

SHOP NOTES King Midget Maintenance and Restoration

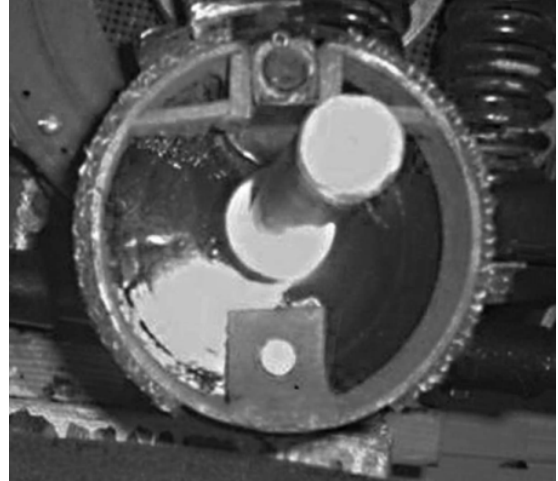
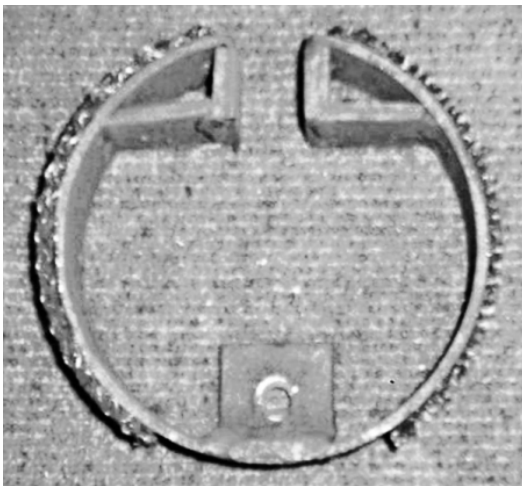


The emphasis on the following brake articles is getting your Model 2 brakes performing at their best and properly maintaining Model 3 hydraulics.

Section
D
Brake

D-1 Jolly's Brakes *by Jolly MacLean*

In the Fall—2009 issue you may recall reading about Jolly MacLean and the hills that challenge his Model 2. Climbing them was one issue. He's also had plenty of problems going down those steep grades. Twice his right brake has failed, which left him brakeless and steering mightily to avoid disaster. In both cases, the brake was so badly damaged neither he nor I could guess what went wrong. Now Jolly thinks he's figured it out.



Before getting to his explanation, a brief summary of how M2 mechanical brakes work. Each mechanical brake has a square "plug" that fits between the two sides of the brake shoes and those plugs are attached to a lever. A cable from each lever runs up to a pair of rollers attached to the brake bar; so that when the brake pedal is pressed, both plugs get equal pressure, forcing the shoes apart and into contact with the drums.

SHOP NOTES King Midget Maintenance and Restoration



Now here's Jolly's estimate of what happened to his right brake:

“I think the ‘flipper’ [that square plug mentioned above] goes past 90 degrees on hard braking. This would put the lever in position to get ‘friendly’ with the drive chain, which would grab and hold the brake lever until it bent the 1/2” shaft that holds the flipper.

“1946-1948 Crosleys do this when the linings are worn. My brake shoes have been re-lined BUT the ‘shoes’ are from another parts-car chassis. I would think that all M2 brake drums would be the same size but, perhaps that is not the case.

“Anyway, a piece of square tubing, 3/4” inside, fits snugly over the flipper (I had it tack welded so it won't slip off) and gives MUCH improved braking without going past 90 degrees. I may do so on the other side at a later date.”

That's an interesting notion that sounds sensible to me, and I can certainly believe that two KMs would have different size drums! Or perhaps that “flipper” is simply worn down? Does anyone out there know? □

D-2 Brake Cables on a Model 2 By Bob Vahsholtz

The brake system of the Model 2 is ever so much simpler than the M3. Too bad the brakes don't work as well! But at Midget Motors, simplicity was the watchword and with the M2's original power and for its day, the brakes worked OK.

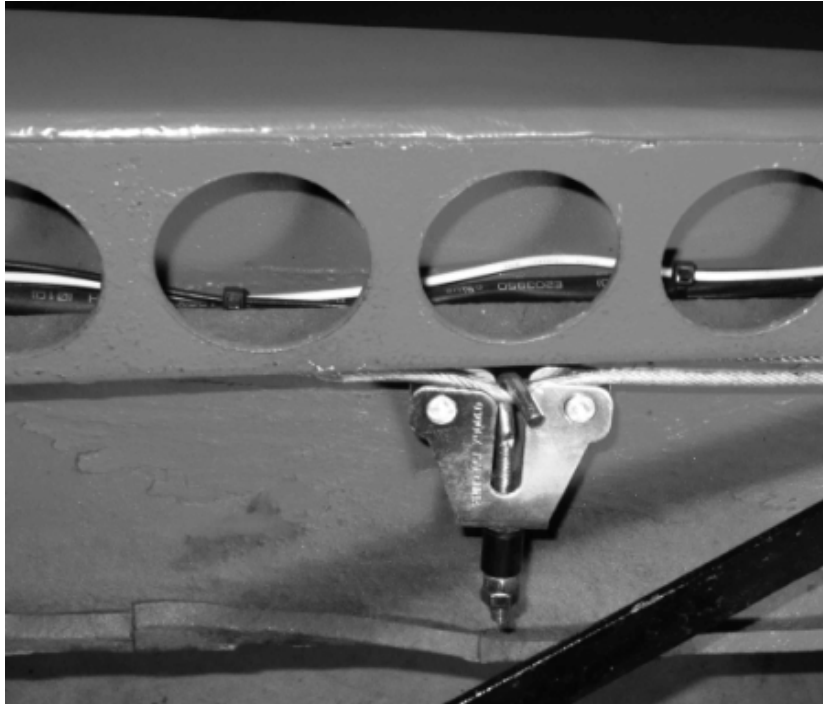
Last summer I bought a Model 2 restored by Frank Bird. Neat little car, but the brakes were crummy and squeaked, as he pointed out before I loaded the car. He'd used the wrong kind of linings and installed them incorrectly (wrapped all the way to the top and pop riveted). Fortunately, he'd gotten proper linings from Skip, and I had them installed.

The brakes then had to be adjusted, and if you've done this, you'll know that Midget Motors made adjustment simple; just tighten a clevis on the right brake until the slack is out of the cables.

Not too bad, except you have to remove the rear wheel to get at that clevis. When you put in new brakes, you'll need to drive the car a few miles to “burn them in” and then readjust.

