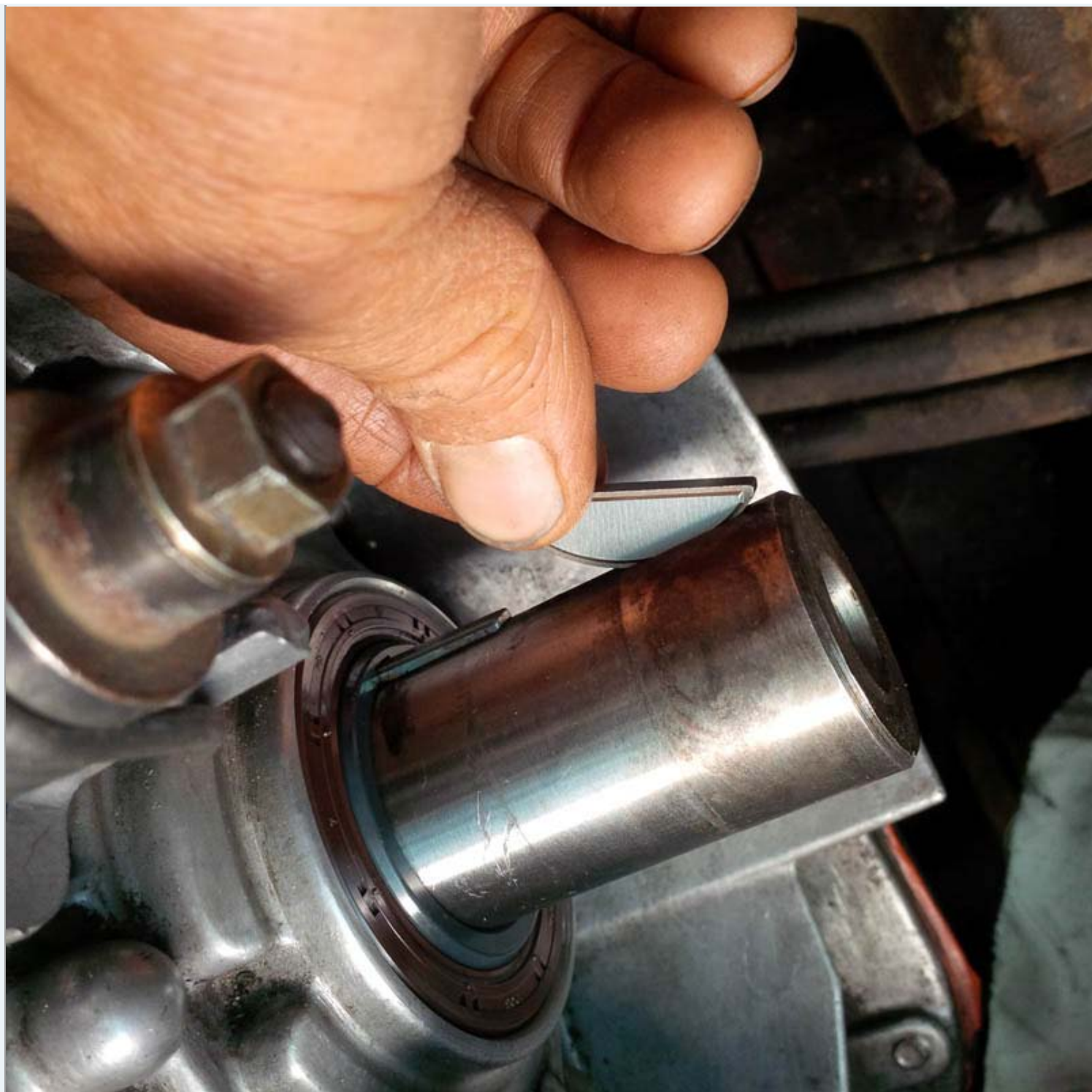
IMG\_20150717\_145025.jpg (264.85 KiB) Viewed 344 times

Knock out the woodruff key with a flathead screwdriver bit and place in a new one. Makes for a nice snug fit with the crank sprockets.





