ENGINE ROCKS, NO BODY ROLL

Lindsay's 'Rest of World' Defender now has a rockin' 2.8 litre engine but that extra performance has left it with too much body roll. It wasn't fitted with anti-roll bars from new. It is now.

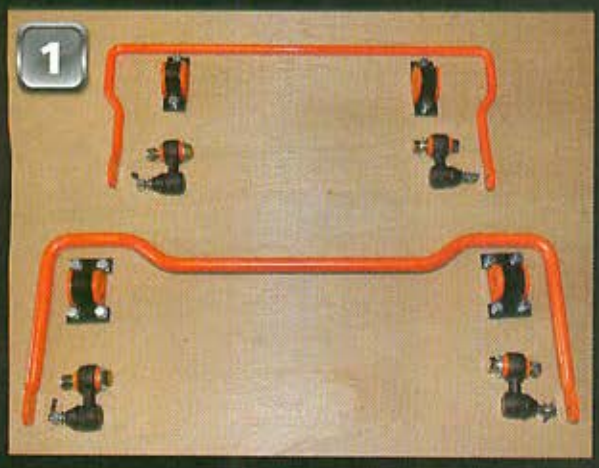
EVEN IF your Land Rover was fitted with anti-roll bars from new, you can change its handling characteristics by upgrading them. And if it was never fitted with them in the first place, you might want to improve its on-road performance by adding a pair.

Anti-roll bars do just what they say on the tin. As the vehicle is cornering it tries to roll to one side but anti-roll bars transmit some of the rolling effect away from the wheel on the outside of the corner, onto the wheel on the inside of the corner. This makes the suspension compress more evenly, keeping the vehicle on a more even keel.

In theory, anti-roll bars have no effect on suspension stiffness. On a perfectly level road surface, that would certainly be true. However, undulating road surfaces cause each wheel to rise and fall in opposition to the wheel on the other end of the axle. When this happens, the anti-roll bar tries to keep the vehicle level and this has the effect of causing more suspension stiffness. It's worth bearing that in mind when specifying the fitting of thicker anti-roll bars than standard. It's also worth

ANTI-ROLL BAR CHOICES

THERE ARE several different anti-roll bar kits available both from Extreme 4x4 and IRB Developments, comprising various thicknesses of bar to produce different handling characteristics. Both IRB and Extreme will be happy to advise regarding your particular needs. The parts listed here relate to the drawing shown in picture 23.



NO:	DESCRIPTION (per bar unless stated)	QUANTITY
Fitting Instructions		
1	19mm Anti Roll bar Front	1
1	25.4mm Anti Roll Bar Rear	1
2	Urethane Anti roll bar bush kit (2 pieces)	1
2	Urethane Anti roll bar bush kit 25.4mm bar	2
3	Bracket Strap Anti roll bar (per bar)	2
4	M10 Nyloc nut	4
5	M10 X 30mm Bolt	4
6	M10A Washer	8
7	Ball Joint Assembly	2
8	M16 Nyloc Nut	2
9	Urethane Anti roll bar bush kit for ball joints (4 pieces)	1
10	M18 Washer	2
11	M18 Pin M16 Thread	2
12	Split pins	2

remembering that anti-roll bars will be detrimental to more extreme off-road work because they won't allow the axles to 'twist' as much as they otherwise would. You pay your money and take your choice.

If, after purchasing an Extreme kit, you are unsure about any of the procedures described here, you are welcome to phone Extreme 4x4 Ltd and ask for technical advice.

PICTURE 2 My Defender came with anti-roll bar brackets already welded to the chassis. This makes it particularly easy to fit anti-roll bars where none have been fitted before. You can carry out this work without removing the wheels.

