Fitting a Tandem Brake Master Cylinder:

There has been an amount of correspondence on the Forum recently in respect of tandem brake master cylinders; 'are they really necessary or is it just a gimmick?' After all many cars managed without them for years and a lot of MGB's have been driving around for circa. 60 years without problems with a single line master cylinder. To answer the question we need to consider what happens if the master cylinder stops pumping, or if there is not enough fluid left in the system to work the brakes. On a single line system the only braking effect you have left is the handbrake, try remembering that in an emergency! On a dual line tandem brake cylinder you should be left with front or rear brakes as a minimum, plus the handbrake if it's the rear brakes that have failed.

You would think that if you keep your brake system in good condition with regular brake fluid changes etc. then all would be well, alas that's not always the case. Of course you can overhaul your single line master cylinder but if you use pattern parts they are often not as good as the originals. If you use NOS parts there's no telling how old they are and how much they have deteriorated over the years.

Unfortunately it's not just the master cylinder leaking internally that can prevent you pumping up pressure. It could be a leaky rear wheel cylinder etc. that prevents pressure building up and as they are double acting that's two potential leak points at each rear wheel. Calipers tend to be less troublesome (their more likely to seize than leak) but there's the two flexible brake hoses plus another one feeding the rear axle. So there are seven potential sources of leaks before you start considering corroded brake pipes and unions, or problems with the fluid itself.

Plumbing in a tandem master cylinder is easy enough, just use the port closest to the pushrod for the front brakes and the one furthest away from the pushrod for the rear brakes and plumb them in keeping the two circuits separate.

There are some extras that can improve a braking system; a common fitment is a 'Combination Valve'. As an alternative the MGB's for the American Market were fitted with a 'PDWA' (Pressure Differential Warning Actuator). This is a much simpler version of a combination valve and unlike a combination valve doesn't regulate the pressure going to the front brakes when the brakes are first applied. If the PDWA valve senses a pressure difference between the front and rear brakes a shuttle valve moves, operating a switch, which in turn operates a warning light on the dashboard.

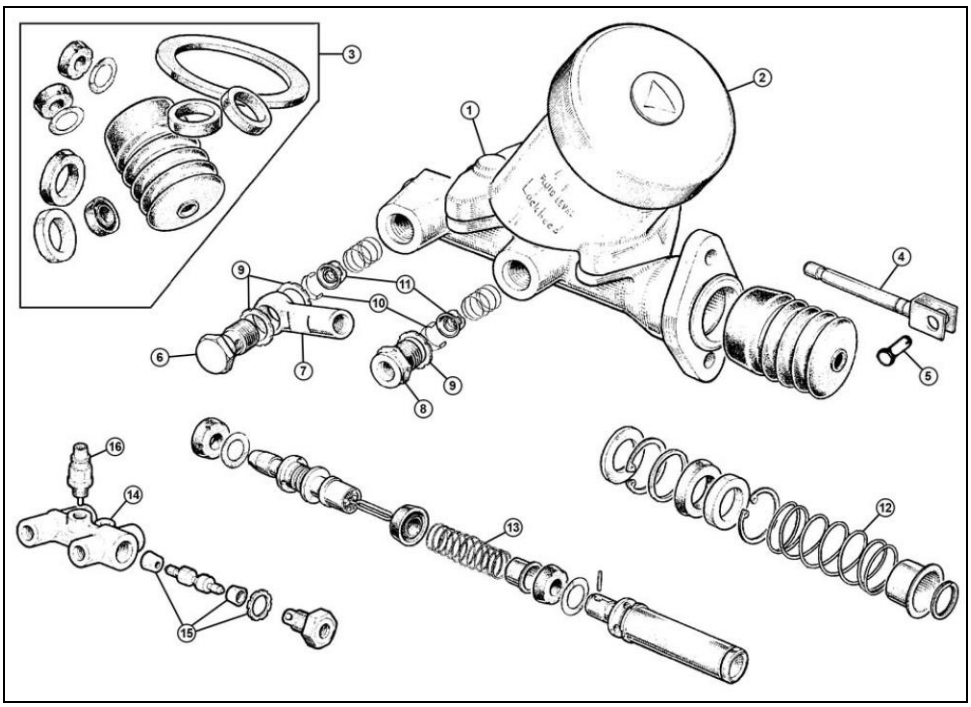
The so called experts (often related to people selling or fitting them) will tell you that the PDWA's are essential; others may feel that you don't need an idiot-warning-light to tell you if you have lost the front or rear brakes. I favour the second category as a loss of either front or rear bakes will result in a greater pedal travel and reduced stopping power, both of which are easily recognised.

Another common fitment is a 'Proportioning Valve', introduced on early vehicles fitted with discs at the front and drums at the rear. These were fitted in the rear brake line to help prevent the rear wheel brakes locking up. On original equipment they were often pre-set and worked on the fit-and-forget principle. Many of the aftermarket ones are adjustable to allow a bit of fine tuning. The MGB's (and many other cars) were never fitted with a proportioning valve as standard, this was because a system with a positive pivot located at the opposite end of the shoes from the wheel cylinder (in the case of the MGB a brake adjuster) enabled a manufacturer to design out unwanted forces by selecting appropriate sized master and wheel cylinders.

