Section B Restoration

Far too many King Midget restorations have been done to summarize in this book, and many of them contain great tips on the process. We've chosen to include Ernest Freestone's early restoration. This section features the extensive and in-depth restoration series written by Dick Russ, as well as some other specific restoration tips. Many of the following sections will also feature valuable restoration help.

B-1 RESTORATION *by Ernest Freestone*

Restoring a King Midget! What a project! How far Do I Go? This seems to be a big question for any antique car owner. Do I make it cosmetically nice? Do I go for authenticity? Do I go for concourse judging? All of these are viable questions, and only you can make this decision.

The King Midget itself makes for an interesting discussion on restoration, and at this point I could get into many, many arguments just how to go or in what direction. (And believe me I have!)

The King Midget due to its minimal costs and construction techniques puts it into a very strange category for restoration. Not putting the "little guy" down, the car was "CRUDE". The car itself was a great little, dependable, nearly maintenance free form of transportation. But, the workmanship was, shall we say, rough. Even in the sales brochure, you could see dents and heavy waves in the body. If you have had the pleasure of seeing an unmolested "original." car, the painting was horrible, runs, sags, orange peel, dirt, etc. When the car was painted, it had been completely assembled, then critical areas masked off and everything was sprayed; wiring, brake hoses, suspension, the engines were half painted, areas of the frame/cradle were over-spray painted or left in prime; in general, like a fly-by-night paint service.

So now we go back to "restoration". To redo this vehicle as it left the factory is not difficult. The difficult point is, if and when you take your little beauty to a car show that is judged, be prepared for abuse if you did it as it left the factory. It will be difficult at best to convince a judge that any car could be produced with such lack of quality in fit and finish.

My King Midget was restored to show standards, or as many would phrase it, over-restoration. This is stripping each and every part separately and refinishing them without the over-spray technique. Many suspension parts, such as the frame work, were done in

"Imron"; the exterior in "Urethane". Then re-assembled with new bolts, nuts, washers, etc., new interior, new top, side curtains, chrome, polished aluminum, new original engine I.D. tags, etc., to the point that it has gained "A.A.C.A. Grand National 1st Place" status. This is not necessarily the extent that everyone should go (It gets costly, even doing all of it myself.)

Starting out-

1. Evaluate the direction in which you want to go. Think about doing it nice; it takes about as long as doing it just so-so. (Redoing it will take even longer.)
2. Remove your parts, taking photos as you go along to remember how it came apart. Label parts left & right, and make notes of certain areas. It will save time when re-assembly comes about.
3. Preparation is the most critical portion of a restoration. If you haven't cleaned or sanded your parts properly, down the road when the finish is applied, those pits and blemishes will show up, or possibly, if you paint over grease or oil, peeling paint and "fisheyes" will occur, thus ruining all of your hard work.
4. Don't use cheap, discount store primers and fillers. A quality filler applied over clean, ground metal will adhere and last the lifetime of the car. Have those little cracks welded; filler won't stop the cracks in the King Midget, the car "flexes" too much. A quality epoxy primer will aid in filling imperfections and give better color holdout and a much more durable finish.
5. Surface preparation, prior to painting, is without a doubt critical to ensure a flawless finish. The more time spent block sanding and cleaning, the better your final finish. Here too, do not skimp on material; there is a difference between that "hardware store" enamel and a quality acrylic enamel or one of the more durable "urethanes" made for the automotive trade. At this point you may even consider giving up the painting to a professional. If you have done all of the work prepping, sanding, cleaning, etc., you may be pleasantly surprised that the actual refinishing by a professional is not all that expensive, as most of the costs involved in a paint job are in the preparation work. And, a good professional has the "paint booth" to do the job safely.
6. When re-assembling after painting, take your time. A slip with a wrench or screwdriver can make a beautiful paint job a botched up mess in a split second. Again, a little more care will make for a quality job.

It should be rioted that whether you are creating a "Grand National" car or just a fun "Driver", this is your car, and you will be very proud of it when you are done. Take your time, don't rush it. It may be small, but, remember that being small, flaws show up a whole lot more. Those with the "Show Car" should NEVER look down upon the "Driver", and those with the "Driver" should not chastise the "Show Car" for over-restoration. By the way, adding things to the car such as fancy mirrors, lights, wheel covers, etc., is customizing and plays NO ROLE in restoration. Judges will deduct points for non-authentic type add-ons.

This hobby is for everyone. The King Midget lends itself for everyone to enjoy it, no matter how one may choose to restore, customize or use the car. The important part is

B. Restoration

keeping the King Midget as a part of AUTOMOTIVE history for future generations to enjoy. Remember, there weren't that many King Midgets made, and even fewer left, so, let's do our best to keep the remaining King Midgets ALIVE! □

King Midget Panel Beaters

In New Zealand they call those who do body and fender repair "Panel Beaters." Three of us collaborate here to tell you a bit of what we've learned about beating panels in doing our own restorations.

B-2 Budgeting Your Restoration *By Bob Vahsholtz*

There are lots of reasons to love a King Midget. Many of us rabid fans have never gotten over the lust generated in our car-crazed teenaged minds, poring over the back pages of *Popular Science*. We'll all be gone one day, so thank goodness there are lots of other reasons why people fall for these little cars.

One reason they love 'em is, King Midgets are cheap and easy to restore. According to the value guide we published in these pages (February 2000), a decent restorable Model 3 can be purchased for around $1,000 to $2,500. A fully restored example might cost you about $5,000. Where else can you get a car that is as much fun, attracts as much attention and is as easy to maintain? The darned things don't even take much garage space, and besides all that, girls think they're cute.

That's the Midget Motors heritage. Lots of fun for mighty few bucks. When undertaking your restoration, it is useful to keep that heritage in mind. Let's look at those figures again. Say you pick up a rough but drivable Model 3 for $1,500—a fair price—and restore it. When you're all done, if you've done your work well, the car might bring $5,000. That means you can't really afford to put more than $3,500 into it, unless you plan to lose money on the deal.

One thing's certain. If your labor is worth anything, restoring King Midgets is not a money-making proposition.

For most of us though, we don't count our labor. Restoration is a hobby, and if we weren't working on the King, our time might be wasted in the pasture chasing a little white ball.

You say $3,500 sounds like an adequate budget for restoration? I got a quote higher than that just to paint mine—after I'd done all the body work, priming and prepping. It pays to shop. I got several painting quotes and the lowest was *ten percent* of the highest. Here's the approximate cost of my restoration:

Purchase Price:	$1,500
Materials and Supplies	500
Top	150
Seatbelts	50
Paint Job	800

That's $3,000, plus a year's work in my barn, averaging maybe ten hours per week. I kept costs down by purchasing nothing but a new top, seat belts and other minor stuff. I splurged on a great paint job and the rest was done with odd bits of sheet metal, fasteners and the like. Start buying fenders, engines, steering dampers and watch what happens to that bottom line!

If I were starting over I'd do some things differently, spending less time and money. That being said, it would have been all too easy to spend a lot more! Our purpose here is to help you keep your cost of restoration within reason.

Main message? Salvage that sheet metal! My car was so rusty it was hard to tell which of its seven or eight coats of paint went on last. There was hardly a square foot of un-dinged metal. The only body work I'd ever done was to use a toilet plunger to pull a dent out of the fender of my Fiat 2000 Spider. If I can do it, you can do it! □

B–3 Fixin' Dents Ain't No Big Deal *By Hal Douse*

With no dealer network, a broken King Midget either had to be fixed by the owner, the factory, or a small-engine repair shop. Those clever guys from Athens made it easy to repair; in fact most repairs then and now are done by owners. That can include any body work from fixing dents to replacing or patching panels. In this article we will fix a dent. Later on perhaps we will explain how to do a major patch job and backyard painting.

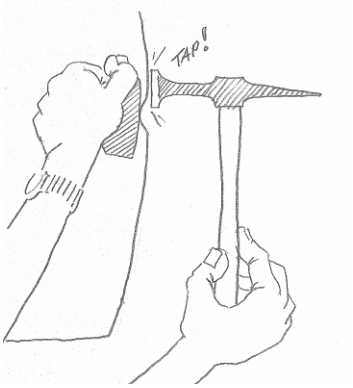
My Model 2 came with two bruised fenders, so we'll use one of them as an example.

The first thing needed is the right tools. The local parts supply store just happened to have a small set of body tools for $17.95. Included in the handy carrying case were the most important tools, a flat hammer and a set of dollies. The dollies do the shaping and the hammer moves the metal.

I took the fender off the car and wrapped the area that was not dented in newspapers so the paint wouldn't get damaged. Next, study the dent to see which way it went in, because that is the way it has to come out. An old-time body guy put it this way, "If you drive your car off into a ditch, you have to pull it out the same way it went in."

The metal wants to go back to its original shape. The hammer and dolly provide the nudge in the right direction. Many dents have a "sweet" spot; in other words, an area that when tapped, will start to draw the rest of the metal back into shape. Support the underside of the dented area with the dolly and tap the dent gently with the flat hammer. Take your time and work the whole area. Give the metal and your arms a periodic rest. Slowly the metal will find its way back to being a fender or a door.

The principle involved is the same as pulling a hammer head onto a new handle. The light hammer taps on the surface and the heavy dolly held tight against the back draws out the dent. Sounds easy, right? I guess if you've been doing it for forty years instead of forty minutes it is. I over-whacked several places creating a bunch of dimples that had to be smoothed down with a body file.



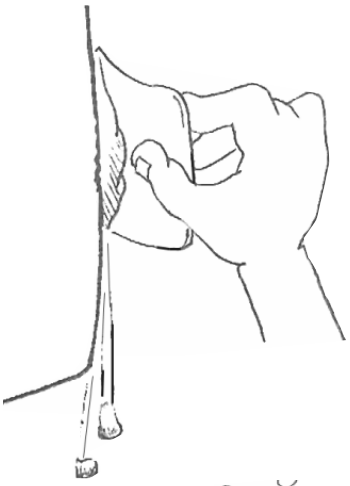
Hold the dolly firmly and tight against the back side of the dent. Hold the hammer lightly by the end of the handle, and tap. Let the dolly do the work. If you can't get at the back with your dolly, sometimes you can drill a few holes and pull the dent out with a piece of coat hanger wire, having a hook bent on the end.

The hammer I have has a round flat head on one end and a long thin pointy head on the other called a pick. Using the pick in the creases helps to pull them out so you can tap them back into shape with the hammer and dolly.

It took about two hours to take the crease out of the M-2's rear fender.

Once the dent is hammered out, then the area is prepared for painting. I used paint stripper to remove all the old paint. I'm not sure if this is the correct way—it was not an easy process. A body file can be used to smooth off any bumps. Apply body filler to the

low areas, getting it as smooth as possible, let the filler harden and sand it smooth.



A friend who has done a bunch of cars suggested a rough sanding with 220 grit, then tone that down with some 400 or 600 grit, and do final smoothing with 1000 or 1200 grit. I hate the sanding part so I tried to short-cut the process and paid the penalty.

My first attempt looked OK so I shot on some primer. Yuk!!! It looked like crap, so I did more sanding and applied a little more filler. The fender looked close to perfect so I primed it again. Hey, looks pretty good, so I applied some color.

It was teeming with blemishes again. Out came the stripper, take off the paint, apply some more filler and sand some more. When the area looks and feels as smooth as a baby's butt, then it is ready to be sanded one more time.

This time the primer goes on nicely. I wet sand between each of about five coats of primer and three or four coats of color with the 1000 grit paper.

From 10 feet it is difficult to spot the repair. I give myself a little pat on the back.

The above project was accomplished with my 18 dollar body tools, a package of 220, 600, 800, and 1000 grit sand paper, two spray cans of gray primer, two cans of color, and a quart of body filler.

Trying to blend the newly painted area into the rest of the fender is the difficult part and one that has yet to be accomplished. If I had planned my work better and taped off and painted the whole back panel of the fender, my body work would be hard to spot.

The key to doing this kind of repair is, don't rush the job and make sure the surface is as good as it can get before applying the paint.

A compressor is nice to have for painting, but don't discount the good old spray can for small jobs. Perhaps the only real fault of canned spray paint is it is difficult to match the paint. You can special order spray bombs in any color from shops that specialize in automotive paint, but they're expensive.

This is Bob. I got a set of those hammers and dollies and had no idea how to use them. I won't attempt to tell you how I worked on my dents! I do have a cheap compressor, so I was able to spray on the primer, and I used over a gallon of Bondo—that's the body putty you mix hardener into, and it saved my bacon! My more experienced neighbor was going to spray my finish paint, but my compressor is too weak. When he saw how much work I'd put into the bodywork, he suggested I go for a professional paint job. I'm glad I did.□

B-4 BODYWORK *by Gary Chu*

It is not necessary to remove the paint in the wounded area. Use 80 grit to roughen any paint in near proximity before applying the Bondo. The new body fillers are formulated to adhere to painted areas if they are first roughed up with 80 grit.

Pounding out a dent doesn't always work. After you think you have removed a dent, when you look closely at the work area, you may see that the dent has gone a little too far in the wrong direction. Now, you have three choices.