IMG\_20150717\_145931.jpg (242.27 KiB) Viewed 344 times

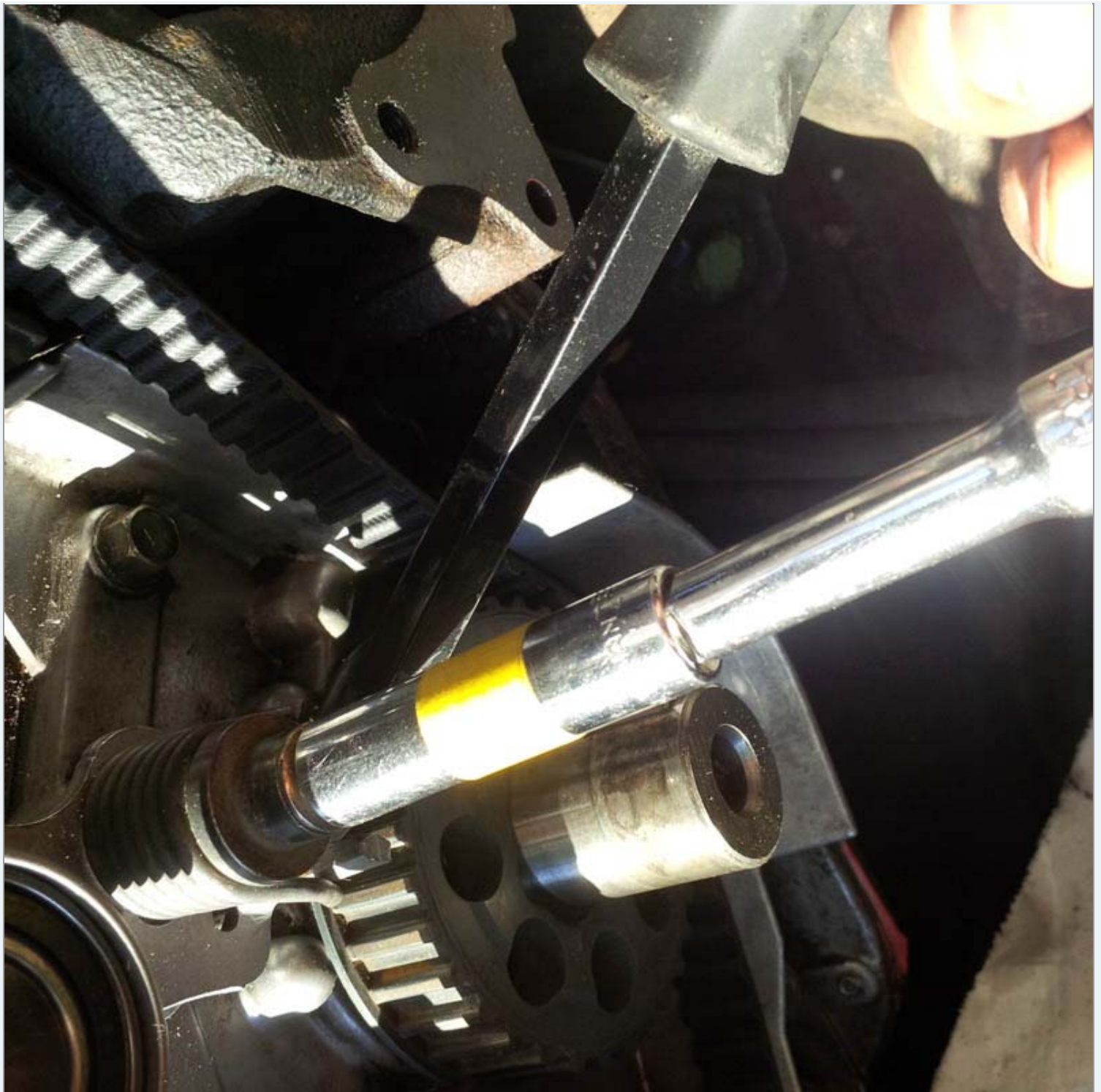


IMG\_20150717\_150450.jpg (290.91 KiB) Viewed 344 times

Next it was time to place the balancer belt. AKA timing belt "B"

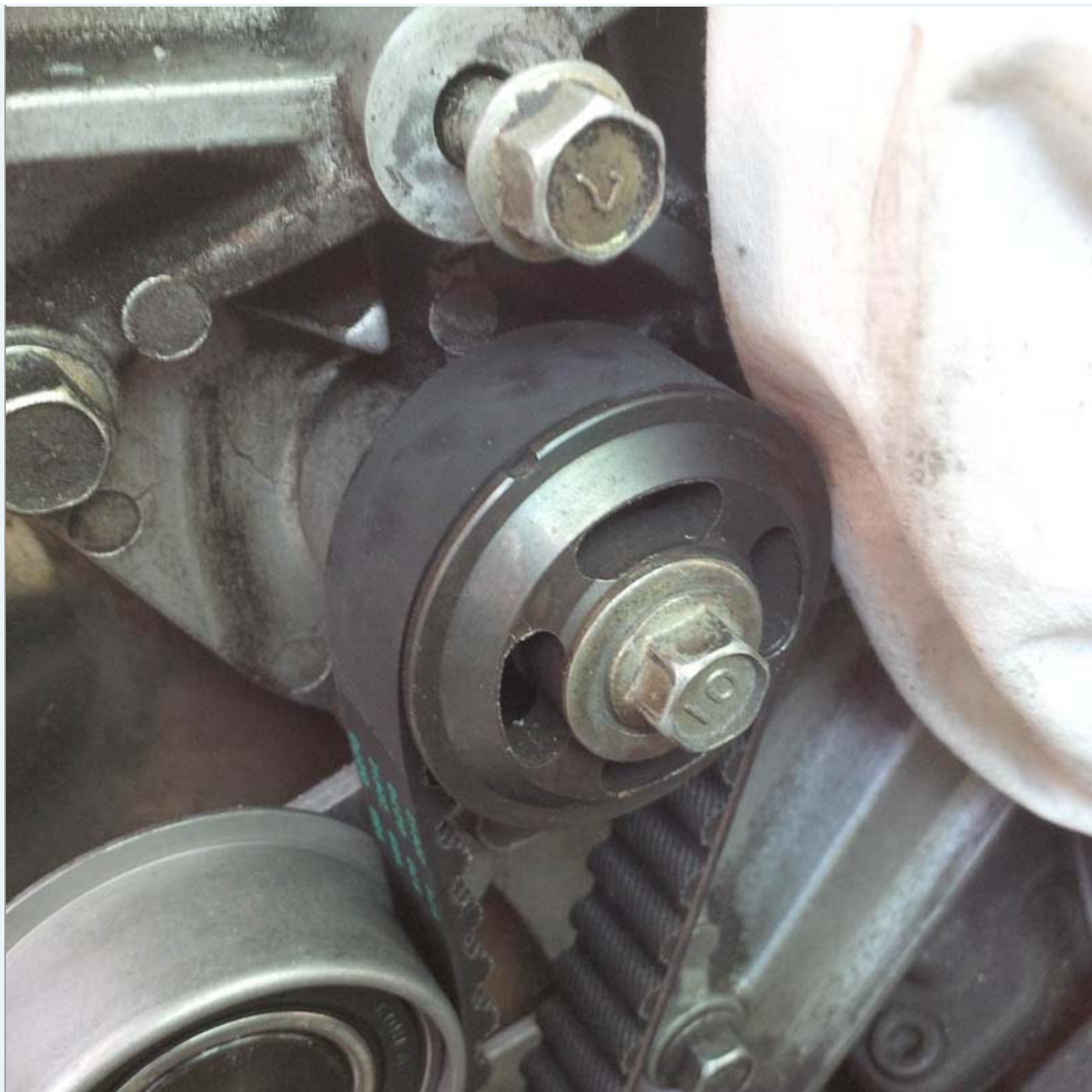
Use a lever bar to push against the tensioner spring and turn the bolts to hold the tensioner in place.





