

TECHNICAL NOTES SERIES

JOWETT JAVELIN – PB, PC, PD & PE JOWETT JUPITER – SA & SC



*County packaging and an example of the AR 55-L and AR 55-R type wheel cylinders.
(Images from the Internet – with thanks.)*

These notes have been assembled in a format that, as much as possible, they assist those who have never attempted such Jowett repair tasks as described in this document. They have been written to cater for younger Jowett Car Club members who may have limited mechanical knowledge.

If a reader of these notes does not feel confident about the procedure described here, then the brake component and associated parts should be taken to a reputable repair professional – if available.

PART XXXIV – COUNTY BRAND WHEEL CYLINDERS (FULL HYDRAULIC BRAKE SYSTEM)

The Jowett Car Club of Australia Incorporated is not responsible for any inaccuracies or changes that may occur within this document. Every effort has been made to ensure accuracy. It is not a Jowett Car Club publication and, therefore, the Club has no control over its contents. These Technical Notes have been compiled by using the information that was available, which was deemed accurate at the time.

*Compiled by Mike Allfrey – August 2023.
Revised – March, 2024.*

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WARNING!
ASBESTOS COULD BE PRESENT IN
GASKETS, FIBRE WASHERS & BRAKES



INTRODUCTORY COMMENT FOR TECHNICAL NOTES

These introductory notes should be read prior to reading Part XXIV of the Technical Notes Series.

The Jowett Technical Notes Series have been an ongoing activity for several years. That means that some techniques and specifications may have been superseded in later notes on the same, or associated topics in the series. Also be aware that some topics and recommendations may be specific to certain Engine Serial Number ranges. It appears that, in Australia, the various State Main Agents did not carry out Service Bulletin information during Jowett active times. A set of known Service Bulletins is in Part III.

Some of the notes are restorations of what was written by members of the Jowett Car Club (UK), the Jowett Car Club (NZ) and by members of the JCCA.

Over the years of involvement with matters Jowett, and with the dawning of the personal computer age, a personal decision was made to help members of the Jowett Car Club of Australia Inc. with technical information. Included with the Technical Notes are 'restored' versions of the Javelin and Jupiter Maintenance Manuals and the associated Spare Parts Catalogues. Future generations will prefer to flick through images on their personal device screens, rather than leafing through pages in a tattered and oil stained book to access information.

The term 'restored' has been used because it soon became apparent that, as with our efforts in restoring Jowett vehicles, we desire excellent quality of workmanship in the reproduction of Jowett related documentation. Not for us the crude, and crooked, photocopies that have been issued over the years. These have, even though accurate at their time, become partly out of date.

Hence the decision to 'restore' the publications and documents that have come to hand.

It should be noted that the Javelin and Jupiter Spare Parts Catalogue is a combination of all the catalogues that were to hand (from 1948 to 1953).

The Maintenance Manuals were originally written on the assumption that they would be used by skilled motor mechanics who had attended service training courses conducted by Jowett Cars Limited and after works closure, were made available for owners who had reasonable mechanical knowledge of motor car maintenance and overhaul.

Included with the Technical Notes Series is a Lucas Overseas Correspondence Course, which can be of great assistance when trouble-shooting electrical problems related to your Jowett, or any other British vehicle of the same period.