D. Brakes

SHOP NOTES King Midget Maintenance and Restoration



Frank came up with a better way. Two simple cable tighteners, one on each side of the car below the seat; one shown above. Now my brakes work great! ▣

Note: Well, better. This idea proved ineffective in that each bend in the cable adds a "stretch point" that has to be absorbed before the brakes become truly effective. See following article. Bob V.

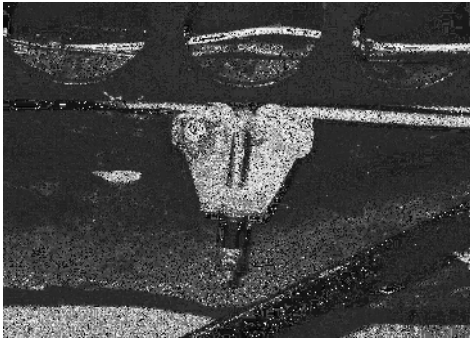
SHOP NOTES King Midget Maintenance and Restoration

D-3 Save Your M2 Brakes *By Bob V. with help from Gert and Randy*

SOME OF YOU MAY REMEMBER stories about Jolly MacLean's "coffee table King Midget." Yes, it sat in the middle of his living room for some years after his meticulous restoration. One day he and I staged a "race" between our KM's in a video made for Reno's *Hot August Nights*. Fun times.

Jolly's car was a dandy down in the LA area, but when he retired to a steep hill in Morro Bay (about 30 miles from our house) those two-wheel brakes and his hill didn't get along. As the linings wore down and Jolly bore down, he tripped the right brake lever over center, made a mess of that brake and nearly killed himself on that hill. Fortunately, the drum dragging on the ground is at least as effective as the brakes and Jolly was able to steer to safety. He fixed the brakes. But advancing age, diabetes and that hill finally got the best of him and he sold that car to Lee Riley, who later sold it to Gert Gehlhaar.

Gert lives on a more modest hill in Lompoc, but quickly established that more braking power was going to be required. About the same time, I bought a Model 2 that had been restored with the wrong (hard, modern) brake linings and the brakes were even worse than Gert's. Fortunately the seller knew of the error and a set of soft linings came with the car. I had them installed and that made some improvement. Still, Gert and I were in close competition for who could stop best, and we were both losers.



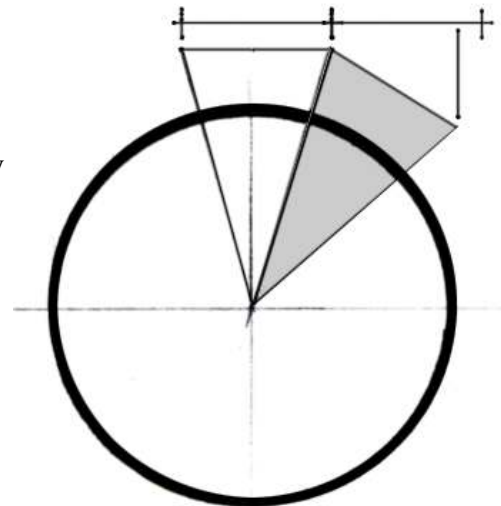
Some may recall that I put a note in the Fall 2012 issue (Page 6) about my "fix." It turned out to be less than satisfactory. That nifty cable tightener I was so pleased with is a bum idea. It tightens the cable by pulling it down into a "V", but in doing so, creates three bends. I had two tighteners, totaling six bends and each absorbs a little stretch when the brakes are applied. There's not enough pedal action to fully activate the brakes during a hard stop—too much of the pedal action goes to absorbing the slack

in the system.

My problem was made worse because of the vinyl-wrapped cable that had been installed on my car. The soft plastic cable wrap also absorbs some slack at each bend, plus around the pulleys. Immediately after adjusting the brakes it felt pretty good but soon I'd find the pedal hitting the floor, even after a modest stop.

Gert tried those tighteners and had a similar problem, even though his car had proper uncoated 3/16" cable. The brake cables need to be as straight as possible. In the original setup, they bend only around those two pulleys.

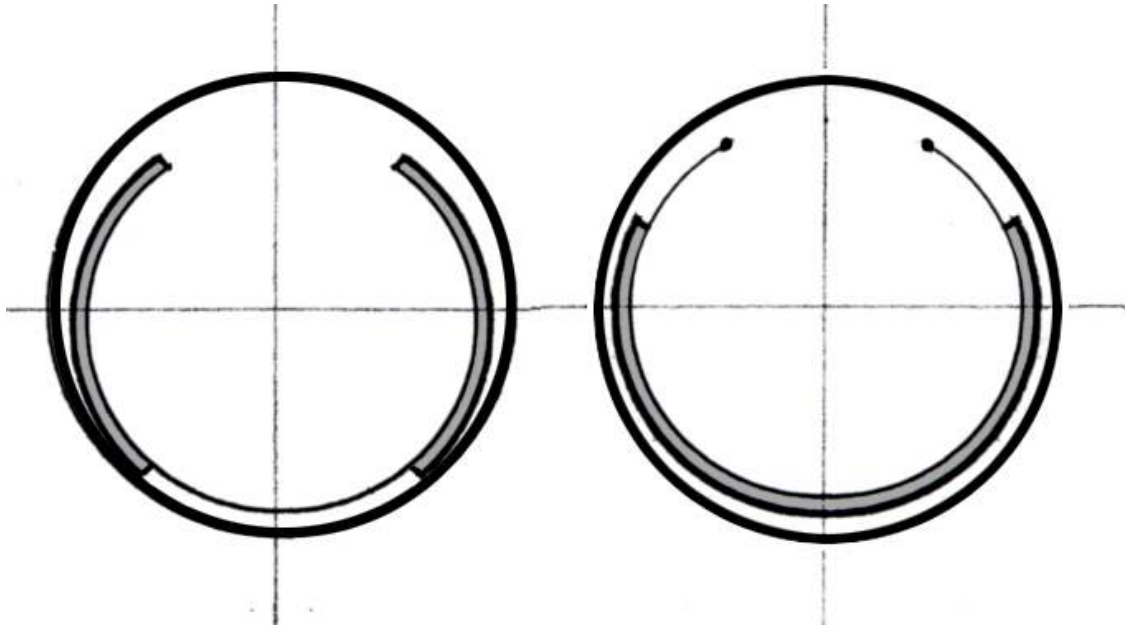
Gert and I got our heads together and worked all



SHOP NOTES King Midget Maintenance and Restoration

that out, resolving to get rid of those tighteners, but that was only part of the problem.