The first requires an oxygen/acetylene torch. Heat the protruding area until it turns orange, then quickly cool it down with a wet rag. This will shrink the over-expanded metal; it's called "heat shrinking." This can eliminate the use of a large amount of body filler or may require none at all.

If you don't have a torch, tap a small dent into the high spot so body filler (Bondo) can be applied. Before applying body filler, sand the surrounding area with 80 grit. I use a piece of wood (about 3"x 5") for a sanding block. Rubber sanding blocks ride over the high spots rather than cut them down. I use garnet (orange in color) sandpaper because it's cheap. If the Bondo is too high, then I may hit it with 50 or 60 grit, then working next with 80 to 100 grit garnet, then with wet and dry: 180, 320, 400 and then 600.

Also if you are working with thin or easily formed metal, try pressing and rubbing the convex side of the dent with a hand sledge or heavy piece of metal (one that does not have any sharp corners or edges). Thicker metals are more resistant to reshaping and thus require more forceful means such as pounding. Pounding a dent stretches the metal and thus requires heat shrinking, but pressing and rubbing will sometimes not work if the metal was severely impacted to cause the deformation.

Next, I use a spray can of gloss black (I like Krylon because it is one of the quicker drying paints and will put on a nice finish for small areas) on the area because it shows all the flaws when dry. When checking your work, stand back and take a look at it from a distance. Then putty, sand and paint again to check your work. Sometimes you will have to do this several times until there is no sign of the repair.

Once you are happy with the results, sand the area to remove the gloss paint; then prime it. Remember most primers are not sealers so they must be coated with some type of finish after the primer is dry. You can temporarily use the spray can of gloss paint for this. If you don't cover the primer with a gloss paint, the primed area may rust and all your work is for naught. Be sure to sand the gloss paint with at least 600 grit wet and dry before applying any finish paint. You may use finer grits (higher numbers) if you feel it will give you a better finish. When each coat of paint is dried, wet sand it with at least 600 grit sandpaper and dry the area before applying another coat of paint. You should apply at least three coats of paint.

I used the above method before my last project—repainting on my '34 Ford. I was extremely satisfied with the results. □

Note: I usually go the low cost route. The red M2 I did was painted with Sunrise Rust-O-Leum … does well enough for me. John White II

Me too, I painted my M2 with spray bombs wet sanding and rubbing. Bob V.

B–5 The Diamond in the Rough Restoring a King Midget; Part One *By Dick Russ*

Back in January of 2009 while sitting in front of my computer I was day dreaming a little about my days as a teenager and thought about the King Midget I once drove. It wasn't the kind of car that most teenagers would have wanted back in the fifties; but at least it was a car. As a kid in high school who didn't have a car, it was a thrill to drive.

I don't even remember my high school friend's name, but I do remember the King Midget that he drove to school.

Even though it was small and had a rope starter, when I was offered the opportunity to take the little car and my girl friend for a ride I was thrilled. As time passed I was finally was able to buy my first car which was a 1937 Packard (which cost me $25). I would say that the King Midget was just a thing in the past and not thought of again.

It wasn't until 1962 that the King Midget resurfaced. I had just graduated from college with a degree in engineering and was on my way to California for my first job interview. While waiting in the plane terminal I bought a *Popular Science* magazine that had an article on the King Midget. Even though I thought about buying one and the cost of the car was only a little under $1,000 I didn't even have job yet so again the King Midget became a thing of the past.

Now that we have a little bit of nostalgia out of the way, let's move on to January 2009 and talk about the King Midget.

Sitting in front of my computer with some idle time, out of curiosity I decided to see if there was anything on the internet about the King Midget and this is where I discovered the International King Midget Car Club and Bob Vahsholtz. As I read more about the club the more it rekindled desire to own a King Midget. I told my wife (LaNeal) that I was thinking about seeing if I could find a King Midget to restore and drive. When I showed her the pictures of a King Midget she was not as thrilled with the idea as I was. At least now she had an idea as to what I was up to.

It appeared the best place to start looking would be to place a small want ad in this club magazine. Then to speed up the process a little I contacted Bob by phone and I would say this is really where the story begins. I told Bob about my desire to find a Series 3 King Midget and he provided a wealth of information. Bob said that he would see what he could do to locate one for me and within a very short time he emailed me a list of King Midget owners in Oklahoma.

Much to my surprise, there was a man by the name of Clifton Hill in Shawnee, Oklahoma (just 40 miles east of Oklahoma City) who had four King Midgets. I contacted Clifton and introduced myself. To my further surprise he said he knew me from articles I had written on Jaguars and that he had read the book I wrote on restoring Jaguar E-Types.

The following weekend my wife and I and a close friend (Ernie Litle) drove to Shawnee to see what Clifton had. The four King Midgets he had were all in need of restoring. The only one that interested me was a 1959 model that seemed to be the most complete and original of the four. When I ask LaNeal what she thought about the little car, she said it

was ugly and wanted to know if I was really considering buying it. That is when I asked her to write Clifton a check, because I'd just bought it.

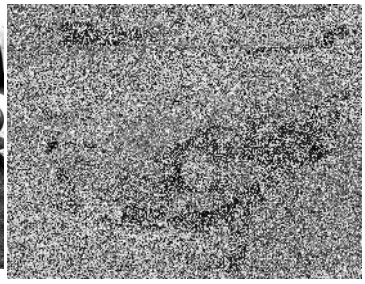
The following weekend Ernie and I, with the loan of a small trailer, drove to Shawnee to pick up my little "Diamond in the rough."

The restoration actually began by joining the club in January and ordering Bob's great book on the historical background of the King Midget. The car is now complete and Bob felt that the club members would enjoy a story on the restoration from start to finish.

When we were at the Jamboree in Concord, NC in August, Bob and I discussed the story and Bob thought that everyone would find it not only an interesting, but helpful in seeing what is involved in a ground up restoration—not only the cost, but also what I ran into during the process. So together we decided to make this a six-issue story starting at the very beginning and taking you through each phase of the restoration.

So let me take you to Shawnee to show you what we found. I will only show you three of the cars with the third being the one I ended up buying.





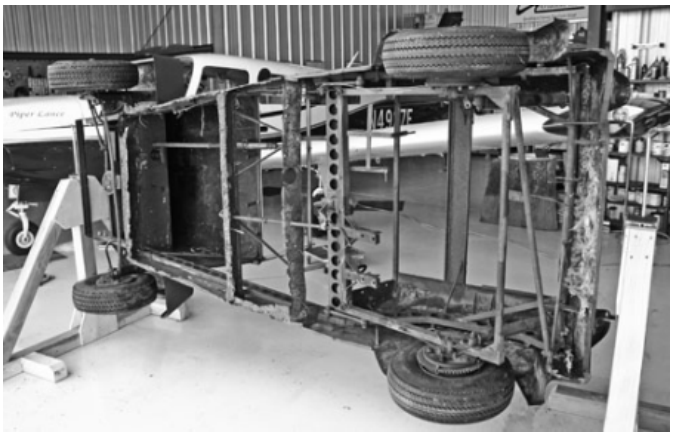
I'm sure many owners have considered a restoration and in many cases owners have his or her own idea as to what that is. In many cases it could be cleaning, making everything operational, finished off with new paint and interior. In the true since of a total restoration it means total disassembly of the car starting with the removal of all body sheet metal (normally referred to as a frame-off restoration), removing each and every component, wiring, hydraulic system, engine and drive train and every nut and bolt to a point there is nothing left that resembles a car except parts.

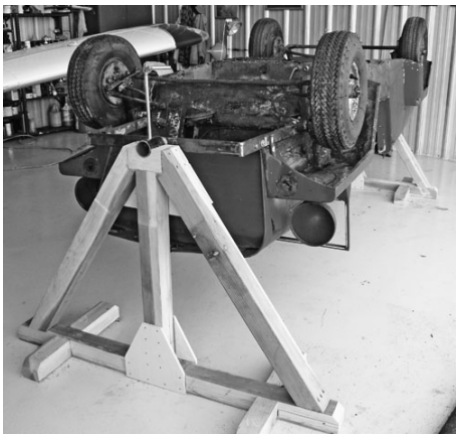
Due to the extensive work that I had planned for the little car and not wanting to have to crawl under it all the time, I felt the best approach was to design a rotisserie to enable the car to be rotated to work on whatever task came about. I needed to rely on Ernie for help on the fabrication. He is a master wood worker and has the woodworking tools. This is not to say that you need to have someone make them for you, it is just nice to have a friend with woodworking skills. The design was pretty straight forward and was to be made out of 4 X 4's.

When I gave the sketch for the fabrication to Ernie he asked me how much this car weighed. When I told him less than 700 pounds he kinda laughed and said the stands would support a tank. He said, as is typical with an engineer, it was over designed.

I designed the rotisserie's pivoting brackets (that were attached to the car's bumper brackets) using ¼ inch X 3 inch steel plate with a 3 inch pipe welded in the center. A local weld shop fabricated them for me. The cost was $70 for the pair and in my opinion

worth every dollar. You can see them in the photos at the right of the car sitting on the stands.





What Bob and I plan on providing the club readers in this series of articles is a complete detailed restoration of every part that makes up the King Midget. We hope you will follow along as we bring you the continuing story of a "Diamond In the Rough." □

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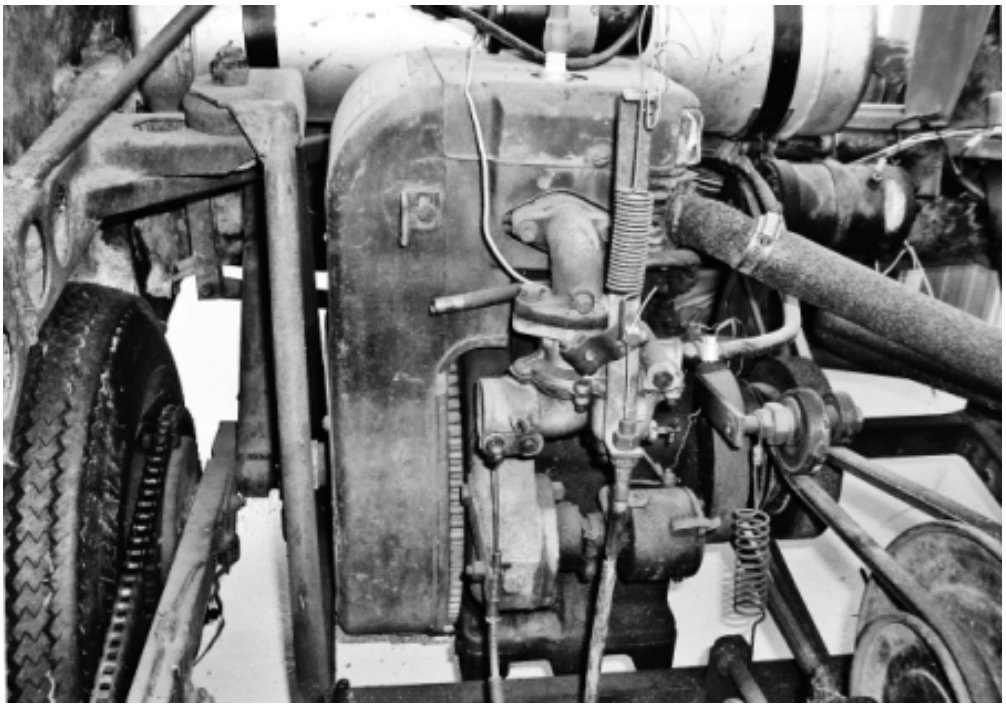
B-6 The Diamond in the Rough Restoring a King Midget; Part Two *By: Dick Russ*

When I left you in part one, we had just finished the stands and the car was ready for disassembly. I would suggest you remove the engine from the engine cradle while you still have the car on the ground, it makes the cradle much easier to lift without this additional weight.



Since this is my first King Midget restoration, there were many questions about the project that needed answering. Bob helped when he could. He suggested that I contact John White in Pennsylvania for some of the specific details. John was extremely knowledgeable and without his and Bob's help, the job would have been much more difficult.

To start with, it is best to take as many pictures as possible and with a digital camera you can take hundreds of pictures you can store in your computer. It will just make reassembly that much easier. I also found that it would be helpful to put each component in a box and label it for future rework and assembly. Keep in mind that many of these cars are over 50 years old and every thing on the car really needs to be overhauled for the car to be reliable.

Two companies that have tools that will be extremely helpful. One is Harbor Freight www.harborfreight.com and the other is Eastwood www.eastwood.com. Both companies have tools, but I feel that Eastwood is rather pricey on some of their tools. One tool you will definitely need is a Spot Weld Cutter. This tool has a hardened circular cutter with a spring loaded centering pin that, when used with a drill motor, will enable you to easily cut out each spot weld from the frame.

At Harbor Freight the tool is only $4.99. Their part number is 95343-OVGA. Eastwood also has many products that are made specifically for restorations and they are the best source for aerosol spray rust removers and paint. Harbor Freight also has a portable spot welder that is under $200 and is mandatory for a restoration. At HarborFreight.com ask for "spot welder."

