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As well as my NC2, I have a 1989 model NA which is car #51 built for Oz. It has 312k on the clock and the engine was getting fairly rattly (stuffed hydraulic lifters) and using oil ... plus I had previously fitted a six-speed gearbox (with regret – unless you also change diff ratio, it's very limiting).

I was given an engine some years back which is an NB (not NA) 6. Apparently this is a poverty-spec engine sold in Japan and UK and parts of Europe – built for fuel economy. It only had 80k on it so I thought it would be good to fit it to the car and then take my time to recondition the original (bog standard) engine and re-fit it to the car eventually to keep it a “matching numbers” car. I had also picked up a used five-speed gearbox with about 80k on it.

I had been “meaning to get around to it” for about three years! There was a khanacross coming up in late February so the Sunday before, after finishing lots of other jobs around home, in the late arvo I thought “bugger it, I'm going to start now ...”

After all, it can't take that long to swap out an engine and box.

My “currency” on such jobs was back in the mid-'80s with Datsun 1600 rally cars and race cars I had built so I'm rather out of practice on major surgery and with the tight confines of modern engine bays.

Fortunately I am well equipped for tools and I have an engine crane I bought a couple of years ago for when I got around to this job. I also have trolley jacks and axle stands ... as well as an old back and a crook shoulder that do not enjoy it when I crawl around on the floor!

Anyhow, getting the motor and gearbox out was relatively easy – I think it was done by about 10am Monday morning, after relatively little hassle and few skinned knuckles. I took the precaution of removing the inlet manifold in the car – a pig of a job to get the fixings underneath BUT it definitely made other fixings more accessible – particularly a couple of tricky bits are the engine/gearbox interface where a couple of brackets are bolted on.

Note to anyone doing this job: if you're undoing any of the engine/gearbox bolts, ensure you have six-point (hex) sockets, not 12-point, and long extension bars, a universal joint and someone who can place and hold the socket while you lie under the car to turn it – *I struck out on all these points!*

I was able to undo the aircon compressor

and wire it to the body, saving having to drain gas. The PPF frame can have one bolt left loosely done up on the diff, allowing it to be swung out of the way; after disconnecting the wiring loom from the PPF frame, I realised that I probably didn't need to – another *bugger*, as it was not that easy to do!

Once the gearbox was drained and the gearstick was removed, the entire engine/gearbox lifted out easily, with the car still on the stands and with an equaliser on the lifting hoist so I could re-jig the balance and keep the gearbox sloping down. I turned up a nylon plug to stick in the rear of the gearbox to prevent any residual oil from falling out. I thought I may need to remove the cam angle sensor (CAS) at the rear of the motor but it turned out that it was not necessary.

To eliminate modding the car to suit the engine, I opted to “convert” the NB engine to NA spec. This involved putting a drive on the end of the inlet camshaft so it can drive the NA6 CAS on the back of the driver's side cam cover. I had this done at an engineering works a couple of years back. Otherwise it was a matter of using the NA inlet manifold and exhaust extractors plus changing over a few sensors and cooling system housings. I also did a cam belt, seals and water pump change as a precaution. After checking the clutch life (*ALWAYS purchase a plastic alignment tool off ebay - \$18 well spent!*) and fitting a new front seal to the gearbox (it had arrived covered in oil and I was not sure where this was from) the two were bolted together and lowered into the car.

Lining up the engine mount holes AND not damaging the CAS or the firewall while working alone was one of the hardest parts of the job. This is one time where a helper would have been invaluable!

Once slotted in, everything was smooth sailing with a couple of silly exceptions:

1. The water pipe that runs along the side of the motor on the passenger side slots into the front housing using an O-ring for a seal. I had looked at it when fitting, lightly lubricated it and said “she'll be right”. *She wasn't!*

As soon as I started filling the cooling system I ended up with green water everywhere under the car. Wonderful ... I had to lie in this later to do other connections! *How to fix?* Check the envelope of spare bits I had bought from an American supplier a couple of years back and there was the correct part – I had it all along and failed to use it. This was a relatively easy fix but for a while I THOUGHT I may have to pull the extractors back out.

2. I had omitted to connect a wire on to the temperature sensor in the housing under the CAS. *Aaaagh!* There is NO room in this part of the engine bay and my hands are too fat. I got my eight-year-old granddaughter involved and, after lots of talking and coaching, she decided it was (a) too dirty, (b) too hot [the engine had been running], and (c) too hard. Oh well, out with the CAS, slot the wire on and re-fit the CAS. If you have ever removed the CAS in the car you'll understand this is MUCH easier said than done!