Gert has experience with mechanical brakes and found that the brake levers on his M2, when properly adjusted, were leaning forward a bit. (see preceding diagram). The levers should lean *back*, so that when the brakes are applied, the movement of the lever applies the maximum movement to the shoe. The smaller the drum and the shorter the brake pedal's throw, the more important this principle. M2 drums are tiny, and there's not much leverage up front.



On Gert's car, the linings were installed in two pairs, leaving a gap at the bottom. Theoretically that should be OK, since the linings are spread at the top and not much braking action might be expected at the bottom. See illustrations above.

Maybe not. John White told me the lining should wrap all the way around the brake shoe, and set with a feeler gauge so that the bottom of the lining just clears the drum. That makes sense, because when the top of the shoe is spread, the braking effect will be greatest if the shoe touches all the way around. We noticed that hole where the shoe attaches to the backing plate is oversize, allowing for the kind of adjustment John mentioned.

But another possibility arose. Might the purpose of that oversize hole be to let the shoe "float" in the drum? That would seem to maximize shoe-to-drum contact and thus stopping power. The downside—wouldn't the shoe then drag a bit at all times? Who knows? Neither of our cars has original brakes.

Our KMW buddy Randy Chesnutt converted his M2 to M3 brakes and had his old M2 brakes left over, with apparently original linings. Those linings were quite worn and as near as could be determined, original. The wear pattern seems to be quite even, with the lining thinnest on the leading edge, as one would expect, and tapering gradually around the perimeter. Again as one might expect from a "floating" shoe. Gert and I decided to float our shoes, but chose to attach them using longer bolts and locknuts to assure they

SHOP NOTES King Midget Maintenance and Restoration

stay in place.

The linings I'd had installed on my car were the same length as Gert's, but one piece, and—too short to wrap the whole diameter. The previous linings had been wrapped to the top and pop-riveted in place. Consulting with the brake guy, he agreed that can't be right but saw no way to rivet them through that little triangle. He said soft linings can't be properly bonded, so we installed them with a gap at the top. Bad idea.

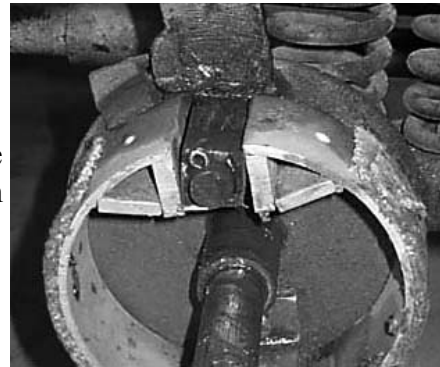
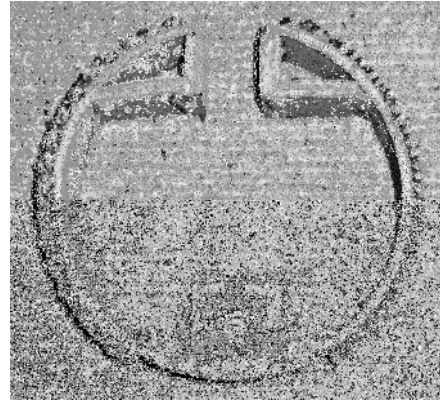
When I went to install the shoes, they wouldn't fit in the drums. I was told I'd probably have to sand them down to make them fit, and I did. Lot's of wear and tear on the belt sander, until they finally fit. The top is where the most effective braking takes place, and you can see in the photo at right how the leading edge (right) is scrubbed off. I suspect my brake performance deteriorated quickly because most of the pressure was at the top of the linings, too far down on the shoe.

Gert had the opposite problem. His shoes were too loose. If you go back to KMN Winter 2010, you'll see a story of Jolly's ordeal and his "solution." He found the shoes so loose they allowed the square actuator to "flip over" on hard braking, and he fixed it by welding a piece of square tubing over the original actuator. He noticed "much improved" braking, and the photo above shows his brake lever tilted back at a proper angle.

By the time Gert got the car, the properly adjusted brake lever was leaning forward, despite Jolly's expanded actuator. Part of that was no doubt due to wear on the lining, but the fact is, the car traveled very little distance in the past few years. What probably happened was that Jolly bolted the shoe in place when he first restored the car, but with minimal use, it slipped downward into the gap in the lining, resulting in the appearance of rapid wear, but more attributable to the top of the shoe having more room to open up, and thus Jolly's near-death experience on the hill.

Based on our discussion, Gert and I both replaced our linings, and both of us had it done at the same shop, Santa Maria Brake and Clutch. We talked to a fellow closer to our age who knew his stuff, and he was able to both bond and rivet the linings properly. Our brake shoes fit nicely into the drums with no sanding and Gert got rid of that square tubing.

Setting out to replace my brake cables with proper 3/16" bare cable, I had a dickens of a time finding it locally, and no luck at all in getting proper ends swaged on. In my usual shade-tree-mechanic fashion, I cobbled new attachments using cable clevises purchased at the hardware store that were never intended for the purpose. Aware that this is bad practice, I used triple redundancy and tightened all those clamps to a ferocious degree.



D. Brakes

SHOP NOTES King Midget Maintenance and Restoration

Looks like the devil and was hard work, but both service brakes and emergency now are tight and straight. So are Gert's, as his cable was good.

Recently it occurred to me that such cable has become popular for fancy architectural railings, so I could have saved myself a lot of trouble and got a neater job by getting proper cables and fittings from www.thecableconnection.com or another such outfit.

If you want to order new cable for service or emergency brakes, it is important to extract the old one, lay it out and get the exact length measurement, because the adjustment fitting has a limited range. It should be near the end of its range when the linings are new, to provide adequate adjustment over the years. It would be great if one of our suppliers would stock such cables in the appropriate length with proper fittings on both ends.

I have one further problem. Before restoration, my car had set out in the Texas weather for years and the brake drums rusted inside—particularly the left. The lathe at the brake shop was not able to turn such a small drum and neither was a specialty shop where they sent me. Time and braking should improve the matter, but I imagine that drum will be hard on that soft lining.

Anyway, both Gert and I have decent brakes now. Not as good as new, nor as good as those on Randy's M2 or Roxanne's (See Lee's article, KMN Spring, 2013, pages 18-19), but those are more powerful cars.

All King Midget drivers should carefully follow Burma Shave's driving advice.

PROPER DISTANCE

TO HIM WAS BUNK

THEY PULLED HIM OUT

OF SOME GUY'S TRUNK

Burma Shave

SHOP NOTES King Midget Maintenance and Restoration

D-4 Stopping a Model 2 *By Lee Seats*

OUR BELOVED MODEL 2, more rare than the Model 3, is also smaller and considerably lighter in weight. When these little guys were built the American roads were less crowded and it was a slower time. So the power was adequate and braking was also. Nowadays the trend among some King Midget owners is to upgrade engines to better keep pace with the traffic of our time. But what about the brakes? Isn't it reasonable that if you upgrade power, brakes should be upgraded also?