Please be aware that this is an ongoing project

Mike Allfrey – February, 2024

Introduction

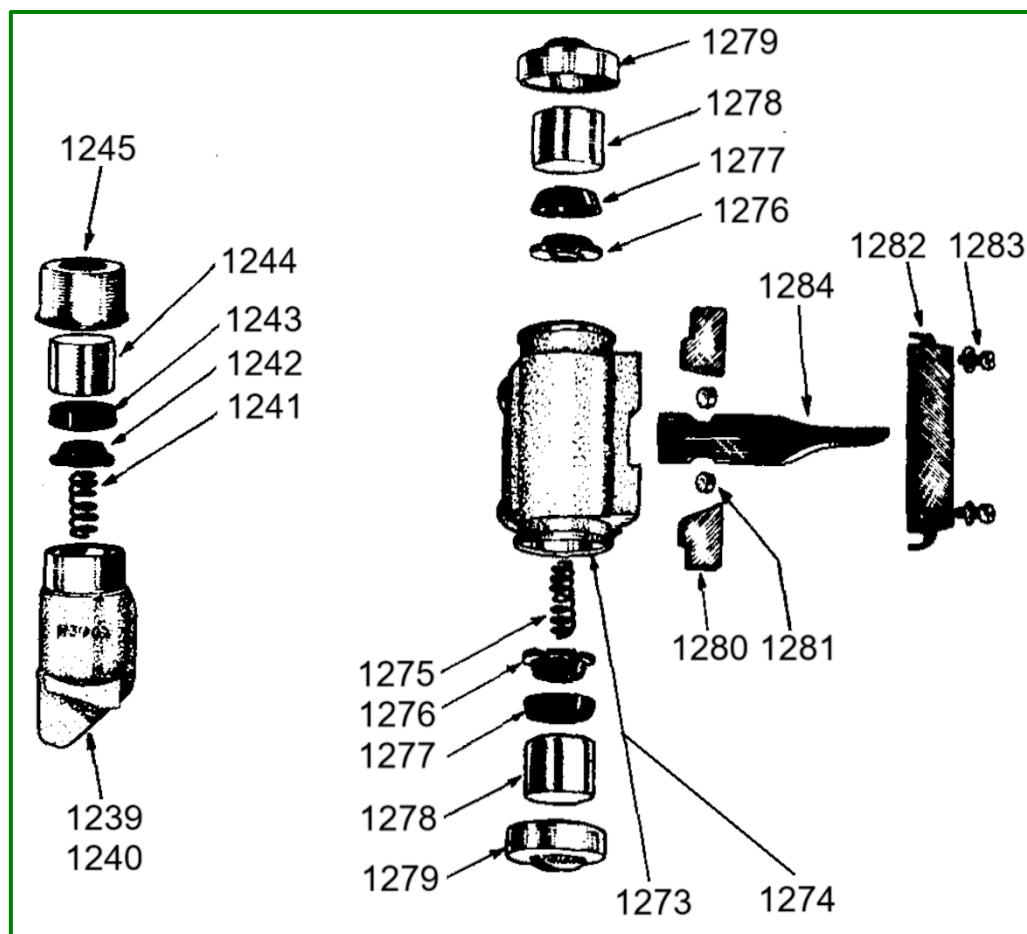
It is well known that owners of Jowett Javelins and Jupiters will not, if at all possible, purchase a set of new wheel cylinders so that braking systems can be overhauled. The preferred options are to hone the original piston bores, have stainless steel sleeves installed into over-bored housings (a bit more expensive) or to have Recoil (Helicoil) thread inserts installed to restore damaged threads for hydraulic pipe union and bleeder screw fitting.

However, there is another option, and that is to purchase a set of new-manufacture (copied) wheel cylinders from Jowett Car Spares Limited (JCSL) – or from other suppliers. The manufacturer of the wheel cylinders stocked by JCSL is a company called County Motor Vehicle Components, located in Taiwan, now dissolved. The agent for the County products in England was in Leicester, and a look at the address on Google Maps revealed a well-established Asian restaurant at the location.

Visually, the County wheel cylinders appear to be correct for the job, however, the installation of the rear wheel cylinders on two separate vehicles confirmed that, as supplied, the AR 55-L and AR 55-R cylinders are not fit for purpose. This *Technical Note* describes the various points that need to be noted carefully before installation of wheel cylinders bearing the County logo.

Throughout these notes part number information is displayed thus: (1280-54361), being the Item No. followed by the Jowett Part No.

Description Of The Parts



Above: Figure 1. Illustration taken from the 1952 Spare Parts Catalogue.

