

Lotus Europa TC Rear Crossmember

The rear cross member serves to link and transmit loading from the rear damper mounts and also to locate the two engine bay stiffening ribs.

Considering the age of the car it is likely that the original dimensions were imperial units and as such initial readings were taken as Imperial with metric units also taken in order to select the nearest metric plate sizes.

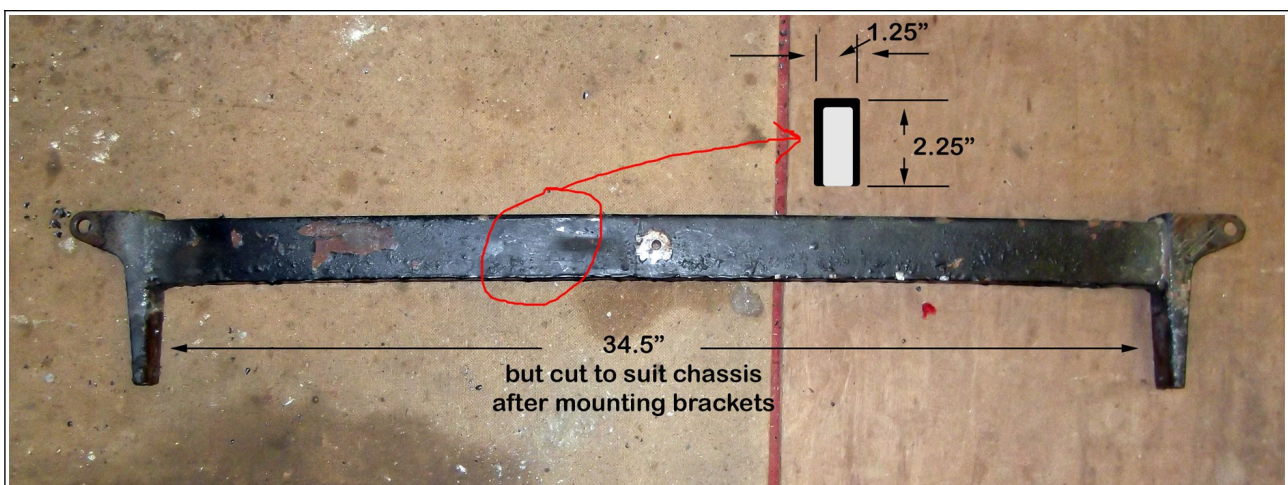
The original brackets which are bolted to the chassis side rails were a U channel with wall thickness of 1/8", measured at between 3.1 & 3.2mm depending on surface condition.

These are linked by a single U section channel to take the sideways loading out of the relatively thin chassis rails. On my car this was in poor condition and it wasn't possible to obtain a reliable thickness, therefore this was estimated at 1/16"m (approx 1.6mm)



Rear Cross member Assembly

The cross member also locates two stiffening ribs which are bolted centrally. This isn't a plain hole, there is an internal crush tube to prevent the sides of the cross member from collapsing.



The cross member on my car was in poor shape and apart from rust also had some distortion. For that reason I only took rough measurements for the length.

During fabrication it's more accurate to bolt both damper brackets in place and then measure exactly what you need for the cross brace length.

Dimensions for the brackets are given in the accompanying PDF file. Looking at modern steel supplies I purchased mild steel in the following sizes;

Brackets : Rectangular section with 4mm wall, 80 x 40mm section (external measurements) The alternative is 3mm wall but I prefer to go slightly thicker rather than fractionally less.

Cross member : Rectangular section with 2mm wall, 60x40mm section This is closed section and will need extra work in the centre to mount a crush tube for the stiffening rib bolt. However it will be a closed section and once rustproofed internally should last well. It will also be stiffer than the OEM.

You'll need 0.5m for the brackets, 1m for the cross member and there will be metal left over.

I made a drilling jig from the OEM brackets to ensure everything is in alignment but even if you can't do this I'd recommend making a simple jig to align the bolt holes to the chassis for the brackets.