Mechanical brakes were used by many manufactures in the early days of the automobile, and continued into the 1930s. But hydraulic brakes proved more reliable with more stopping power. The Model 2 was manufactured with 2-wheel mechanical brakes. Midget Motors changed to 4-wheel hydraulic brakes with the Model 3. The Model 3 brakes are good enough for upgraded powerplants; the Model 2 however, could use a little more brake.

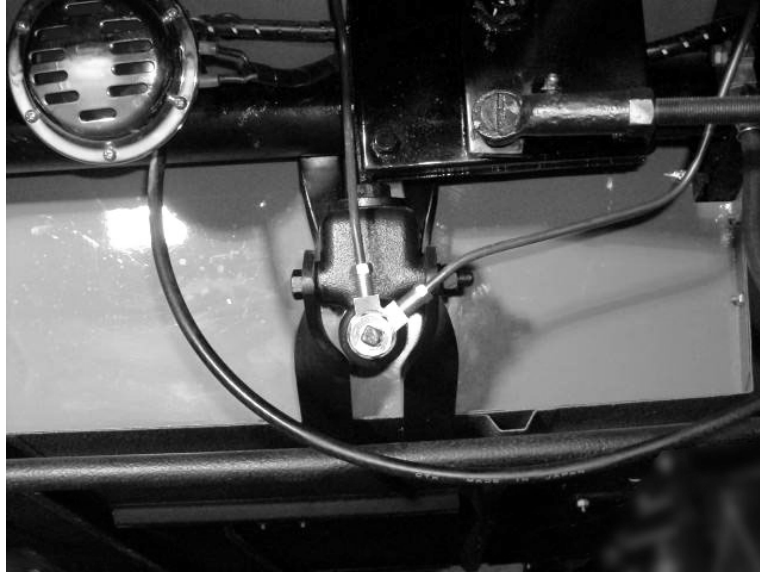
Recently I did a brake upgrade on a 1954 Model 2. It had an engine upgrade about 3 years ago to a 14 HP Vanguard, with a few tricks to enhance performance. The brakes did ok but could have been better. So I put Model 3 hydraulic brakes on the front and set them up to work with the existing rear mechanical brakes.



You have a few options with the installation. I bought the replacement spindles that Paul Gerhardt makes which include the brake backing plate mounts. Or you can make the brake backing plate mounts and weld them to the existing spindles. Another option involves the front brake drums. Maybe you can find a pair of Model 3 front wheels with built-in brake drums. Or, do as I did and take existing Model 2 wheels, weld brake drums in and turn true with the wheel. You will also need Model 3 brake shoes, spring and backing plates. Then you will need two wheel cylinders and a master cylinder from a 1946-1962 Willys Jeep.

D. Brakes

SHOP NOTES King Midget Maintenance and Restoration



I mounted the master cylinder just under the steering box on the left edge, location determined by the location of the brake pedal. You want the master cylinder to be inline behind the brake pedal. I used two pieces of flat bar 1" x 8" x 1/4" and two pieces 1" x 6" x 1/4". The 8" pieces get a 3/8" hole in each end and mount to the bottom of the floor pan and the rear holes in the master cylinder. The 6" pieces get a 3/8" hole in one end. These bolt to the front two holes in the master cylinder and weld to the cross beam above. I put a 90 degree twist in each piece to line up mounting points. The pieces that mount to the floor will require a slight bend at the edge of the floor board to line up with the back holes in the master cylinder. Next I bought 10" flex hoses and "s" tubes that fit a Jeep. The "s" tubes go from the wheel cylinder to the hose anchor on the spindle.



You will need two clips to secure the flex hoses to the spindle anchor. You will also need a 2-way distribution block and bolts for the end of the master cylinder from the same Jeep. The bolt is needed to plug the hole in the master cylinder where a pressure-type

SHOP NOTES King Midget Maintenance and Restoration

brake light switch would go (the Model 2 uses a mechanical brake light switch on the pedal). Then I bought two lengths of brake line, two tees and three plugs. The tees I used have a mounting hole so they can be secured to the frame rail just behind the bumper mounts.



Once you have mounted everything, then bleed the brakes. Now a note: The master is close to the steering box, so to fill the reserve, I used a turkey injector syringe. This works well. You will have to measure and make a rod and clevis to actuate the brakes with the brake pedal. It is a good idea to make the rod adjustable so you can tune the proportioning relationship between the front and rear brakes. I attached the rod to the brake pedal with a small roll-pin. The small roll-pin doesn't weaken the brake pedal. The clevis has a hole larger than the roll pin which allows the clevis rod to self-align into the master cylinder hole. Also since there are only two wheel cylinders to fill, I backed the shoes away from the drum to give some pedal travel. This will also adjust the timing between the application of the front and rear brakes.



D. Brakes

SHOP NOTES King Midget Maintenance and Restoration

Once the brakes are adjusted I found the car stops very well. Getting the front to apply a little sooner than the rear is where you want them to be.

If this is a project you decide to do, I have more pictures and I am always available for questions. Material costs were; Spindles \$400, Model 3 rims and brakes \$200, other brake parts \$200.

Model 2 braking; *safer*. □

SHOP NOTES King Midget Maintenance and Restoration

The Doctor Will See You Now, TECHNICAL INFORMATION by *Old Doc Buckeye*

D-5 Brakes and Drive Chain

(Editor's note - Old Doc Buckeye has owned King Midgets for years and, although his whereabouts is a secret, he can be reached with questions through the editor.)

Our first letter comes from a feller in Stretched Chain, Ohio. It begins, "Dear Doc Buckeye: Give me some tips on King Midget brake systems. They seem different."

Well, sonny, you're right and you're wrong. Let's start at the master cylinder. A skinny 12 year-old kid is the best tool for checking the fluid level. Get to the package shelf cylinder inspection plate through the passenger door so you don't have to fight the steering wheel. We made up a slanted mirror to view the fluid reservoir and put clean, new brake fluid in a very clean liquid dishwashing squeeze bottle to squirt fluid into the cylinder.

Changing brake fluid every two years will help to eliminate trouble with rust and sticking wheel cylinders. The one-man vacuum bleeder is an easy way to suck out old fluid from the wheel cylinders. Don't forget to inspect those steel brake lines and rubber hoses.

When you adjust the brakes, don't leave even the slightest drag on any brake. You only have 10 or 12 hp and you can't afford to waste any of it.

