

# Replacing the rubber cone suspension on Minis

Expert

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Most models of the Mini, together with the Riley and Wolseley variants, use cone-shaped rubber springs in their suspensions. Although generally very reliable, they can deteriorate with age, causing the car to sag on its suspension, which considerably affects its ride and handling characteristics.

Replacement is reasonably straightforward – it is a good idea to replace both front and rear spring units at the same time.

## Front springs

The Mini front suspension has its upper and lower suspension pivoted on the sub-frame, with a swivel hub connected to the arms by ball joints. The rubber spring is mounted in the sub-frame tower with a strut connecting the upper arm to the spring. A telescopic damper is fitted between the upper arm and the inner

wing.

The rubber spring must be compressed to allow strut removal and a special tool (see sideline, overpage) is needed for this purpose. First, find the sub-frame tower mounting bolts on the engine bulkhead cross-member, then knock back the locking tabs on the lockwashers and slacken them off. Remove one of the bolts so you can twist the cover plate to the side, revealing an access hole, then retighten both bolts. Later models have a screw plug instead of the cover plate – you simply undo this.

Position the spring compressor over the access hole and turn its T-handle so that the central screw engages with the thread inside the rubber spring – it should take nine complete turns to engage the screw fully. Now screw the compression nut down the thread into contact with the tool body, and continue turning to pull up the spring into its mount-

## Tools and materials

- Spanners and sockets
- Screwdrivers
- Jack and axle stands
- Rubber spring compressor
- Ball joint separator
- Wire brush and scraper
- Replacement rubber springs
- Replacement knuckle joints
- Grease
- Anti-rust primer and paint



## Corroded trumpets

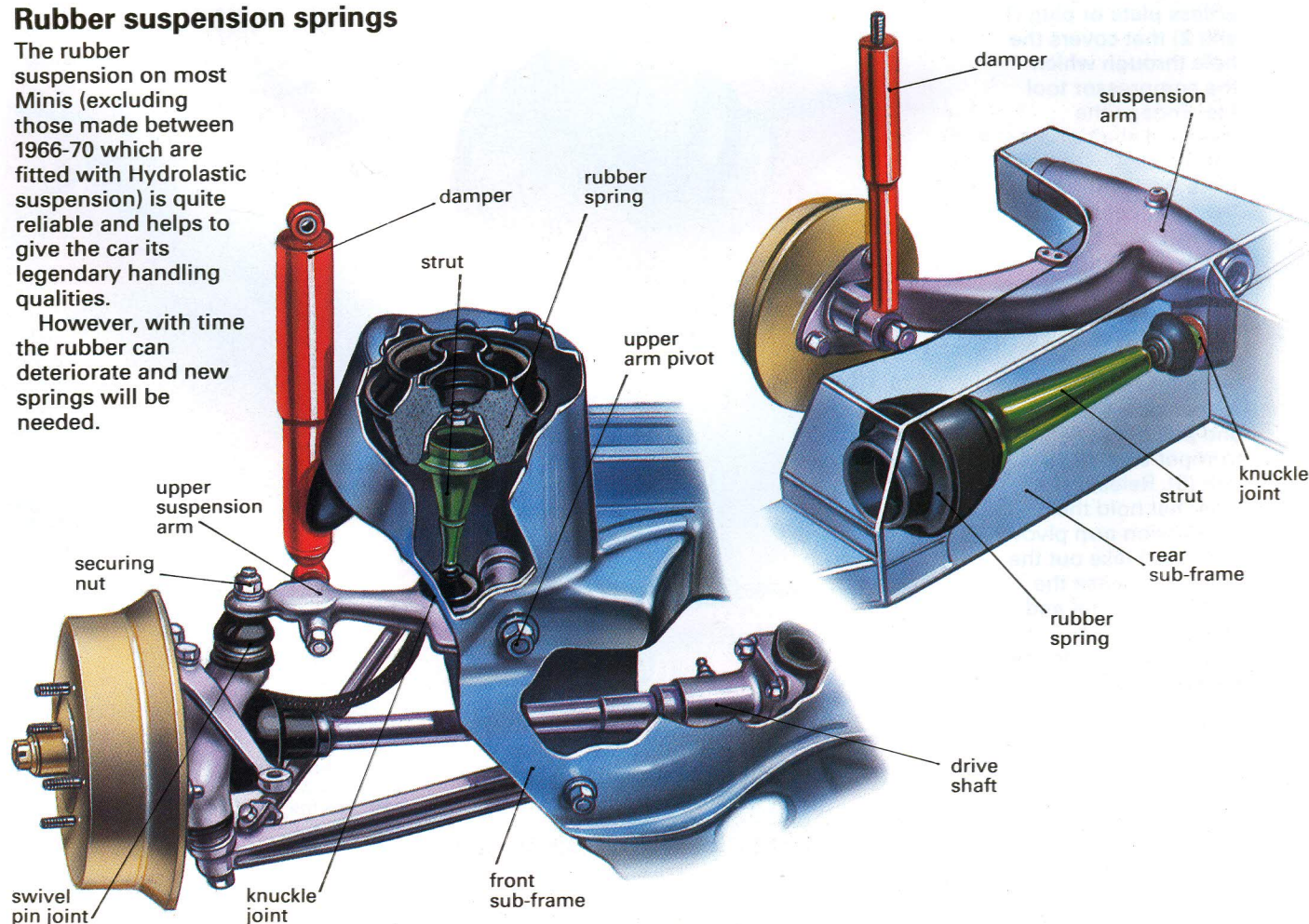
When you are dismantling the suspension it's a good idea to check the suspension strut units (also called trumpets) for corrosion. It is quite common to find that the alloy has rotted away, seriously weakening the units and making them unfit for further service.