IMG\_20150717\_152923.jpg (299.88 KiB) Viewed 344 times

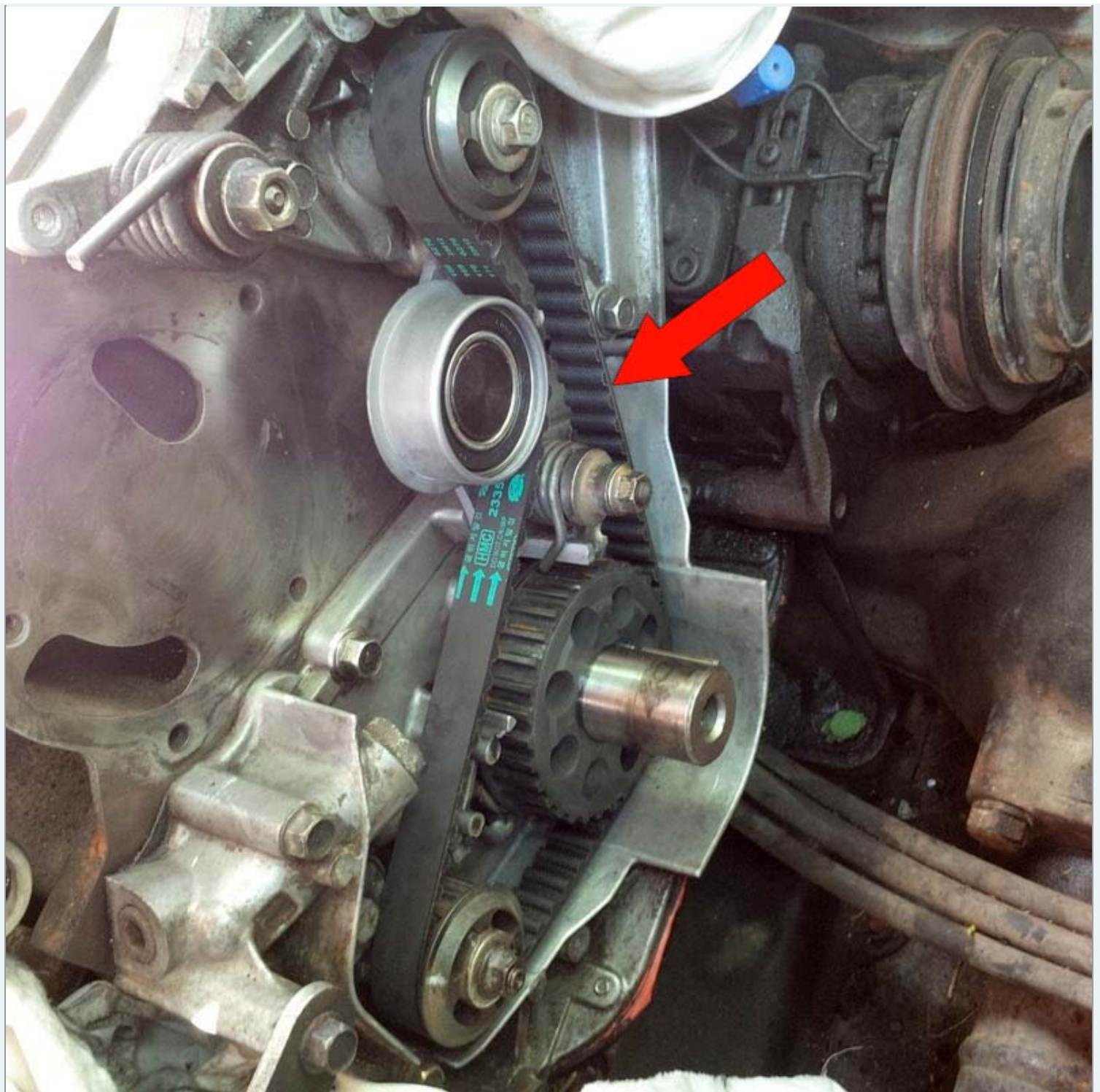
Align all the timing marks on each sprocket and slip the balancer belt into place. It took a couple of tries to get it to line up.



IMG\_20150717\_153352.jpg (244.71 KiB) Viewed 344 times

Release the tensioner and check for deflection on the right side which should be 4 to 5 mm according to the manual. Note that the belt has direction. This is a clockwise turning motor.





IMG\_20150717\_153339.jpg (348.87 KiB) Viewed 344 times

Last edited by [Tojo](#) on Fri Jul 24, 2015 5:23 pm, edited 2 times in total.

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1997 Isuzu ELF 2.0Ton Crane truck, 4300cc diesel, NKR66E



Tojo

“

### Re: L300 Head replacement and timing belt DIY, step by step

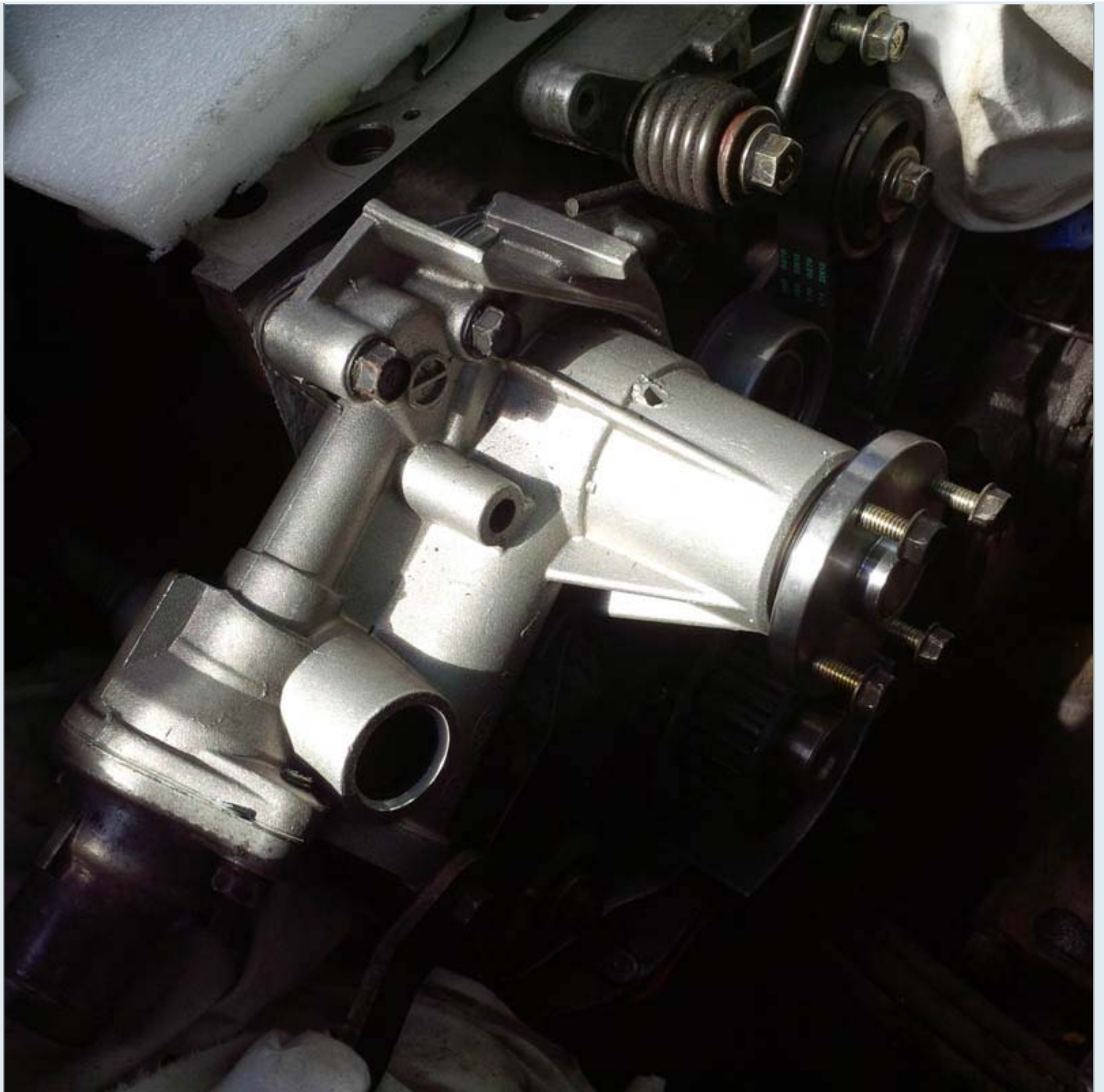
□ Tue Jul 21, 2015 4:32 pm

On goes the water pump. Straightforward, but watch that you get the correct bolts of the correct grade stamped on the head into the correct hole! See the attached diagram. I used some Permatex RTV gasket maker to stick it all together.



