



Rex On Rails - Part Three

Installing and testing the second component of Whiteline's Handling Pack - an ALK (otherwise known as anti-lift kit or castor kit)...

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In Part Two of Rex on Rails we installed a Whiteline 22mm adjustable rear swaybar to our '94 WRX. The stiffer swaybar - teamed with our optimised tyre pressures and performance wheel alignment - made a massive difference to handling. The biggest improvement was much-reduced mid-corner understeer; in fact, when provoked, the chassis could now be made to oversteer considerably. Already it looked like we're starting to balance out the inherent understeer built into the WRX...

In Part Three of the series we'll install what's arguably the next most cost effective handling enhancement - a Whiteline ALK (otherwise known anti-lift kit or castor kit), and comment on the WRX's new handling characteristics...

The Whiteline ALK

So what is the Whiteline ALK and what does it achieve?

The kit comprises replacement front control arm mounts fitted with a relatively low-compliance bush. The mounts are engineered to relocate the control arm pick-up to deliver additional castor, while the low-compliance bush reduces alignment variation during cornering. In the case of a WRX (which is fitted with MacPherson front struts) castor is essentially the angle that the front struts lean back from vertical. The benefit from additional castor is greater *camber* while cornering (greater 'dynamic' camber).

Whiteline claims their kit delivers an extra 0.5 degree positive castor in static conditions and around 1.0 degree in dynamic conditions. Reduced bush deflection (in comparison to the factory bushes) is the reason for the kit's greater dynamic castor.

Whiteline has recently introduced three different versions of their ALK - all use the same control arm mount but with varying bush firmness. The softest in their line-up is the Comfort version, which uses a '70 Duro' bush; the other two versions use a firmer 80 Duro or 95 Duro 'motorsport' bush. We settled on the Comfort version for our MY94 WRX given it's an everyday get-around mobile; it had to remain comfortable. The Comfort ALK - part number KCA361 - retails for \$219 including GST, or can be purchased as part of the Whiteline Handling Pack.

Anti-Lift Geometry?

Before getting down to it, we should clarify a question that Whiteline have recently investigated - does their ALK *really* increase anti-lift geometry?

Taking into account the position of the instant centre, wheelbase length, centre of gravity, percentage front torque and percentage front braking, the WRX's anti-lift and anti-dive characteristics can be found. With fitment of the Whiteline ALK it has now been discovered that the factory anti-lift and anti-dive geometry is reduced to virtually zero. In other words, the amount of fore-aft pitching will actually *increase*.

For comprehensive details on this topic, a discussion paper can be found on the Whiteline website (www.whiteline.com.au).

Fitting the Whiteline ALK

Similar to the adjustable rear swaybar fitted in Rex On Rails Part Two, Whiteline's ALK can be installed at home within a couple of hours.

To install the kit, the chassis must be elevated and the front suspension extended to its full droop position. If you're fitting the kit at home that means placing the front of the car on chassis stands so that the front wheels are lifted off the ground. Note that there are some *very* tight nuts and bolts that need to be undone and, since there is potential for the car to wobble on chassis stands, we highly recommend adding a stack of bricks (or similar) beneath each chassis rail as a 'back up'. The last thing you want is the car falling off its stands...

Once the car is safely raised we can begin removing one of the factory control arm mounts - pick either the left or right side to work on first. Following the instruction sheet supplied with the kit, the first step is to loosen the 22mm nut at the end of the control arm; don't fully remove the nut at this stage. An open-end or ring spanner is required for this job.

Next, remove the two 20mm bolts that secure the factory control arm mount to the body - these are particularly tight. With the control arm mount now detached from the body you can begin withdrawing the mount from the vehicle. For ease of removal on manual transmission vehicles, Whiteline suggests taking off the gearbox cross-member. However, we weren't keen on touching any more than we had to and - since we'd seen the mounts removed from a Liberty RS without touching the gearbox cross-member - we opted to take the more difficult approach. Once you learn the technique, though, there's nothing particularly difficult about it. The easiest way to remove the factory control arm mount is to insert a small diameter screwdriver through the inboard hole of the factory control arm mount and its aligning threaded fitting. Use this to guide the mount away from the body as you pry the control arm down with a lever.

Once the control arm mount is removed, be sure to clean the exposed control arm stub. Remove any residual dirt and rubber and give the friction surfaces a thorough wipe over - this will maximise bush life and minimise the chance of squeaking.

Now we can turn attention to those sexy anodised control arm mounts...

Enclosed in the ALK you should find a satchel of white lithium grease. Select the appropriate mount (a sticker identifies the left and right side mounts) and apply a "thin layer" of grease to the visible surfaces of the bush. Make sure you use no more than half the satchel on the first bush; there's another one to come!

With the bush fully greased, the next task is to slide the new control arm mount over the exposed stub. Make sure the stub remains clean before you slide the mount over it; cleanliness is very important. Also, note that the mount must be correctly oriented; the large diameter bush face must mate against the face of the control arm flange. Manoeuvring the mount into position is, again, a little awkward - use a lever to pry the control arm away from the body so you can fit the mount over the control arm stub. Try not to rub off any grease during this process.

Now we begin fastening the Whiteline control arm mount. First, grab one of the nyloc nuts supplied in the kit and screw it over the control arm thread - but don't tighten the nut at this point. Note that the Whiteline nyloc nuts are larger than the factory nuts - they're 1-inch versus 22mm. Next, align the control arm mount holes with the corresponding holes in the body and insert the factory 20mm bolts - again, do not tighten.

Repeat the procedure for the opposite side of the vehicle.

With the left and right side control arm mounts finger-tightened, lower the front of the vehicle to the ground and bounce the suspension. This will enable the new mounts to settle into position.

The last - and very important - step is to slide under the car and tighten the body bolts and control arm nut to the appropriate torque. The Whiteline instruction sheet suggests the body bolts should be torque'd to 100Nm, and the new nyloc nut should be fastened to 90Nm. Note that this is a particularly awkward job with the car at ground level. A hoist or pit makes things a lot easier!

With the nuts and bolts done up nice and tight, go for a careful drive to make sure everything is performing normally - the car should track almost identically as before. After a minimum of 100 kilometres, Whiteline then suggests checking and re-tensioning the body bolts and control arm nut.

On-Road Results

The effect of the ALK was not as monumental as the stiffer rear swaybar, but it gave an impressive improvement nonetheless.

Initial turn-in is noticeably sharper - especially when given a rapid steering input. After this initial turn-in response, the front tyres are then much more resistant to being overloaded. With greater front-end grip, you're able to pour on torque even when there's considerable steering angle applied; the upshot is faster corner exits. From seat-of-the-pants, the feeling is that the front wheels are more effectively pulling the car out of every corner.

The only trade-off so far has been a *very* slight increase in NVH. This is noticeable only over sharp bumps such as train crossings. We are talking about an extremely small margin, however - regular passengers in our Rex didn't notice any difference at all.

So here we are with half of the Whiteline Handling Pack already installed. We'd suggest the adjustable rear 'bar and ALK are the two most critical components of the kit and, not surprisingly, they've provided f-a-r superior handling characteristics (along with more even tyre wear and barely increased NVH). Still to come from the Whiteline Handling Pack is a stiffer front swaybar and rear camber kit...

Footnote - The Whiteline ALK was supplied to AutoSpeed for this test at no cost.

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