FITTING BELLHOUSING AND DRYSUMP PROTECTION TO A VAUXHALL ENGINED SEVEN

Introduction

There are two things that you're not told when you 'dry-sump' a 2.0 litre Vauxhall engine Caterham 7.

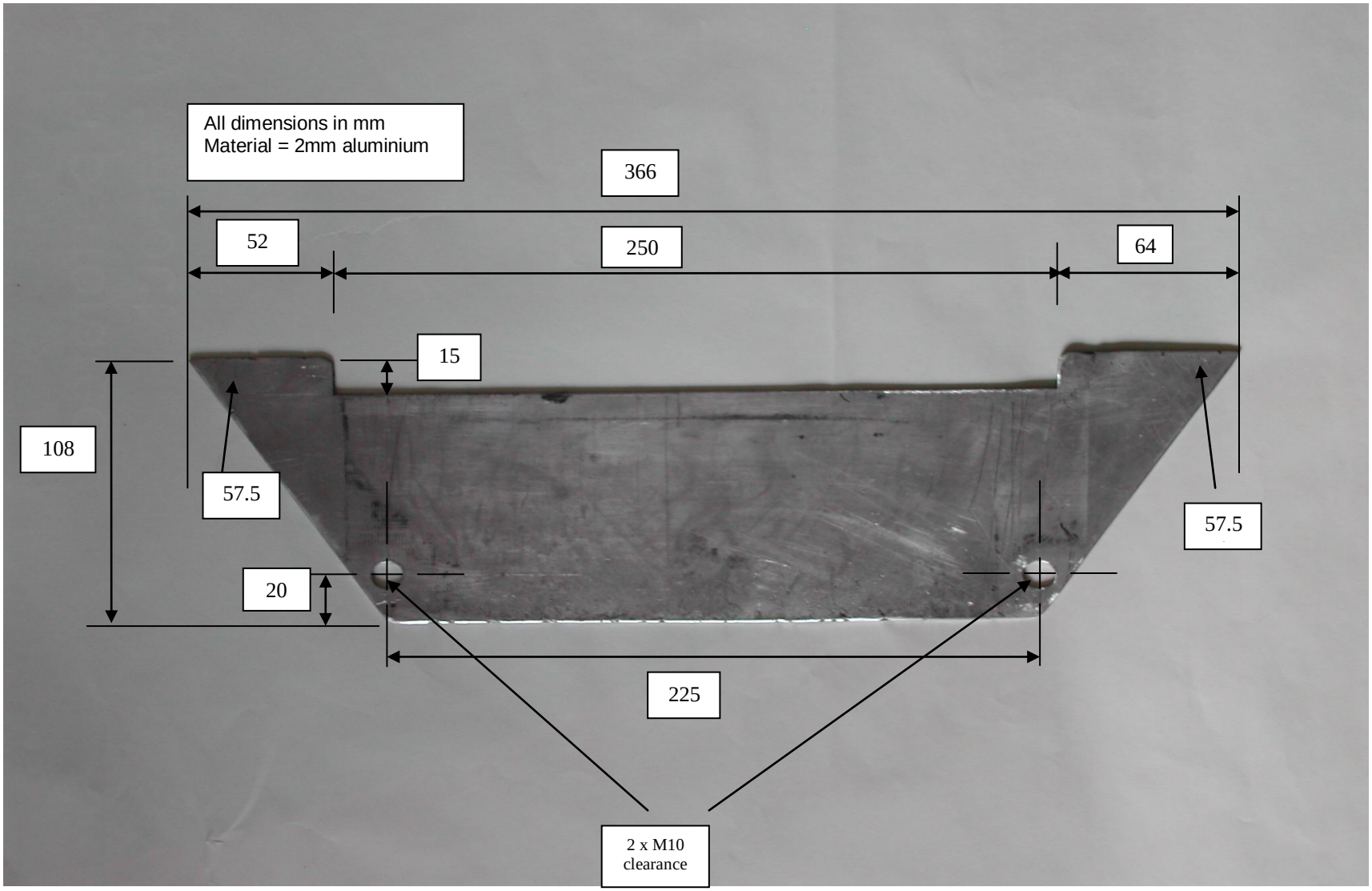
The first is that the original sump covers the lower opening to the bell housing but the Pace dry-sump version supplied by SBD does not. There's a huge gap left each side which would allow all manner of crap into the flywheel space, especially on a road car, and could potentially cause serious damage. The Caterham supplied dry sump and 'bell tank' bellhousing doesn't present this problem.