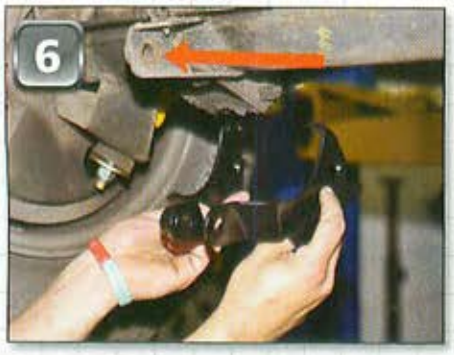
PICTURE 3 For earlier Defenders without anti-roll bar mounting brackets, Extreme can supply new brackets for fitting to the bare chassis. The chassis bracket set seen here is for a 90/D1/RR Classic (as an illustration). The 110 rear is the only one with the four bolt fixing.

PICTURE 4 The new brackets (they seem to be really well-made) are folded and drilled ready to be fitted to the chassis.

PICTURE 5 Extreme can advise on the correct location for the brackets and you can then drill holes in the chassis before inserting the rivnuts to provide captive nuts in the chassis. New rivnuts are supplied with the kit and Extreme also sell an excellent riv-nut tool to set the M10 riv-nuts into the chassis. (It also does other size riv-nuts for light guards and similar accessories.) It retails at £37.45 plus VAT.

PICTURE 6 The axle mountings consist of a pair of very nicely made brackets for the end of each axle. You can see the welded-on variety already fitted to my axle (arrow).

PICTURE 7 The back of the bracket is self-locating on the Panhard rod bracket.



replacing existing Anti-Rolls Bars

1. Undo the two M16 nuts and bolts that connect the ball joint to the existing anti-roll bar (if fitted) and remove the split bushes.
2. Remove the split pins from the existing ball joints and undo the castellated nuts.
3. Tap the body of the ball joints firmly to release the tapered shaft from the axle brackets and remove.
4. Undo the two anti-roll bar clamp nuts and bolts. →

rear Anti-Rolls Bar

PICTURE 8 Here you can see the orange Extreme anti-roll bar in the size recommended by them and compared, by Ian Baughan, with the thickness of an original Land Rover anti-roll bar. The effect of a thicker rear bar is to increase oversteer which may, or may not, be what you're looking for. Ian prefers it, I'm not so sure.

PICTURE 9 Ian started the assembly by fitting the polyurethane bushes onto the bar...

PICTURE 10 ...followed by the two mounting brackets. NOTE: brackets must be fitted the right way up. The dog leg (if bent into the bar) must face down to clear rear mounted fuel tanks.

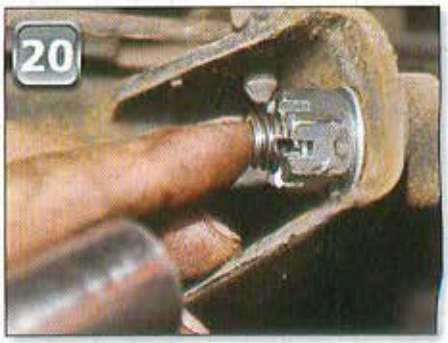
PICTURE 11 Because he's such a good and thorough bloke, Ian brushed copper grease into the threads of every mounting bolt before fitting them.

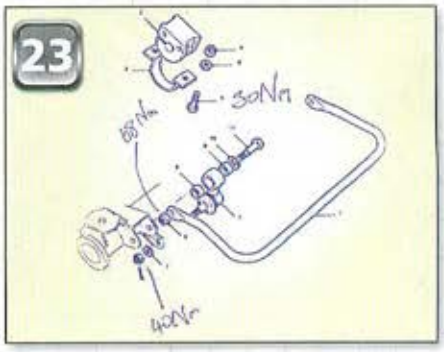
PICTURE 12 He also used Würth aerosol wax where the steel of the mounting brackets would be in contact.

