

GETTING ALIGNED

Before being considered for alignment, the vehicle must be in reasonable condition with no loose or worn bushes or joints in the steering and suspension, and wheel bearings correctly adjusted.

It's impossible to assess a vehicle to an accuracy of minutes of degrees if a worn joint allows a couple of degrees loose movement in the wheel. Tyre pressures are also checked, and the vehicle should be normally loaded so that suspension and tyre deflections are normal.

After the vehicle is pronounced fit for testing, the technician goes on to create a worksheet at the computer terminal and fits the targets to each wheel. From now on, the assessment is done from the screen and keyboard. The machine links up to its manufacturer's website and downloads the latest Land Rover specifications for the vehicle.

Instantly, the system has digested every alignment angle of each wheel. But that's not good enough. Because the target plates are attached to the wheel rims, it's essential to prove the rims are true, without the slightest buckle, or to record any buckle so the computer can adjust its readings to compensate.

The technician eliminates run-out by manually rolling the vehicle back on the platform, then forward again, as the attached target plates revolve with the wheels. The cameras track their rotation and send any run-out corrections down to the computer station.

That's the vehicle assessed, bar the virtual paperwork. The process is fast, but physical adjustment of alignment and re-checking takes time. This, plus a big financial investment on the part of the garage doing the job, means that a Discovery 3 alignment, including worst-case rectification work, can nudge £130 – though that's only about the price of one of those tyres that won't now be scrubbed.

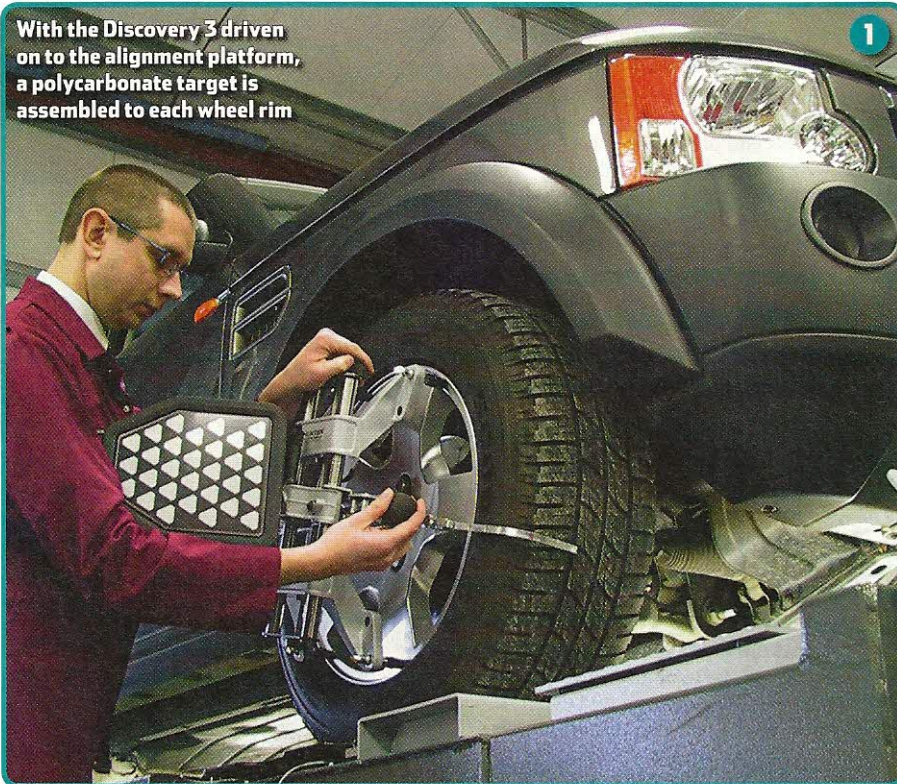
So much for the theory. Now we'll see what actually happens as we roll on the first patient – a Discovery 3.



First, the front castor angle is checked. Brake pedal is clamped down to eliminate any hub bearing play from readings

ALIGNING DISCOVERY 3

With the Discovery 3 driven on to the alignment platform, a polycarbonate target is assembled to each wheel rim



The suspension/steering bushes and joints on our Disco 3 have already been checked and are known to be good.

The air suspension system is programmed to 'geometry set-up' mode, so we get straight into the business of alignment.

This procedure applies to Range Rover Sport, which has a similar rolling chassis design to Discovery 3's. Many aspects are similar on Range Rover and, to a greater extent, Freelander.

With the vehicle on the lift, we first check the factory settings on the computer database, which is bang up to date. It shows our 2005 model originally had a front wheel toe of 10 minutes of one degree negative, but a 2008 revision is already telling us the factory has introduced new settings of 10' positive toe. Rear toe has also been revised from 10' to 14' positive.

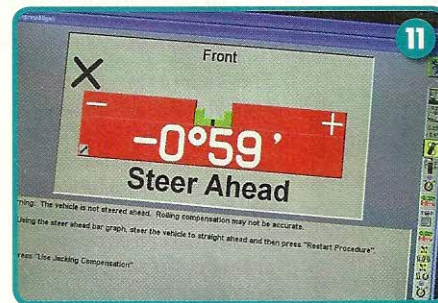
It's comforting to know that Land Rover continues to monitor the performance of its vehicles long after production and continues to tweak them for best performance – it also shows the importance of using a garage that has direct access to this latest information.

The target plates are fitted, the wheels checked for run-out... and the computer screen already displays the alignment results. The technician first checks the rear axle thrust angle – the direction in which the rear wheels are pushing the vehicle, which should be along the vehicle's centre line (D3 doesn't have a solid rear axle, but we're talking about the combined directional thrust of both rear wheels).

Because D3's rear wheel alignments are adjusted individually, just one wheel misaligned can bring the average thrust direction out of tolerance.



With the front wheels resting on turntables to avoid any tyre flex affecting the readings, the steering is turned from lock to lock



Having confirmed that castor is correct throughout the steering movement, the computer guides steering to dead-ahead