Item No.	Part No.	Qty.	Description
1239	54366	2	Cylinder Body – L.H. (H3062)
1240	54367	2	Cylinder Body – R.H. (H3063)
1241	54368	4	Spring (H3082)
1242	54269	4	Air Excluder (H3112) – Original Die-cast, County plastic.
1243	54370	4	Seal (H1347)
1244	54371	4	Piston (H5149) – Original style shown.^
1245	54372	4	Dust Cap (H3228) – Currently replaced with rubber boot.^
1273	54373	1	Cylinder Body – L.H. (412811) – County No. AR55-L.
1274	54374	1	Cylinder Body – R.H. (412821) – County No. AR55-R.
1275	54368	2	Spring (31118) – County spring longer than Girling.
1276	54375	4	Air Excluder (469841) – Original Die-cast, County plastic.
1277	54370	4	Seal (468315)
1278	54376	4	Piston (480272) Original style shown.^
1279	54377	4	Dust Cover (482747) – Currently replaced with rubber boot.^
1280	54361	4	Handbrake Tappet (480711)
1281	54378	4	Roller (27015) – $\frac{5}{16}$ dia. x $\frac{5}{16}$ -in.
1282	54379	2	Cover Plate (487143)
1283	54380	8	Cheese Head Screw 2BA (13112)
1284	54381	2	Draw Link
1291	54214	4	Grover Washer $\frac{1}{4}$ -in. (GB539) – Not illustrated.
1293	54215	4	Nut – Slotted $\frac{1}{4}$ -in. ANF – Not illustrated.
–	–	4	Split Pin – For slotted nut – Not illustrated or listed.

Note: All above listed items are common to both Javelin and Jupiter. Items suffixed ^ relate to early full-hydraulic parts, the pistons were of simple cylindrical shape and the brake shoes were located in the pressed steel dust cover. Later pistons were shaped as shown in *Figures 2 and 3*, featuring more effective rubber boot type dust covers,

The County Brand Wheel Cylinders

The County Motor Vehicle Components packaging on the front page of these *Technical Notes* show, in the position where part number identification would be, red question marks. The photographs were taken from Internet Websites for illustrative purposes only. The reason for the question marks is because a complete set of wheel cylinders was received from JCSL individually packed in clear plastic bags which had no identification labels or markings on them. That meant that wheel cylinders with unknown characteristics were being fitted into a Jowett Jupiter's braking system.

The County wheel cylinders had been advertised in the Jowett Car Club's magazine *The Jowetteer* and, therefore, it was assumed that the wheel cylinders would be a simple replacement for the original Girling units. The service provided by the volunteers at JCSL was exemplary and it was felt that the set of County wheel cylinders at £260.00 were of excellent value.

The concerns experienced follow, but it must be borne in mind that such wheel cylinders may be fitted to a Jowett full-hydraulic brake system by those who may not have the skills required to investigate and instigate alterations to ensure that the County wheel cylinders do replace original Girling wheel cylinders, as they should.

Club members should not have to resort to shaving material from the air excluders (Part No. 54375) or re-profiling brake linings to an extent that the brake drums fit over the linings. Such activities need to be prevented; these *Technical Notes* are an attempt to ensure that.

The County Wheel Cylinder Experience

Note: All Part Numbers and Item Numbers have been taken from the 1952 *Jowett Javelin and Jupiter Spare Parts Catalogue*. The only identification at the County wheel cylinders was relief numbers cast onto the cylinder bodies.

Rear Brake Wheel Cylinder

It was discovered immediately, that after installing the County rear wheel cylinders and brake shoes, the brake drum was impossible to fit over the brake shoes. At the same time, it was discovered that the handbrake would be inoperative, due to excessive clearance between the handbrake tappets (1280-54361) and the brake shoe web. In addition to those two conditions, the threaded port for the pipe union nut was not machined to match the reverse flare on the brake pipes (1412-54185 and 1413-54186) that was employed by Jowett Cars Ltd. The bleeder screw port was suitable for use.