A new or good second-hand replacement is the only solution.

## Rubber suspension springs

The rubber suspension on most Minis (excluding those made between 1966-70 which are fitted with Hydrolastic suspension) is quite reliable and helps to give the car its legendary handling qualities.

However, with time the rubber can deteriorate and new springs will be needed.



## Spring compressor tool

To release the front rubber springs a special compressor tool is required. This consists of a threaded central shaft that engages with a nut built into the centre of the spring, and a compressor nut that is used to compress the spring.

You can buy the tool at a good accessory shop, but you will also be able to hire one – probably the cheaper option unless there is a likelihood of doing a lot of work on the front suspension.

ing. Compress the spring until the suspension strut is no longer under compression and free to move.

Jack up the front of the car, support it on axle stands and remove the wheel. Remove the retaining screw and withdraw the rebound-rubber from under the upper suspension arm. Free the damper lower mounting where it is attached to the suspension arm; compress the damper and move it to the side.

Undo the nut holding the swivel hub to the upper suspension arm and break the taper joint, using a separator tool. Pull the strut knuckle joint out of its seat in the wishbone and lever the top end away from the spring so that the strut can be withdrawn. As the strut is often stuck fast you may have to lever hard with a stout screwdriver.

Remove the nuts and washers from the upper arm pivots. Undo the retaining bolts, take the front retaining plate off and extract the thrust washer. Push the pivot pin forwards,

remove the rear thrust washer and work the arm out from the sub-frame. Turn up the nut on the spring compressor to release the pressure on the spring. Undo the central screw and remove the spring compressor. Pull the rubber spring away from its mounting in the sub-frame tower.

Clean out the spring mounting in the tower and check for rust (see sideline, right). Work the spring up into place in the sub-frame tower, making sure it seats properly on the internal spigot. If you find the rubber sticks during installation, use a little water and washing-up liquid to lubricate it.

