

REPLACING WHEEL CYLINDERS

American comedian George Carlin is credited with saying "When you step on the brakes, your life is in your foot's hands." He has a point, however we can go some way towards giving the foot the best chance by keeping our brakes in as good a condition as we are able. There are many different components in a car's braking system, here we deal solely with wheel cylinders, a common source of trouble particularly with cars that are not used frequently.

The wheel cylinders of the Minor suffer the same two basic problems as any other vehicle's wheel cylinders, leaking and seizing. Their design leaves every opportunity for dampness to instigate corrosion and a small amount of corrosion




leads quickly to seizure. Fig. 1 shows the rust formed after a short lay-up in damp conditions. Once piston and cylinder have rusted together it is almost impossible to free them without causing damage. If your car is laid up for the winter, it's not a bad idea to give the footbrake a few pumps on a regular basis. It may help to keep the moving

parts free.

Front wheel cylinders appear more prone to problems than their rear counterparts however we should remember that on most cars from the Minor era there are four front cylinders and two rears thus the natural odds are two to one. Front cylinders feature here; the same principles apply to those at the rear, however there is the handbrake arrangement to be taken into consideration. Series MM cars differ slightly, but all the principles apply.

Often a leaky cylinder can be cured by replacing the seal and this operation can be carried out without removing the cylinders. Seized cylinders present a different

problem and almost certainly will have to be removed. Many owners fear tinkering with the brakes, but with correct preparation and of course the appropriate spare parts, changing wheel cylinders can be executed without trauma as long as the job is done methodically.  Here are some tips which don't appear in the service manuals. These instructions apply only to vehicles which, apart from the area being worked on, are fully assembled and functional.


It should be noted that although rear cylinders are interchangeable, at the front there are two left-hand cylinders which both go onto the left (near)side of the car, and two right-hand, which go onto the right (offside). Sometimes they are marked, often they are not but it isn't a problem as it will be found that offered up wrongly, the bolt holes won't line up.

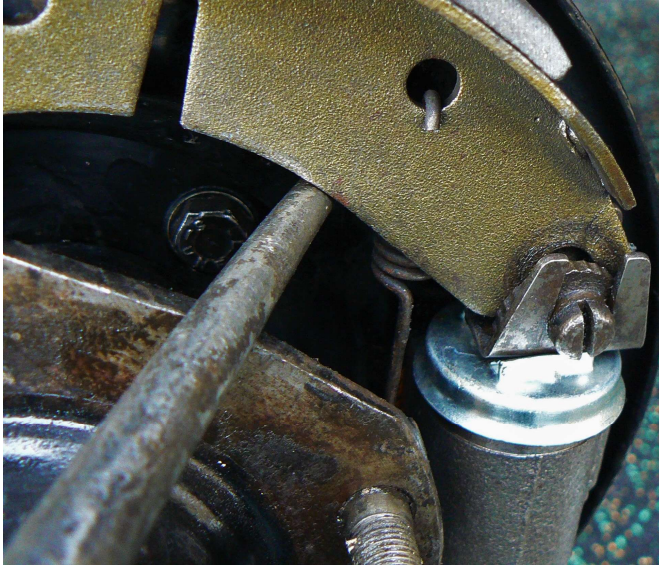
If time allows, it is advisable to clean the brake backplates with a wire brush and to douse all pipe unions and bolt heads in paraffin or penetrating oil, preferably several days before work begins.

After removing the wheel, clamp the flexible hose to prevent undue fluid loss. (fig. 2). Doing this now will ensure that it is not forgotten until fluid dribbles onto



your clean garage floor. Use a pair of grips or a small clamp whilst protecting the hose with rag or cardboard; it doesn't have to be nipped up particularly tightly. This is a good time to inspect the hoses for cracks and replace if necessary.

Back off the brake adjusters and remove the brake drum; inspect the drum for cracks and internal scoring or grooving.  *If a rear drum is removed, place spacers on two opposing wheel studs and run nuts up tightly to them. This prevents the half-shaft oil seal leaking whilst work progresses.* If in any doubt about replacing parts the right



way round, take a photo BEFORE dismantling. Lever the brake shoes up at one end and slip the adjusters out (fig. 3); take off the brake shoes and if in good condition, lay them aside with their springs as found on the car. This will serve as a reminder when reassembling. If the shoes appear worn, damaged or are wet with fluid or oil, replacement will be

necessary. If oil or grease is found within the brake mechanism it will be necessary to investigate and rectify the cause, usually a defective hub oil seal.