IMG\_20150717\_155953.jpg (277.89 KiB) Viewed 344 times





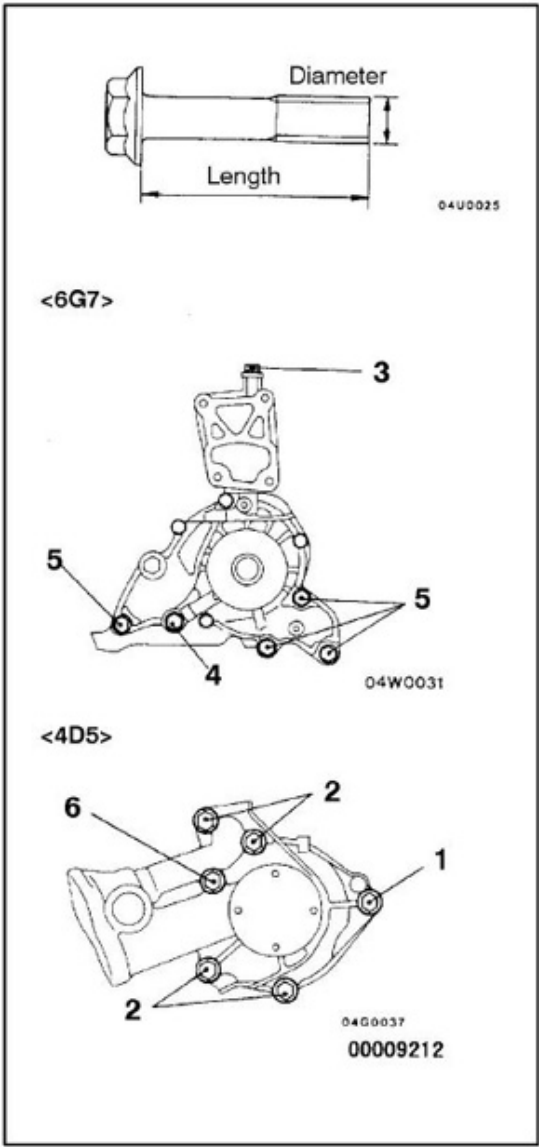
IMG\_20150717\_161405.jpg (225.04 KiB) Viewed 344 times

14-12

ENGINE COOLING – Water Pump

►B◄ WATER PUMP ASSEMBLY INSTALLATION

No.	Hardness category (head mark)	Bolt diameter x length mm
1	4T	8 x 25
2		8 x 40
3	7T	8 x 14
4		8 x 20
5		8 x 25
6		8 x 70



water pump\_sm.jpg (107.15 KiB) Viewed 344 times

Last edited by [Tojo](#) on Sun Jul 26, 2015 9:06 pm, edited 2 times in total.

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Re: L300 Head replacement and timing belt DIY, step by step

Tue Jul 21, 2015 4:39 pm

Fresh dowels on the block.





IMG\_20150721\_132448.jpg (307.26 KiB) Viewed 344 times

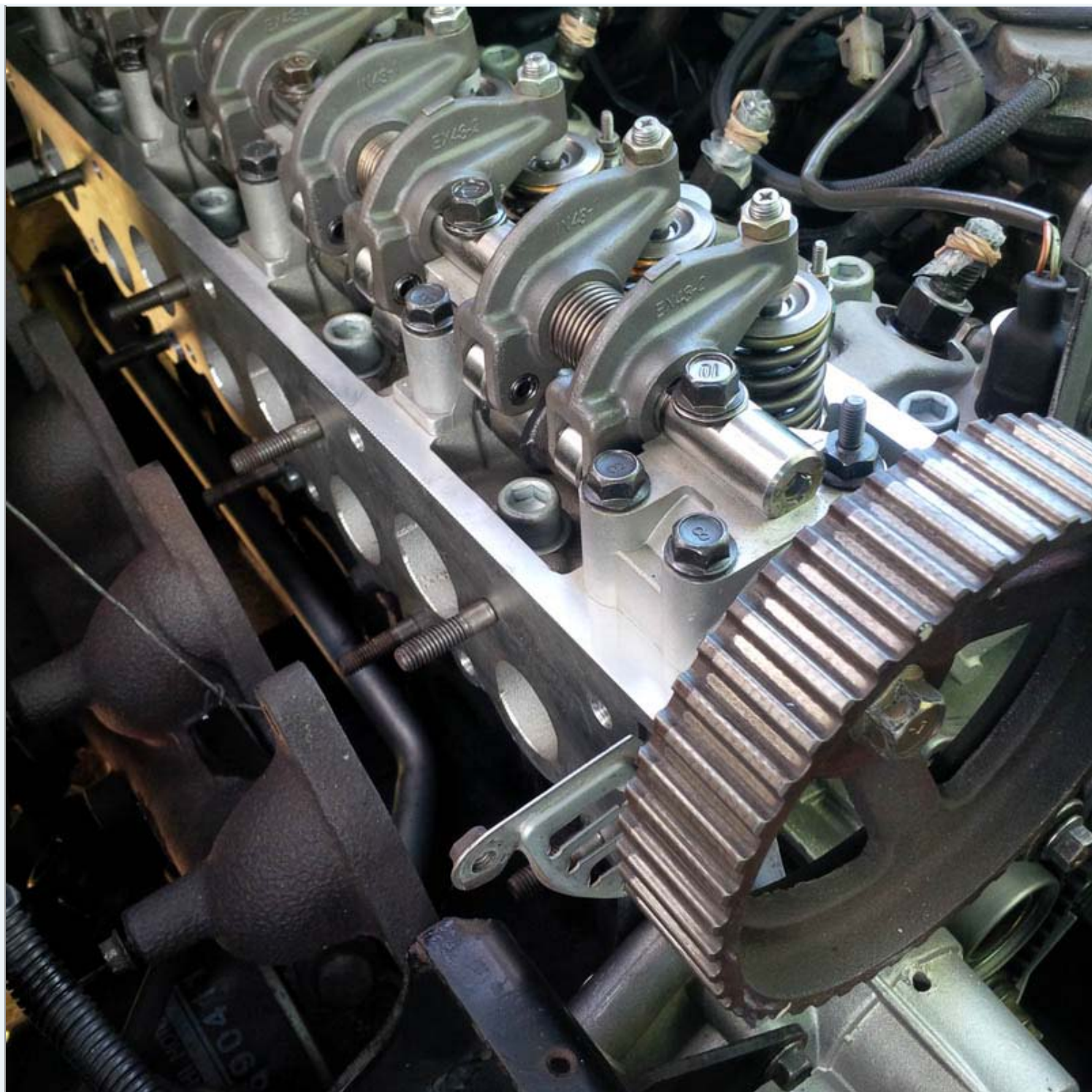
Clean the mating surfaces with brake cleaner because it evaporates and leaves no residue. Then place the head gasket. Used compressed air to blow out the head bolt holes and clean off the threads in the block.