Change the steel cable on the parking brake. Sure, it looks good where you can see it; but as it bends on the pulleys, rust has weakened it. It's probably plumb rotten! Did you boys know that those three pulleys are supposed to turn freely? Take them off and get them unstuck.

Speaking 'bout stretched chain, it's the chains that wear first, mostly 'cause you boys don't put chain lube on them. When the chain wears, it puts uneven tension on the sprockets and causes a "hook" pattern. To check for chain wear, remove the chain and put it on a flat surface while compressing it by pushing the ends together. Mark the length and stretch out the chain. If you are longer by one link, replace the chain. Here's a hint for you cheapskate boys: you can turn the large sprocket over when it hooks and get lots of miles out of the other side of the sprocket teeth.

Now you boys with the Type 2 cars are really blessed and cursed at the same time. Your mechanical brakes will work fine but really need to be well looked after. Pull those rear drums and make sure that you have fat, thick lining left all around the one-piece shoe. Make sure the linkage is free, and put a drop of gear lube in the actuating shaft. Check for worn pins and cotter keys. If there is any grease on the lining, replace it and the grease seals, 'cause that's where that stuff comes from. Don't worry about your front brakes—there ain't none! That cable has to be in great shape and where you can't see it is where it goes around pulleys. That's where it strains and that's where it's gonna bust. It's cheap stuff to get so replace it. Remember that you only have one wheel parking or emergency back-up braking on the left rear wheel, and it uses the same lining that the service brake uses. Don't forget to lube the ends of the cross shaft. Check for pedal bottom each time you drive and adjust the cable if needed. Remember, the time to fix it is in your shop, not while you're making that almost stop. The old Doc had a close one a long time back!

Keep being confused 'bout them cars, and let the Old Doc help you out! □

D-6 Changing the Master Cylinder *Hal Douse*

You've managed to locate that barn fresh King Midget, Lucky you! Among other minor problems you might have noticed is the brakes no longer work, this is typical of any old car that has been sitting for a long time. Brake fluid is corrosive and it will seize up cylinders and clog brake lines in a very short time. My '64, which had not been driven in many years was a prime candidate for brake problems. Hoping for the best, I filled the master cylinder with brake fluid, pushed the pedal and nothing happened. The piston in the master cylinder was stuck in the open position. I tried to free it up with brake cleaner then with PB Blaster, the laxative of the automobile world, if PB can't loosen it up nothing can and nothing moved. Once I got the MC out of the car I tried the big hammer it was still stuck! Nothing left to-do except replace it.

You may have noticed that the master cylinder (MC) is conveniently, located behind the steering box. Two long bolts hold the MC in place. Removing the horn on my 64 made it easier to get to the rear bolt. It also made it real easy for me to forget which wires went to the horn and which ones connected to the pressure switch that operated the brake lights. I mention this because plans change, things happen and it may be a few weeks before you get to finish the job, so it's a good idea to mark stuff or make notes to yourself.

There is a brass fitting at the front of the master cylinder it will have a copper line and a rubber brake hose attached to it. Remove the copper line and leave the rubber hose attached. The rubber hose is also attached to the back of the steering box with a metal clip. Remove the nut that holds the clip to the box and leave the bolt in place. While we are removing stuff, unhook the short brake line that goes from the hose to the front left wheel. The brake line will turn inside the clip that holds the line to the car. I left the rubber brake hose attached to the MC and pulled it out of its bracket. Then unhooked the hose and the two wires that operate the brake light switch attached to the front of the MC.

The local parts store had to special order the master cylinder, which took a couple weeks. While waiting for the new mc to arrive, I pulled all the wheel cylinders and found two of them were frozen beyond repair so I ordered four new WC's, which arrived a couple weeks after the MC. This is why we should make notes and mark things. The master cylinder is **Wagner F2796**. The front brakes are **Wagner F7568**. The casting number on the rear brake cylinder were difficult to read so I took a guess, got it wrong and wheel cylinders that didn't fit. By now 5-6 weeks had passed and I'm still dinging with this brake job. The two old front wheel cylinders worked so I used them, put the new F7568's on the back and sent the two misfits back My midget has the same WC's on all four corners. It seems to stop just fine, although it is not something I would recommend.

Fill the new MC up with fluid, pump it a few times to get the air out and cap off the lines before installing it; this cuts down on bleeding out the system. Didn't work for me and I'll explain why. I got everything back together and pushed on the pedal, fluid was squirting out from 2-3 different places. I fiddled around and got all the leaks stopped except the one around the MC. My cost cutting move was not to replace the copper seals that go between the mc, the brake-line block, and the pressure switch for the brake lights.

SHOP NOTES King Midget Maintenance and Restoration

Too further cut costs and save myself the half-mile trip to the parts store and 14 cents for the two seals, I used a couple seals I found in my garage junk box. I put everything back together for the 6 or 7th time and the leaks were still there. Mr. Cheap (me) finally went to the parts store and got the right seals and a 3rd quart of brake fluid. It should have taken about a quart to do the whole job. Just a quick reminder that once the brake fluid has been pumped through your brake-lines it's contaminated and should be disposed off. Also you cannot mix the new (DOT5) synthetic brake fluid with the old stuff. In fact you should not even consider using the synthetic stuff unless your braking system is a 100% new.

Once the MC is back in the car, filling it requires using a little known Yoga position. You are required to somehow curl half your body under the steering wheel of the Midget and pour liquid into a hole you cannot see and everything has to be done with one hand. To save myself from spilling brake fluid all over the car and myself, I would put a couple ounces of fluid in a small jar and pour it into the MC using a small funnel. My finger served as a kind of dipstick to check the level. With everything properly done and the lines bled out the King's brakes are working good as new. Of course the horn and the brake lights didn't work no matter which combo of those three wires I used. An email to the King Midget Doctor solved that problem. Like all these projects, I've learned some things that will make the next KM brake job go smoother. ▣

D-7 Give Me a Brake *by Gary Chu*

If you have a car which hasn't run for quite a while, it's better to re-do the complete brake system (except for brake lines).

Remove the master and wheel cylinders. Use a flare nut wrench when loosening all brake fittings; I believe it takes a 3/8" flare nut wrench. At this point, I disassemble the backing plate and all its parts, power brushing and painting them. I like to paint the parts different colors. I think it makes it more attractive and it will keep them from rusting. Do this cleaning and painting before working on the wheel and master cylinders so the paint can be drying while you work on cylinders.

Use a compressor to blow out all the brake lines to get rid of any residue fluid which may have water in it. But, before doing so, I also stick the end of each brake line into a 2-liter soda bottle so there is no mess on the garage floor.