The County rear wheel cylinders were not supplied with the cheese-head screws that secure the cover plate (1282-54379). The screws (1283-54380) from the original Girling wheel cylinder did not match the threads provided. In addition, the mounting studs do not have holes for the split pins that secure the slotted nuts against the Grover washers (Not illustrated 54214).

Front Brake Wheel Cylinder

The County front wheel cylinders, initially, could not be fitted into the back plate due to the mounting studs being out of position. The front wheel cylinder pipe union ports for the bridge pipe union nuts were not machined to match the reverse flares at each end of the bridge pipe.

County Rear Wheel Cylinders – Action Taken

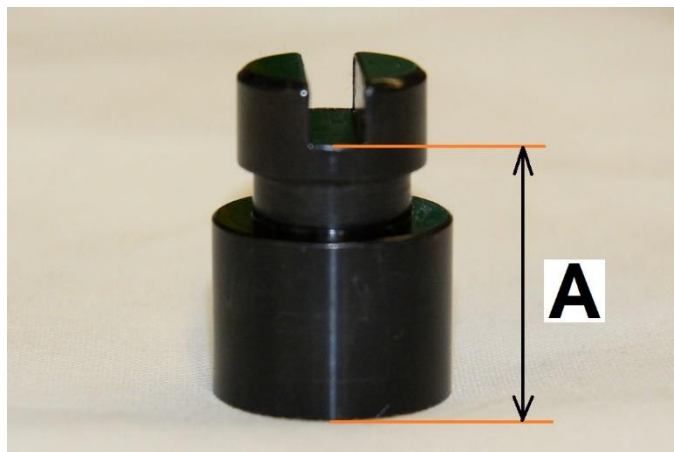
At first, the situation was somewhat surprising and mystifying. Experience had always shown that a new correct specification Girling rear wheel cylinder was a direct replacement for the original, and the component replacement task was simple. There were no concerns about brake drums not fitting over newly relined brake shoes, nor was there any concern related to the fit-up of the brake pipe.

The first indication that matters were not right, was the sloppiness at the draw link (1284-54381) due to there being 0.040-in. (1.02 mm) clearance between the handbrake tappet (1380-54361) and the brake shoe web at both ends of the wheel cylinder, the total clearance being 0.080-in. (2.04 mm).

The cause of this concern was investigated as follows:

1. The County wheel cylinder pistons were measured from the slot where the brake shoe web seats, to the piston face that contacts the wheel cylinder seal (1276-54370). The dimension was 0.9805-in. (24.905 mm). The same measurement was taken from a new stainless-steel piston, giving the dimension of 0.935-in. (23.749 mm). There was a difference of 0.0455-in. (1.156 mm) thus giving a total difference of 0.091-in. (2.311 mm).

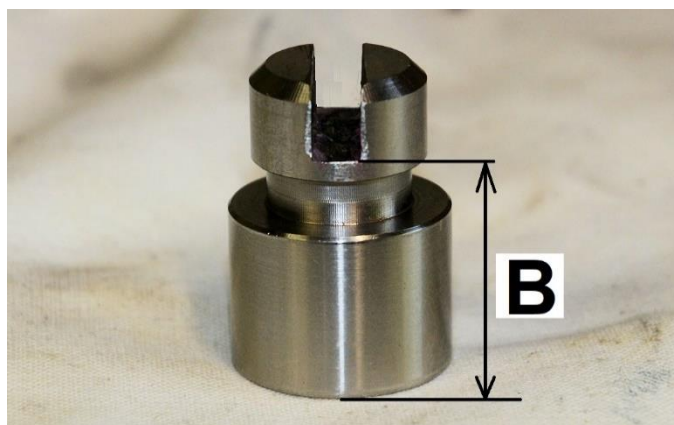
Right: Figure 2. The County piston dimension 'A' – 0.9805-in. (24.905 mm).