The second is that the Pace three stage pump and the Titon two stage scavenge-only pump are belt driven and, without some form of protection, the toothed drive belt can pick up stones from the road or gravel trap which will almost certainly damage or take them off the pulley. This would not only deprive the engine of oil, immediately in the case of the three stage Pace pump and after about 20 seconds with the two stage Titon, but also the debris could interfere with the cambelt and cause that to come off too. The consequences of either or both are too horrible to contemplate!

Bellhousing Cover Plate

The answer to the first issue is quite simple and involves shortening the sump by milling 2mm from the rear face. This allows a tailor-made 2mm thick ali plate to be inserted, cut to the shape of the aperture and held in place by the two M10 through-bolts clamping the bottom of the bellhousing and the sump rear face together. The two sump lugs may require drilling, if not already done, and they can be filed to a better shape which shortens them slightly, so increasing ground clearance. Obviously a different thickness of ali plate would require a correspondingly different amount to be milled from the sump back face.

As always with these types of project, the dimensions shown are those that suited my car and may vary for your specific chassis. Always carefully check the dimensions before cutting metal or, better still, make a cardboard template first so you can check the fit.



As precise installation dimensions may vary, it is recommended that a trial template is made from cardboard to check in-situ dimensions before cutting metal. The SBD dry sump requires shortening by milling the plate thickness (2mm) from the rear end face of the casting to accommodate the plate between the sump rear face and the bell housing front face. The dry sump casting rear legs require drilling to accept 2 x M10 through bolts, plus nyloc nuts and plain washers, from the bottom holes in the bell housing, the bolts also passing through the plate and securing it in place.

Sump Shield

The second item is a little more involved than the first and requires a bit more fabrication and 'tin-bashing'.

As well as providing protection to the cam belt and oil pump and alternator belts, any one of which can be damaged by stones and then take-out the cam belt, I have an external crank sensor that mounts on a purpose made lug that's part of the sump casting at the front edge. This relatively fragile device is also vulnerable to stone or grounding damage so it seemed sensible to build in some protection at the same time. The sensor 'reads' a toothed ring fitted to the crank pulley. The internal crank sensor and crank mounted timing wheel were removed after seeing pictures of one that had fractured and come apart inside an engine, fortunately without damaging anything else. SDB also claim that they get a much more reliable ECU timing pulse with the external arrangement.

The SBD sump comes with two M3 mounting holes predrilled and tapped so that the sensor cable comes out towards the front of the car. In my view this makes it unnecessarily vulnerable to damage so I drilled and tapped another two holes at 45degrees to the originals, allowing the cable to come out at 45degrees towards the rear.

The pictures show the general design of the plate but obviously the cut-outs and forming need to match the dimensions of the car to be fitted. I used 2mm thick ali which has proved perfectly adequate without being overkill for the job. The number of scuffs and dents after a few years use bear testimony to its efficacy and to how essential this item is.