Replace the master cylinder and inspect the wheel cylinders. If the pistons of the wheel cylinder are immovable, use a large drift with a flat end to knock out the pistons, being careful not to gouge or scratch the cylinder walls. Once evacuated, inspect the walls of the cylinder. I found that even though there seems to be corrosion keeping the piston immovable, the bore is normally in good condition except for the center portion which is not the critical operating component. The outer inch of each end of the cylinder is the most important operating component. If this area is not pitted, the cylinder is rebuildable; it's cheaper than buying new cylinders. If it's pitted, replace the cylinder.

D. Brakes

SHOP NOTES King Midget Maintenance and Restoration

You may "power brush" the pistons to clean off the corrosion--don't worry, the pistons only serve as a method of transferring the movement between the brake shoe and rubber cup and does not have anything to do with making a seal for the brake fluid.

If the critical ends of the bore are not pitted, buy a small hone at the auto parts store--costs around \$10 or less. Clean out the cylinder, coat its walls with some clean brake fluid, and go back and forth with the hone about ten times, making sure the stones of the hone do not come out of the cylinder while it is spinning. Do this to both ends of the cylinder, then wash out the cylinder and use a compressor to clean it out; don't forget to blow the bleeder valve hole and the brake line inlet completely. Then, reassemble with new kit, coating the rubber cups and pistons with brake fluid. Leave the bleeder valve screw a little loose so when you assemble the brake shoes, air will not prevent you from compressing the cylinder.

After doing all of this work, put on newly relined brake shoes; by doing so, you know you will not have to pull off the brake drums later to do a brake job. As much as we use these cars, the brake job should last longer than our lifetime.

Reassemble all parts onto the car. Adjust the two brake shoe adjustment lugs so they do not hold the shoes in the outward position, thus preventing the brake drum from seating properly. Put the drums back on, fill the master with brake fluid, and you are ready to bleed the brakes.

There are at least three methods of bleeding brakes (always starting with the wheel cylinder nearest the master cylinder):

1. Having someone pump the brake pedal about ten times, then maintain pressure on the pedal while you open the wheel cylinder bleeder valve. Close the bleeder valve when there are no bubbles in the exiting brake fluid or the brake fluid stops flowing. If bubbles still appeared when you closed the valve, go through the pumping and valve opening process again until no air bubbles appear in the fluid. The helper should maintain full pressure on the pedal after pumping ten times.

Let him/her know that the pedal will go down when you open the valve, and constant pressure on the pedal must be maintained until you have closed the bleeder valve. Perform this bleeding operation until no more air bubbles in the brake fluid are exiting the wheel cylinder. Then, go on to the next wheel cylinder which is the next closest to the master, then, the third closest to the master, then finally ending up at the fourth cylinder which is furthest from the master cylinder.

2. Use a pressure bleeder. After filling the pressure pot with the recommended amount of brake fluid and then the recommended amount of air pressure (about 20 lb.). Screw it onto the top of the master cylinder and start bleeding each cylinder starting at the one nearest to the master as previously mentioned. This makes it a "one-man" operation. I put a quick disconnect where the host connects to the master cylinder adapter. Don't forget to release the pressure in the pressure pot before removing the quick disconnect from the master cylinder; otherwise, you will have brake fluid squirting all over the place.

SHOP NOTES King Midget Maintenance and Restoration

3. Use a Mity-Vac to evacuate the air from each wheel cylinder after filling the master with brake fluid. Mity-Vac is a brand name of a tool used to create a vacuum so that you will be rid of air in hydraulic brake or clutch lines. Yes, still start with the cylinder closest to the master and end up with the furthest from the master.

I found it is less messy if you make a plastic "catch bottle" with an 18" piece of fish tank plastic hose coming out of the center of the bottle will keep the fluid contained and not all over the garage floor, backing plate and you. I use clear hose because it permits me to see the air bubbles and/or solid brake fluid emitting from the wheel cylinder—an indication whether or not the cylinder is completely bled or not. Besides, it is the right size to fit over the hole in the bleeder screw. Keep the hose covering the opening of the bleeder screw until you close it. Also, when you drill the hole in the bottle cap, make the hole a little smaller than the hose; it will help in making a seal between these two parts. Once the brakes are bled, adjust the brake shoe adjusting lugs so, as you spin each wheel, there is a slight dragging noise which indicated the shoes are barely touching the drum. Be sure you adjust both lugs on each wheel.

Next step is to adjust the emergency/parking brake. Once that is completed, you are ready to "hit the road."

Good luck with your brake job! □

Note: In bleeding the brakes, start with the shoes adjusted. Do not pump the brake pedal. Doing so will mix air in the brake fluid. To bleed, go to the furthest point, which is the left rear as measured by brake lines. Open bleeder, push down brake pedal to force out the air. Then close bleeder before letting up on the brake pedal, or you'll suck the air back in. Paul Gerhardt

D-8 LETTERS: Brake Lines, Cylinders and Fluid

You can buy the three rubber brake lines from NAPA. I bought standard lengths of brake line and bent to fit and cut off to proper length and double flared the ends. Double Flare kit was \$25 at auto parts store. Auto Zone may loan you one for free. Master and wheel cylinders and lines were less than \$150. Use DOT 5 (pure silicone) brake fluid in it, which cannot draw moisture and rust and will not boil. (Not that hot brakes are an issue on a KM!) **Alan Day**

Check the usage of DOT 5 brake fluid with your local auto parts stores. I do not believe that you can use Dot 5 (Silicone) with ANY other type of fluid.

I've been told that it is GREAT for new installations and really is the only type rebuilders recommend anymore when the complete system is being done. Not only does it not boil quickly or attract moisture but it also does not corrode any brake parts it touches like regular brake fluid does. I've only used the complete new installation one time. Worked great.

Word of caution. I would recommend that the vehicle that has been completely changed over to DOT 5 be labeled, not only to remind the current owner, but also for the benefit of any future owner. We know how quickly some Kings can move around and, unfortunately, some are sold by family members who may not know the little details of the King they are selling. Again, I do not believe you are to mix DOT 5 with ANYTHING else. ▣

Note: I used DOT 5 in my car and had a wheel cylinder go bad. I had to turn the drum and replace the brake shoes to get the silicone out.

Always replace old rubber lines. They may look good, but in 50 year-old cars, they can collapse causing no brakes or locked brakes. Paul Gerhardt

SHOP NOTES King Midget Maintenance and Restoration

D-9 Brake Drums *by John Weitlauf*

TECHNICAL NOTE #1

Brake drums for King Midget 1951-1970

There were four different brake drums used on King Midgets as follows (see photo):

1951-early 1957 (Version 2). Mechanical brakes on both rear wheels only. Nothing on the front wheels. Brake drum is approximately 4-7/8" inside diameter x 3-1/2" deep. Drum welded to wheels and non-removable. Drive sprocket on right rear wheel bolted to four tabs welded to drum.