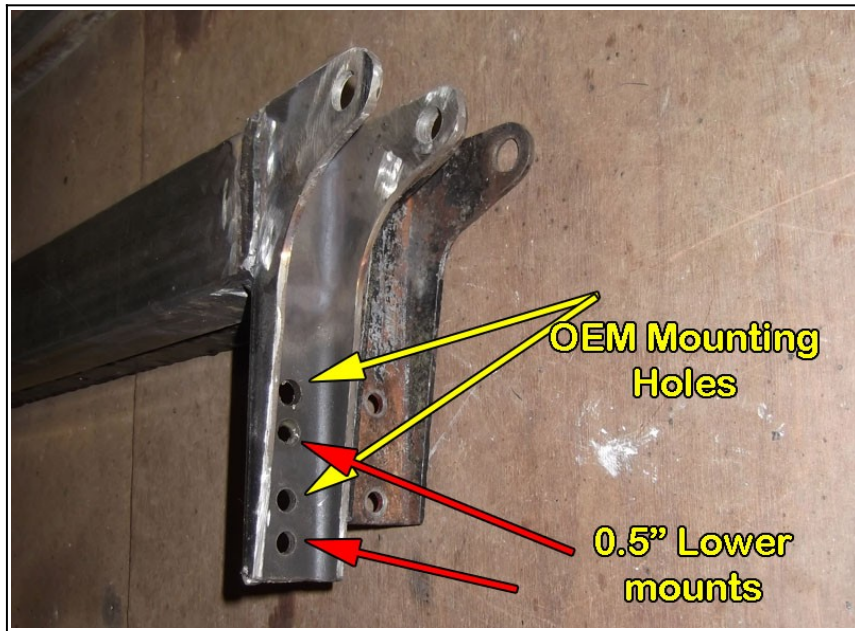


Drilling Jig

There are 2 sets of holes in this jig, the OEM settings and 0.5" away just in case I want to lower the car at any point in the future. This allows me to mount at a different point on the chassis which of course will raise the whole section in relation to the chassis * luggage tray. There's enough clearance on my car to do this (and probably even more) without hitting the tray.

Fabrication is straightforward. I cheated a bit by cutting the brackets from the rectangular section, cuts down the welding and the chance of me distorting the bracket during welding !

The next photo shows the old and new brackets after fabrication, together with the extra holes in case I want to lower the car but keep the same springs/damper range.



Old/New brackets

Once I had both brackets made I welded one to the rectangular cross member section, cut roughly to size. I bolted this on the car and then marked the overhang on the chassis to cut for the exact length.

The car is on axle stands at this point with the weight being taken in front of the cross member so this area is just hanging free and not taking the car weight. Hopefully this ensures the correct dimensions ?

Cut, tack weld on the other mount and check. If all ok, complete the welding of the other bracket.

Check the fit. Because I'd used a deeper channel section I knew there would be tight clearance on the silencer box so that needed attention. Also the central hole where the engine bay struts meet needs reinforcement to prevent the bolt from crushing the section, so that's another job.

Exhaust clearance first. Very simple, I only needed 5-6mm to ensure clearance so I just slit the rectangular section, ground out the clearance I needed and then re-welded to give a closed section again.



Silencer box clearance

The next one is more complicated, the central hole needs a crush tube inserting to prevent the walls collapsing with over enthusiastic spannering.

On the OEM design, an open U section, it's easily done. With a closed section you have two options, either;

- drill the hole(s) oversize to meet the dimensions of your crush tube.
- Drop it in place & weld, grind flush to surface

Or, if you don't have any pipe/tube to hand

- drill hole to exact size
- cut access section from below, slide in tube or stiffening section alongside the holes
- tack weld in place, restore closed section

Either method will work, you just want something to prevent the engine bay struts from collapsing the wall section.

Then it's just a case of painting and installing.....

