

# ORIGINAL THINKING

Trevor Cuthbert reports on a new idea from D44 that's led to a great looking, must-have piece of protection equipment

DEVON 4x4 are well known as a specialist 4x4 company, offering a complete range of services for owners and enthusiasts of all makes of 4x4 and off-road vehicle. They supply complete trucks, specialist parts, replacement spares and preparation equipment through to routine servicing and maintenance.

The engineering and fabrication arm of the company, D44, is headed up by Matt Cook. Matt is an ex-Land Rover development technician and is now

responsible for the development of the new D44 range of products. The range is extensive, with new products coming on stream on a regular basis. One of the latest is replacement ultra heavy-duty diff pans that can be unbolted from the Land Rover axle.

This facility to easily remove the diff pans allows for inspection of the differential without having to remove it from the axle. The crown bolts can be checked for tightness and, on single pin differentials, a

broken or jammed half shaft can be pushed out, without the need to strip the other side of the axle.

**PICTURE 1** The main advantage of the D44 removable diff pan is its immense strength. They cannot be easily knocked off like clamp-on diff guards, nor do they trap build-ups of mud, which promotes corrosion, ultimately causing axle casings to leak.

The Diff pans are cast using the lost wax process in a material called 17-4-ph, which





has a very high strength, hardness and fairly good corrosion resistance as it is a type of stainless steel. The material is used in the aerospace industry for manufacturing things like gas turbines.

Matt set out to produce a clean design for the D44 diff pans with sacrificial teeth on the lower edge to absorb major impacts and to aid a little with cooling. The units were CAD designed in-house, specifically to suit Land Rover axles.

They are available as a kit, comprising the diff pan itself, the weld ring (to which the diff pan bolts) which is welded onto the Land Rover axle, and the cap screws to bolt the pan in place. Alternatively, D44 will convert your axles for you at their workshops in South Molton, Devon. I opted to have the expert himself convert the axles for my Defender.

**PICTURE 2** The front and rear Rover axles have been stripped down to bare casings and steam cleaned of all mud, grease and grime. The rear hubs can be left in place but the differentials certainly need to be removed and half shafts need to be withdrawn.

**PICTURE 3** The spring mounts on the rear axle were a little corroded, so it was a great opportunity to weld on a new pair to bring the axle casing back to tip-top condition.

**PICTURE 4** Matt uses the plasma cutter to remove the original diff pan in one smooth and quick operation. The plasma cutter makes a very neat cut with the minimum of fuss.

**PICTURE 5** With the cut complete, Matt lifts off the diff pan and consigns it to the scrap pile for eventual recycling.

**PICTURE 6** The axle casing is then moved over to another work area where, using an angle grinder fitted with a metal-grinding disc, he cleans up any rough edges where the diff pan had been attached.

**PICTURE 7** The axle now has a clean, smooth flat surface to which the new base can be welded. D44 call this the "weld ring" – a precision cut steel component with threaded holes to which the new diff pan is bolted.

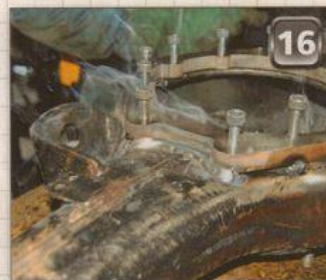
**PICTURE 8** Matt lines up and centres the weld ring onto the prepared axle casing.

**PICTURE 9** The weld ring is then firmly clamped in position.

**PICTURE 10** Using the MIG welder, Matt tack welds the weld ring to the casing on both sides.

**PICTURE 11** With the weld ring tack welded in the correct position the new diff pan is firmly bolted onto its base using the supplied cap screws. This means that, when the proper weld around the circumference of the ring is carried out, it will remain completely flat and not be allowed to distort by the temperature changes, as Matt completes the weld. This is very important so that a perfect seal between the diff pan and the weld ring can be made, keeping the EP90 gear oil from leaking out when the axle is put into service.

**PICTURE 12** The new diff pan is completely masked off so that weld spatter won't ruin that rich red finish.





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**PICTURE 13** With the diff pan firmly bolted down and masked off, further tack welds are made around the ring.

**PICTURE 14** The masking and diff pan are removed and then Matt screws the bolts back into the threaded holes in the weld ring. This is to keep weld spatter out of the threads as the final weld is made.

**PICTURE 15** Matt begins to weld around the circumference of the weld ring. The standard of welding must be excellent in order to make an oil-tight seal, ensuring that EP90 won't leak out.

**PICTURE 16** The weld that Matt completes down one side is indeed of a beautifully high standard. No bird droppings here!

**PICTURE 17** As Matt welds around the ring, he adjusts the orientation of the axle on his bench to make it convenient to weld every part of it to the axle.

**PICTURE 18** The standard and quality of the MIG welding at D44 really is second to

none – oh to have such skill.

**PICTURE 19** After the welding is complete, Simon cleans off the weld with a wire brush attachment and the new diff pan is again bolted back onto the axle.

**PICTURE 20** The finished job looks absolutely excellent and very strong. The complete axle casing will need a good coat of primer and paint now, before it is refitted to the Land Rover.

**PICTURE 21** The front axle is converted in exactly the same way, except this Panhard rod bracket looks to be very close to where the weld ring will be.

**PICTURE 22** Matt removes the old diff pan from the front axle, using the plasma cutter, just as he did with the rear one.

**PICTURE 23** The bottom edge of the offending bracket is then cut away from the axle casing using the plasma cutter.

**PICTURE 24** Using a heavy hammer and

chisel, the bracket is knocked away enough to allow the weld ring to fit into position.

**PICTURE 25** The bracket is well clear now and the casing has been cleaned and prepared for both the adjusted bracket and the weld ring to be welded to the axle casing.

**PICTURE 26** Matt first welds the Panhard rod bracket to the casing...

**PICTURE 27** ...then the weld ring is clamped and tack welded as before. This minor complication with the bracket on my front axle casing was a one-off. Subsequent axles converted by Matt at D44 had enough room for the weld ring to be fitted without the modification. Land Rover tolerances eh?

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