When you have all your components removed, the first order of business is to disconnect all the wiring and remove the hood and fender assembly. If you are planning on reusing the existing wiring, be sure to identify the wire as to what it is attached to. Masking tape and a Sharpie permanent marker pen work well. To remove the hood requires you to first remove the windshield and the headlights from the fenders. Next you will find the hood/fender assembly is held on by several ¼ inch cap screws (bolts) on each side of the frame and fenders. There are three spot welds just forward of the right and left posts securing the floor to the chassis and several spot welds holding the small triangular trim pieces at the base of the windshield. To make it easier to locate the spot welds, I suggest you use a wire brush in an electric drill to clean off the paint covering the spot welds. You will also find several pop rivets securing the hood to the floor as well as the windshield frame. These are easy to remove by drilling the heads off with a 3/16 twist drill. The spot welds will need to be cut out and this is where you will need the spot weld cutting tool. With this tool you will be able to easily cut out each spot weld. When you have the spot welds cut out and the attaching hardware removed, you will be able to remove the whole front end off of the chassis.

I really suggest you replace all the original wiring. The wires will become corroded internally with age and there is no better time to replace the wiring harness than now. Old wiring can lead to unreliable operation of the car and the electrical system. Even if you haven't much experience with electrical wiring, the KM wiring is really very basic and not that difficult to make. If you need help, I have drawn up a new electrical schematic for the Series 3 that works great and is free for the asking (see KMN, Spring, 2009).

The Series 3 originally had a positive ground electrical system. To upgrade the electrical system I made the drawing a negative ground. It is very easy to change the grounding system by just reversing the battery leads, ammeter leads and the coil leads. Henry Ford was responsible for the positive ground system on automobiles. Ford stayed with the system until 1956 at which time Ford switched over to negative ground with the introduction of the 12-volt battery. Most car manufacturers of the era preferred the negative ground system.

If your floor is rusted out in several places it might be easier to cut out the rusted areas and weld in new steel. You can normally find sheet steel companies in the phone book. I

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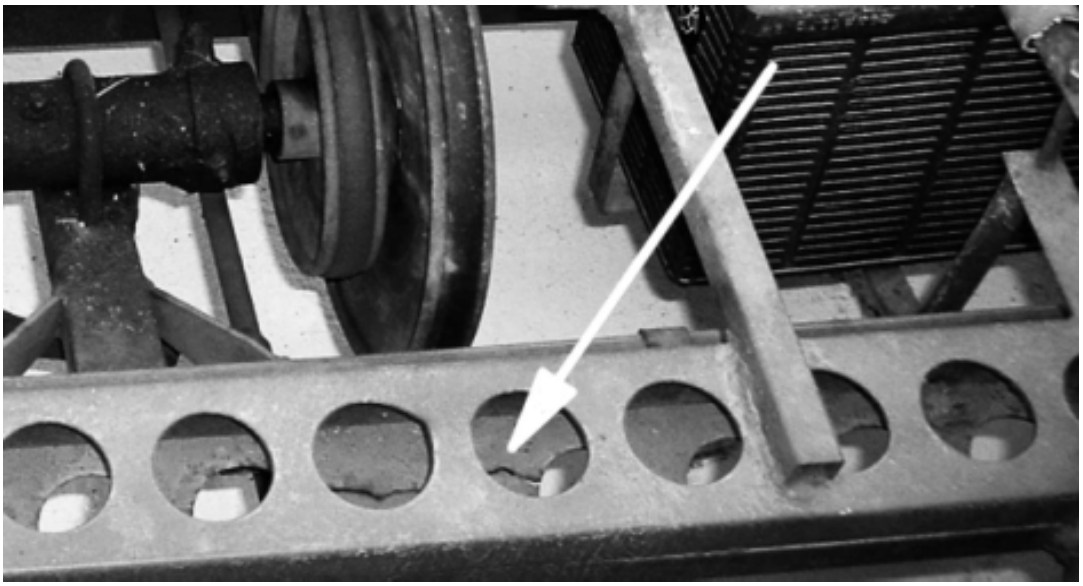
recommend you use 20 gauge for the floor. If you have considerable rust, I would suggest you replace the entire floor which you will be able to buy from Midget Motors.

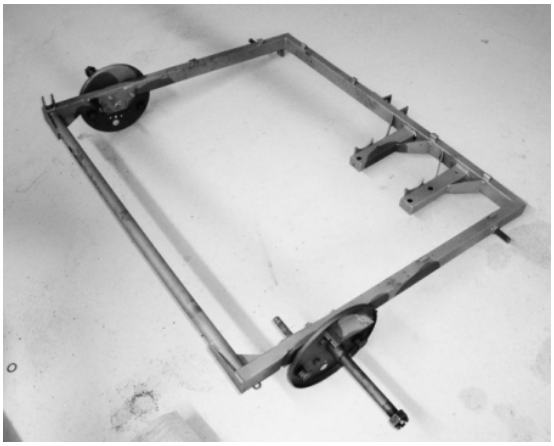
This is an ideal time to inspect the cross frame behind the seat for cracks. To find a crack above the area where the rear suspension is attached at the center section cracked is not uncommon, and if cracked, needs to be welded before anything else is done.

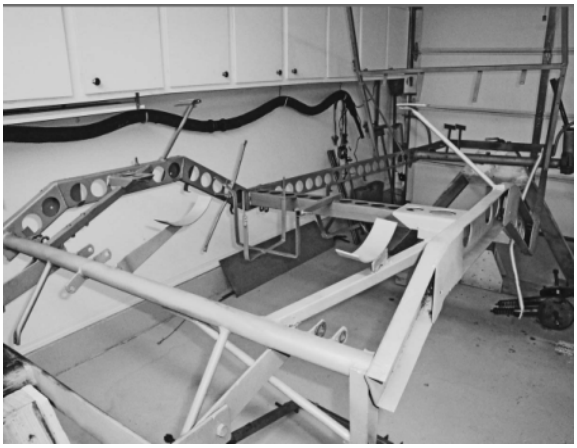


Look closely at the photo in front of the large pulley and you will see the crack on the underside of the cross frame. If you made the wood rotisserie like I did, you will find it easy to rotate the car for easy access to every part of the car.

The next step is to remove the right and left rear side panels. The fenders are spot welded and an integral part of the side panels so they will come off as an assembly. To enable you to remove them, you will need to cut out several spot welds on the area at the top of each seat back and top support and remove the ¼ inch bolts attaching them to the frame.

Now with everything removed from the chassis it will be easy to clean up in preparation for reassembly. I would recommend you have the chassis sand blasted to remove all the old paint and rust. This will allow you to inspect the chassis for any cracks that might need to be welded.





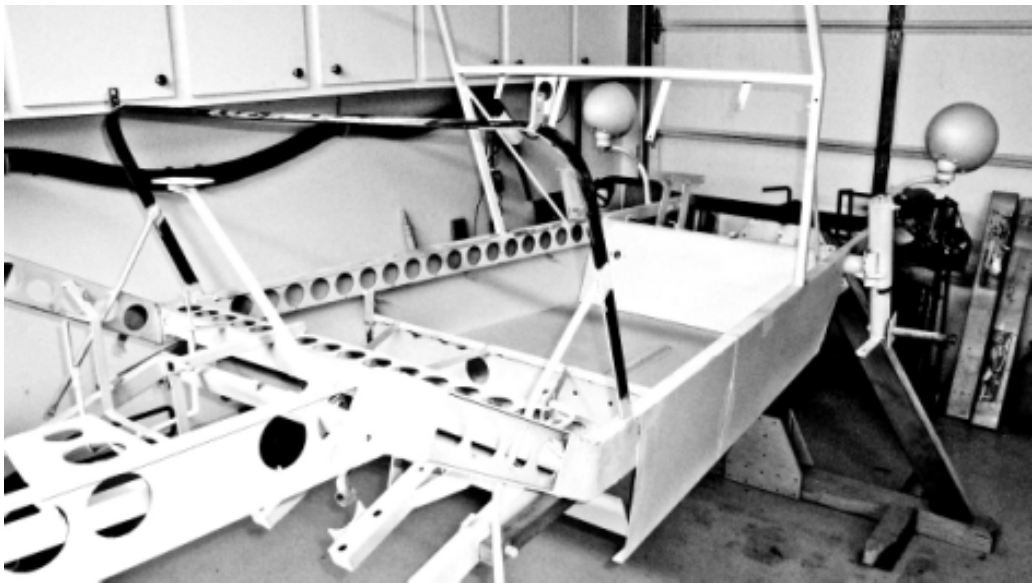
When it is all cleaned up I recommend you paint the entire chassis with epoxy primer which will provide great protection from rust almost forever.

When preparing to work with sheet metal you will find the job much easier if you have a set of aviation tin snips. They come in three styles; right, left and straight cut. They are very inexpensive at Harbor Freight and I consider them a must when working with sheet metal.

Replacing the floor was one of the most fun and easiest parts of the restoration. The floor pan has the sides as an integral part of the design which has flanges bent over on the top of the sides. To install it is just a matter of springing the flanges away from the frame as you lift it into position and the floor to just snap over the frame.

B. Restoration

Although Midget Motors didn't weld the floor to the chassis (except for the three spots on each side up front), I preferred to spot weld the new floor to the chassis in several places along the entire top of the floor. Just remember that if you primed the chassis you will need to remove (sand off) a small amount of the primer in the area where you will be spot welding.



In the preceding photo you can see the floor primed and installed.

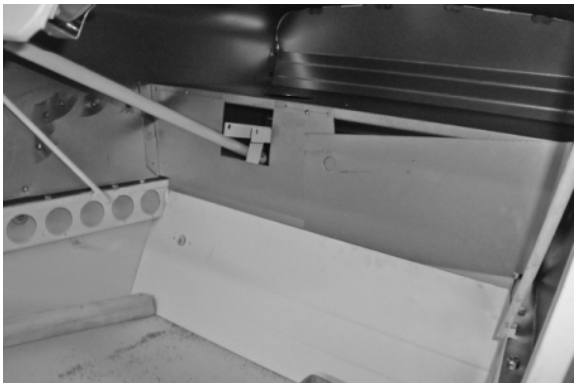
One of the most rewarding benefits of a total restoration is you not only get to know everything about your car, it also enables you to clean and paint all the components before you reinstall them in the car. This is when it becomes fun because everything is clean, beautiful and you have a great feeling of accomplishment. Attention to detail is what makes a difference.

In the next episode I will go into more detail on overhauling components as well as several things that can be done to improve the car without degrading the originality. The final goal is to have a King Midget that is not only beautiful, but will be a show car that is also reliable enough for everyday use. □

B-7 The Diamond in the Rough Restoring a King Midget; Part Three *By Dick Russ*

In the last article I left you with the installation of the floor pan.

If you order a new front end from Midget Motors Supply you will receive the hood w/grill and the right and left front fenders. The hood will fit right in place on the chassis rails. You will need to transfer the holes for the four mounting bolts to the new hood mounting flanges, which is really easy. Once it is in place, it is then just a matter of match-drilling the holes for the 3/16 diameter pop rivets that secure the upper flange of the hood to the windshield frame and installing the four forward bolts to the chassis.



When you receive the hood, you should have two new windshield corner close-out pieces of sheet metal that will need to be spot welded in the lower corners of the windshield. I would recommend that you spot weld the aft flange of the hood to the chassis just as Midget Motors did originally. With this in mind an alternate means for securing the hood to the chassis would be to bolt the hood down instead of spot welding. From a structural point of view you would gain the same integrity as if it were spot welded.

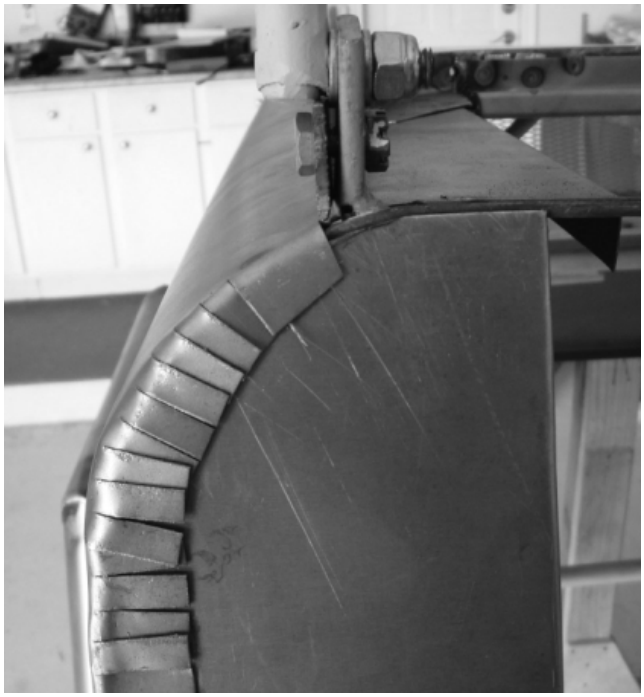
The only remaining part of the hood installation is to pop rivet the inside portion to the

floor foot well (reference preceding photo) and secure the aft vertical sides to the forward door posts.

I preferred to spot weld the sides to the forward door posts, but if you are installing piano hinges for the doors, the hinges will secure the hood flanges to the vertical posts.

