

Know Thy Springbox

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No, this hasn't got anything to do with the South African rugby team! - Phil.

Encouraged by the image of our Chairman squeezing bathroom sealant into his electronic ignition. I decided to bring "Technical Tips" down to earth with a bump (clever stuff this, think about it!) with "Suspension Topics" - the novel!

To start with, a few words for the uninitiated (there must be some out there) on the wonderful 2CV suspension system.

Misconceptions abound regarding this system, the most common being that it is interconnected (it is not), or self levelling (definitely not). *As far as I know, although the front and rear are not actually interconnected, on early cars there is nothing to stop the compression cups in the middle pushing against each other when you go over a really hefty bump (eg when you land after jumping that humpback bridge at 90mph!). Only the post 1976 Ami 8 had the fixed central suspension cylinder - Phil.* The system is, however, unconventional as its springs run lengthways down each side of the car in cylindrical

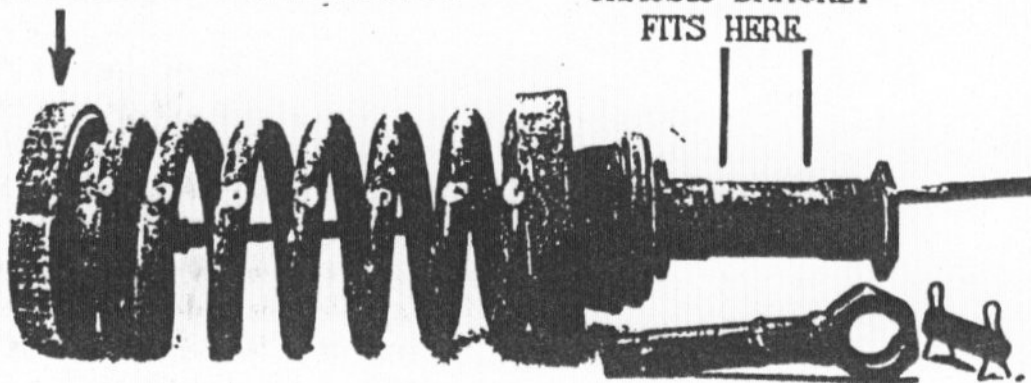
"springboxes". Each box contains two springs (front and rear), through which long tie rods pass on their way to the suspension arms via adjustable eye-bolts. Various methods of damping have been used but all recent cars are hydraulically damped all round. This is a simple, and cheap to produce, system capable of long service even when totally neglected - which it nearly always is!

Its uniqueness allows little in the way of tuning as the springboxes are welded containers and as far as I am aware springs are not available. The dampers can be changed for proprietary units with adjustable damping although recent "field trials" by John Nash at Sandown on an "Armstrong" unit proved to be disappointing, the standard "Boge" unit being superior to the "Armstrong" on its firmest setting!

Attention is drawn to suspension matters by "noises" from beneath the car. Initially a slight groaning of protest (Haynes says this can be cured by injecting castor oil "medicine", not a

SPRING RETAINER WITH FERODO.

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EXPLODED VIEW OF SPRINGBOX SHOWING MAIN COMPONENTS.

(ONE SIDE ONLY SHOWN)

universal panacea - read on) and then a dry grinding as the spring retainer graunches its way through the bottom of the springbox. A later stage of this condition will mean a visit to your local scrapyârd for a replacement from a more recent car, more of this later.

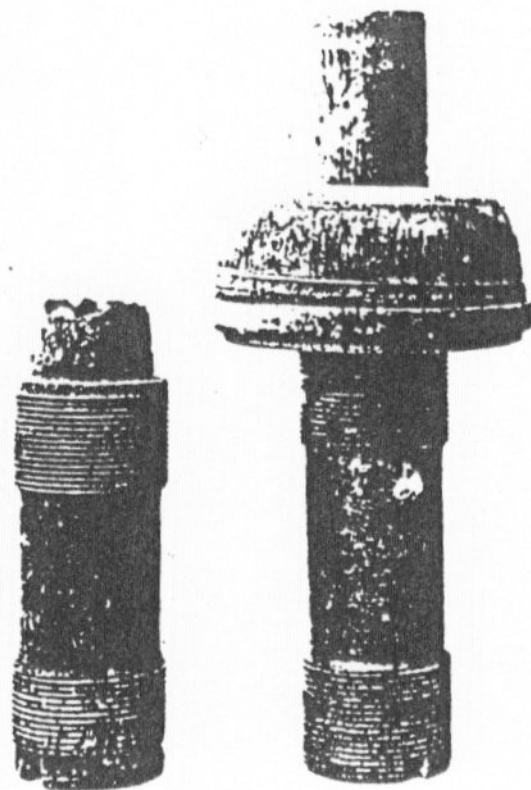
So what can be done to ensure happiness in the suspension department? First a précis on exactly what we are dealing with. Each springbox contains two springs of unequal length made from 15mm spring steel. The front is the longer being 8 turns and 190mm free length while the rear is 7 turns and 170mm free length. Each spring has a retainer through which the tie-rods pass on their way to the suspension arms. The spring retainers have 18mm wide strips of "Ferodo" type friction material rivetted around their circumference. This appears to have two functions - retardation and prevention of metal-to-metal contact, although I doubt the efficiency of the former if castor oil is injected! The springboxes, as previously mentioned, are not demountable unless you grind off the end caps but as spares are unobtainable there is not much point.