The engine started pretty much straight away from a guessed initial position on the CAS.

I thought I was Christmas, but as soon as I revved it there was an ungodly screeching! It seemed like belt screech but I started doubting all the work I had done on the front of the motor and assumed I had buggered up the water pump or cam belt etc. I decided to investigate further before stripping off the front of the engine again (*glad I did*).

Twenty-four hours of investigation finally “proved” it was belt screech, so I tightened the alternator belt harder and it stopped. By now it was late Thursday. I went out Friday morning to start finishing up and check timing ... but there was NOTHING from the battery. The battery was about five years old; it had been working beautifully but was now totally dead. I tried charging but my smart charger said it was not capable of taking a charge.

By now it was mid-morning Friday, and the khanacross that I had set my sights on was on Sunday. I went and got a new battery (\$150), slotted it in and started

transmission changeover



the car – *beautiful*. I took it for a short drive – *magnificent*. There was not much power (I expected that from the “poverty pack” engine) but both engine and gearbox felt tight and “new”.

Lovely ... but wait, what’s that smell? Smells like battery gas.

Open the boot and the battery is sweating, bubbling and the sides have bowed out (I mean REALLY bowed!). Clearly only one possibility – the alternator that came with the motor is overcharging. Of course my original motor used a vee belt drive while the later NB motor uses a flat belt drive, so I can’t simply substitute it. Nothing I had would undo the drive nuts on either the old or the “new” alternator drives, so it was off to the auto elec (half an hour away) to see if he could get me sorted (it was now early Friday arvo).

After disassembly, he found the drive pulleys were not interchangeable – different shaft diameter! So he scratched around and found an old pulley that, after some machining on the lathe, could be made to work.

“Mate, I’m busy rebuilding a truck starter at the moment so come back just before I shut this arvo ...”

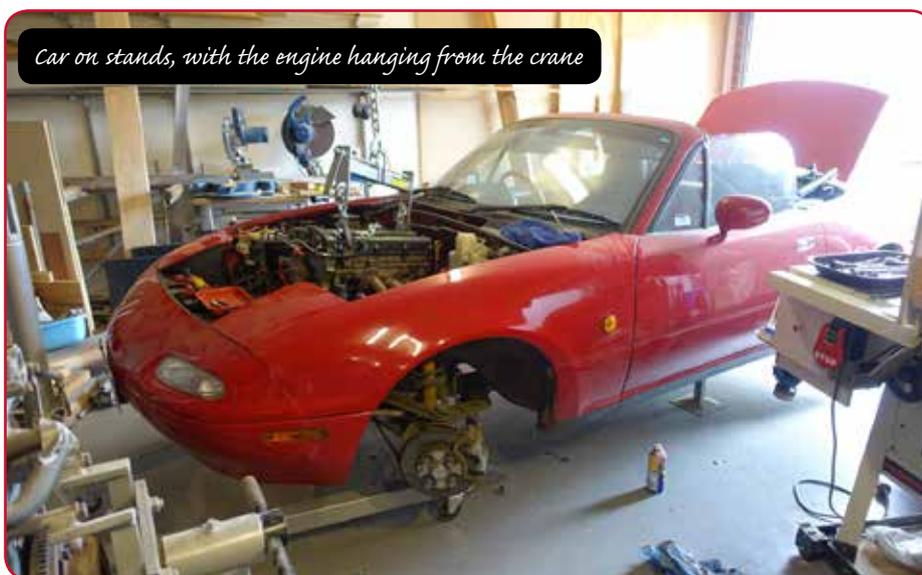
So I returned later, hoping he had sorted the problem (by now I was *determined* I would be driving THIS car in the khanacross if it killed me!). The pain from all the skinned knuckles, and the loss of most of the week, *had to have been for something*.

Fortunately he had sorted the drive and I re-fitted it as soon as I got home ... and on Saturday morning I took the car for a drive – *beautiful!*

It was really pleasant to drive and the battery had lost much of its bulging and was now cool (I think the two-year warranty may have gone west however).

I drove the car to the khanacross and it did not miss a beat – it was a bit gutless up the hills, but otherwise it felt like a new car. *A pity the driver did not perform nearly as well!*

I had hoped for fairly smooth sailing on this changeover, but I should have expected what actually happened – it seems to be what usually happens with me! ■



Car on stands, with the engine hanging from the crane



Old engine, about to come out



Out it comes



Empty engine bay



removed engine



replacement engine