IMG\_20150721\_133309.jpg (282.55 KiB) Viewed 344 times

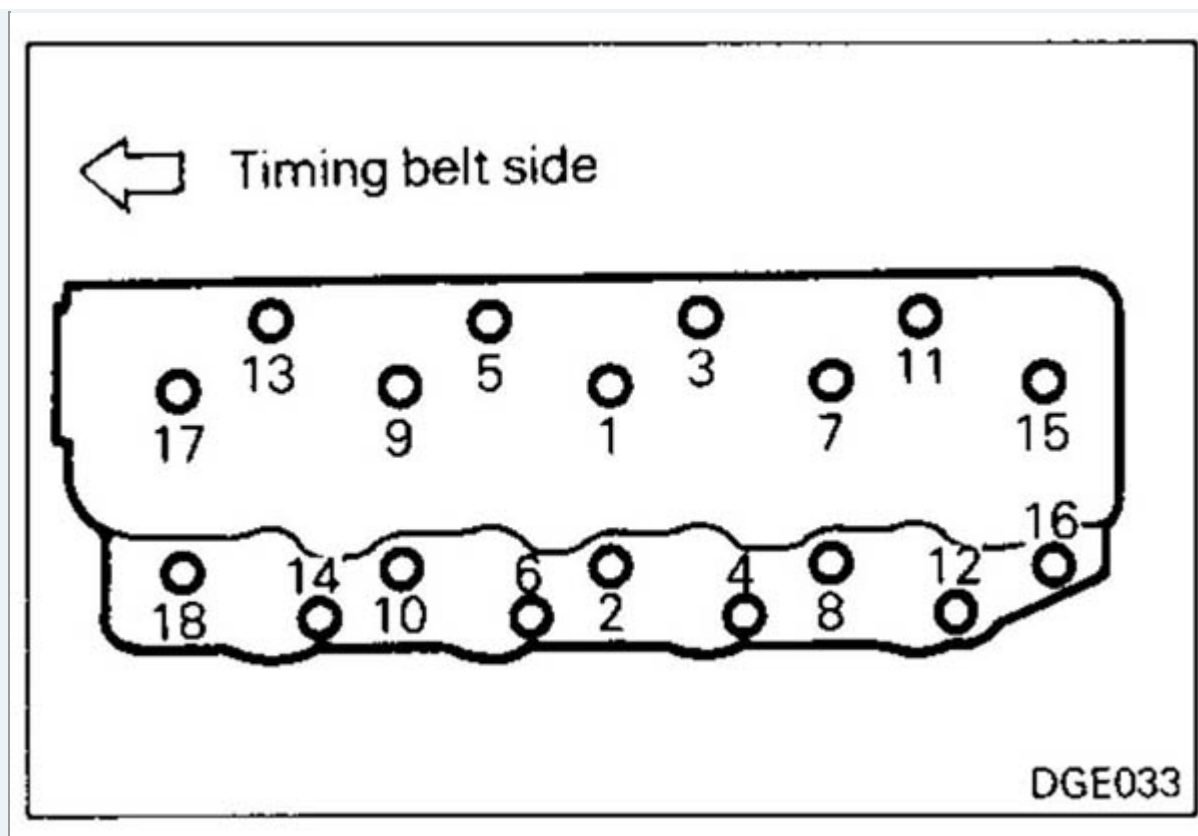
On goes the head.





IMG\_20150721\_144523.jpg (399.7 KiB) Viewed 344 times

Take your time and torque to spec which is 113-123 Nm or 83 to 90 ft. lbs. Follow the pattern. Do it gradually and work your way around the pattern several times before reaching your final torque setting.



head bolt install.JPG (56.68 KiB) Viewed 344 times

Fresh head bolts. Chamfered edge on the washer faces up. I used a small drop of engine oil on the threads. Not too much or it leads to hydraulic lock and stripped threads.