2. The diameters of the two pistons, where they fit in the bore, were measured, and found to be within 0.0005-in. (0.0127 mm) of each other. It was decided to use the stainless-steel pistons.

3. The rear brake was reassembled and there was still clearance at the brake shoe web, but reduced, between the hand-brake tappets and the brake shoe webs. The supposition then was that the County air excluder spring was coil-bound. The brake drum could not be fitted over the brake shoes.

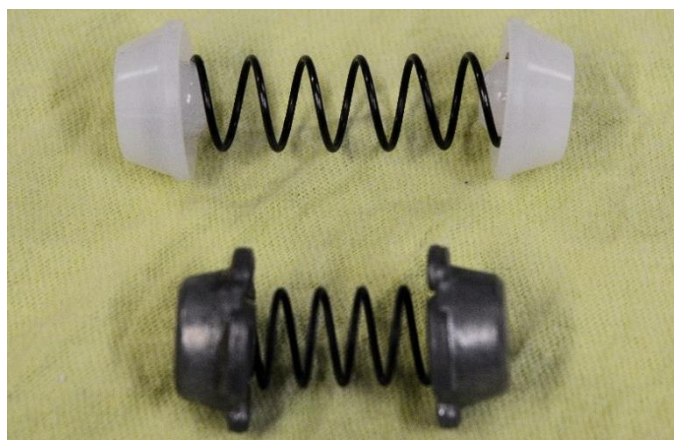
Right: Figure 3. The new NZ piston dimension 'B' – 0.935-in. (23.749 mm).



4. The County spring and air excluder assembly was compared with the original Girling spring and air excluder assembly. The difference in overall length was immediately noticed.

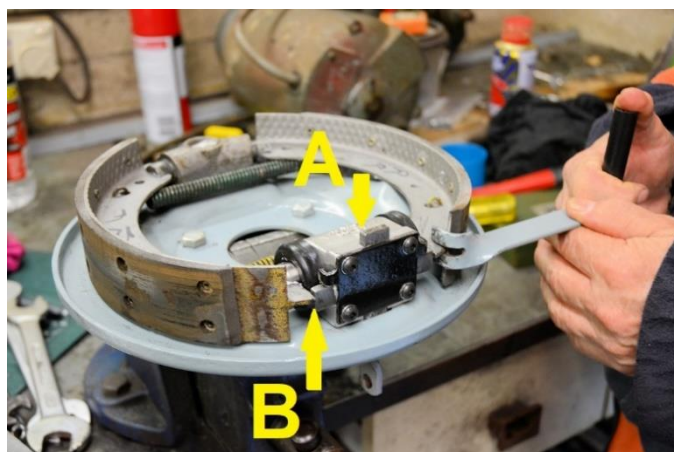
It was decided to install the Girling assembly, which had die-cast air excluders. The rear brake was reassembled and, right away, the brake shoe webs abutted firmly against the handbrake tappets (1280-54361), and the piston could be pushed into the cylinder by a small amount, indicating that the spring was not coil-bound.

Right: Figure 4. The County assembly is the upper unit, the Girling is the lower unit.



5. It was discovered that the seals that came with the County cylinders appeared to be thicker at the section between the piston face and the air excluder face than the original seals from Girling. The dimension for the Girling seal was 0.0118-in. (3.0 mm) and that for the recently purchased An Jee brand 7/8-in. seal was 0.157-in. (4.0 mm). In addition to the dimensional difference, the An Jee seal is made from stiffer material than that used by Girling. This dimensional difference would increase the loading on the air excluder and spring assembly – another point to watch for.

Right: Figure 5. 'A' is the handbrake draw link and 'B' indicates where the brake shoe is hard against the handbrake tappet.



During the investigation, the County supplied seal was compared with the An Jee seal to ensure that the supplied seal was a firm fit in the

cylinder bore. At this stage, the thickness of the seal was not being investigated. The two seals appeared to be dimensionally the same.