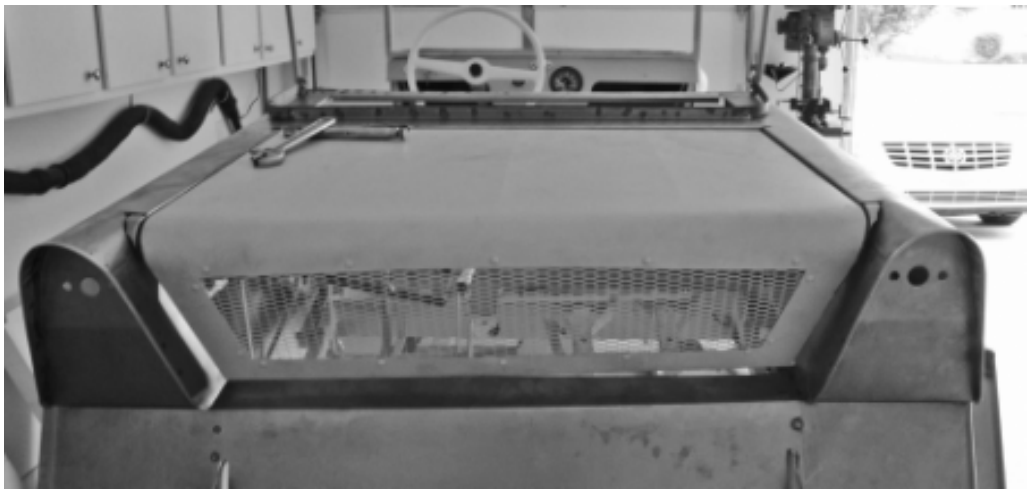
The aft quarter panels come with the fenders already spot welded so you won't have to worry about the proper alignment of the fenders. The installation is quite easy. You will need to exercise care in the fitting to the chassis to make sure they are square with the front end. This is best accomplished by placing a carpenter's level on the windshield horizontal tubing and blocking the car level with pieces of wood. If you made the wood frames like I did, it will be easy to level.

The rear quarter panel/fender assemblies are attached to the chassis with ¼ inch bolts in four locations. Two directly on the chassis rail and two to braces welded to the chassis. The downside to this installation is that KM used long ¼ inch bolts and numerous washers stacked as spacers for alignment. So when you start the fitting, you may need 40 or 50 washers as spacers. Before drilling mounting holes, make sure the quarter panels are in alignment and level. The side support for the seat back will establish the forward location of the panels.



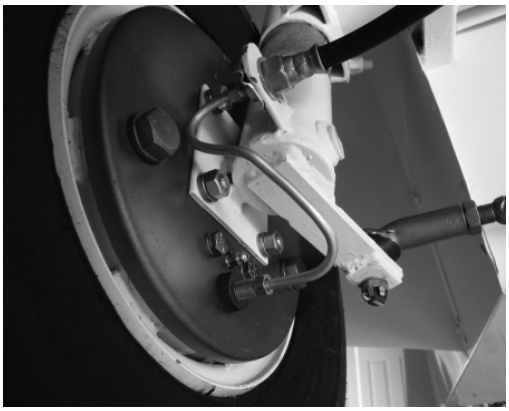
You will need to bend over the precut strips on the forward top edge and spot weld them to the seat support.

The top hinge support for the deck lid will establish the distance between the quarter panels but it is imperative that before you weld it to the quarter panels you measure the deck lid and add a 1/8 to 3/16 inch gap on each side.



The sheet metal lower rear panel (bridge) should fit right in place between the quarter panels using the same measurement before final attachment. With the preceding parts in place, you're home free to start the overhaul and installation of the rest of the car.

What I recommend is you disassemble each brake assembly and clean everything completely. If you have access to a bead blaster, it is best you bead-blast the backing plates, wheel cylinders, springs and brake shoes. If you don't, at least clean them up with a wire brush and solvent. Each wheel cylinder (4) should be overhauled before re-installation.



If you have never done this before, it is really easy, but you do need a wheel cylinder hone that you will use in an electric drill motor. Fortunately the wheel cylinder kits are available from NAPA Auto Supply. Just remove the brake line and the two bolts securing each cylinder to the backing plate. Next remove the two rubber boots from the cylinder and push out the two pistons and spring. The cylinder will need to be honed to provide a good sealing surface for the new seal kit. If you do not have a cylinder hone, the best place to buy one is from NAPA. They will normally have two styles; a three stone and a two stone. You will only be able to use the two stone model due to the bore diameter of the wheel cylinder being too small for the three stone hone.

The honing is very simple. Just clamp the cylinder in a vise where each end is open. Next you need solvent or kerosene to provide a cleaning medium for honing. Then it is

just a matter of chucking the cylinder hone in the drill motor and inserting the hone in the wheel cylinder. Add a liberal amount of solvent inside the cylinder (which will be messy, so you might want to place a steel bowl or pan under it). Continue to hone each wheel cylinder until you have a good clean bore. You may have some pitting in the center of the cylinder caused by water in the brake fluid. As long as the pitting is not in the outer sealing area it shouldn't pose a problem with the operation of the brakes.

Brake fluid normally used is a glycol base and very hygroscopic and should be replaced every two years due to moisture accumulating in the lines, master cylinder and wheel cylinders, especially on vehicles that are not driven frequently. I would recommend the use of DOT 5 Silicone brake fluid so you don't have to worry about rust forming in the hydraulic system. It is not hygroscopic like conventional brake fluid. *[Note: Mark the access lid that you've used silicon. The two types cannot be mixed! Ed.]*

During your restoration I feel it is imperative to replace all of the metal brake lines and flex lines. There are three flex lines and five hard lines. The hard lines are 3/16 diameter and readily available from NAPA and the cost is less than $25 for all of them. You will need a small diameter tubing bender to form the tight radii of the tubing, especially when making the front brake lines, which you will be able find at Harbor Freight Tools. Don't forget to do the same overhaul to the master cylinder as well.

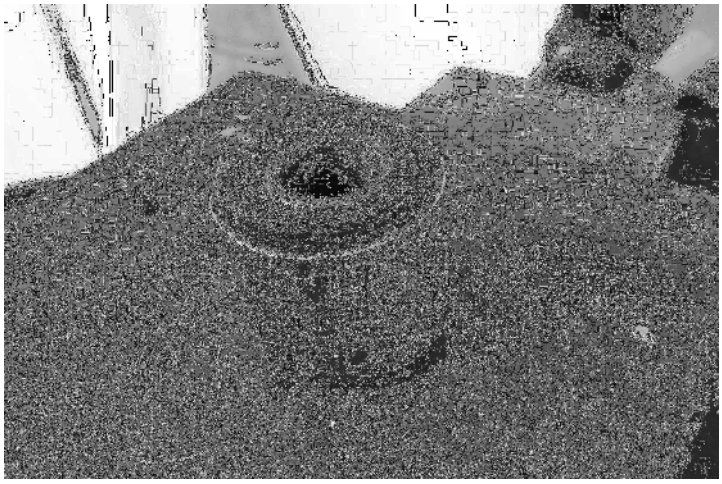
At this time it is important to run the long brake line down through the frame on the right side of the car. Be sure to cover each end fitting with masking tape to protect them from contamination while you continue with the work. The other hard lines and flex lines will be installed as one of the last things you do after everything is painted. Another small item you need to pick up at NAPA is a foot of 3/16 ID rubber fuel line. You will cut this in one-inch lengths and split lengthwise to place around the fuel line where welded sheet metal clips secure the brake lines to

Many of the cars have the rear spring suspension shock tubes perforated by corrosion due to water accumulating inside the tube. This is not a serious problem because there is an easy and inexpensive fix. Normally the springs will be fine and only need to be cleaned up. The housing tubes can be another problem and should be repaired.

You may not be able to find replacements but as I mentioned, the repair is easy and very inexpensive. In a future article of our restoration series I will show you how to make them like new, along with many other items on the car. So until next time, hang in there with me. □

B-8 Diamond in the Rough; Restoring a King Midget, Part Four *By Dick Russ*

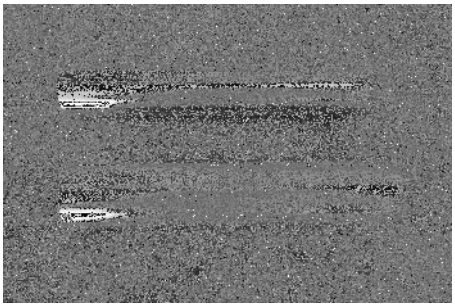
When I left you last I was talking about rebuilding/repairing the Spring Shocks. As I said, this is easy and can be very inexpensive, especially if you have a welder. If not, talk a friend into doing the welding for you.



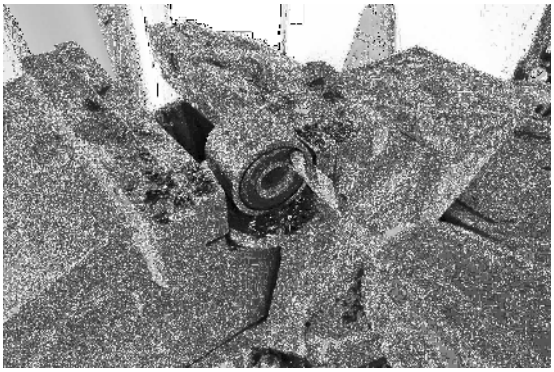
Before you get started, I would recommend you call Midget Motors (419-663-9287) or Alan Conley (914-493-2784) and order four shock rubber mounts. They have these in stock and are reasonably priced.

The first step is to stop by a shop that installs mufflers and tail pipes. They normally have small cutoff sections of straight exhaust pipe that are the perfect diameter for both the inner and outer shock tubes. The larger tube is 1 ¾ inch OD and the smaller is 1 ½ inch OD. Please note that the size of the original King Midget larger tube is 1 11/16 inch diameter OD but the slight difference in size won't hurt a thing. In many cases the muffler shops will be throwing these short pieces in the trash and may just give them to you. If not, the cost should be no more than a dollar or two. In many cases you may find that you only need to replace the lower (larger tube) section. An alternate source for the tubing is electrical conduit. Many times if you stop by a electrical/mechanical contractor, they will have scrap pieces they will give you. The sizes for the conduit are the same as the exhaust pipe. The main difference is the conduit is galvanized.

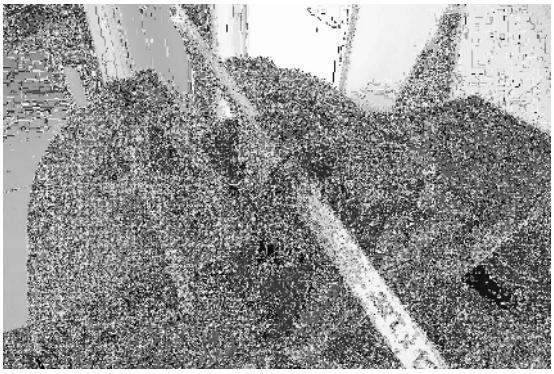
You will need 8 ¼ inches of the large 1 ¾ diameter tube and 8 ¾ inches of the smaller 1 ¼ diameter tube. And of course if you are doing both shocks you will need two each of the tubes.

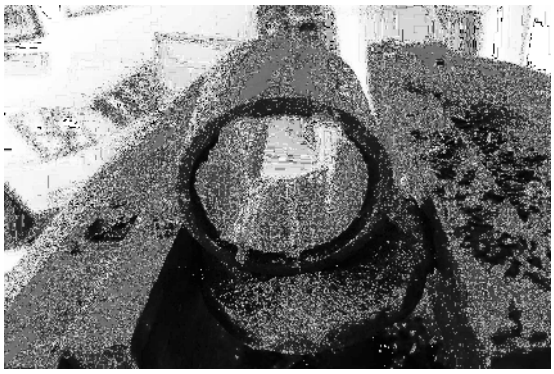


Before you do anything else, this is a good time to remove the old rubber mount bushings that are pressed into the end fittings of each shock tube. In most cases due to age, pressing them out can be a real bear of a problem. I have found the easiest method for removal is to drill out the rubber around the entire perimeter and push out the inside portion of the mount.

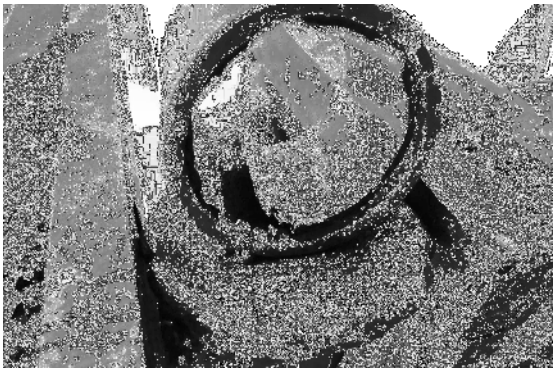
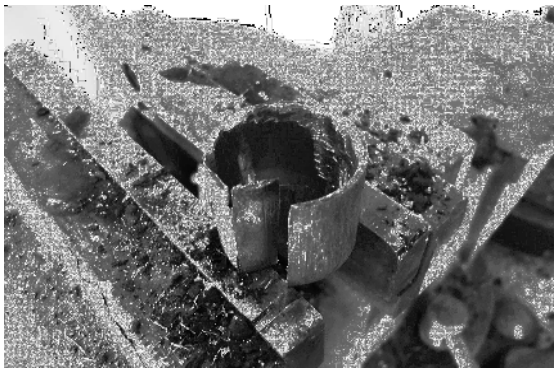


Then clean out the rest of the remaining old rubber bushing leaving only the outer portion of the mount sleeve. Then I recommend you separate the blade from your hacksaw and reassemble it with the blade inside the mount sleeve. Now you need to carefully make two saw cuts on the inside of the mount sleeve about 5/16 inch apart; but not totally through the metal.



