

How To Convert standard struts to coil-overs

Standard struts won't give us full drop on our project V8 Capri without bottoming out. Here's what's involved in creating adjustable struts and corresponding inserts.

The process of converting our project V8 Capri to fully adjustable suspension continues — we've already fitted a compression strut kit complete with adjustable TCAs and next on the list is to drop the suspension height, which is a task commonly done with lowered coil springs at the front and lowering blocks at the back. The latter we've already built in when we fitted our narrowed 8-inch Ford rear axle along with Webster Race Engineering. We mounted the axle on leaf springs with our own fabricated lowering blocks/mounts.

But we need to drop the front by a corresponding amount, which is very low! Trouble is, you can only do that so far with the standard spring configuration and that's not enough. What's more, it's still fixed height.

The normal solution's to convert the front struts to 2.25 inch inside diameter (ID) springs with adjustable platforms; meaning you can wind the springs up and down and therefore alter the ride height to suit. This is a job you can do either by buying purpose-made/converted struts, or the budget way, do it yourself with an abutment kit and fitting new inserts at the same time.

The problem is that you can again only lower the springs so far before you run out of damper travel, because the strut bodies have a fixed length meaning they bottom out on the lowest setting — which isn't low enough for us.

The ideal solution is to shorten the strut bodies, while fitting shortened inserts — we had an idea we could do this ourselves but consulting with the experts at Gaz, Dave Lyon shook his head and said, "not sure I'm happy with that..."

The problem is, the strut tube has a thread at the top so you can't simply cut it off and fit a lowered insert as you can't screw the cap back on! And cutting and shut the strut tube itself (minus 2 inches in our case) isn't a reality because the load going through a strut and the forces on the weld could be too extreme. The strut has all the steering leverage going through it after all... The only safe way is to remove the stub axles from the strut tubes and replace them with lowered ones with corresponding shortened inserts. This is a job for an expert — but to see what's involved and convince us it's not a DIY job, we went to Gaz Shocks to be shown the complete process, step-by-step...

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1 STRUT CHOICE

You need any RS Escort or 2-litre (or 2.8) Capri struts. You just need the stub axles which have detachable steering arms and a bearing platform that's 28 mm at the large end, 19 mm at the small.



2 We actually have an odd pair of struts — one's a 2-litre, the other a knackered Bilstein — but it doesn't matter for the aforementioned reason! Check the bearing surfaces are not pitted.



3 STUB AXLES

Next job's to strip the struts — assuming you've binned off the springs using a set of spring compressors, Gaz's Mark Gazzard undoes the top nut on the tube to remove the oil on the inside.



4 Our 2-litre Capri strut is a wet strut, meaning the piston and rod is assembled in the casing along with the damping oil, which needs draining out into a suitable waste container.



5 Our Bilstein's a dry strut, meaning it has a self-contained insert that slots in the damper tube. It removes in the same way — undo the top nut and pull the insert out.



6 Next, Mark mounts the strut upside down in the vice, and cuts the bottom of the strut body tube off with a disc cutter in an angle grinder, corresponding with the angle of the stub axle casting...



7 ...he then dresses the weld back with a flap disc in a smaller grinder, again to the shape, so that you should end up with the tube flush with the stub axle casting...



8 If you look very carefully, you can see the very faint line that separates the casting with the strut tube, meaning it's no longer attached by weld.



9 Mark now heats the casting with an Oxy-Acetylene torch until it's red. A quick whack with a copper-faced hammer and the casting should drop to the floor — obviously, this needs care.



10 The next step in Gaz's process — obviously, once they've cooled! — is to clean the stub axle castings up by shot blasting them. Don't touch the bearing surfaces, though!



11 Lovely and clean, the stub axles are the only bits that we actually need — the rest goes in the scrap bin.



STRUT BODIES

12 We need to shorten our strut bodies by 2 inches and the easiest way to do that is to replace them altogether with new ones made from 2 inch steel tube with course-pitch thread.

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These are made to the correct length by a CNC lathe in-house at Gaz.



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In addition to the main components of stub axle and tube, Gaz also reinforce the weld area using side wedges made from 3 mm steel plate. They also weld on new brake pipe supports, too.



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Our inserts will eventually be wet so our first step is to close the end of the strut tube. They produce this disc of 5 mm steel for this, which is beautifully MiG welded into the base of the tube.



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Next it's cleaned up on the wire brush, which removes any oxidation allowing a clean weld for the next bit — it also improves the surface for the final coating, too.



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We need to weld in the strut tubes to our prepared stub axles, which are mounted 45 mm up from the base of the tube.



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The body should be a very tight push-fit into the stub axle casting; obviously positioned up to the mark.



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Next bit's to position the reinforcing wedges, which sit 'square' with the casting — they're tacked on, position checked, then finish welded.



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The strut's turned over and the brake pipe support's welded on next; in line with the wedge.



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The underside of the strut body is finish-welded into the stub axle casting using MiG. The weld is also wire brushed afterwards too.



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Construction of the strut body's now complete — it's cleaned up before being plated using a black Zinc coating, giving plenty of corrosion resistance.



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INSERTS

The inserts are wet (assembled inside the strut casing). They consist of the central rod, piston and casing in the strut body. First the central rod, which is machined to length on a CNC lathe...



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...next step's to fit some rebound stops to prevent the rod from coming out too far — Mark measures the required length and makes a mark...



25 ...onto which, the stops correspond. This is pretty simple — Gaz machine a steel ring, which is slid over the rod and is welded in place with two sections of stitch-welded MiG.



26 At the base of the rod is the piston assembly — to the side is the piston ring/seal...



27 ...this then slides into the receiving tube, which again is machined to the correct corresponding length.



28 At the base of the tube is the valve assembly, which simply pushes into the base of the pressure tube.



29 The unit can now be put into the strut body casing....



30 ...and high-viscosity, multi-grade damping oil is added to Gaz's own spec.



31 The top's sealed with the rod guide which supports the piston rod is first fitted at the top.



32 This sits just below the fixing nut along with a wiper seal, which is now fitted in place along with a twin-sprung, self-aligning, dual-lipped seal.



33 The fixing nut's added next and done up tight to seal the tube — damping system complete.



STRUT ASSEMBLY

The coil-over system consists of two springs which are matched to the load they'll need to support. Ideally this is determined by corner-weighting.



35 Dave has experience with setting cars up so he reckons we require 400 lb, 9 inch springs. The threaded collars are first, then the springs, followed by the spring caps.



36 The struts are complete although we need to fit adjustable top mounts, which we'll discuss when we fit the struts to the car. We will also show how to adjust the struts for height and damping.