6. After the rear brake components have been fitted, it is essential that the end of the hand-brake draw-link (1284-54381) protrudes out of the wheel cylinder body as shown at 'A', *Figure 5*. The brake shoe webs must be hard against the handbrake tappets (1280-54361), in the fully off position, as shown at 'B'. This situation must be verified prior to fitting the brake drum.

There is no mention in the Jowett Maintenance Manual, nor in any Girling service information that was available, about this requirement. But then, at the time the manuals were written, genuine parts would have been assumed to be readily available.

7. Comparison of the two air excluder/spring sets, *Figure 4*, shows that the County air excluders have long spigots for the spring to fit over. The genuine Girling excluders do not have extended spring spigots. This indicates that as the pistons are forced together by the tension of the top shoe return spring (1294-54211), the air excluders will contact each other before the spring (1275-54368) becomes coil-bound.

All of this means that with the difference in piston effective lengths, air excluders that could make contact with each other and the longer spring as supplied by County, renders the wheel cylinders as being unfit for purpose.

8. The issue with the cheese-head screws (1283-54380) can be resolved by opening out the threads with a #10-32 UNF HSS hand taps (middle cut, then bottoming cut) and using Allen type button head screws to suit as shown in *Figure 5*.

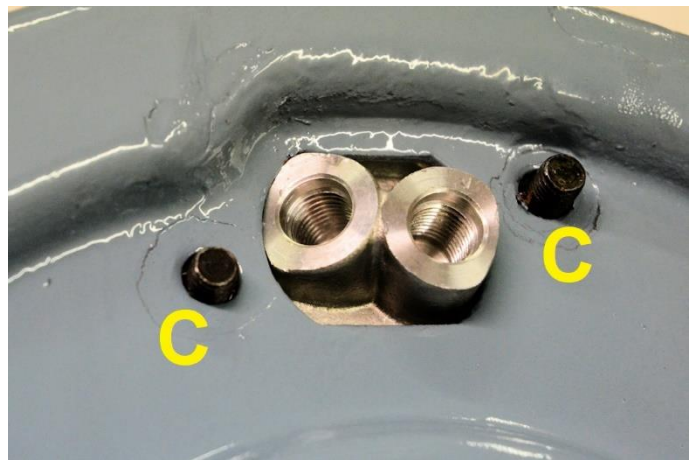
County Front Wheel Cylinders – Action Taken

The situation with the County front brake cylinders (1239-54366) was easier to solve, the locating boss with the two ports were snug fits in the openings provided for them in the back plate. With the boss aligned, the studs that secure the cylinders in position, could not pass through the holes in the plate. The following action was taken:

1. The stud holes in the back plate were drilled $\frac{1}{32}$ -in. (0.79 mm) oversize, from the original hole diameters to provide room for the County studs to just pass through.

Right: Figure 6. Indicator 'C' shows the offset of the studs with the wheel cylinder boss in its home position.

2. The County wheel cylinder was pulled into its home position by fitting plain washers and Nyloc nuts that were fully tightened and then backed off half a turn.
3. It is assumed that the wheel cylinder assembly was a suitable fit, due to ease of drum fit.
4. The Nyloc nuts had been backed-off so that, after the brake drum had been fitted, the brake hydraulic system bled of air, the pedal pushed hard several times and held down while the Nyloc nuts were tightened to ensure that the brake shoes were initially centralised in the drums.



Fitting Hydraulic Pipes To County Wheel Cylinders

Due to the County brand wheel cylinders having hydraulic pipe ports being suitable for non-original pipe flares, the following steps need to be taken:

1. Obtain six (6) cone adaptors (Part No. BX-244) – maybe buy eight in case of loss under car.
The part number is that used by BGT Brakes, 18 Cambria Road, Keysborough, 3173.
Other types of adaptors are available, however, screw in adaptors with a copper washer, may require a degree of careful hydraulic pipe bending.
2. The concave side of the BX-244 adaptor faces the wheel cylinder housing.