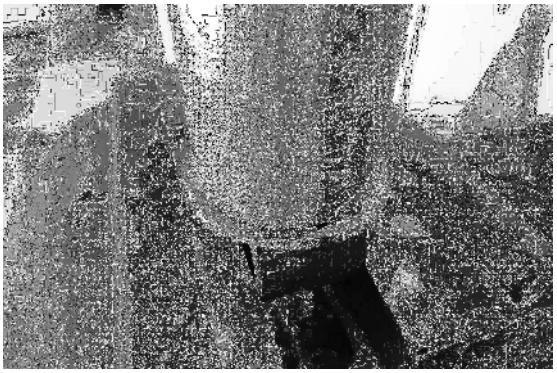
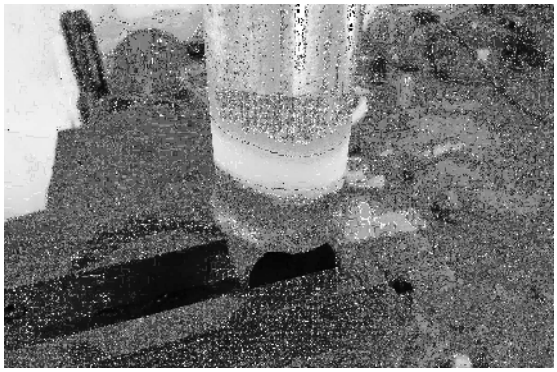


Next remove the hack saw and with a small metal chisel, separate the sleeve at the saw cut. Normally the metal will split at the saw cut relieving the pressure making it easy to knock out the sleeve. Once removed, it is just a matter of cleaning up the fitting in preparation for a new rubber mount.

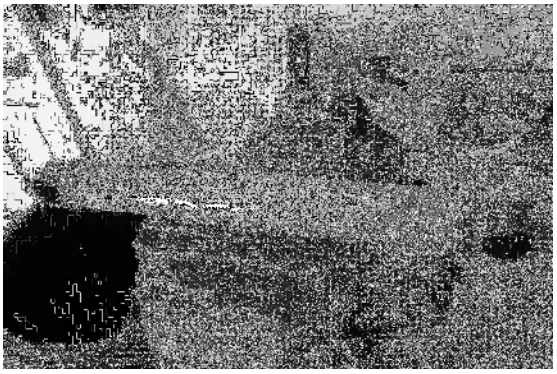



After you have the two halves of the shock separated, clamp the shock tube in the vise and using a hacksaw, cut the tube off next to the weld. This applies to both shock halves (inside and outside tubes). Next you need to grind or sand off the old remaining tube and weld to where the end fitting is cleaned off and flat, ready to accept the new tube.

If you hadn't noticed, the end fitting on the large tube is offset to one side. This is for clearance when installed on the frame. So be sure to weld the large tube to this end fitting.

I recommend you clamp the end fitting in the vise and place the tube on the end fitting and weld it around the entire outer circumference. Repeat the same process for the other tube. Be sure to drill a 3/16 diameter oil hole 5 1/8 inches from the open end of the smaller tube. When done clean off the weld residue with a wire brush and wipe down with lacquer thinner (or enamel reducer) and apply a coat of good metal primer. When dry, paint with your choice of color. I prefer a battleship gray.




Next it is just a simple matter of pressing in the rubber mounts into the shock end fittings.

B. Restoration

If you don't have a bushing installation tool, I have found they can easily be installed by using a large socket (the same size as the rubber mount sleeve) and use your vise to press the fitting into place as shown above.

With all that done you now have two new shocks that will last for years. One thing that you might want to do is measure your springs. Many times you may find one a little shorter than the other and this can easily be corrected by placing fender washers inside either tube. Just add however many you need to correct the length discrepancy.

Until the next time, happy motoring. Plus we will look forward to seeing you in Oklahoma City for next years exciting 21st Jamboree. □

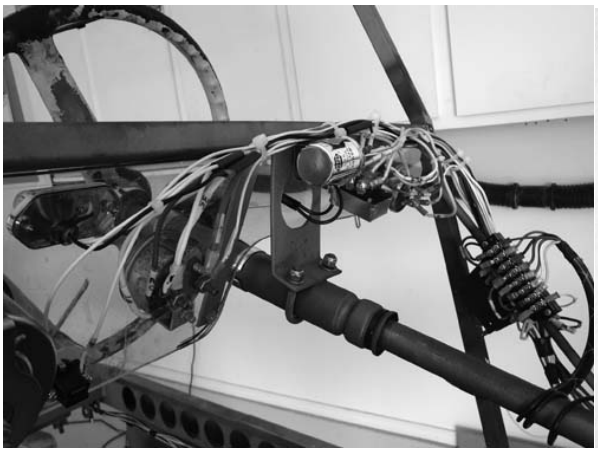
The process Dick went through and described so well above involves a fair bit of work. You may find it easier to simply install purchased shock tubes designed for other purposes. Your car will even ride better than with the original design Dick has replicated.

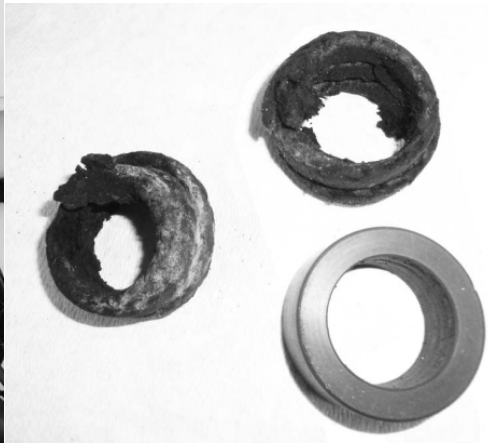
It's your choice of course, but when someone asks Dick (or anyone with the original design) how the suspension worked, he can show them without making excuses.

B-9 The Diamond in the Rough Restoring a King Midget; Part Five *By Dick Russ*

The last time I left you with installing the primary sheet metal components. With that accomplished I think it might be fitting to concentrate on some of the minor (but equally important) tasks. One being the steering column. I have noticed that many of the King Midgets have steering wheels with a lot of loose play. If you can move your steering wheel up and down and sideways, the bearings are worn out and need to be replaced. If you haven't removed the steering column you might find what I'm about to tell you entertaining; or at least I did. The main support housing on the outside of the steering column is a tube about a foot long with convolutes rolled into the steel.

These convolutes (see below) provide a place for bearings to support the primary steering column that the steering wheel attaches. Now, referring to them as "bearings" might be a little stretch of the imagination, but functionally they worked (after a fashion). The bearings I'm referring to were nothing more than small pieces of rope (above left and top) that were placed in the outer housing convolutes to support and provide a bearing surface for the steering column.





I don't want to be too critical of this design because it was certainly inexpensive and cost was a major factor when it came to marketing the King Midget—but rope! And if that will work for you and you're happy with it, then leave it alone. On the other hand, since we are not trying to cut manufacturing costs in our restoration, there is a better way to improve the design at minimal cost.

So let's improve the design a little if you will.

First of all you don't need to remove the entire steering column but is really easy. You do need to remove the steering wheel from the shaft first. In some cases the wheel might be difficult to remove so you may need a steering wheel puller.

In my case I just loosened the nut a little and hit the nut with a lead hammer while pulling back on the wheel and it came loose. If you wish to remove the whole column, you will have a bolt that attaches the column to the steering box that must be removed. Next you will need to disconnect the horn wire and U-bolt clamp attaching the steering column housing to the bracket on the lower side of the instrument panel. With this done you should be able to extract the steering column (or housing if you wish) from the car.

Next you should be able to hold the steering shaft and slide the convoluted support housing off of the column. If you look down inside the support column you will see the two rope bearings pressed into the convolutes on each end. With a curved pick you should be able to remove these rope bearings very easily. In the photo (above left) you can see one of the new bearings made out of gray nylon.

What I did and highly recommend is to not reuse the rope bearing, even if they are new. I suggest you make or have made a couple of synthetic bearings out of nylon or Teflon bar. Most large towns and cities have companies that specialize in plastic hardware. In Oklahoma City the company is Regal Plastic. There may be one in your town. If not, you could call Regal in Oklahoma City and they would send you a piece of nylon tubing. You only need a couple of inches of 1 ¼ round bar.

I happen to have a metal turning lathe so I was able to turn the new replacement nylon bearings on my lathe. It is really easy and even if you had to have a machine shop make them for you I don't think the cost would be prohibitive.

Where I changed the design was to make the bearing (the one next to the steering wheel) press into the end of the column housing (below left) whereas KM had the rope inside the

housing. For the lower bearing I made the nylon bearing to fit inside the housing (above right) just like the rope.

I had to cut a slit (look closely at the bearing and you can see the slit) in the new nylon bearing to enable it to be squeezed small enough to be slid into the housing. Then I was able to expand it back into position with a socket. Next it was just a matter of working the steering column tube back into the housing (with the new bearings) and reinstall it.

I wish I could give you the exact sizes for the new bearings but somehow I have misplaced them. The best part is it is very easy to measure the steering column to determine the inside diameter of the bearing and the outside dimension and width can be taken directly from the housing. I would recommend you make the bearing next to the steering wheel .002 oversize to enable it to be pressed into the housing to where it won't rotate or come out.

That's it for part five. Next time I'll cover rewiring the King Midget which is a very important task to insure reliability.

PS: Hope to see you in Oklahoma City for the 2011 Route 66 Jamboree this summer. Check the IKMCC (www.kingmidgetcarclub.org) website for details. □

B-10 The Diamond in the Rough; Restoring a King Midget; Part Six *By Dick Russ*

Well my friends this years 21st Route 66 Jamboree is all over and it's time to get back to our real world of daily tasks. I do want to personally thank everyone who made the long journey to Oklahoma City this year. I hope you all enjoyed the event as much as LaNeal and I enjoyed having you and sharing some of our historic sites and places to tour.

The last episode I said I would talk about the wiring. If you are restoring or even refurbishing your King Midget the wiring can be a problem that you really should address. Briefly, I think I should mention a little bit about the wiring in our cars. If you haven't replaced it, you should bear in mind that even if you have a 1969 model the wiring is still 42 years old. You may also think that it looks OK and everything works, so what is he talking about?

When the wiring harness was first built up at the factory the wiring was new. It was made up of different sizes and colors of insulated (plastic or vinyl) covered copper that conform to an AWG (American Wire Gauge). This will then become some particular size (i.e. 10, 12, 14, 16, 18 etc. gauge) Each of the wires in the harness is made up of a multitude of copper conductors (single wires) sized to conform to the electrical load carrying capacity or amperage rating for the wire which in turn is determined by the circuit that it will power.

Many of you may be thinking; so what? The reason for my covering this somewhat boring analogy of the wiring is to help you understand why it is so important to replace the wiring if you want your cars to be more reliable and trouble free. As I mentioned earlier, each wire as we know it, is made up of many small single conductors (strands) of copper wire. From the day the conductors are coiled to form the wire (as we know it), the copper starts corroding. This corrosion has been occurring from day one and over time will cause resistance in the wiring that will degrade the ability for the wire to provide the needed current to operate the component or system (i.e. lights, generator, ignition coil, and distributor to mention a few). In fact when I pulled the old harness from my car I found several wires broken inside the insulation that couldn't be seen with the naked eye. Had I reused the existing wiring, it would have been a nightmare to try and find why something wasn't working

Rewiring a car can be somewhat intimidating if you haven't had some experience. I can assure you, it really is not hard to do if done systematically. By this I mean *one wire at a time.*

But first you need a plan on what you are going to do. Will it be just one circuit or all circuits? If it is just one wire then it is just a matter of running the wire from point A to point B. But if you want to insure reliability; replace them all. And for this you really need a wiring schematic. I have drawn a new schematic that I used to rewire my '59 model which has a 6 volt battery and all the components (light bulbs, horn, starter and generator).

