

Rebuilding the Lada 1600 engine (II)

Disassembly of the major engine subcomponents

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This chapter focuses on how to strip the main engine subcomponents and/or internal assemblies. I'll start with the easy stuff and leave the most difficult for last...

1.- Camshaft and bearing housing assembly:

There's nothing hard about this. Cover the jaws of your bench vice with a couple old rags and secure the camshaft/bearing assembly, but **DON'T OVERTIGHTEN IT!** The bearing housing is made of aluminum, so there's a strong chance that it will be distorted (making the camshaft hard or impossible to remove) if you clamp it way too tight:



Use a 10mm spanner to loosen the camshaft thrust plate nuts (located at the front of the bearing housing) and then remove the camshaft thrust plate itself:



The camshaft can now be easily withdrawn from the bearing housing. See? Piece of cake...



2.- Crankshaft:

The crankshaft oil passages/galleries have these little plugs which need to be replaced as a matter of course, but that's a job usually left to the rebuilder shop/engineering works:



Nevertheless, the rear end of the crankshaft houses a small bearing (named pilot or spigot bearing) which should be replaced every time the engine or gearbox is removed regardless of its condition:



There are a good number of tricks for removing a pilot bearing, but I feel the easiest way is by using a slide hammer along with a proper pulling fixture. I happen to have a K-D Tools axle shaft puller which proved extremely effective for this purpose:



The puller flange and slide hammer shaft have 5/8" UNF threads, so it was pretty easy for me to fabricate a simple pulling fixture using a 5/8" UNF long nut, a standard 1/2" grade-8 nut/bolt and a flat 1/2" washer. I had the 1/2" bolt head turned up in the lathe until its diameter was a tad smaller than the pilot bearing's inner race and *Voila!* Now I had something that can be used as some sort of hook on the end of the slide hammer:



The picture shows how the improvised puller device is inserted through the bearing inner race. I had to tip the slide hammer a little bit so the step right under the rounded bolt head could "snag" on the inner race:



A couple hits of the 5-pound slide hammer are fair enough to pull the pilot bearing out from the crankshaft's rear end...



3.- Water pump:

The front case of the pump houses the drive pulley hub, shaft, bearing and impeller while the rear case only has a couple inlet and outlet connections to it. Only the front housing will be replaced during repairs, but we still need to split the pump apart. Start by clamping the pump in the vice (again, line the jaws with rags to avoid damaging the soft aluminum case):



...Then, using a long 13mm socket and ratchet, remove the four fastening nuts:



Remove the fan shroud bracket:



...And finally remove the pump's front housing:



Remember to remove the alternator tensioner before discarding the old pump!. My tensioner is dead straight because I have a 90 A Femsa alternator which is quite different from the OEM Lada one:



Once the engine is fully rebuilt I'll be building my own version of the now world-famous Hoodoo's alternator relocating bracket, but I guess that deserves writing a separate article... ☺

4.- Cylinder head:

The cylinder head houses a good bunch of small components. Before fiddling with it it's a good idea to place the head on a flat soft surface like a piece of cardboard, wood or clean rags to avoid damaging the gasket mating surface:



Start work by using a 10mm socket to loosen the timing chain damper fastening bolts. Once the damper is removed the head will sit level with the workbench:





Now it's time to remove the cooling system connections, starting with the heater matrix return pipe. Use a 10mm spanner for that:



Living in a tropical environment means you could use water instead of refrigerant as coolant, but this is just a small sample of why it shouldn't be used. The salts dissolved in normal tap water can attack the aluminum; that's why anti-freeze has inhibitors in it to prevent this from happening. One thing's for sure: I won't be using only water again!



Use a long 13mm socket to loosen the nuts on the thermostat/upper radiator hose Tee connection and remove the latter from the head. That plugged-up short section of hose is where the thermostat is supposed to go, but I got rid of it a few years back since it's not needed in a 30° C+ year-round weather:





Use the long 13mm socket along with a 6" extension and the ratchet to remove the intake and exhaust manifold fastening nuts:



One of those nuts is very well hidden:



Pull gently on both manifolds in order to separate them from the cylinder head. In doing so, take special care so as not to damage the EGR valve tubing, this can be removed later:



Use a small flathead screwdriver to pry out and remove the manifold gaskets:



A 13/16" spark plug socket must be used to remove the spark plugs and the temperature transmitter. The transmitter is located above and slightly to the left of the No. 4 spark plug:

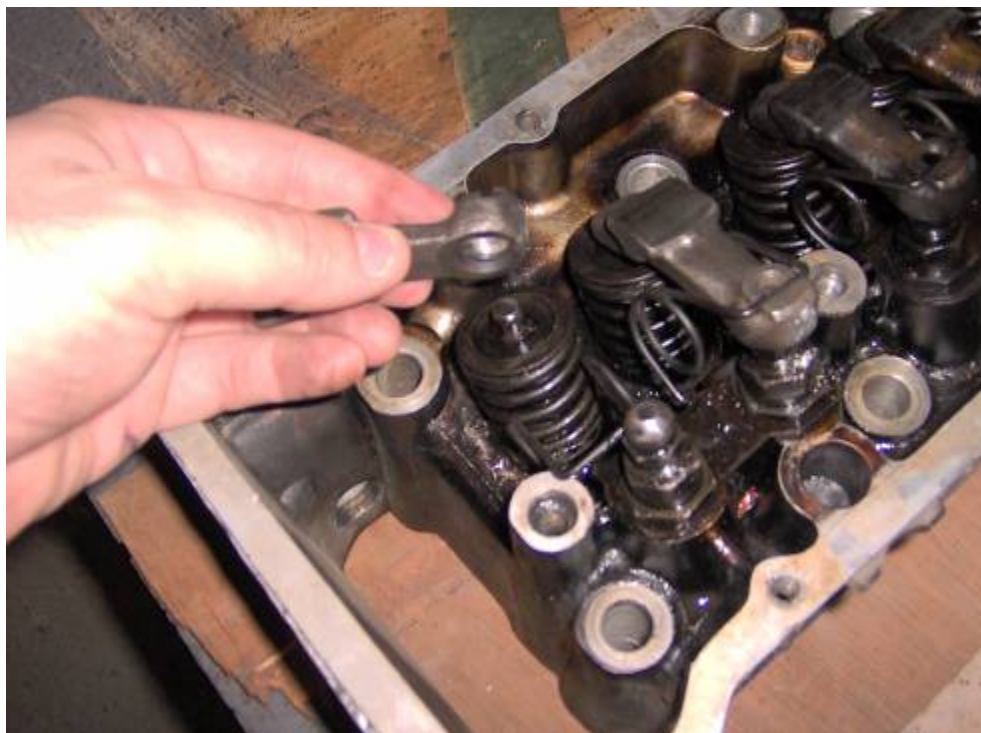




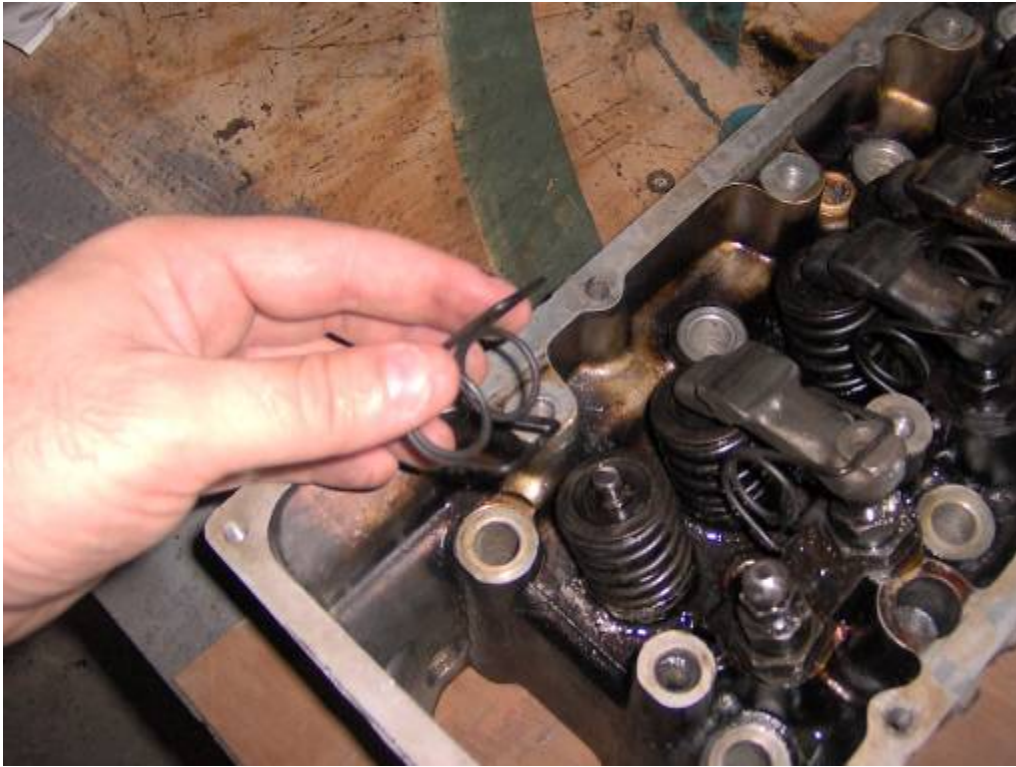
Although not mandatory, all work on the head will prove easier if all of the studs are removed first. The easiest way is by using a couple spanners to jam two nuts together on the stud threads and then using a spanner to drive the stud out like a conventional hex bolt. Head studs come in only two sizes (5mm and 8mm), so make sure you have two nuts of each size and two 10mm and 13mm spanners:



Now that all of the studs are out of the way it's a lot easier to access the valve rockers. Grab the rocker with your thumb and index finger, pull upwards (see picture) to withdraw it from the adjusting screw spherical support, shift the rocker towards the valve side and finally slide it out of the rocker spring and out of the head:



After removing the rocker, the rocker spring can now be easily pulled out from its hook under the adjusting screw:



The adjusting screws should be removed from their threaded bushings. These screws can be very hard to remove on old engines, so it's a good idea to spray them with some penetrating oil (such as WD-40) and let it sit overnight:



Next morning, use a 17mm spanner on the locknut and a 13mm one on the adjusting screw itself to loosen them out:



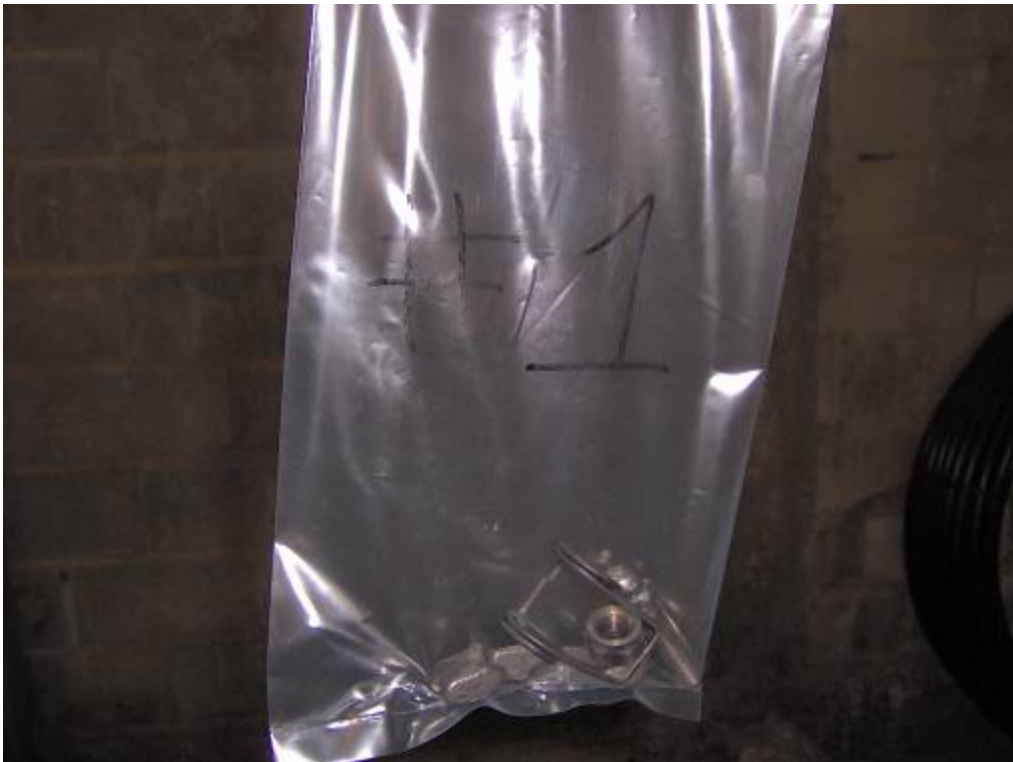
On the first article of this series I stressed the importance of storing valvetrain components coming from different locations separately. The key to avoid mixing up components from different valves is to remove each part one at a time, then toss them on a solvent bucket...



...Dry them (I'm poor and don't have an air compressor, that's why I use an old T-shirt to dry everything out)



...And finally place them in separate transparent plastic bags, which have been previously marked with a permanent marker according to their position on the cylinder head:



Don't go and seal the bags because we ain't done yet...

You'll need a valve spring compressor in order to remove the valves. From my experience I can assure you that there's basically two kinds of valve spring compressors: Those that work, and those that don't.