3. Insert the adaptor, with a small amount of rubber grease on its concave side, using a pointed tool and a small screwdriver to position the adaptor over the cylinder's inlet drilling. Gently push the adaptor home so that rubber grease is seen to be squeezed out.

Right: Figure 6. The adaptor that fits into the pipe ports so that reverse flare (Girling) can be fitted.

4. Gently insert the hydraulic pipe into the port, hold firmly in position against the adaptor and thread in the union nut.

5. Tighten the union nut to make a fluid tight joint. Do not overtighten the nut. Check that the hexagon of the nut is not hard against the port boss – this condition indicates that adaptor has fallen from the port.

6. Note that overtightening the union nut can cause the reverse flare and the end of the nut to increase in diameter which will certainly cause problems during dismantling i.



Installing The Rear Wheel Cylinder

The rear wheel cylinder is designed to 'float' in slots in the back plate so that the rear brakes can stay centralised inside the brake drum. This installation differs from the front brakes where the brake shoes themselves can 'float' individually. The County rear wheel cylinders are equipped with ¼-in. UNF studs that are not drilled to accommodate the split pin for securing the slotted nut against the Grover washer (single coil spring) that was used originally. A Grover washer is a thinner type of spring washer, that is not a sharp end type locking washer. Its function is to hold the dust cover plate (1292-54218) against the back plate, in such a way that the wheel cylinder can slide, but the plate can be held in position thus preventing irritating rattles caused by rear axle movement.

Since the late 1950s self-locking nuts have been employed to hold the wheel cylinders so they can float yet hold the cylinder against the brake back plate (1297-54228). The following procedure, which is particularly important, should be adopted for fitting the wheel cylinder:

1. Ensure that there is not excessive paint in the area where the cylinder will be able to move. Place the cylinder loosely in position and slide it from one end of the slot to the other. With a fine point ink marker, identify each limit.
2. Apply a smear of white grease to the area covered by the moving cylinder housing.
3. Ensure that the dust cover plate (1292-54218) is absolutely flat. Note that previous over-tightening of the wheel cylinder can distort the dust cover plate.
4. Apply a smear of white grease to the face of the dust cover plate that faces the back plate.
5. Insert the wheel cylinder into its slot in the back plate.
6. Place the dust cover plate over the cylinder mounting studs. Fit close-tolerance plain washers over the studs and thread on new ¼-in. UNF Nyloc nuts and tighten firmly in place so that the cylinder sits firmly against the back plate.

It is considered preferable to fit the dust cover plate using the original ¼-in. Grover washers that can be held in place by Nyloc nuts. This procedure will prevent rattles emanating from this source and keep the wheel cylinder in its correct alignment with the brake shoes.

7. Slacken off both nuts until the cylinder housing can slide, with a small amount of drag within its slot. Check the movement several times and then wipe away surplus grease. The sliding of the cylinder should be checked and adjusted after 500 miles (805 kilometres) have been travelled.
 8. The cylinder should be moved to its midway point before fitting the hydraulic pipe and threading in the union nut. The cylinder may require some movement to facilitate getting the union nut to start easily in the threaded port.
 9. The original Grover washers (1291-54214) can be used with new Nyloc nuts, should this be so, the nuts should exert enough force on the Grover washers to ensure that the wheel cylinder slides as described at Step 7., with the Nylon locking portion fully engaged on the studs.
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Flare Forms For Hydraulic Brake Pipes

There is often confusion about the flare forms at the wheel cylinder ends of brake pipes.



Above: Figure 8. An example of 'Bubble' flare.

Above: Figure 9. An example of 'Double' flare.

The two common types of hydraulic pipe flares can be described differently:

1. *Figure 8.* Shows an example of a Bubble flare, also known as a single flare. Pipes with this type of flare can be fitted into the County ports for hydraulic pipes without the need for adaptors. This type of flare can be formed, with appropriate tooling, in one operation.
2. *Figure 9.* Shows an example of a Double flare, also known as a reverse flare and frequently called a Girling flare. This is the type of flare originally used on a Jowett. The reason for its Double nomenclature is because the flare is formed using two operations. The first opens out the deep flare and the second operation folds the flare inwards and over itself.