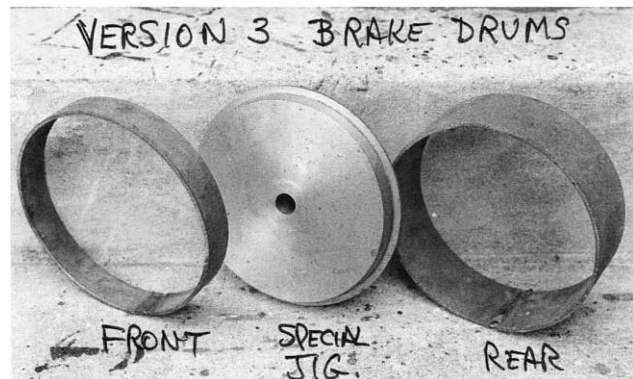
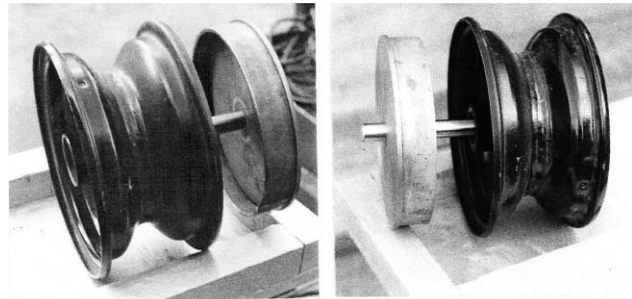
TECHNICAL NOTE #7

New brake drums

If a new brake drum needs to be installed, a special jig needs to be used to insure proper alignment and centering. See three photos.

Brake drum is a tight fit to steel jig with precision 3/4" center hole. This holds drum accurately in place until drum is welded to rim.

Photos are for Version 3 cars only. A similar jig for smaller outside diameter brake drums would be required for Version 2 cars' rear wheels. □



Note: Does John Weitlauf still have these jigs? They'd probably be a big help in getting King Midget wheels reproduced! Bob V.

D-10 LETTERS: Adjusting M3 Brakes

Bob: I am looking at adjusting the brakes on my Model 3. I see the two adjusting [nuts] on the back of the brake plate.

I think they adjust in opposite directions? One of my front wheels' brake shoes are rubbing and hung up. Any idea which direction to turn each of the adjusting bolts to release the shoes?

Also my tie rod needs adjusting since when I had the car flat-bedded for the tranny repair, the tie rod got bent. [The previous owner] straightened it but now my steering wheel is out of position (spokes in wheel dropped down a quarter turn like starting to take a right turn). I also checked the toe-in and it's not just the 1/8" toe-in, its more like 1 1/8" and my steering wheel is out of position (spokes in wheel dropped down a quarter. Any idea if the drag link, if adjusted, would have any change in the steering wheel position? Lenny Pearlstein

I'm no expert, but I've been there and done that! As best I can determine, it appears that brake adjustment is a cam sort of deal, that you can turn in either direction. If no amount of adjusting can get rid of the drag, you may have a warped brake drum, perhaps from being banged somehow. You might be able to see it if you pull the wheel, but maybe not. I had my brake drums turned, which is a challenge because you have to find a brake shop that can handle it. Also, those drums are soft and thin, so you can only turn them once!

As to front end adjustment, you want to jack up the front end, put the steering wheel on dead center and hold it there somehow while you adjust the single drag link to the left wheel. Then loosen both ends of the tie rod. It's left-hand threaded on one end and right-hand on the other. Turn the tie rod until the two wheels are both pointed straight ahead. Then lower the car to the floor, and have someone get in it. Adjust the tie rod until you have at least an eighth and perhaps twice that of toe-in. Then make a final adjustment on the left drag link to be sure the steering wheel is horizontal. It may take a little back and forth effort if your expertise is as limited as mine!

Bob: Thanks for the reply. John White has been great as usual and helpful with my questions and limited KM mechanical ability. I'd not be in any class of expertise to say the least. However, I enjoy learning more about the KM and doing some things myself on the car. This also makes owning a KM more fun when you can tinker and build up the confidence level of taking it for a ride. □

D-11 Broken Wheel *by Tim Gross*

The facial expression of David Gross shows the feeling of despair felt when our participation at the Spring event was cut short by a broken drive wheel.

Our trouble was made worse by some neglect in maintenance of the wheel. Last summer while preparing for the Jamboree, I noticed a fine crack around the outside of the wheel just past the edge of the hubcap. I thought that it was a



SHOP NOTES King Midget Maintenance and Restoration

stress crack from where the wheel was welded during manufacture or restoration. It was.

Not wanting to go to the trouble of removing the rear wheel and checking it out, I had a few electric spot welds tacked over the crack to "be sure" that it would not cause me any trouble. I did a lot of driving in the car soliciting interest and advertising for the Jamboree; it was by far the most often daily usage that I have ever given the car. I did not know that the crack was deepening and growing more serious.

I test drove the car in the spring to ready it for the event at McArthur, and everything seemed ok. I think that the bouncing effect of trailering probably finished what damage had already been done. When we began to unload, everyone agreed that it was not safe to drive.

Wheel ruined

When I finally was home from work long enough to work on correcting the damage in time for Norwalk, I removed the wheel and discovered how bad it was torn up.

The crack on the outside was not the worst; on the inside the wheel looked like a cabbage torn open. The wheel was torn open with large ragged and bent distortion resembling rose petals.

I removed the sprocket from the brake drum and took out the bearings which looked ok. I was told by my local welder/ fabricator that the wheel could not be saved but if I could get another, he could remove the brake drum and install it on a new wheel.

The Latest

Gary Wood has found me a wheel, and if I am at the Jamboree, you will know that I have been able to get it fixed. I share this sad story because it might help some other members avoid such trouble. I know that many of you have much better mechanical and diagnostic automotive skills than I do. If you do, I know that you will not let such a problem develop with your car. *An ounce of prevention is worth a pound of cure.* □

D-12 That M3 Master Cylinder *By Bob V.*

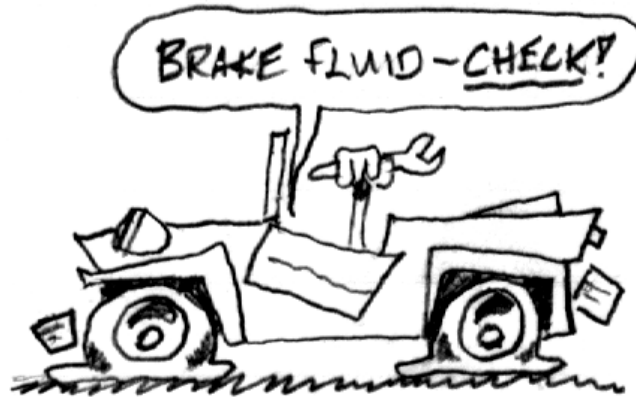
GOT A CALL THE OTHER DAY from Jim Owen, a KMW buddy from Texas who, like many of us, is a bit challenged in both age and girth. "How," he inquired, "am I supposed to deal with the challenge of topping off the master cylinder?"