I had the bad luck of wasting my hard-earned money on a K-D tools universal overhead valve spring compressor which proved to be completely useless for this particular application. This design only allows external springs to be compressed, but the Niva's head uses both internal and external springs and there's no way the inner spring would allow the valve collets to be removed using this type of tool... Baffled and frustrated for wasting money on a real piece of crap, I went back to the hardware store only to have the sales manager say that they couldn't give me a refund because the packaging was badly damaged. After politely telling him that he was the biggest wanker in town, I hauled for another store, got me a 4-inch C-clamp and sat in front of it for over two hours while thinking about my next move...

After lots of more thinking I took my nice and shiny brand-new C-clamp, squeezed it on my vice and proceeded to cut and grind the hell out of it with an angle grinder. Curiously, all that grinding frenzy turned out to be like therapy for me...

So therapeutic it was, I even took my cheapo made-in-Taiwan 13/16" spark plug socket and cut a couple pieces off of it. I got to use the grinder again for shaping a couple bits of 5mm thick steel plate and then took everything to a welder friend to have it all joined together. Well, I guess they don't say "Necessity is the mother of invention" for nothing... This pic shows the ridiculously priced and totally useless K-D Tools VSC right next to my simple creation:



To tell you the truth, I was amazed by how well everything turned out. This simple tool allowed me to take out all of the valves in less than ten minutes...



Luckily for me, the valve adjusting screws have M12 x 1.25 threads. If this wasn't the case, I seriously don't know how I would've managed to engineer things out:



After compressing the springs, the collets can simply be removed using tweezers (I used a magnetic parts retriever for this purpose):



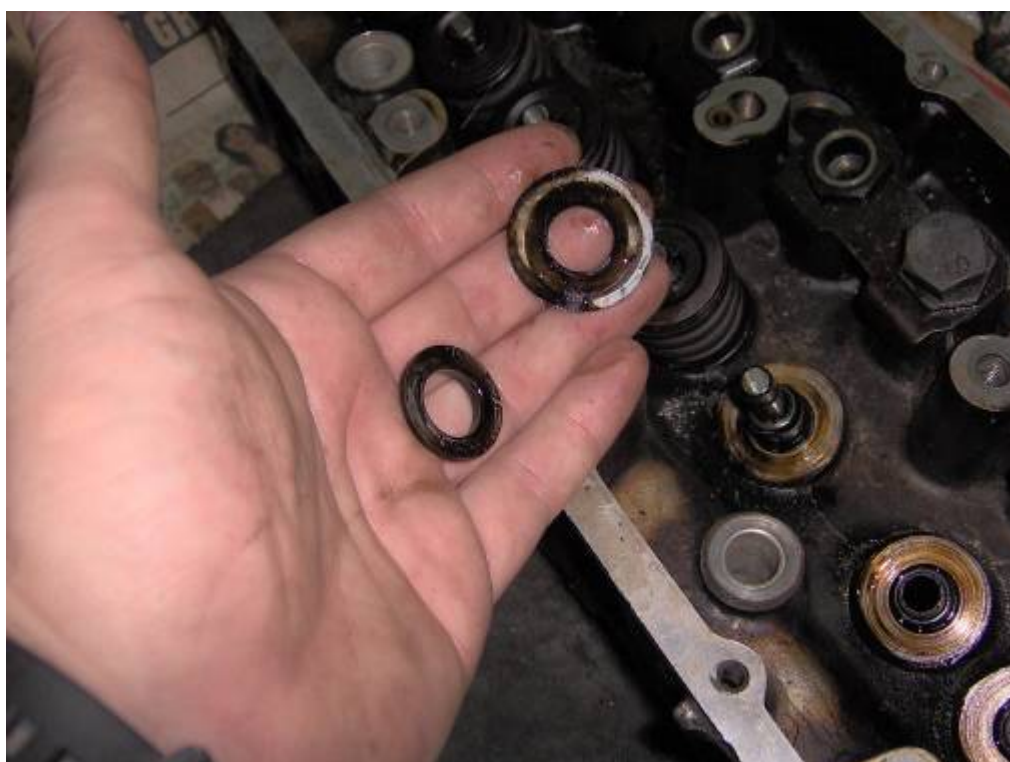
Relieve the pressure on the springs, remove the valve spring compressor and take out the upper spring seat:



...Take out both inner and outer springs...



...Followed by the flat washers that double as lower spring seats ...



...Withdraw the valve from the head's underside...



...And finally remove the old valve stem seals. If the guides/valves are still in good condition and are going to be reused, take special care not to damage the guides while removing the seals:



Remember to store each component in the right bag, even the valves if they're going to be reused:



If the guides need to be replaced I'd strongly suggest leaving such job to the engineering works. They'll have the special equipment to remove the old guides, install the new ones and ream them in place to ensure a right fit. This is how the head should look like once everything is out of the way:



Alejandro Gabatel, November 2006.-