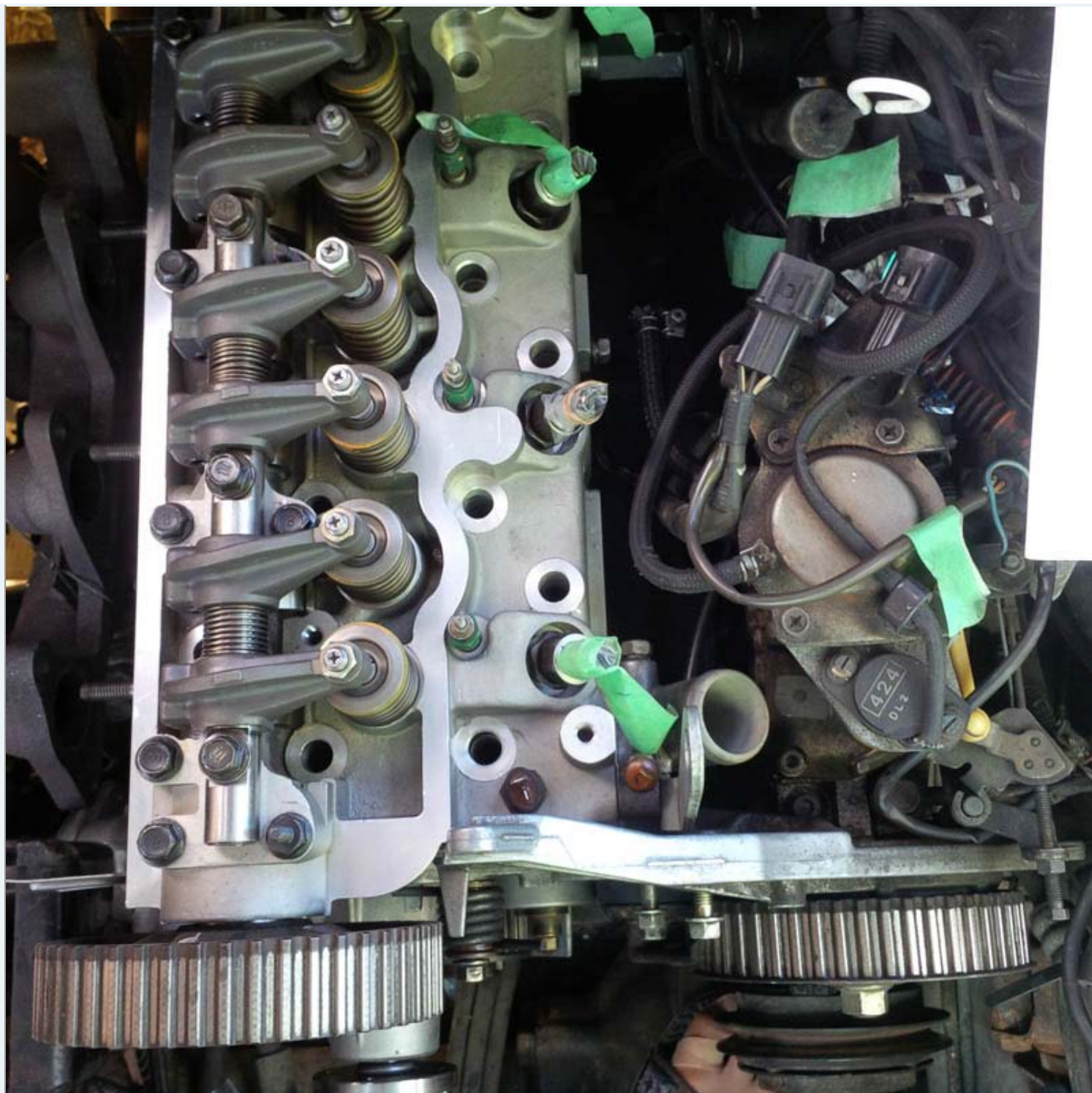




IMG\_20150721\_135857.jpg (359.45 KiB) Viewed 344 times

Ready to start reattaching stuff!





IMG\_20150721\_141103.jpg (379.21 KiB) Viewed 344 times

Last edited by [Tojo](#) on Sun Jul 26, 2015 9:06 pm, edited 1 time in total.

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Tojo

“

## Re: L300 Head replacement and timing belt DIY, step by step

Wed Jul 22, 2015 5:19 pm

Timing belt time!



On goes the new tensioner.



IMG\_20150722\_094327.jpg (266.5 KiB) Viewed 330 times

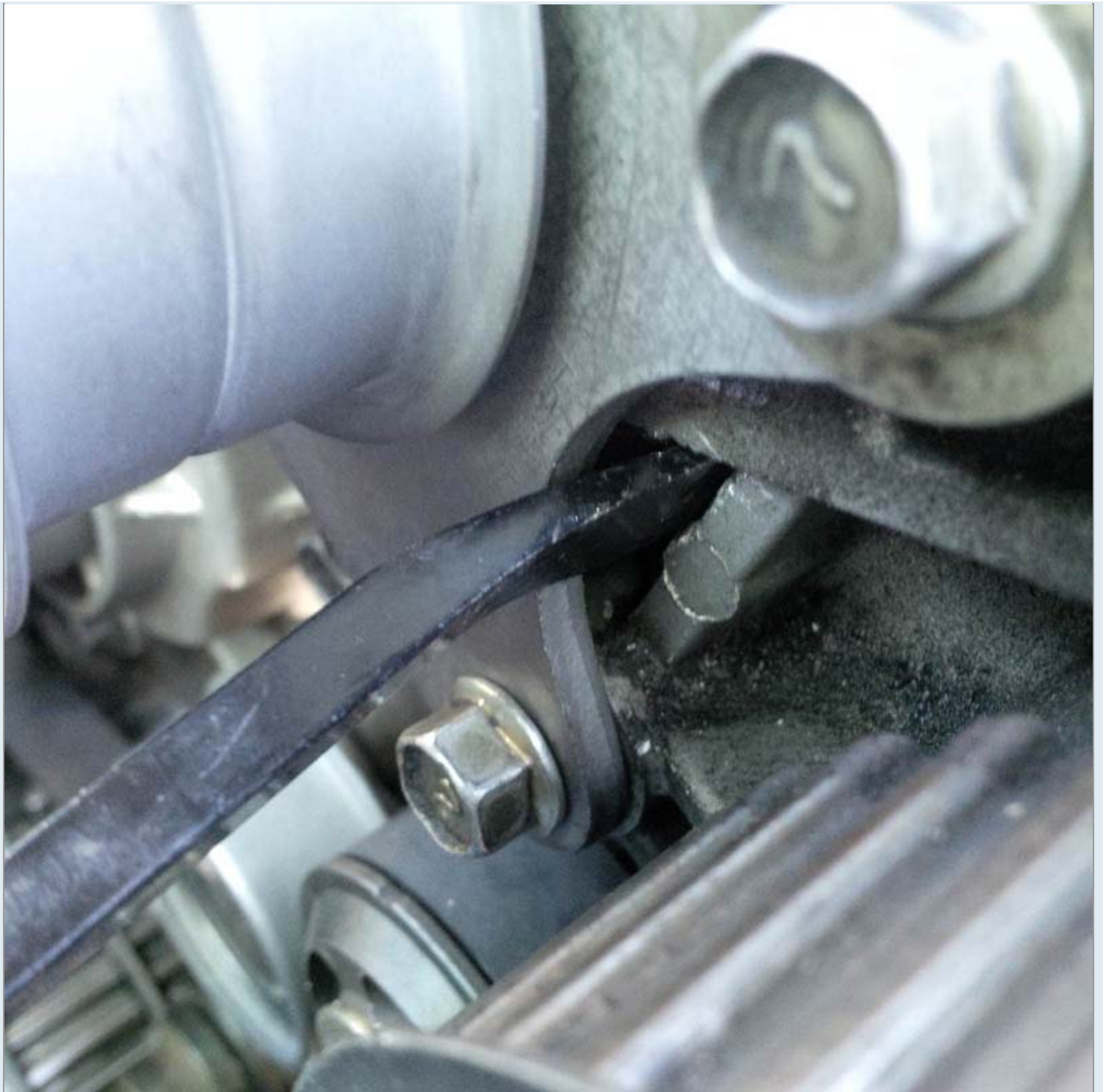
Tricky to get the tensioner and spring into place. Probably a few ways to do this, and this is what I did. Place a small lever bar and push against the spring (towards the drivers side). Pop the spring over the bent metal hook on the tensioner.