Good question, Jim. I advised that he had just discovered why these cars are called King "Midgets." One must employ a midget to deal with brake issues. Jim did not find the tip helpful. I suggested he take the car to a local brake shop, and he guessed they'd not even be able to *find* the darned master cylinder.

We discussed getting one of those John White special hinged hoods, but ... c'mon, switching hoods is not a casual Saturday task, especially when the car is already restored and painted.

D. Brakes

SHOP NOTES King Midget Maintenance and Restoration



I told Jim how I'd performed the task some years ago, employing the pocket mirror and funnel setup.

"Yeah," said Jim, "but how'd you get the lid off the master cylinder?"

That Jim is just full of good questions. I couldn't remember, except it took a great big wrench that was too big to get into the dumb access hole. Maybe I used channel-lock pliers?

Stumped, but hating to admit it, I suggested it might be possible to access the cap from beneath the front end (though I know I'd never done so). Jim admitted he'd never pursued that option either. He did so.

In his cold Texas workshop, Jim discovered it is indeed possible to get under there and get to the master cylinder with a 1 - 1/16" end wrench, and the process is facilitated by removing the horn (a simple task) ...



... and there it is, from the bottom, just past the horn and below the "access" hole! Maybe one could even top it up from there, using a (very clean) pump oil can having a flexible spout, filled with brake fluid. □

SHOP NOTES King Midget Maintenance and Restoration

D-13 Replacing Parking Brake Cables on a Model 3 *By Bob Olbers*

I purchased new cables online from Flanders Cables in Pasadena, California (www.flandersco.com, 626-792-7384). I ordered three 601-10306 universal cables, which are 72" long, 0.100" (2.5mm) diameter with a swaged fitting installed on one end. I also purchased a 618-10388 "clean cable cutter" to get nice un-frayed cuts.

Remove the original cables and pay attention to their routing (see the schematic). Note that the guide tubes and sub-frame pulleys on the underside of the sub-frame are shown here in "x-ray" fashion.

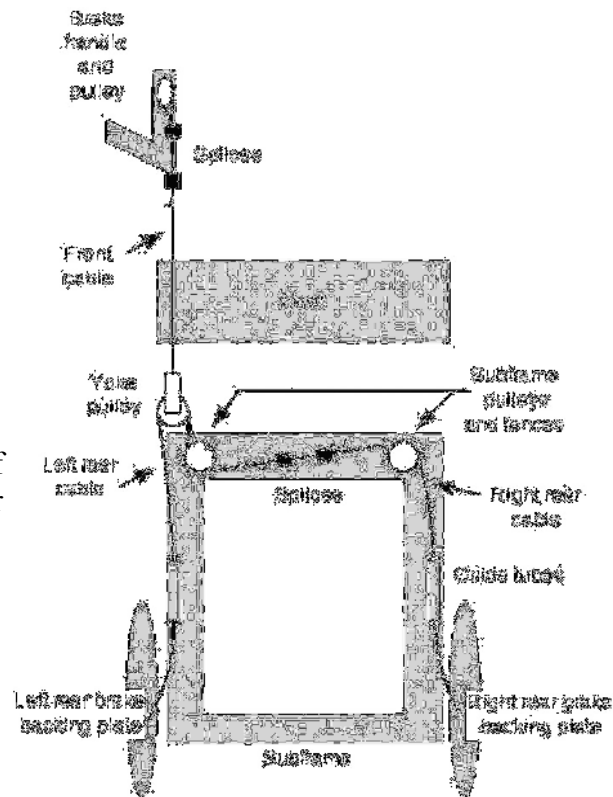
The cables ride on a total of four pulleys: one on the brake handle, one in the yoke, and a pair on the front corners of the rear suspension sub-frame. Check that each pulley turns freely and that the metal retaining "fences" around the sub-frame pulleys don't bind the cable. I added a fender washer behind the brake handle pivot bolt on my car to provide additional support and to prevent the bolt from twisting or bending the frame rail when the brake is applied.

Insert the left-hand wheel cable through the lever arm inside the left rear brake drum, through the guide tubes in the backing plate and on the sub-frame, around the yoke and left-hand sub-frame pulleys, and along the front of the sub-frame. Repeat on the right side. Splice the cables together using two split-bolt connectors. There will be plenty of excess cable, which you'll cut off after getting everything adjusted.

Insert the third cable through the front of the yoke, through the rear bulkhead, under the seat, and through the hole under the left front seat corner to the brake handle. You may need to remove the yoke pulley before inserting the cable. Run the cable around the handle pulley, and tie it back on itself just behind the pulley with two more split-bolt connectors.

Beginning with the rear cables, work the slack out of the cables by loosening one connector at a time and pulling the slack through until the cables are snug but the brakes are not binding when the handle is disengaged. Repeat the process with the front cable. You may need to repeat this a few times to get the brakes properly adjusted. Afterwards, trim off the excess cable with the cutters and enjoy your King Midget without that annoying wheel chock (although I carry one anyway, just in case ...).

Note: Special thanks to Skip Weaver, who is a great source for parts and friendly advice. The diagram is based on a sketch that he provided to me. ◻



D-14 Letter: Filling Master Cylinder with a pump

After reading the article on installation of new fluid to the master cylinder in the fall issue of King Midget News, I thought I would share with you a very effective and easy way I have solved this. Simply purchase from Walmart or a marine parts store a pump used to install fluid in the lower unit of a boat that costs about \$6.95. Remove the master cylinder cap ...use the pump to put the brake fluid into the master cylinder. It threads onto the brake fluid bottle easily. I use a paper clip to check the brake fluid level as I fill. Take your time. It works. And no standing on your head to complete this task. I hope you find this helpful.

You can go to Walmart.com and search Shoreline marine lower unit pump. You will see a photo and information on it. It has been not only a lifesaver for using on our boat, but also on the King Midget. I've used it for years. I purchased mine at our local Walmart.

Regards,
Art Adkins