The illustrations above show flares formed in copper pipe. The images were 'borrowed' from the Internet – with due acknowledgement.

Rear Wheel Cylinder 'Float' Explained

The rationale behind the Jowett (Girling) full-hydraulic operated brake system is to ensure that, assuming correct maintenance procedures have been implemented, equal force is applied at the brake shoes by each wheel cylinder piston. By permitting the expanding mechanism (rear wheel cylinder assembly) to 'float' at the back plate, an equal force is applied to each shoe and a greater braking torque produced for a given actuating force.

Starting at the front brake, each brake shoe is adjustable with the snail cams. The brake shoes are free to 'float' at the two wheel cylinders so that they are centralised in the drum. The wheel cylinder bodies (1239-54366) have a cast-in steel ramp for the brake shoes to slide and centralise on. It is possible that the term 'float' is not really a correct term, because when the brakes are properly adjusted, the brake shoes do not 'float' a great amount. However, the self-centralising action ensures that both brake shoes contact the drum at the same pedal (hydraulic) pressure.

At the rear brakes, the system is somewhat different. Both brake shoes are under the influence of just one adjusting mechanism (Part No. 54225, adjuster wedge), the adjuster body (Part No. 54213), is securely bolted to the back plate. Therefore, the rear wheel cylinder is designed to 'float' (slide) at the back plate, so that the brake assembly can centralise. The brake shoes can slide in the tappets (1288-54226 & 54227), once centralised the shoe sliding movement is minimal. The rear brake will centralise when the brake is applied, during vehicle forward movement. The same also happens when the vehicle is moving rearwards. Sometimes, when parking on a slope and the hand-brake is applied to stop the vehicle running backwards, and having a large amount of lining wear, a metallic clunk may be heard from the rear of the vehicle. This condition was really noticeable on older farm tractors equipped with drum brakes, due to the driver sitting between the brakes.

In circumstances, when a rear wheel cylinder assembly has been locked (seized) in position, one of the pair of brake linings can wear quicker than the other. Brake performance will be reduced and pedal travel will increase significantly.

The entire setup relies on brakes that are kept well adjusted. Long periods of being out of adjustment can, in extreme cases, cause wear at the rear wheel cylinder mounting studs where they contact the back plate.

Braking System Air Bleed Screws

The County wheel cylinders came complete with air bleeder screws with rubber protective caps.

These screws are of the later type and do not require the seating ball (1248-54199) to be fitted. The screw has a tapered seat that matches the drilling in the wheel cylinder.

The air bleed screw does not require forceful tightening to ensure a fluid tight seal. After bleeding air from the hydraulic system, replace the rubber dust cover (1247-54198).

Effects Of Incorrect Wheel Cylinder Piston Size

Within the County wheel cylinder range there are other rear wheel cylinders that carry the same marking, AR 55-L and AR 55-R with, possibly, 1.00-in. (25.4 mm) diameter bores, pistons and other internal components. Wheel cylinders of that size will significantly increase brake pedal travel and, if used singly, would cause gross brake system imbalance, particularly on wet or slippery surfaces.

Do not be tempted! Fitting of such parts will require an engineer's certificate – a large cost item.

Conclusion

These notes have been produced using the experiences of three members of the Jowett Car Club of Australia Inc. The notes provide assistance for those who will be installing wheel cylinders that were manufactured by County Motor Vehicle Components, they do not relate to other brands that may be available to Club members.

It should also be declared that the name County, in this instance bears no relation to the Land Rover County model, nor does it relate to County Four-Wheel-Drive tractors.

Prepared by Mike Allfrey – August 2023.

With assistance from Philip Squire and Andrew Henshall.