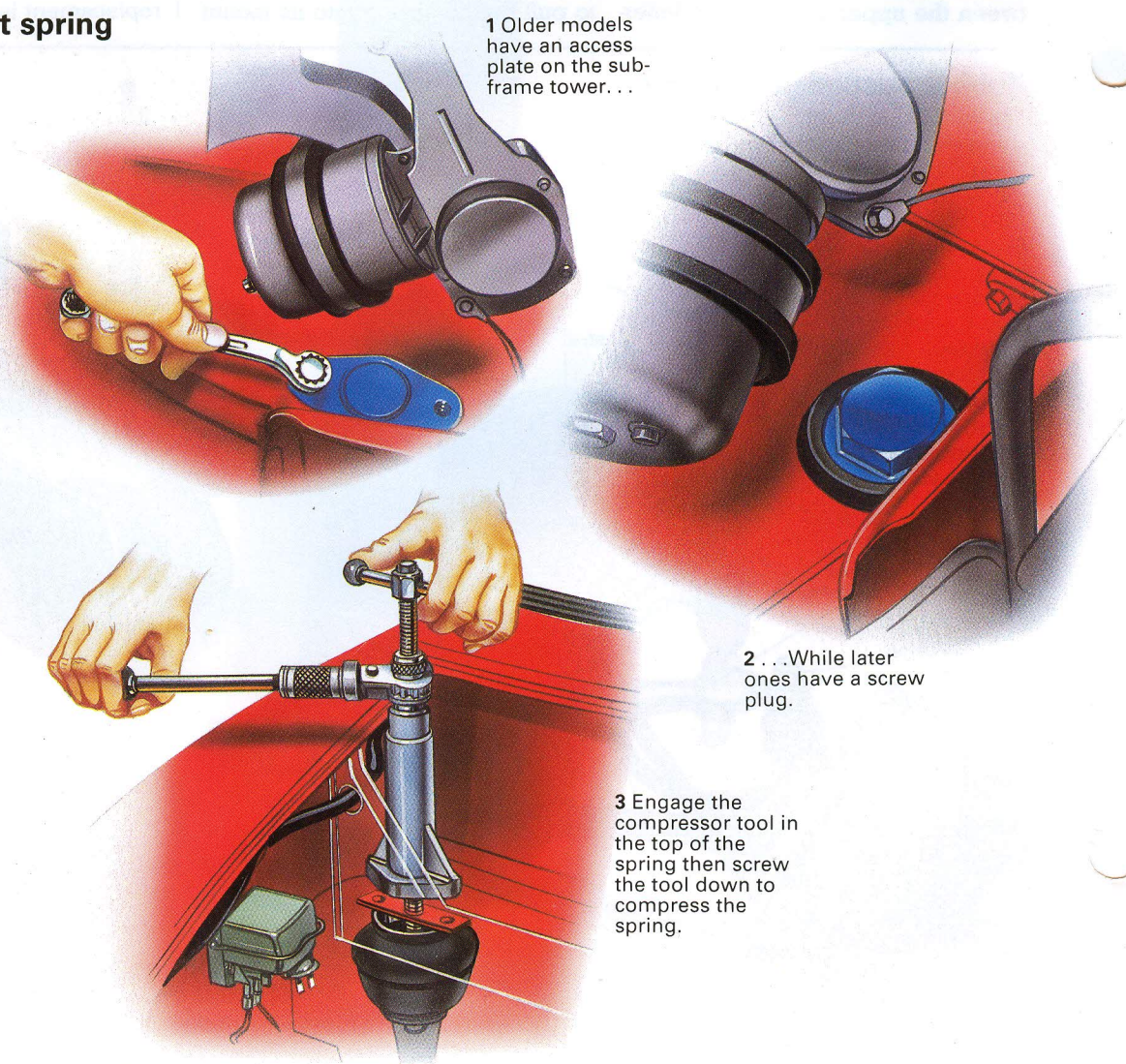
Position the spring compressor, engage its central screw with the spring and compress it. Before refitting the upper suspension arm, check that the bearings are in good condition, clean the pivot shaft and grease both it and the bearings.

Position the rear thrust washer on the arm and hold it in place with the

## Removing a front spring

Start by moving the access plate or plug (1 and 2) that covers the hole through which the compressor tool fits. Engage the threaded shaft of the compressor with the nut in the centre of the spring and screw it down nine full turns. Screw down the compressor nut (3).

Working from under the wheel arch undo the nut holding the ball joint (4), lever the suspension arm down and pull out the trumpet-shaped strut unit (5). Release the nuts that hold the suspension arm pivot shaft, and take out the arm (6). Release the compressor tool and pull or lever the spring from inside the sub-frame tower (7).



1 Older models have an access plate on the sub-frame tower. . .

2 . . . While later ones have a screw plug.

3 Engage the compressor tool in the top of the spring then screw the tool down to compress the spring.

seal. Fit the front seal on the arm, slide the pivot shaft into the bearings and work the arm into position in the sub-frame. Push home the arm and fit the retaining plate. Work the seals into position over the thrust washers. Fit and tighten the pivot shaft washers and nuts.

Clean the knuckle joint and seat (in the suspension arm), and check them for wear and damage; replace any faulty parts – they are very cheap (see sideline, overpage). Also check the end of the strut.

Push up the strut into position on the spring and locate the knuckle joint in its seat. Work the dust cover over the lip of the seat to give a good seal. Refit the rebound-rubber. Make the joint between the swivel hub and suspension arm, and fit the damper to the arm mounting. Fit the wheel, lower the car to the ground

and slacken the compressor nut. Remove the compressor, and refit the cover plate.

### Rear springs

In the Mini rear suspension, the rubber spring is horizontally mounted in the sub-frame with a trailing radius arm pivoted on the sub-frame in front of the spring. Suspension movement is transferred from arm to spring through a spring strut with a knuckle joint between arm and strut. The damper is fitted between the wheel end of the radius arm and the car body.