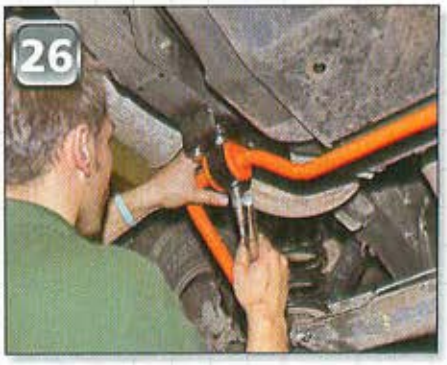
PICTURE 13 Ian's dad just happened to be passing and got roped in to help hold up the heavy rear anti-roll bar while the polyurethane bushes were slid into their correct locations. Ian attempted to fit all the mounting bolts but hit a snag.

PICTURE 14 For a reason best known to themselves, Land Rover made the welded-on mounting bracket with two different sizes of hole: 10 mm and 8 mm. Of course, you don't notice it until you start to fit the bolts! Ian carefully drilled out the 8mm holes...

PICTURE 15 ...using the Würth Protection Spray again to protect the bare metal...







PICTURE 16 ...before fitting the balance of the 10 mm bolts provided with the kit.

PICTURE 17 Before fitting the tapered ball joint to the axle bracket, make sure that the tapered hole is clear and clean. If it's not, the taper won't seat correctly.

PICTURE 18 Ian pushed the tapered pin into position...

PICTURE 19 ...and loosely fitted the castellated nut plus washer.

PICTURE 20 You can partly tighten the castellated nut at this stage (though not fully) but Ian points out that you must turn the tapered pin so that you will be able to insert the split pin later on.

PICTURE 21 The shouldered pin for connecting to the end of the anti-roll bar got the copper grease treatment...

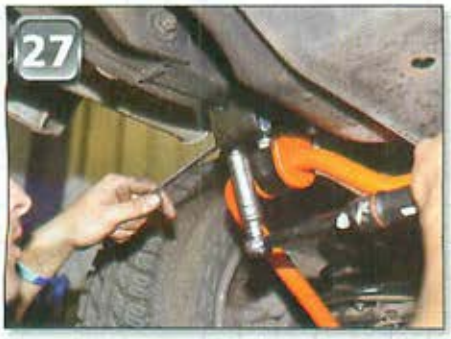
PICTURE 22 ...before being used to attach the bar to the ball joint assembly. Note that the large washer goes between the head on the pin and the polyurethane bush.

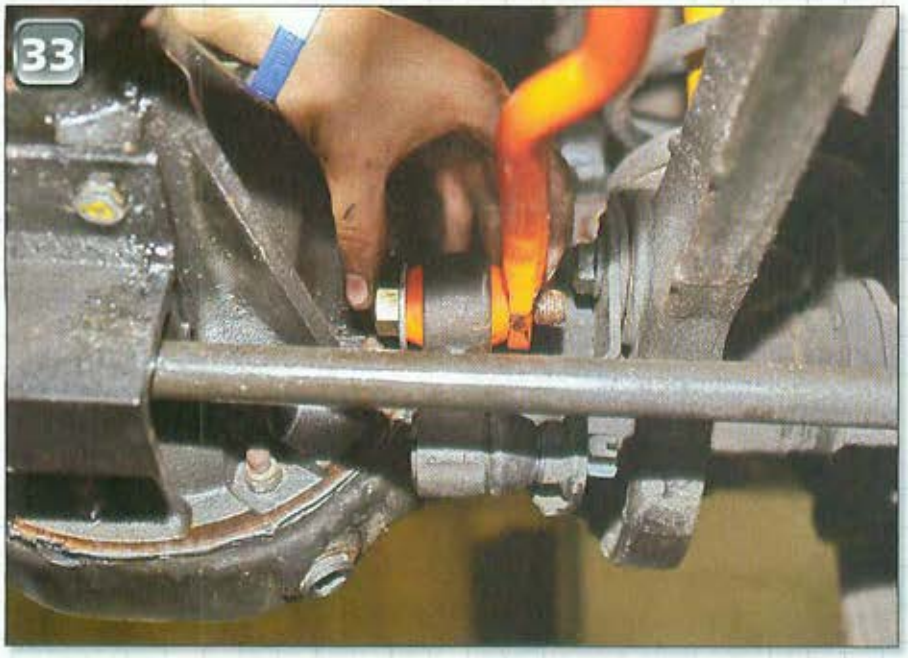
PICTURE 23 Ian grabbed the recommended torque figures from the good old Haynes manual and I scribbled them down for ease of reference. Extreme tell me that their fitting instructions now also contain the three main torque settings needed here.