IMG\_20150722\_095313.jpg (275.19 KiB) Viewed 330 times

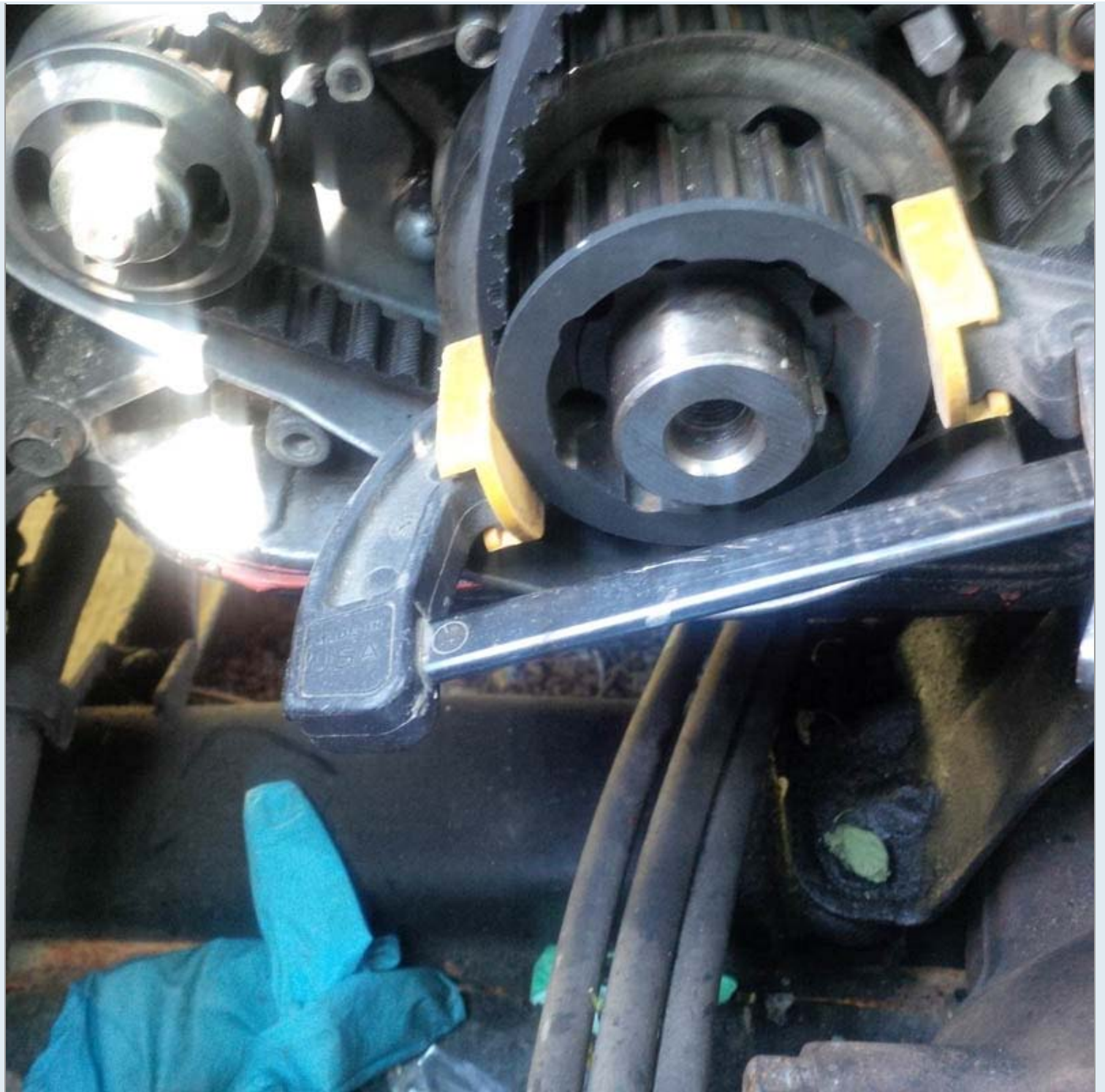
Once the spring is in place and you've replaced the two bolts, move the lever bar to this position on the tensioner and apply some leverage to push against the spring. Tighten the upper bolt on the tensioner to hold it in place so it doesn't rebound. Keep the bottom bolt finger tight.





IMG\_20150722\_100019.jpg (250.29 KiB) Viewed 330 times

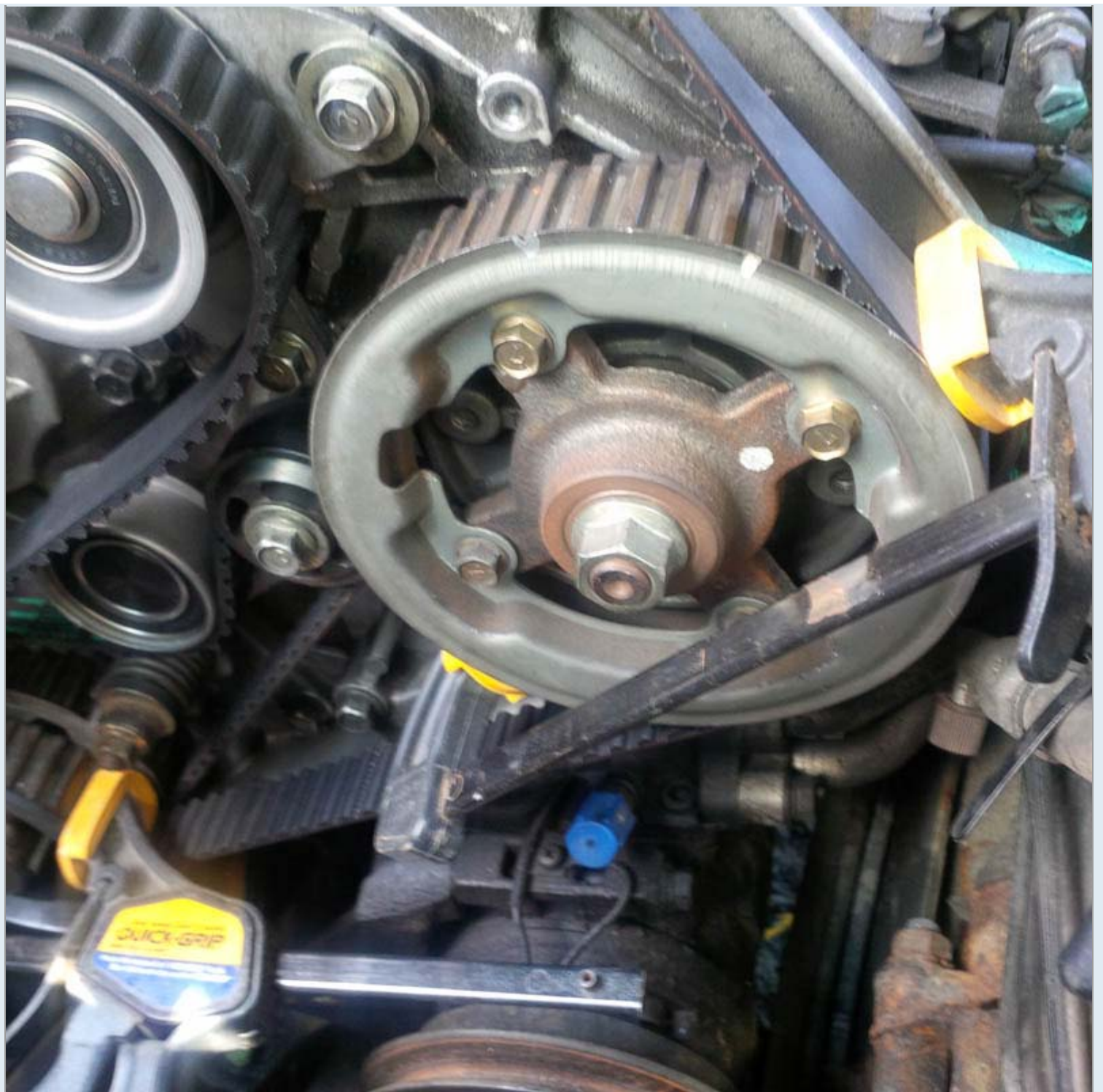
Align all the marks on the crank, cam and IP sprockets. Clamp the belt in place on the crank sprocket.