To remove the spring, undo the shock absorber top mounting nuts inside the boot, noting how the mounting rubbers are fitted, and remove them. On most models you have to move the petrol tank to get at

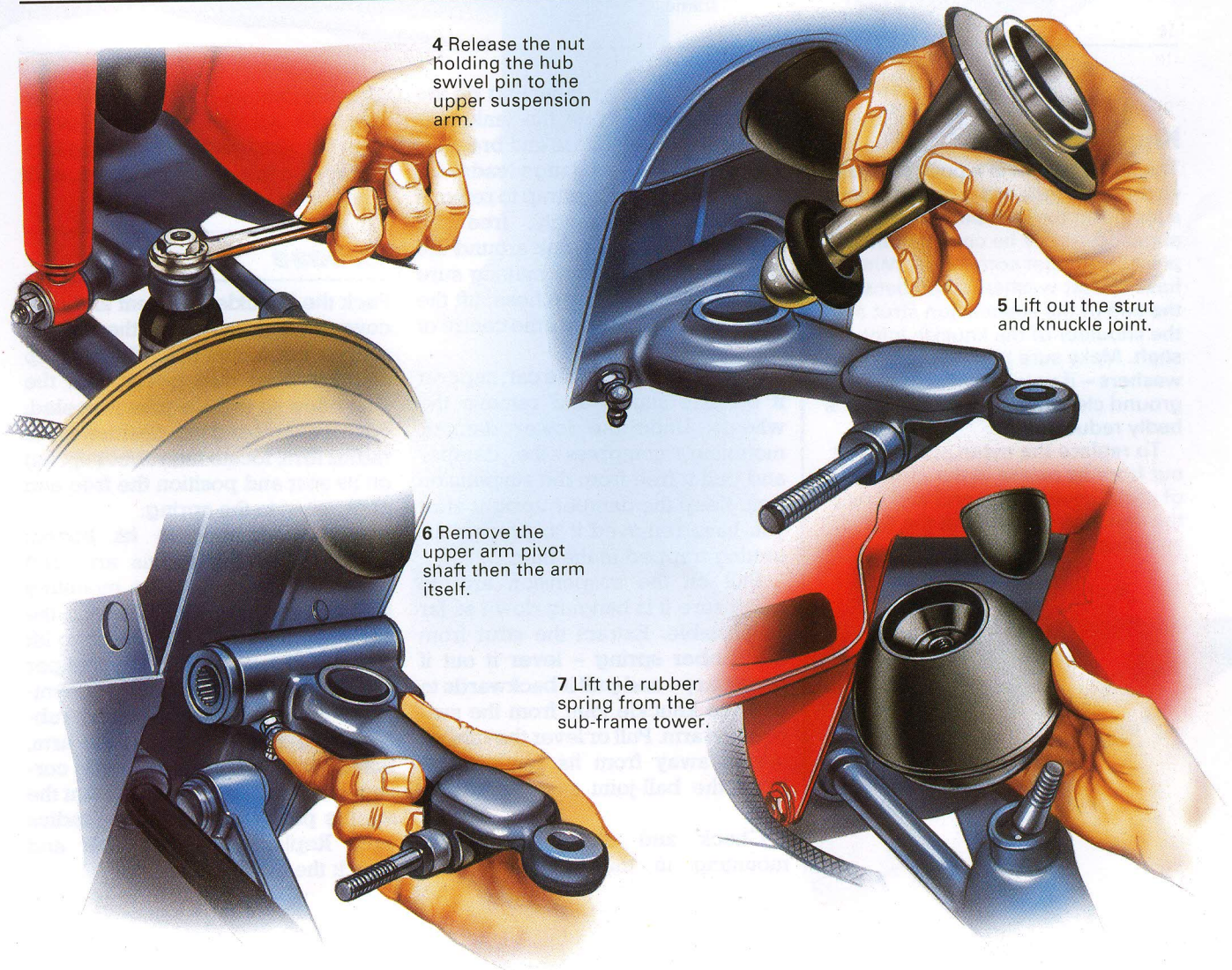
### Checking the mountings

Thoroughly clean inside the spring housing, using a wire brush or scraper to remove any rust patches. If there is only surface corrosion, treat it with an anti-rust primer and repaint. Hammer-finish paints are suitable (no primer is needed) and dry quickly, allowing you to get on with the job; aerosols are also fast drying.



### Serious corrosion

When the corrosion is more serious you will have to get welded repairs done. These are difficult and time-consuming, and often the best solution is to fit a new sub-frame.



