LOW VOLUME VEHICLE TECHNICAL ASSOCIATION Inc

# Spring & Hub-carrier Adjustable Suspension

**Background:**

A more recent incarnation of 'adjustable platform' suspension systems has evolved over recent years, and is now commonly found within vehicles modified in Japan and imported into New Zealand, and is also available from within the New Zealand after-market parts industry. The system uses a universal strut body with different hub-carrier brackets to suit the different makes and models of vehicles for which they are marketed. The units incorporate the usual spring adjustors on top of the strut body, but the difference with these units is that they also incorporate height adjustability at the hub-carrier end.

This suspension system has no commonly-used generic term, but is often referred to as 'D2' suspension. 'D2' is simply a brand name, and has become synonymous with this type of suspension because 'D2' was one the of the first after-market manufacturers to widely market this system. Most other Japanese after-market suspension companies now market systems following the same principle.

*Above is an example of a spring and hub-carrier adjustable coil-over shock absorber.*

**Potential problems with this type of suspension:**

The design of these systems enables the strut assembly to be installed with the incorrect spring rate, and then adjusted incorrectly. This can leave an excessive amount of (potential) suspension travel, however with the hub-carrier adjustment adjusted in such a way that the vehicle is positioned too low, the tyres are able to come in contact with the vehicle body or structure before the suspension contacts the bump stops.

Also, in such cases, if a spring were to break, the wheel assembly would become wedged into the inner guard.

After research on the subject, and discussions with LVV Certifiers who are familiar with this type of suspension setup, LVVTA is satisfied that such systems can be safely used, provided that the systems are installed with the height adjustment and spring pre-load adjustment correctly set.

Post: P. O. Box 13797, Johnsonville, Wellington, New Zealand
Office & Courier: 6 Burgess Road, Johnsonville, Wellington, New Zealand
Phone: 64 4 477 4372 Fax: 64 4 477 4374 E-mail: techlvvta@xtra.org.nz

**The correct way of adjusting adjustable spring and hub-carrier suspension:**

When presented with a vehicle with an adjustable spring and hub-carrier suspension system, an LVV Certifier must ensure that the following steps have occurred:

- Spring rate:

  It must be ensured that the correct spring rate has been selected for the vehicle. There is a correlation between the vehicle height and the spring rate. If the spring rate is too stiff, the shock absorber will be fully extended even when laden.

- Setting spring pre-load:

  When it has been determined that the correct spring rate has been selected, the first adjustment required is to set the spring pre-load.

  Tighten the adjusting nut (lower spring seat) against the spring to ensure the spring is captured between the spring seats on full extension, and then tighten it another one full turn to set initial pre-load.

  Next tighten the lock-nut to secure the spring setting. Spring preload can be re-adjusted later to firm up the ride if required, and this will not affect the ride height.

- Setting vehicle height:

  The vehicle height is set by turning the body of the strut body into the lower housing or hub-carrier.

  When the vehicle height is at an acceptable level, tighten the lock-nut against the housing. The depth that the shock body is inserted into the lower housing needs to be checked to ensure it has a safe amount of thread engagement.

  With the vehicle back down on level ground, inspect the shock absorbers to ensure that they are close to the centre of their travel, and have sufficient clearance to the bump-stops. This is another way of ensuring that the correct spring rate has been selected.

- Adjusting ride quality:

  To set the desired ride quality, increase the spring pre-load (by adjusting the lower spring seat) ¼ to ½ a turn up until the car achieves minimum bounce without becoming too harsh. Always make sure both sides are adjusted by the same amount.

  Then adjust the damper settings. Start with the setting in the middle and road-test the vehicle, and adjust the damper setting from soft to hard as required.

**Finally:**

In order to minimise an LVV Certifier's time when presented with a vehicle incorporating this type of suspension system, the information contained in this Information sheet should be provided to any such vehicle owners.

If you have any queries or require any further clarification relating to this Information Sheet, please feel to contact one of the technical team at the Wellington LVVTA office on (04) 477 4372.

Tony Johnson
Chief Executive Officer
**Low Volume Vehicle Technical Association**