Suspension cylinders are "handed", the shorter tie rod going to the front, marked with yellow/blue paint if you can find it. *If you find it is marked "AV"/"AR" then "AV" goes to the front "AR" to the back - easy to remember because reverse gear is marked on the gate as "AR" - Phil.* If you get the box the wrong way round you will get zero ground clearance!

Problems? Yes, quite a few, usually due to age and neglect (the story of my

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A BAD CASE OF DISTANCE-PIECE CORROSION!

life!). The scenario goes like this...water entering the loosely fitting gaiter at the front of the box mixes rust to form a very effective grinding paste. Cure? Bore holes in the bottom of the box (not small ones!) and lubricate with, you've guessed it, castor oil. In extreme cases the "Ferodo" will wear away completely, thus speeding up the destruction process.

Assuming that we have an unserviceable springbox and march off to the scrappers clutching tools etc. what problems are there in removing spring-

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boxes? Quite a few, now read on...

From practical experience I offer the following information.... First select the most recent 2CV you can find (all springboxes are the same except those on the post '76 Ami 8). Ignore the nearside box as it gets more water spray than the off-side. Jack and support the car. *Not necessary if, as usual, it's on top of two other cars (because the 2CV isn't strong enough to be on the bottom) one of which has a slightly domed roof like a Morris Minor - I'm sure the scrappers do it on purpose just to see me take an undriveable 2CV for a spin! - Phil.* Remove the dampers. If these look serviceable, hide them in your toolbox - Whoops! What a giveaway! (well more like a takeaway really!). Push off the spring clips from the knife edges and remove same (if necessary, slacken off the eye-bolts to accomplish this) from the front and rear suspension arms. Check very thoroughly the external condition of the springbox for impact flats (although these can be pulled out with a slide-hammer), holes worn through from the inside and

external rusting.

The springbox is positioned by the insertion of threaded distance pieces which pass through brackets fixed to the chassis (see illustrations). In most cases rust between the steel rubber-doughnut carrier and the distance piece prevents the 45mm AF nut from fully unscrewing and stops the distance piece from being removed. Despite liberal amounts of "Plus Gas" the nut usually unscrews so far and then jams solid, although you may be lucky. The solution is to cut the doughnut and distance piece with a cold chisel. This should be easily done and the springbox can now be removed. Get a spare distance piece from the other side of the car. Use the rear one as it won't be so rusty.

Reassemble in reverse order, lubricating the box thoroughly. Grease the threads of the distance pieces before doing up the nuts. Fix the gaiters with "Jubilee" clips or similar so they don't just dangle uselessly on the rods. Paint the visible threads with "Waxoyl" or grease to stop water penetration and to aid dismantling next time.

Culled from 2CVGB News:

Suspension Cannister Repair

As complete strangers to 2CV restoration, my father and I were not aware that suspension pots are not repairable - so we went ahead and repaired them! Haynes has this to say:- "Although the central suspension units can be rebuilt, specialised equipment is necessary....." The diagram in the Haynes book shows the cylinder's construction well, but doesn't say that the tie rods and springs are of unequal length, with the long spring and tie rod going to the front. My cylinders were in good condition, except for the front end plates, which were badly rusted by the crud thrown up by the front wheels. As I have two 2CVs, we decided to cannibalize the cylinders.

The cylinder to be repaired was wrapped with a layer of insulating tape, two inches from its rusted front end, and the donor cylinder was wrapped at the identical distance from its perfectly sound rear end plate. We followed the tape carefully with a hacksaw (32 t.p.i. is best) to get a square cut around each tube, thus ensuring the cylinder would end up the same length as it started! The internals were cleaned and the new end plates offered up to the tube, held square and then spot welded in three or four places with a MIG welder. The spots were then ground flush.

A strip of metal was cut to go round the tube, leaving a 1/16" gap to weld its ends together. This was held tightly, with a big hose clip, for spot welding, then the clip was removed for continuous MIG'ing of all its edges, giving strength and ensuring its oil/water tightness. With this oil and water tight joint, the cylinder is ready for lubrication and use, as strong as when it was first made.

Andrew Nicholson

(This method could also be used for another purpose - at the same time as repairing the suspension cylinder, you can modify it. For a special with a shortened wheelbase, you can build a suspension cylinder containing two rear springs and tie rods, utilising a pair of rotten and otherwise worthless cylinders. If the cylinders are rust-free, just grind out the welds on the end caps to release them. When reassembling, add ½ pint of castor oil to each cylinder. Do not use ordinary motor oil as this causes the rubber 'doughnuts' on either side of the cylinders to split. -Ed.)