

YOUR RESTORATION STARTS HERE

Some Things to Consider When Working on Your Healey Chassis

By Chris Rampen and Martin Jansen

The Austin Healey chassis is probably unique among sports cars - a monocoque ladder frame. You may have wondered why Healey went to the great expense of both stamping and seam welding sheet steel to recreate a simple piece of square tube. For the answer one must go back to post-war England - back to the era of "Export or Perish!" At that time the government controlled the allocation of materials and steel was hard to get in any form. The form Healey got was 16 gauge mild steel sheet, and with that the boys went off to work. The result was the car we all know and love.

The passage of time haunts most Healeys on the road today. The chassis was, as it should be, a highly stress unit and while time has done little to the output of the Healey's motor the strength of the frame has surely suffered. Indeed such is the nature of rust that it usually attacks the areas of highest stress first. The number of cars we see with beautiful exteriors but chassis badly bodged with fibreglass, bondo, tin cans and other nightmares is incredible. It is not surprising that most of them have doors, bonnets and boots that don't close properly.

The purpose of this article is to show you how to do the job right and end up with a car this sweet, straight and worthy of the investment of your time and money.

The chassis is meant to do two things: be a perfectly rigid frame on which to hang the body and hold the drivetrain and keep the suspension components in alignment. Those who speak romantically of the flex of the Healey frame are both technically uniformed and dangerous. Only go-karts and per-war cars with wood and cloth bodies are meant to flex. Without perfect rigidity the body panels will be

in alignment just once - the day you put them on. Even by Japanese standards the Healey is a tight fit and a testimony to British craftsmanship. It follows that any sort of alignment is possible with a frame that maintains a constant shape.

The alignment of the suspension components needs no explanation except to add that the Healey has no adjustable links - caster and camber are set by the locations points. If your car steers "funny", then look for a frame that is out of shape. Similarly the drivetrain should be dead straight. While it is true that universal joints are meant to take up any mis-alignment, they run that much sweeter and last longer if we can limit their movement to one plane. The bearings in the gearbox and differential housing also suffer less.

Any true restoration begins with the complete removal of the frame followed by judicious sandblasting. With the Healey, it is important to remember



that what you don't see is as important as what you do see, and a seemingly perfect underside may be dangerous to life and limb as well as the pocketbook. It is impossible to do the job - as I have seen some people do - without removing the front and rear bulkheads. If you farm out the job, and your panel beater thinks he can do it with bulkheads on, go elsewhere.

While some people recommend chemically stripping the chassis, we would not recommend this approach. First, it is bound to leave at least trace amounts of corrosive chemicals inside the frame- no matter how hard you try to neutralize the stuff. Second, it doesn't leave the metal in as prepared state as blasting, and third, it's expensive. Some experts may claim that sandblasting removes too much metal but, in our opinion, if the metal disintegrates upon blasting for your own safety, it needs to be replaced.

With the chassis stripped to bare metal, it is time to assess the damage. First inspect all suspension and drivetrain location points for cracks. Then start tapping the chassis systematically with a small ball-peen hammer. Healthy metal should "ring"; thin sections produce a dull thug. Mark out thin sections with a sharpie with a respectable overlap into solid metal. Now is the time to stand back and decide if there is sufficient metal to justify a restoration.

Clearly, it is inevitable with cars of the Healeys' vintage that there exist many cars with chassis where there is simply no more sound metal to weld on to. But with the Healey with its highly stressed and special construction, we need more than a skeleton on which to hang patches, there are too many holes or sections too large, or in highly stressed locations the chassis will simply have to be scrapped. The reasons for this are twofold and are taboo in panel beater customer relations.