IMG\_20150722\_120329.jpg (325.3 KiB) Viewed 330 times

Put a wrench on the IP sprocket and turn it clockwise to align the timing mark, then clamp on the timing belt. There will now be slight tension on the right side of the belt (passenger side).

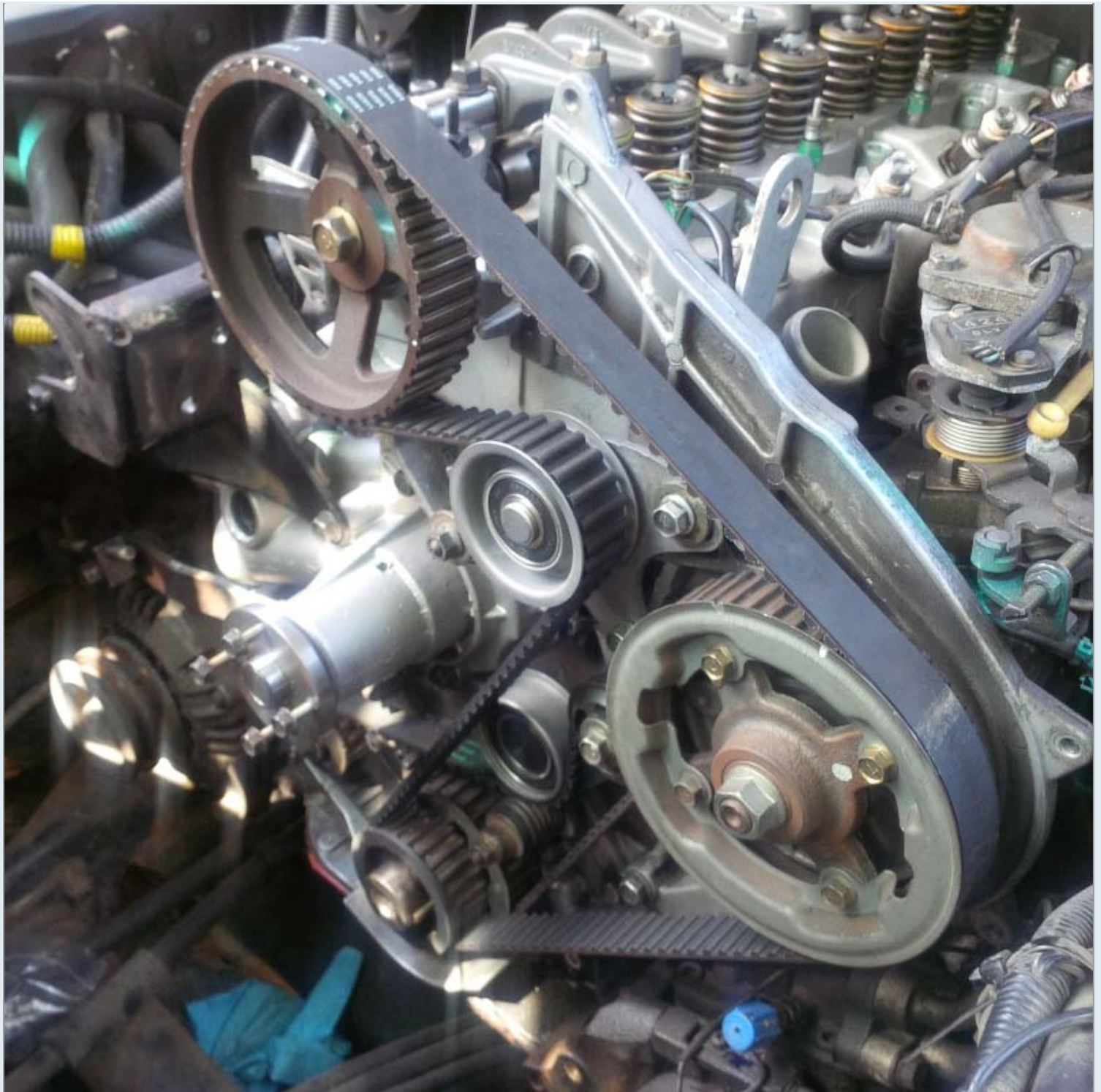




IMG\_20150722\_120354.jpg (338.44 KiB) Viewed 330 times

Ease the belt onto the cam sprocket without moving anything and it should look like this.





IMG\_20150722\_120648.jpg (755.41 KiB) Viewed 330 times

Release the upper bolt on the tensioner and allow the spring to apply tension to the belt. Torque both bolts down and you're done!

Check deflection, should be 4 to 5 mm.





IMG\_20150722\_121109.jpg (263.02 KiB) Viewed 330 times

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lrp374



Re: L300 Head replacement and timing belt DIY, step by step

Sun Mar 20, 2016 3:53 pm

Tojo I just reviewed your post on the Head replacement etc. and it even makes more sense than the first time. I didn't remember the replacement section but it will even be more help than the removal. I think you should get some kind of award or @ least a royalty from those who use your great post. Thanks again for the effort I know it really adds a lot of time

to your repair. 😊

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⚡ Return to “L300 Technical”

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