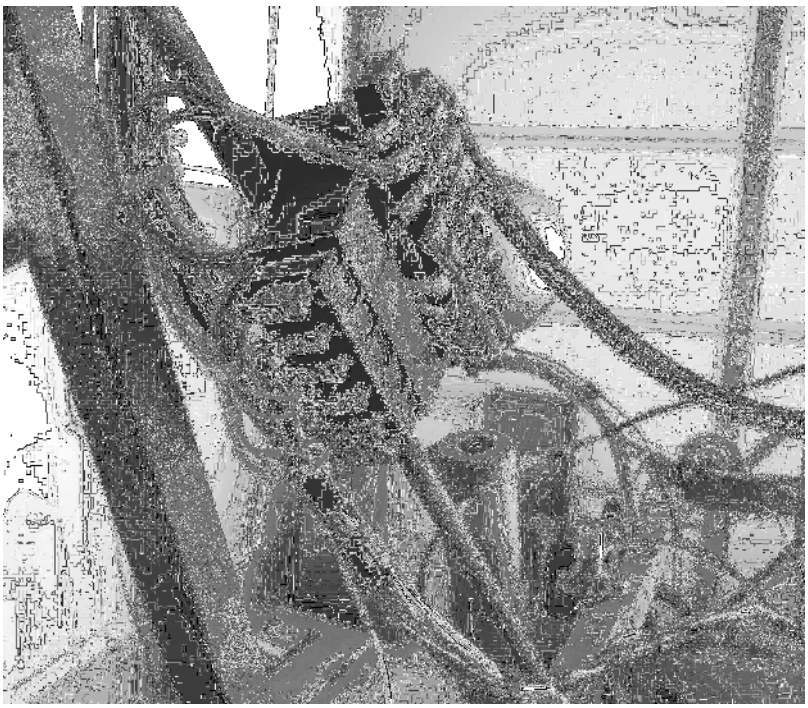
The car originally was a positive ground system and to make it easier in case I ever wanted to change to a 12 volt system, I converted it to a negative ground system. The only difference between a positive ground and negative ground system is the terminals on

the battery and the wires to the ammeter need to be reversed. The rest of the car systems will not know the difference. If you have a 12 volt system this schematic will work fine just as it is, with the exception of the voltage regulator and generator/alternator wiring. If you have a copy of the King Midget Parts and Repair Manual you will find the 12 volt schematic (figure 6.1) on page 66.

Let's get started on this part of the project. Before you start tearing everything out of the car I would suggest you visit your local NAPA dealer and buy some spools of copper wire. You will need 10, 12, 14, and 16 gauge wire in about 10 or 11 different colors. The spools nominally come in 25 ft spools. They will run anywhere from $3.00 to $4.00 a spool. So you can plan on spending somewhere from $30.00 to $40.00. You will also need an assortment of crimp connectors and a crimping tool which you can normally find in a kit form for under $10.00.

I would recommend that you just disconnect the wires from every component in the car and pull the whole harness out of the car. It doesn't matter where you start on the rewire, it just matters that when you do, you complete that wire from end to end. I found that it worked best to run a copy of the schematic and mark off each wire as you run it. When the wires are all marked off you know you're done.

You will notice in the picture below that I wanted to upgrade the electrical system by installing a fuse block rather than using inline fuses like Midget Motors. This wasn't really necessary, it was just something I wanted to do.



So let's take it one at a time and start with the starter relay which is the main power source. There you will run a 10 AWG wire from the relay to an inline fuse and from the fuse to the ammeter. I like to identify each end of the wire that I run with a number. You can buy a set of stick on wiring numbers from Radio Shack (very reasonable).

I like the wire marking dispenser kit that www.mouser.com, Mouser Electrical Supply,

sells. It dispenses a pressure sensitive tape you write on with their special pen that comes with kit. It's kinda pricy but will last forever. The part number of the $35.95 kit is 644-S100X125VARY. You just check off the wire on your schematic and go to the next one.

Rather than run the wiring harness loose and unprotected like Midget motors did, when completed, I preferred to remove the complete harness from the car and then wrap the entire harness with electrical tape to add more protection. But that is just a matter of choice; either way will still work fine.

The key to a reliable electrical system (and King Midget) is clean terminals; especially grounds. If you are reusing existing components, clean each terminal with Scotch Brite making sure there is no corrosion to cause problems.

I have provided a copy of the wiring schematic I made along with a key to the wires and related wire size. I can assure that it works because it is the system I have in my King Midget.

The colors are really based on what you can buy and what you want. Just make sure you keep track of the color for each wire. In reality, all the wiring could be one color as long as you identify each wire. The following is the key to the wires and sizes needed.

That pretty much covers the rewiring. If you have any questions I will be happy to help. Just email me at dickathome@cox.net. Until next time, happy motoring. □

Note: Dick's wiring diagram is reproduced in the Electric section (section H-12) of this manual, along with a 12 volt version (section H-13). Dick's email is now dickathometwo@yahoo.com Bob V.

B. Restoration

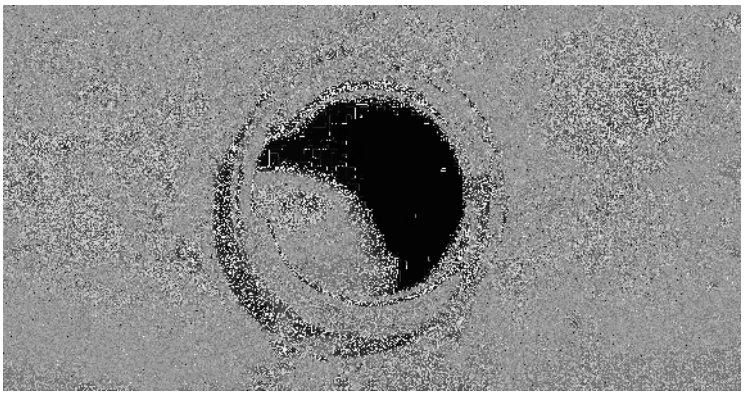
B 11 The Diamond in the Rough; Restoring a King Midget; Part Eight *By Dick Russ*

Well my friends, I think I have covered just about everything that I have done to restore our King Midget. As the series ends I would like to cover a few items that I feel enhance the usefulness of our cars; make them just a little bit better and more user friendly.

I was concerned about my fuel tank since the car had been sitting so very long. I expected rust in the bottom of the tank. All fuel has a certain amount of water as well as being hydrophobic, which causes rust in the bottom of the tank.

After pulling and emptying the tank, sure enough; lots of rust. Hard to tell if the shell was solid but for sure something had to be done to fix it.

Hirsch Automotive Products in Newark, NJ (www.Hirsch auto.com) has a motorcycle fuel tank repair kit #CRK-01. It is designed to clean out the tank and provide a new fuel proof liner that can repair small perforations caused by rust. It sells for $29.95 and is easy to use.



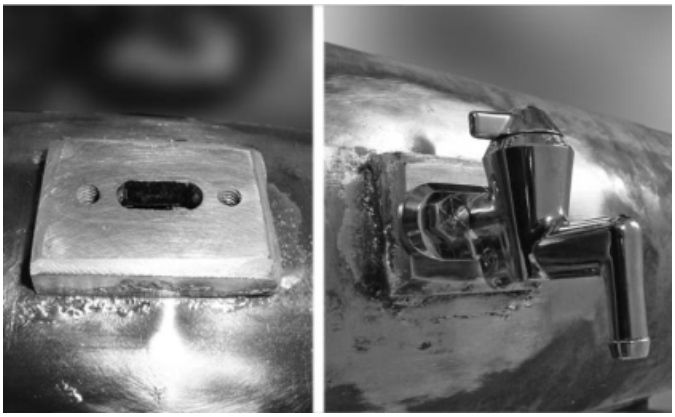
You will end up with a leak-proof fuel tank nearly as good as new. Best of all, it is designed to do a three gallon tank, which is what we have.

On the fuel tank subject, I really don't like the idea of not knowing how much fuel is in the tank. I know there are gauging systems available, but I don't know how reliable they are, not to mention the cost. I found a fool proof alternative that goes back to the days of the Volkswagen. Early Beetles did not have gauges either. What they had was a stand pipe and shut off valve so that when you ran out of gas, you just switched the valve to the reserve and away you went, to the nearest service station. So why not the same system for our Midgets?

I have a Suzuki motorcycle that has no fuel gauge either. It has a selector valve with main and reserve. When the fuel level drops to one gallon of fuel, the engine slows down and quits unless you turn the fuel selector to the one gallon reserve. This simple

modification makes our tank a foolproof fuel system.

The modification is easy, but does require some extra work. If you don't have a desire to do it yourself, a local machine shop can make the mounting block that you will need to install the Suzuki shutoff valve. I made the block out of a .50 X 1.60 X 2.25 inch brass bar.



I have a detailed drawing of the block for anyone wishing to make or have one made. Just send me a self addressed stamped envelope to ~~8617 NW 73rd Street, Oklahoma City, OK 73132.~~ (Obsolete address)

There has to be a downside and that is the Suzuki shutoff valve P/N 44300-38A72 which costs $100, unless you can find a used one. The best part is when the fuel level gets too low and the engine quits, you just get out and turn the valve to reserve. You're on your way again with one gallon of fuel. I'll gladly pay a $100 to not be stranded somewhere out of gas.

The next modification came about from necessity. Just after finishing the restoration and assuring my wife of our little car's reliability, it left us stranded a couple of miles from home.

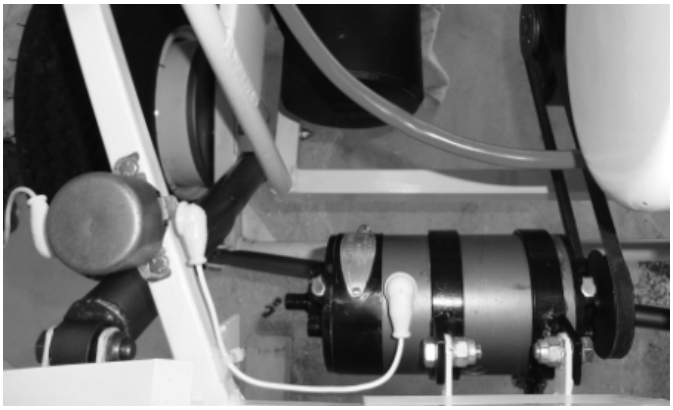
We had no spark despite everything overhauled or new! This was mind boggling, but certainly fixable.

B. Restoration

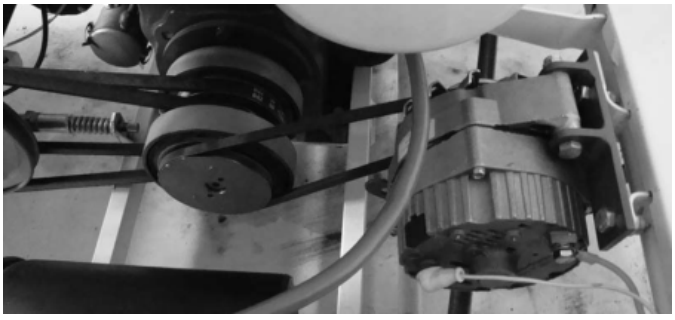
After getting the car home and trouble shooting, I found the ignition coil had failed. No problem; just stop by NAPA and buy a new coil. So with the new coil installed, my next trip again ended within a block of my house.

Well, I thought to myself, new parts fail. So I exchanged the faulty coil for a new NAPA coil (under warranty) and I was ready to go again. This time I didn't get out of the driveway until the new coil failed. There had to be a reason for the failing coils.

Now I will be the first to admit I don't know everything I should about many components, but I do understand electrical systems and the only thing that could be causing the failures was too much current to the coil, which was easily determined by checking the voltage output of the generator. The 6-volt three brush generator system was putting out 10 to 12 volts and since my car did not have a regulator it was enough to burn up the coils.



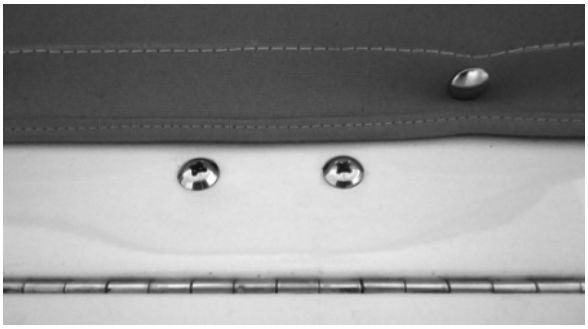
I probably should have fixed the generator to keep the car more original, but I also wanted reliability. Searching the web I found a company in Kansas that had a 6 volt alternator with built in regulator for $50. I ordered one, made a bracket for mounting it in the same place as the generator and voila; I now have a totally reliable electric system.



Having said that, let me tell you about the other ignition coil problem. As many of you are aware, those Wisconsin motors had the coil mounted on top of the engine

Now this didn't really become a problem per se, except that on several occasions, when I opened the engine compartment, I found the coil just laying on top of the engine with the mounting bracket broken in half. This didn't surprise me that much considering how the little Wisconsin shakes. But after replacing the bracket three times I felt it was time for a change.

The change, although not original, was to mount the coil above the engine on the sheet metal that has the deck lid hinge. It did require drilling a couple of extra holes in the body. I picked up some stainless screws at Ace Hardware and polished the screw heads. It was so simple to do and since then, the little car has been totally reliable.



Another modification I feel important is latching the engine compartment deck lid. I don't like the way Midget motors did theirs on any of the series three cars. I also didn't like the idea that we had no way of locking the deck lid. So with a little ingenuity I came up with an idea that works well, not only holding the deck lid secure, but enabling the lid to be secured with a lock and key.

It will require a little welding. First of all I welded a ¼-28 nut on each side of the sheet metal just below where the deck lid closes. Then I bought a couple of door stops (that fit on door hinges) and removed the threaded stop with rubber bumper and installed a ¼-28 lock nut and installed them in the nuts previously welded.