Remove the short pipe connecting the two front cylinders. Use a good-fitting spanner and start carefully. Often the nut is seized to the pipe and turning the nut will twist the pipe off. A little care here can prevent this happening.

The flexible hose can now be loosened from its cylinder, but only by half a turn. The bolts holding the cylinders to the backplate should now be removed, these are two different sizes and awkward to get to. Use a socket spanner of the correct size, don't struggle with ill-fitting spanners as the bolt heads will become rounded and life will become more difficult!

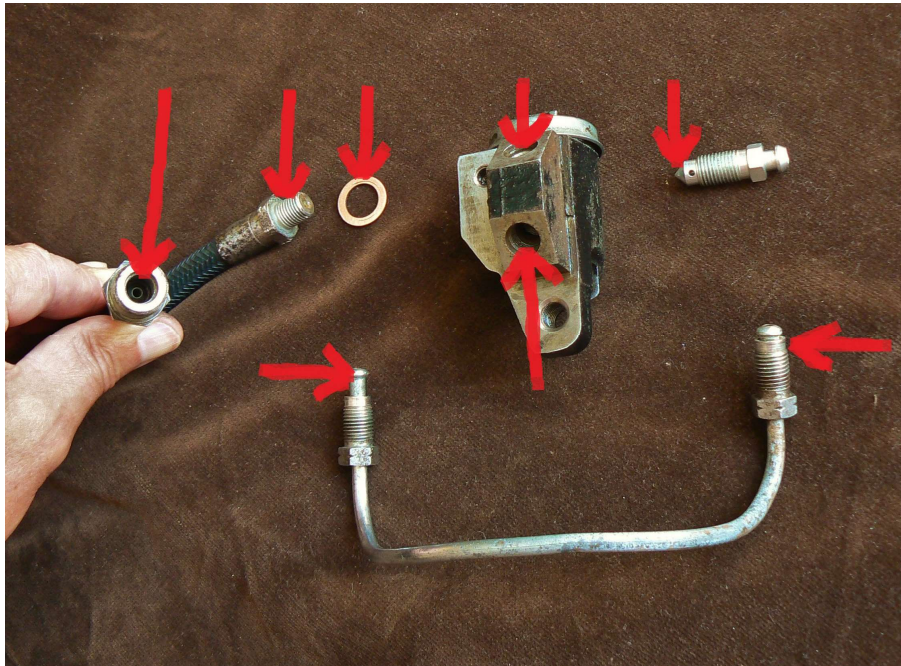
Once the bolts are out, the cylinders may be detached from the backplate; the flexible hose can be undone by turning the cylinder, once it is free. There is a copper washer on this joint; don't lose it!

Now the backplates are free of any fittings, and can be cleaned thoroughly on both sides. If the opportunity exists, give them a nice coat of black paint.

Retrieve the copper washer which you didn't lose; rub both faces lightly on a piece of fine wet and dry, laid on a flat surface. When even and shiny, hang the washer from a piece of wire and heat gently in a flame until it begins to turn red, then allow to cool. This will soften the metal for a better seal. If the washer shows

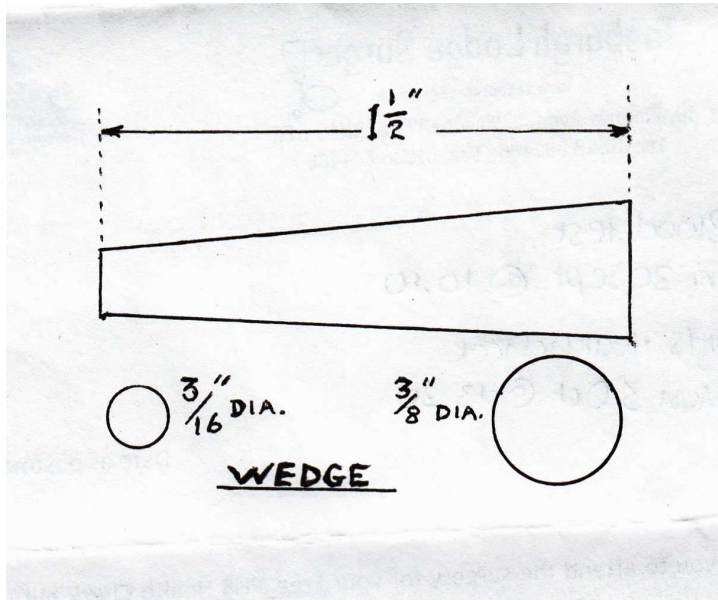
signs of damage, replace it!