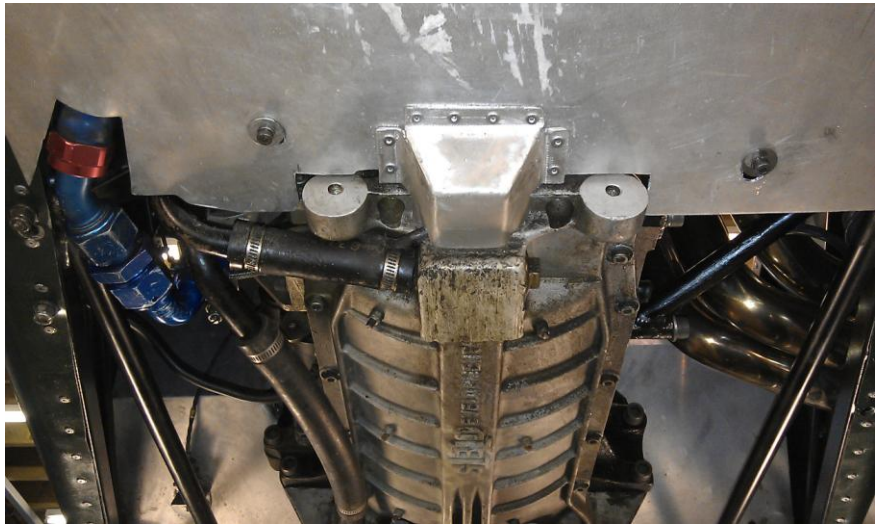
The front edge of the plate was rolled to fit over the front chassis rail by clamping it in a WorkMate and bending/bashing it round a suitable radius broom stick. I lined the inside of the resulting channel with duct tape to help protect the powder coated tube. The plate needs a slight bend roughly in the middle across its width to follow the contour of the underside of the chassis. Other bits of forming and shaping, around the oil pipe for instance, used bits of wood and a soft hammer or mallet and proved relatively easy to do if done with care and a bit at a time. A good pair of tin snips and a junior hacksaw are essential.

The plate is held in place by two 'P' clips around a tube either side towards the rear of the protected area. The clips are modified by the addition of an M4 hankbush fitted to the upper flange. These act as a captive nut for each of the two M4 screws and large washers holding the plate in place via two holes drilled in the plate. These holes ended up 10mm in diameter after several goes to get them to line up with the 'P' clips but this does make it easier to refit!

The rear edge of the plate has to be cut and trimmed to fit around the front of the sump casting. There needs to be a small clearance gap to allow for engine movement without contact with the plate but not so large as to allow small stones from a gravel trap to get in. Somewhere around 3 to 4mm seemed about right.

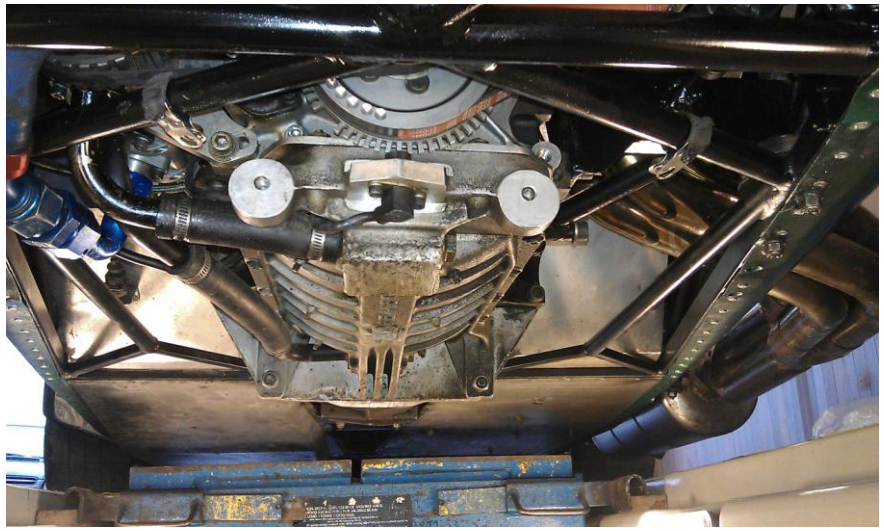
The last part was to fabricate a cap to cover the crank sensor. Again, this was bent up from 2mm ali with sides sloped at about 60degrees. The first one proved its worth after a big smash at a French hillclimb. Although the cap was mangled, there wasn't a mark on the crank sensor which, I'm pretty sure, would otherwise have been wiped off its mounting. The replacement second iteration was identical to the first but, although by no means essential, this time I welded up the front edges to give it a bit more stiffness. Once trimmed to clear the sensor cable, the cap was pop riveted into place.