PICTURE 24 Ian started with the shouldered bolts he'd just fitted...

PICTURE 25 ...then went on to the axle mounting pins, where he made sure that the slots in the castellated nut lined up with the holes shown in picture 20.

PICTURE 26 Note that he'd left the chassis mounting bolts loose so that the anti-roll bar centred itself correctly inside the polyurethane bush. So now, he nipped up each of the bolts... →





PICTURE 27 ...before tightening them to the correct torque.

PICTURE 28 Here's a tip from Ian Baughan: don't push the split pin fully home so that its head disappears into the castellated nut. If you do, and you need to remove it later, you will have nothing to grab hold of. Position the split pin head as shown here and then use pliers to fold the open legs of the split pin in opposite directions to each other.

front Anti-Rolls Bar

PICTURE 29 Here you can see that Extreme have recommended and supplied a front anti-roll bar (orange) that is actually thinner than the standard one (black). This is to increase the effect of oversteer referred to earlier.

PICTURE 30 The front anti-roll bar was offered and loosely fitted up in the same way as the rear had been...

PICTURE 31 ...with the chassis mountings left deliberately loose so that the bar could slide sideways as the ends were fitted...

PICTURE 32 ...Ian installed the ball joint assemblies to the brackets on the axle.

PICTURE 33 Then, the ends of the anti-roll bars were bolted to the ball joint assemblies...

PICTURE 34 ...before everything was tightened and torqued, as before.

PICTURE 35 On the front axle, it doesn't matter where the hole for the split pin is orientated because there are no obstructions.

PICTURE 36 As with the rear anti-roll bar, the axle mounting bolts are tightened last of all. Ensure that all nuts, bolts and fixings are tightened to the manufacturers' torque specifications. See picture 23.

PICTURE 37 Ian couldn't resist giving these blingy orange bars a wipe clean after he'd finished!

PICTURE 38 He also couldn't resist going over to an almost brand new Defender, fitted with standard anti-roll bars as original, and comparing the amount of rocking movement with that on my vehicle. Mine felt considerably stiffer, he said.

Do be careful to specify the type of roadholding that you want to achieve. I recently had a close encounter with a homicidal school bus driver on a greasy, wet, narrow country lane and ended up going sideways before taking a trip into the undergrowth. No harm was done though a number of Worcestershire primary school children probably wet themselves. (I know I nearly did...)

Now, even in these extreme on-road circumstances, the Defender felt quite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controllable and it's true that many 'sporting' drivers say they like lots of oversteer. But I wish my Landy hadn't stuck its rear end out quite so enthusiastically.

In general though, the 110's road-holding is vastly improved and the vehicle feels much flatter and more secure when cornering rapidly. Suspension is definitely a touch stiffer than it was before, though. I think I'll have a chat with Ian and the lads at Extreme and see what they recommend. They tell me that, for instance, if a customer has a winch bumper and winch on the front, a roof tent or spare wheel and tyre on the bonnet, or a combination of these, they will often advise that the standard anti-roll bar is retained or a 25.4mm diameter unit is fitted.

Incidentally, I'm very impressed with the quality of the kit supplied by Extreme and (as always) by the work carried out by Ian Baughan. You won't go far wrong with either of them.

NOTE FROM EXTREME 4X4: Suspension modifications and upgrades can change the handling characteristics of your vehicle. Road test your vehicle with care to become accustomed to any changes before using your vehicle to its full potential. LRM

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