Before fitting any part of the braking system it should be remembered that cleanliness is far above godliness. A small amount of grit in the wrong place will cause a leak of fluid so pay particular attention to all parts, especially the




hydraulic connections. Crucial areas are shown arrowed in fig. 4. When all parts which are to be fitted have been cleaned, inspected and replaced where necessary, they are ready for the process of reassembly.

We are now ready to reassemble the front brakes.



🔪 The first job is to find a scrap of softwood and make four (roughly) round, tapered wedges as described in fig.5. They don't have to be perfect - just functional. Half an hour spent making a set of these will be well-spent, securing the ends of brake springs saves much time and temper and the wedges can be kept in the toolbox for future use.

Pass the flexible hose through the front slot of the backplate, place the washer

over the free end of the flexible hose and screw the upper hole of the cylinder fully onto it. Final tightening can be done when the cylinder is firmly bolted to the backplate. Keep the clamp on whilst this is being done. The cylinder can now be secured, renewing screws if necessary. Threads are 1/4" and 5/16" UNF;  socket (Allen) head screws are advantageous here. If using the existing and undisturbed hose you may be lucky enough for it to end up within a quarter of a turn of the original. If not, the union at the inner end of the hose will need to be slackened in order to take any twist out of the hose.

Bolt the rear cylinder into place then fit the short joining pipe, ensuring that its flared ends and nuts are clean and that the pipe is not touching the lower end of the steering gear. A little judicious bending may be needed here. The brake shoes



can now go on, as shown, your wooden pegs as seen in fig. 6 will help to keep the spring ends in place. Fit the adjusters last, ensuring that they



are clean and wound fully back (fig. 7). They must fit snugly into the shallow channel formed on the top of the piston, as in fig. 8.

Knock the brake shoes central and refit the brake drum. Do not attempt to adjust the brake yet. The replaced cylinders can now be bled. With a bit of running around, this can be achieved easily by one person, as the master cylinder incorporates a rudimentary valve to prevent fluid flowing backwards when the pedal is released. Admittedly, it's much easier with an assistant!

➡ Firstly, use a clear bleed tube so that the outflow from the cylinder may be inspected at source. Attach bleed tube firmly to the bleed nipple, which should be nipped up fairly tightly then slackened by half a turn. Ensure that the master cylinder is topped up with the appropriate fluid and temporarily replace the inspection cap. This is to contain the small fountain of fluid which spurts up directly below the inspection hole when the pedal is depressed.

Pump the brake pedal firmly a couple of times, then quickly undo the clamp; return to the brake pedal and give three or four steady but full strokes then nip up the bleed nipple. Take a look at the fluid in the bleed tube. If it is free from bubbles, try the pedal for firmness. If it is spongy or there are bubbles present in the tube, repeat the bleeding process. Twice should be enough.



Inspect all pipe unions for leaks, using a good light source, and re-check all nuts for tightness. The bleeding operation will have moved the shoes around a little and they should now be nicely centered so the final job is to adjust the brake (fig. 9). Turn the drum by hand and advance the adjuster until the drum tightens, then back off the adjuster by one click.

Try the pedal again, to ensure that the bleeding process was successful. If the pedal is spongy, bleeding will need to be

repeated. It's better to do this now than to find out later that the brakes don't work! After all brake work is completed and the pedal is satisfactorily firm, a short road test should be carried out to confirm that all is well.

➤ *As a little extra touch, a set of protectors for the bleed nipples can easily be made from some pieces of rubber tubing having one end plugged with a rubber disc (fig. 10). They keep mud and water from entering the open end of the nipple, thus preserving it for future operations.*