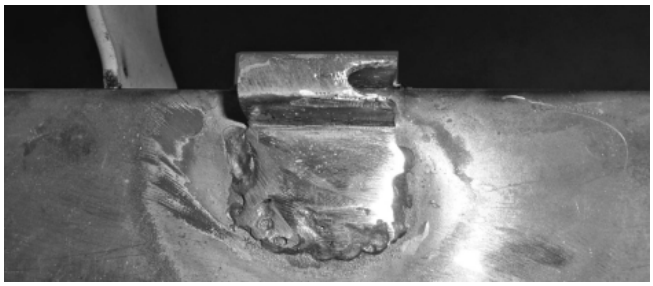
Then it was just a matter of adjusting the stops to where the deck lid rested on each rubber stop. Then I tightened the lock nut and it was finished.

B. Restoration

The cabinet lock I bought at Lowes for around $5.00. I just drilled a hole in the deck lid to install the lock.

I did need to notch the lock arm to fit the receptacle.

The receptacle for the locking arm was bent from scrap steel and I played with it until I had a good fit; then welded it onto the cross piece.



I did add another small strip welded from the frame to the sheet metal to add strength in holding the lid latched. Now when the deck lid is closed, it fits tight and is securely locked.

In the next issue I will add some other recommended mods. □

B-12 The Diamond in the Rough; Restoring a King Midget; Part Nine *By Dick Russ*

Well my friends, in my last article I mentioned I would provide more tips on improving the KM.

There has been much said about the steering and all the inputs from others have great merit; but be that as it may, I would like to talk about the steering system from my viewpoint. So let me back up to my restoration.

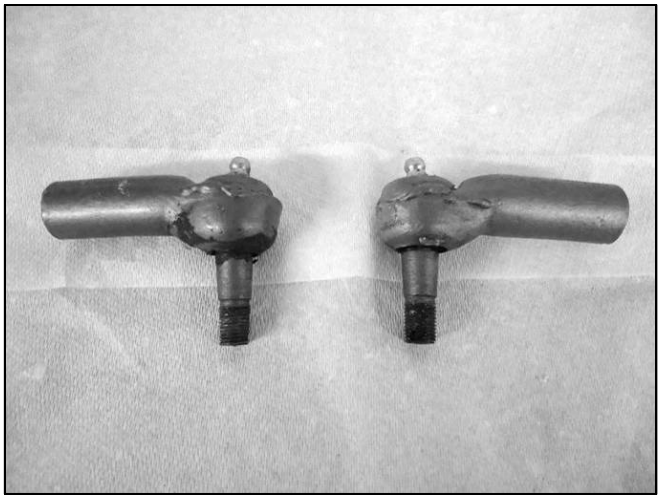
After I brought the car home in preparation for the restoration, one of the items that required considerable attention was the steering column supporting the steering shaft below the steering wheel. In fact it could be said that for all practical purposes it wasn't supporting much at all. The steering wheel had so much play you could move up and down as well as side ways as if there were no bearings in the column.

After removing the steering wheel and the column, upon inspection it appeared that Midget Motors used a rope-like material coiled in each end of the column to support the steering shaft. This was a simple design and apparently worked for years; that is until they finally gave up the farm, so to speak.

Many may remember that in my early write-up [Spring 2011] I covered replacing the rope with nylon inserts. The reason I bring this up now is to get to the root of the steering system to correct any or all play that can contribute to poor steering. So, if you have play in the steering column, you need to fix it as well.

Now I must confess that I have not been a happy camper with the way my car handled on the road after the restoration. It just didn't track well. Well, this is where the story should have begun.

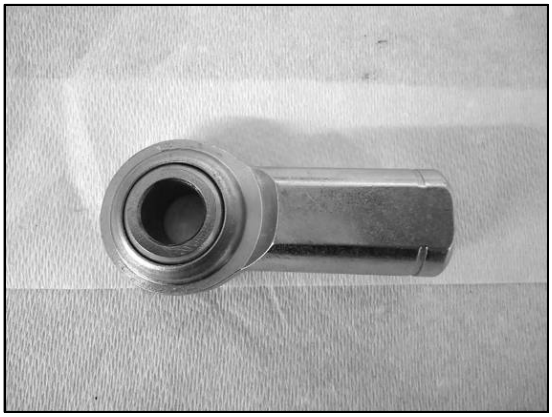
During the restoration, which included replacing every nut and bolt, bearing and bushing in the car, it seems with all my inspections of the components on the car, I felt the tie rod ends were OK and didn't need replacing. So I cleaned them up, painted them, installed new grease fittings and rubber dust boots and they were beautiful (so to speak). They were also worn out, as I later found out after driving the car. So let's get right down to preparing the steering system to where it drives like a new car should.



I have no idea where Midget Motors acquired the small tie rod fittings they used (above) but I suspect they may have been readily available from Crosley or some other small vehicle manufacturer. Without this information it is very hard to find exact replacements, or should I say duplicate tie rod ends.

Fortunately there is a Steel Ball Joint Rod End that works perfect if you are willing to perform a small and easy modification to the steering arms, which I will cover in a minute. I can assure you that if you haven't replaced the tie rod end fittings, there is nothing that will fix the steering. And besides that you can replace them all for under $30. So just do it!

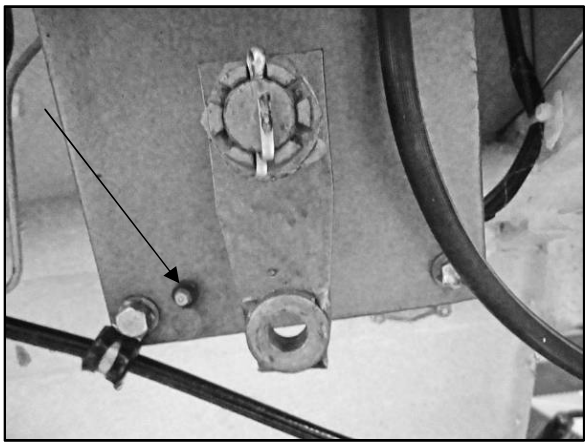
But first let's talk about the new hardware.



McMaster-Carr (www.mcmaster.com) has the ball end fittings you need to overhaul the steering system. You need two RH threaded (P/N 4444T231) and two LH threaded (P/N 4444T232)). The cost is $6.98 each, plus shipping.

I mentioned you will need to do a small modification. This modification consists of drilling the attaching holes in the steering arms to ½ (.500) inch. The reason for drilling them is the new Ball End Fittings Ball Joint comes machined for a ½ inch bolt. To use the new fittings requires drilling all the attach points to ½ inch diameter. I drilled the arms (and gear box arm) first with a 32/64 drill and then reamed each hole with a precision reamer to .500 diameter. This may have been overkill because a ½ inch drill may have

done just as well; but it won't give you the precision fit, but then again, that's my way of doing it.

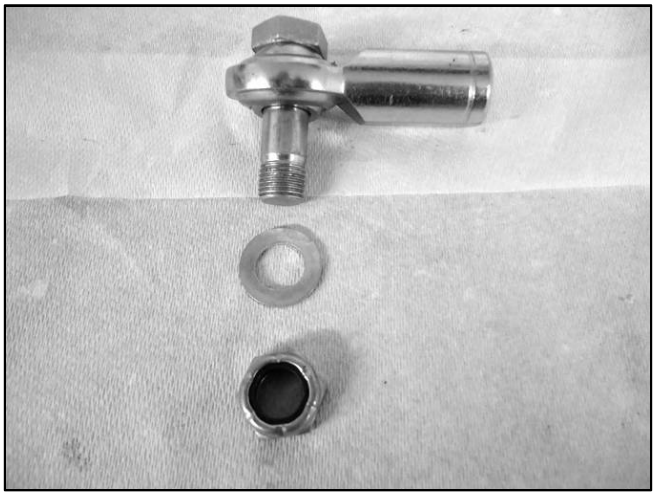


As I mentioned, the steering arm on the steering box will also need to be drilled to ½ (.500) as well. So while you are at it, check the steering box arm for play. If it moves in and out of the steering box, remove the cotter key and snug the big nut up as required to remove the end play. Don't forget to install a new cotter key. Be sure to grease the internal gears with chassis lube. There is a grease fitting on the gear box. (See arrow)

Now with the steering arms on each wheel and the steering arm on the gear box drilled, you are ready to put it all together.

I would highly recommend that you buy aircraft quality NAS close tolerance bolts rather than common hardware from a hardware store. The reason for this is we are working to rebuild the steering by removing all the possible play. The hardware I recommend is (4) NAS1108-18 bolts, (4) AN960-816 washers and (4) MS21083N8 (Nylock) nuts.

If you don't have a source for aircraft hardware you may want to order them from Hardware Inc. in Oklahoma City at 405-787-1088 (ask for Nancy). Please understand that this is only my recommendation. You certainly may use common ½ in NF (National Fine Thread) bolts from a hardware store; it just won't be as precision as with the closer tolerance bolts.



B. Restoration

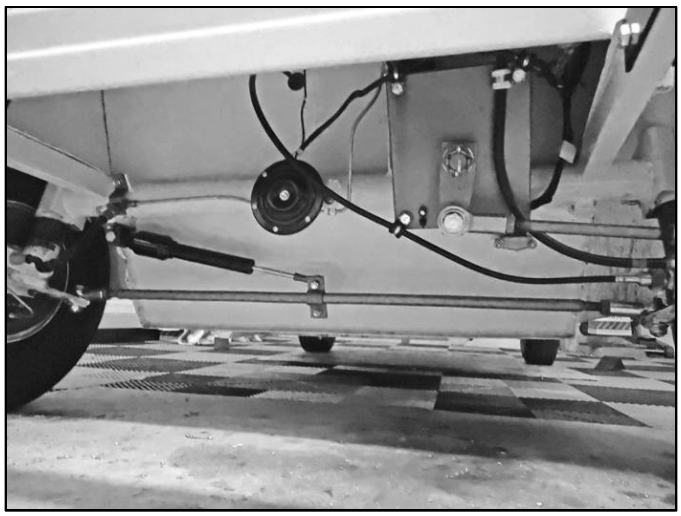
Now that you have all your hardware, you're ready to go to work. Before you actually start the alignment, be sure to service the tires with the proper inflation pressure. The factory recommends 8-10 psi for the front and 20-22 psi for the rear. Whatever pressure you use, just make sure the pressures for the front tires are both the same. Also, before you install the new ball fittings, you might want to give each ball a good coat of wheel bearing grease with your grease gun. If you are using the NAS bolts you will probably have to tap them into the steering arms due to the close fit.

Before you install the (short) tie rod between the steering box arm and the left wheel steering arm, make certain that the steering gear box arm is positioned in the six o'clock position. Install the new Ball End Fitting and tie rod in the left wheel arm. Make certain that you thread it into the new Ball End a minimum of 1/2 inch. Do not install the other Ball End Fitting in the gear box arm at this time.

Next, I would suggest you jack up one side of the car to where the tire is free to rotate. Using a scribe (or prick punch), spin the tire and scribe a line in the center of the tire tread around the entire circumference of the tire. Do this for the other tire as well.

If you have a long (length of the car) straight edge or a straight 2 x 4, have someone place it on the rear tire and the left front tire to align the left wheel while you center the steering wheel and adjust the position of the short tie rod and the ball fitting to where the bolt perfectly slides into the hole on the steering gear box arm. Ideally the left wheel will be set to 1/16 inch toe in. If using the close tolerance bolt you will probably need to tap it in place with a mallet at least far enough to get the washer and nut started. Torque nut to 30 ft. lbs. Set the straight edge (board) aside. You should not have to adjust the short link anymore so go ahead and tighten the jam nuts.

Now you are ready to install the (long) drag link between the left wheel and the right wheel. This will be easy. Just install the new Ball Ends (greased) onto the drag link a minimum of 1/2 inch thread depth. Install the bolts in the ball ends and insert into the left and right wheel steering control arms. Note: position the left wheel as straight as possible before installing the right hand ball end.



Next you will need the car firmly sitting on all four wheels. Ascertain that the front shock tubes are firm with little play. Do this by bouncing the front end up and down using the front bumper. If set properly, there will be little spring back. If there is, tighten the nut on each strut using a 9/16 wrench until there is only a small amount of spring back.

Torque all the ½ inch Nylock nuts to 30 ft. lbs. With the help of a friend, measure the distance from the scribed line on each tire (on the back of the tire and the front of the tire) with tape measure lined up with the scribed center line of each wheel. What we are looking for is the distance on the back of the tire to be between 1/8 to 1/4 inch greater than the front measurement. Normally 1/8 inch (but nothing less) is the desired toe in. This distance can be made by rotating the (long) drag link one direction or the other until this measurement is obtained. The ideal situation is where the left side is 1/16 inch toe in and the right side is 1/16 inch toe in. Once this measurement is obtained, tighten both jam nuts on the drag link firmly against the new Ball End Fittings.

While you are working on the front end, it would be a good time to service the front struts with 90 wt. gear lube (oil).

One last thing, be sure to balance your tires. Normally the tires are pretty bad about balance and they can really affect the way the car handles.

With the above accomplished, you should now have a tight and smooth steering system.