First, no matter how great the skill of the panel beater, the repair will never be as strong as the original chassis. Indeed, in all likelihood the more beautiful the repair is the greater the loss of strength. The reason for this is simple- welding will harden the steel making the area brittle. The frame will crack again but this time two to three inches- in the quench zone- from the weld. Hammering the panel flat will work but will harden the metal further and the necessary grinding and shrinking will add another unwanted freeze/thaw cycle into the work piece. This brittleness is okay in unstressed body panels but is a definite no-no with a chassis. We can, of course, hang the chassis in an atmospheric oven- if we can find one big

enough- and stress relieve the chassis but that leaves us with a big pretzel and leads to the second area of concern: maintaining the alignment of the frame.

Putting heat into the chassis will distort the frame. What always amazes us is how much distortion a seemingly insignificant weld can cause. From experience a two inch weld at one of the rear suspension points can cause the front of the frame to move more than an inch and a half- even if the frame is securely clamped at the time! You can imagine the warpage caused by welding in a four foot section, which is why you can't weld in a four foot section. The difficulty involved in this diatribe is to show that there is a rational basis on which to scrap a chassis and that, contrary to popular belief, there is no such thing as a perfect chassis repair. It is a matter of quantifying each patch and the degree and direction of the distortion caused by the work. In short, it is a suck - it and - see proposition and this where experience really counts.

There are few things to say about welding except that the main goal is always to put as little heat into the frame as possible and therefore MIG welding really the only way to get proper penetration without overheating the metal. The sequence of welds is similarly important in limiting distortion. For example, in welding an outrigger you should start by diagonally tacking the four corners then lay a bead top and bottom and then either side. Having welded the chassis, it is time to check the chassis alignment.

Unfortunately, with the Healey the cheap and dirty method of bashing the chassis into alignment is not really applicable- the structure is both too stiff and too weak. Putting the chassis on a frame straightening rig is the only real practical proposition, but it has its limits. Because the rig uses only a few points to react against the part being pulled, the result is a new stress raiser. In small degrees this is tolerable, but gross misalignment of the chassis will leave you with considerable weakened 'S' shaped rails. Again, the success of the repair comes down to your original evaluation of the frames reparability.





The completed chassis should be lightly blasted and immediately sprayed with primer, preferably zinc chromate based.

What options do you have if your chassis is beyond safe repair? You may, of course, try to find a better chassis or buy a new chassis ready for build up.

Jule Enterprises produces a chassis using tube identical to the original except for the 3/8 seam running midway along the chassis rails. We use 1/8 gauge steel. The tube is pound for pound stronger than the original and much stronger than a frame that has seen the elements of 40 years or more. (See also article- Sure Foundation) It is also dead straight and reproduces Donald Healey's original geometry. The price is significantly less than the price of any serious restoration and infinitely better value than a bodged repair.

For some this may be sacrilege, and we are the first to admit that the Healey's unique construction is a big part of its place in history. But it seems ludicrous and downright dangerous to believe that a chassis this is 10% Healey and 90% patchwork and isn't straight or strong is

any more original than Donald Healey's masterpiece.

We are committed to producing Healeys that are as original and safe as possible. We love Healeys. We are not, however, willing to sacrifice your safety, investment and enjoyment, by doing a less than satisfactory job.

If you are still contemplating repairing your chassis, check the laws in your area. In Ontario, a car must be safe to be on the road. When ownership is transferred an inspection by a licensed technician/mechanic must be completed. The seller must disclose to the buyer any major structural repairs done to the car prior to sale. Non-disclosure of this information could be deemed as a fraudulent act. That inspection will include checking the chassis. The chassis cannot be "visibly cracked, perforated by corrosion or have loose or missing connecting fasteners that may degrade the safety of the vehicle or jeopardize its handling characteristics..... shall not be visibly perforated by rust or otherwise damaged or have any opening other than those intended by the manufacturer" (Schedule 1 -4(a),(b)

of The Ontario Ministry of Transportation, Highway Traffic Act). If they do not pass, the car cannot be licensed as a safe vehicle. All licenced trade shops are aware of this rule. We urge you to discuss this with your mechanic. It would be a shame to have invested all your time and money to be told your car had no value as it was not fit for the road. But it would be a bigger shame if you or your family member were hurt while riding in your Austin Healey as a result of a bodged chassis repair .