Note.
Early NG builders noted that the standard MGB brakes didn't work so well - because the lighter NG upset the braking balance. Those early 'NG Pioneers' discovered that fitting MG Midget wheel cylinders helped restore the balance. If you really want a proportioning valve then buy an adjustable one (circa £25 upwards) and fit it in the rear brake line.

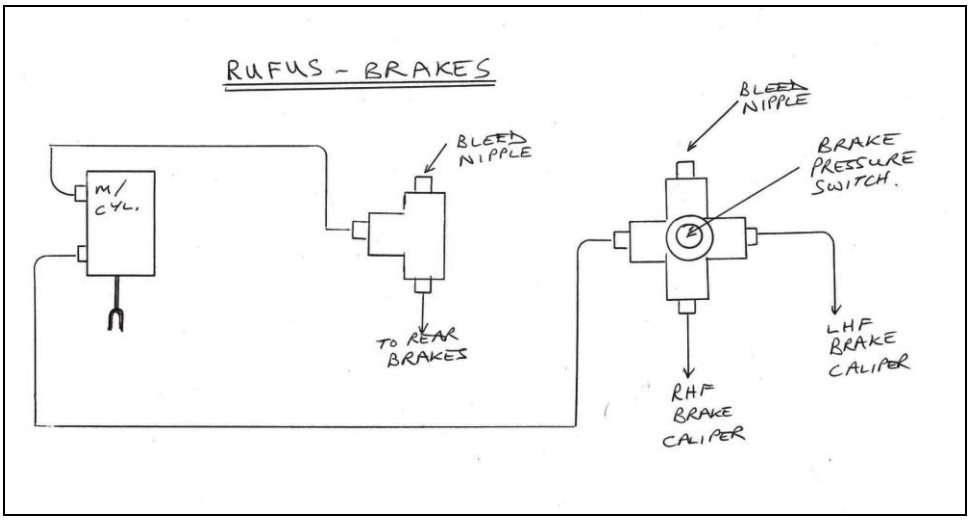
The last common fitment you need to consider is the 'Check' or 'Residual Pressure' Valve, which as its name implies should be fitted as close to the master cylinder as possible to keep residual pressure in the

complete brake line. If you look at the schematic drawing of a USA Tandem Master Cylinder (as fitted to MGB's for American export) you will notice check valves in the master cylinder (items 10 and 11 plus the spring in the diagram below) for both front and rear brake lines. When/if you take the plunge and purchase a new USA spec. master cylinder you will discover that there is no check valve fitted for the rear brakes. Presumably the manufacturers realised you don't need one. If you disagree with the manufacturers then you can buy an after-market inline version for less than £20.



USA spec. tandem brake master cylinder.

If I am building or restoring a car then I normally give it the full works, including; a new master cylinder, new rear wheel cylinders, new brake hoses all round, new brake pipes and unions all round and brake fluid compatible with the seals. About the only thing I wouldn't automatically renew is the front brake calipers but I would strip and rebuild them with new seals.



This is how I'm doing it on Rufus and how I will eventually do it on the TC.

What can you do if your brakes fail? First I would pump the brake pedal like crazy while at the same time applying the handbrake. If the revs are not too high then drop down a gear or two. If you're near a fork in the road and one road goes uphill then take it. In the worst case scenario try and hit something soft like a hedge; although having said that I remember an incident in Cyprus in the sixties where a motorist decided to demolish a bush rather than be involved in a head on collision with an oncoming lorry. Unfortunately the bush was a camouflaged Humber armoured car doing office duties in the vicinity of a temporary road block.

Me next to a Humber Pig in 1965, try hitting that thinking it's a hedge!

The normal way to recover a vehicle without brakes is on a recovery vehicle or trailer, or towing with a straight bar over a short distance. Although I wouldn't recommend it in this day and age there is a simpler way to recover a vehicle back to its home location with failed brakes. The vehicle is used to tow another vehicle that does have brakes and the driver of the rear vehicle slows and stops both vehicles. I've actually done it a couple of times as a young army mechanic, but back in the sixties and seventies the roads were nowhere as busy as they are today. Best to play safe and fit a tandem master cylinder.

Summary:
Personally I think that a tandem brake master cylinder is essential and as well as fitting one to Rufus the TA I have purchased another USA spec. one for my TC.

Although some of our cars are old enough to qualify for a 'free gratis' MOT taking your car for an annual MOT Test is always a good idea, and it's especially important after a full build or refurbishment as during part of the MOT the tester does a brake balance test. During Emma the TD's MOT the tester always told me that the brake balance whilst acceptable was close to the border line. It will be interesting to see how Rufus fares with his MG Midget rear wheel cylinders.

Finally get in the habit of checking the brake fluid level on a regular basis. Whilst the level will slowly reduce as the brakes wear you should immediately investigate any significant loss of brake fluid.