4 Release the nut holding the hub swivel pin to the upper suspension arm.

5 Lift out the strut and knuckle joint.

6 Remove the upper arm pivot shaft then the arm itself.

7 Lift the rubber spring from the sub-frame tower.

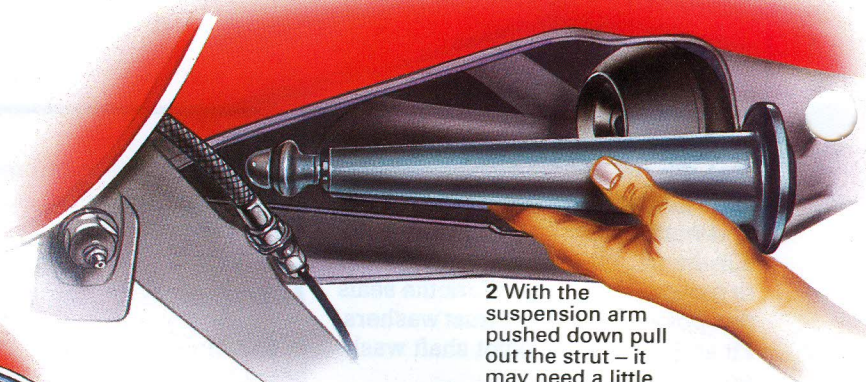
## Rear spring removal

Release the damper from the suspension arm (1), then force the arm down as far as it will go and disengage the strut knuckle from the suspension arm (2). Lift out the strut and remove the spring (3).

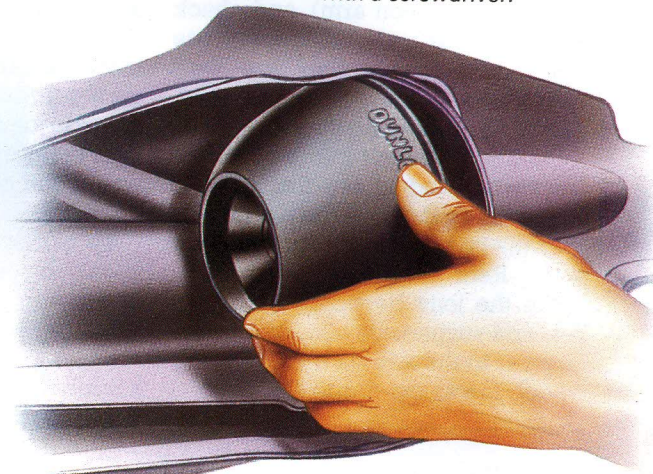
1 Release the damper fixings at the top and bottom ends.



2 With the suspension arm pushed down pull out the strut – it may need a little encouragement with a screwdriver.



3 The spring can be lifted or levered from the sub-frame.



## Knuckle joints

The knuckle joint is a push fit in the end of the strut; use a hammer and a long drift to tap it out – it will almost certainly be corroded in place. Note that some older Minis have spacer washers fitted between the end of the suspension strut and the shoulder of the knuckle joint shaft. Make sure that you refit these washers – if you leave them out, the ground clearance of your car will be badly reduced.

To replace the nylon seat, lever it out from its recess in the arm (a pair of pliers could help here) and press the new one home. Pack the seat and dust cover with grease.

the upper damper mounting on the left-hand side. Drain the tank, disconnect the outlet hose and breather pipe, undo the fuel gauge leads and release the securing strap to remove the tank. Alternatively, free the strap, and pivot the tank around the front hose connection, making sure you do not damage the hose; lift the rear of the tank towards the centre of the car.

Jack up the rear of the car, support it on axle stands and remove the wheels. Undo the lower damper mounting, compress the damper and pull it free from the suspension arm. Keep the damper upright after you have removed it to prevent air getting trapped in the fluid.

Pull on the suspension arm to make sure it is hanging down as far as possible. Extract the strut from the rubber spring – lever it out if necessary – and pull it backwards to free the knuckle joint from the suspension arm. Pull or lever the rubber spring away from its seating and prise the ball-joint seat out of the arm.

Check and clean the spring mounting in the sub-frame, the

knuckle joint and the seat (see side-line, left). Also check the end of the strut for damage. Make sure the rubber spring is in good condition, or fit a new one.

## Grease

Pack the knuckle joint seat and dust cover with grease, and then fit the seat on to the joint ball. Work the lip of the rubber dust cover over the seat edge so that the joint is sealed. Push the strut end into position in the radius arm, locate the rubber spring on its seat and position the free end of the strut in the spring.

Fit the damper to its bottom mounting on the radius arm and extend it. Check that the mounting rubbers are properly fitted on the top of the damper. Use a jack to lift the radius arm so that the damper top stud passes through the mounting hole, and fit the mounting rubbers and nut. As you lift the arm, make sure the rubber spring is correctly located on its seat and that the strut is properly fitted to the radius arm. Replace the fuel tank and check the connections.