Tray in situ

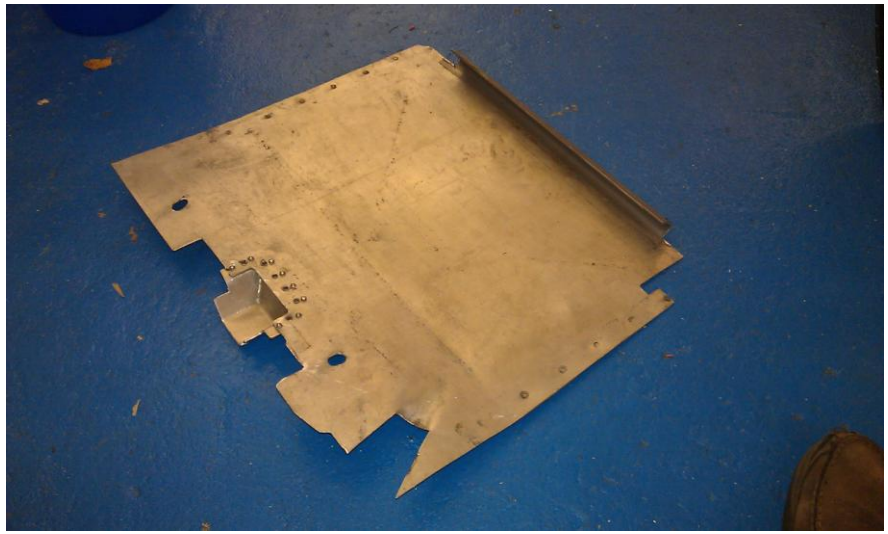


Close up showing crank sensor cap and shield securing screws

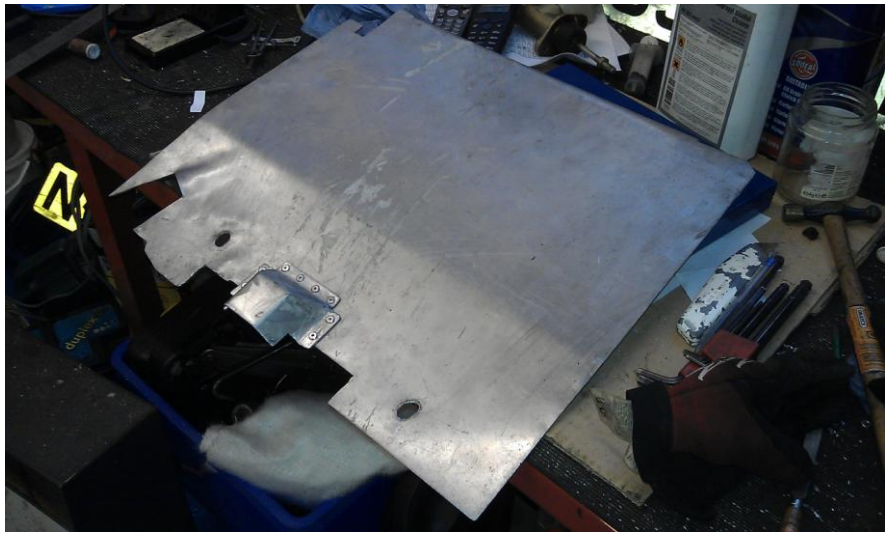
The whole tray can be removed and replaced in seconds, to gain access to the belts or to check for stones, simply by removing the two caphead bolts.



Crank sensor rotated through approx.. 45degrees



Finished shield – ignore holes from previous sensor cap fitting!



Finished Shield

'P' Clip Detail showing Hankbush

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