If you have any questions, you are certainly invited to send me an email at dickathome@cox.net □

Note: Email is now: dickathometwo@yahoo.com

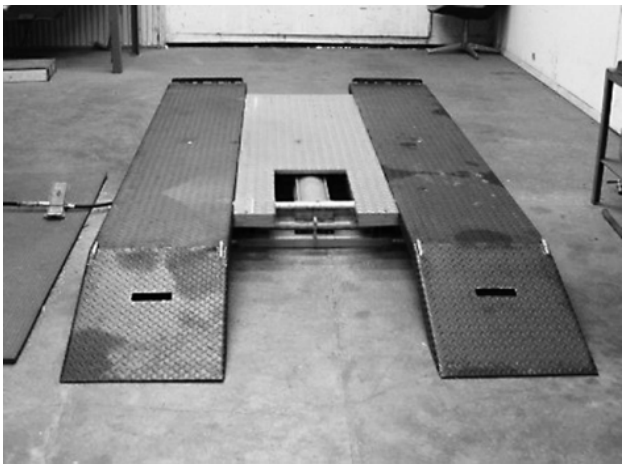
After reading this series, those contemplating King Midget restoration may be a bit discouraged. Take heart! Dick started with junk and wound up with what is arguably the best King Midget in the world. As you will see throughout this book, many of us have lesser aspirations, encounter different challenges and for the most part, persevere! It is

B. Restoration

generally agreed that the King Midget is one of the easiest cars to restore, and among the most rewarding when it is finished. Bob V.

Note: At the beginning of his restoration series, Dick Russ showed a nice design for a rotisserie, work stand or whatever you choose to call it. Such hardware has been found to be a worthy investment for those undertaking a proper restoration. A number of variations have been created, including the following:

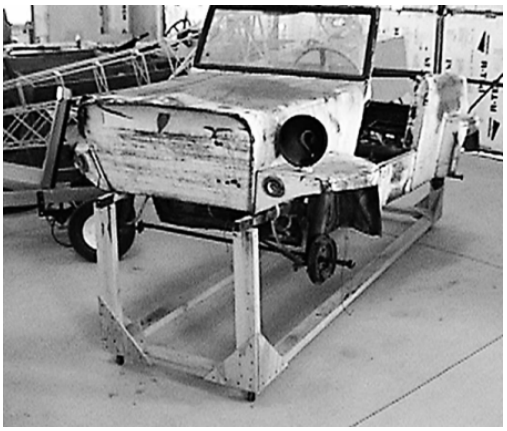
B-13 Work Stand

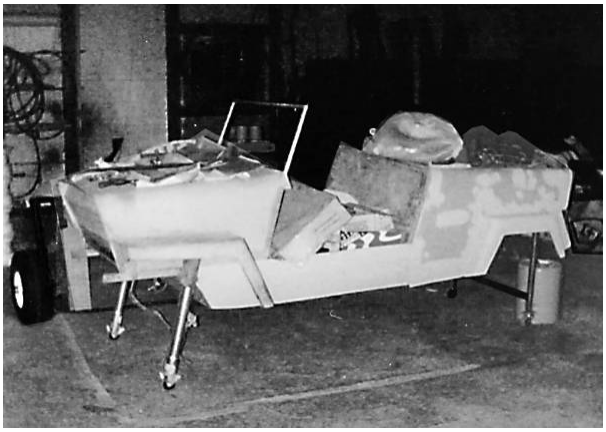


Denny Jasper built this one and says:
*"*If you're too old to get down and too decrepit to get back up, you might want to invest in one of these. It's a 1,200 lb. capacity air operated motorcycle lift with fabricated ramps and platforms added to each side. Really works very well. The red platform motorcycle lift was bought from Harbor Freight for $500. Materials to widen it and make it fit the KM are another $500 or so. But a must for an old man.*"* □

B-14 Simple Work Stands

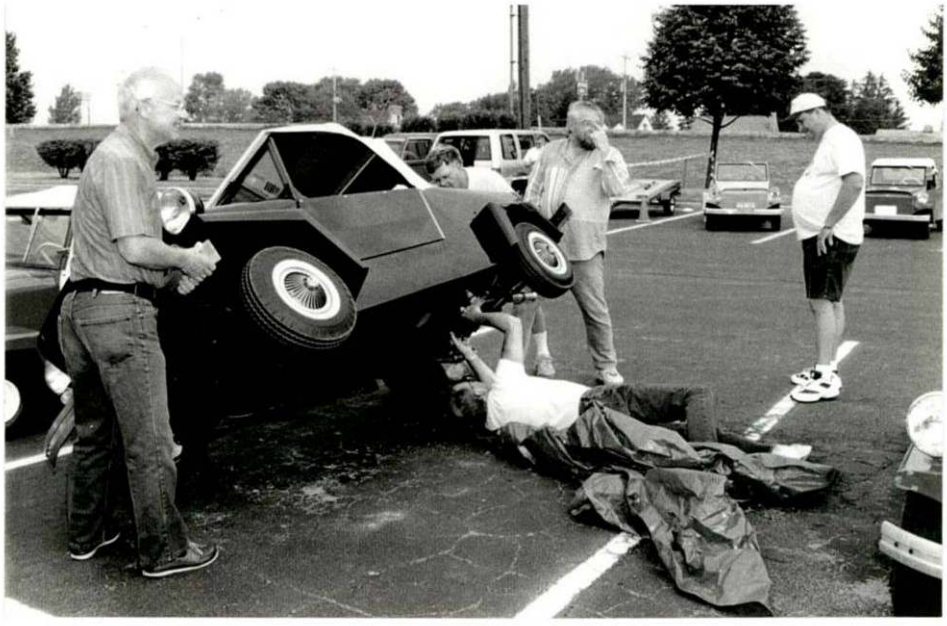
Dick Russ is a meticulous craftsman who has done a great job of documenting his restoration. But he'd be the first to tell you there are many approaches to the task. Below are a couple of alternatives to the rotisserie Dick described in the Fall 2009 issue. Please send in your comments, suggestions and even criticisms of this restoration series. We may be geezers, but we're not too old to learn from each other!





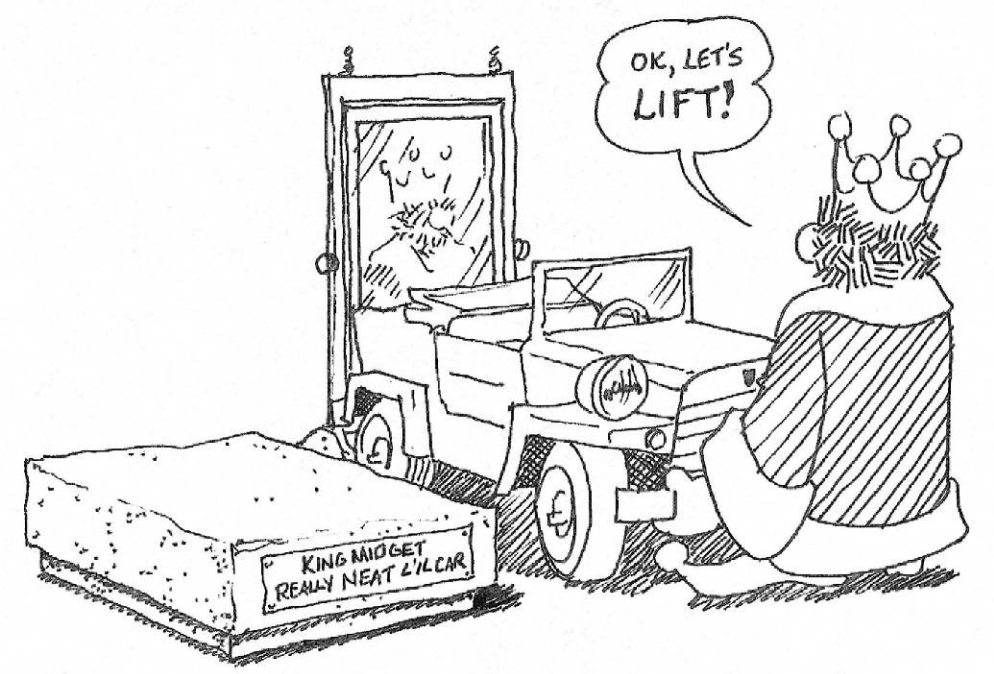
Shown above left is a simple wooden work stand Lou Kelley built about five years ago. Below right, Wayne Goss utilized the front strut tubes and a simple rear frame. □

B-15 Temporary Work Stand—KMs Only



Gary Warren needed to repair his King Midget. Who needs a jack when you have friends like Bob Vahsholtz, Ron Breault, Bill Baker, and Mat Kreinbrink.

Sometimes you just need to get out and get under when your shop is back home. Here's one way to do it.



Single handed? Try this! ☐

B. Restoration

B-16 Penetrating Oil *by Randy Chesnutt*

Machinist's Workshop Mag recently published some information on various penetrating oils that I found very interesting. Others might appreciate this. The magazine reports they tested penetrates for break-out torque on rusted nuts.

They are below, as forwarded by an ex-student and professional machinist. They arranged a subjective test of all the popular penetrates with the control being the torque required to remove the nut from a "scientifically rusted" environment.

Penetrating Oil	Average Load
None	516 pounds
WD-40	238 pounds
PB Blaster	214 pounds
Liquid Wrench	127 pounds
Kano Kroil	106 pounds
ATF-Acetone mix	53 pounds

The ATF-Acetone mix was a "home brew" mix of 50/50 automatic transmission fluid and acetone. Note the "home brew" was better than any commercial product in this one particular test.

Our local machinist group mixed up a batch and we all now use it with equally good results. Note also that "Liquid Wrench" is almost as good as "Kroil" for about 20% of the price.

Steve from Godwin-Singer says that ATF-Acetone mix is the best and you can also use ATF- lacquer thinner 50 - 50 mix. □

B-17 Reverse Electrolysis *by Dan Chapman, aka Fat Dan*

While working on my old David Bradley walk-behind tractor, I did some research and found an interesting way to remove rust, release seized bolts, and remove old paint and grease. It's even environmentally safe. It's called Reverse Electrolysis, though I've seen it called by other names. I call it Reverse Electrolysis because that's what it does. It "reverses" the rusting process. It works because of chemical reactions to iron when DC electric current is passed through a solution—a process called "reduction."

Reverse Electrolysis is really simple. You've seen a bolt left in the rain and the results? Rust. The rain is the solution and the rusting parts are the result. Those parts are what you want to clean. Like magic, when you reverse the polarity, you get a wonderful reaction—a rust remover. Hence, Reverse Electrolysis. For this reduction process to work you must give up something—sacrificial iron rods, to get something—clean parts. Let's be clear; the rust gets eaten away by Reverse Electrolysis but the process will *not replace* the iron that has been removed by rusting. It just cleans the iron that is left, right down to the molecular level.

Here's what you'll need:

- A plastic bucket a bit bigger than needed to hold the part you're to clean
- Several sacrificial iron rods (rebar works great and is cheap)
- An iron or steel rod to suspend the part from
- A battery charger (10—20 Amps will work on large surface area parts like sheet metal; 6 Amps will work for a bolt or two)
- Some wire (not copper)
- Wire nuts (the yellow or red ones)
- *Washing* soda (Arm & Hammer makes it—NOT *BAKING* SODA)
- Water (enough to cover the part.)

Safety Precaution: Some people use stainless steel instead of the iron rods and/or the plastic bucket, but the chemical reaction caused by Reverse Electrolysis and stainless steel puts off a hazardous byproduct which is not good for you or the environment. Another safety issue: this method needs to be done in a WELL VENTILATED area or outside. As Reverse Electrolysis starts, the solution begins to bubble with oxygen bubbles coming from the part being cleaned and hydrogen bubbles from the sacrificial iron rods. This combination is extremely explosive in a confined area.

To get started, secure the sacrificial iron rods to the bucket in strategic locations and wire them together (see figure 1). As many as eight and as few as four iron rods can be used in a plastic bucket. Wire the iron rods to the side of the plastic bucket, making sure the iron rods go to the bottom of the bucket. Then wrap a piece of wire around the iron rod and secure it by twisting the wire with pliers. Then wire all the iron rods together using the wire nuts. Do this as shown so the part is suspended in the solution, "line of sight" in comparison to the iron rods. The part you clean is to be surrounded by an electrical current. You can use copper wire but you *cannot* let any copper touch the solution, as this will cause an unwanted reaction, impregnating your iron part with copper

and causing it to rust rapidly.

Figure 1 Tank

Next fill the bucket with water to a level that covers the part to be cleaned, but not so full that water touches the rod suspending the part. To make the solution (or base) you just add about one cup of Washing Soda to about five gallons of water. Washing Soda is used for washing clothes and is not harmful to you or the environment.

When you suspend the part in the solution, be sure that the iron rods don't touch the part to be cleaned. That could cause a spark and you don't need that. For simplicity I made some steel wire hooks to suspend the iron part in the solution (see Figure 2), however, it would be better to bolt the part to the wire and wire to the rod to ensure a continuing good connection.

Figure 2 Before

Be sure you hook up the positive and negative leads correctly (see Figure 4). Otherwise the iron rods will be cleaned and your part will be eaten away, and very quickly. The NEGATIVE lead hooks the steel rod that suspends the part being cleaned and the POSITIVE lead hooks the sacrificial iron rods. Plug in the battery charger and watch the bubbles. After two hours (depending on the size of the part and the size of the battery charger) unplug the current and you can look at the part (see Figure 3).

Figure 3 After

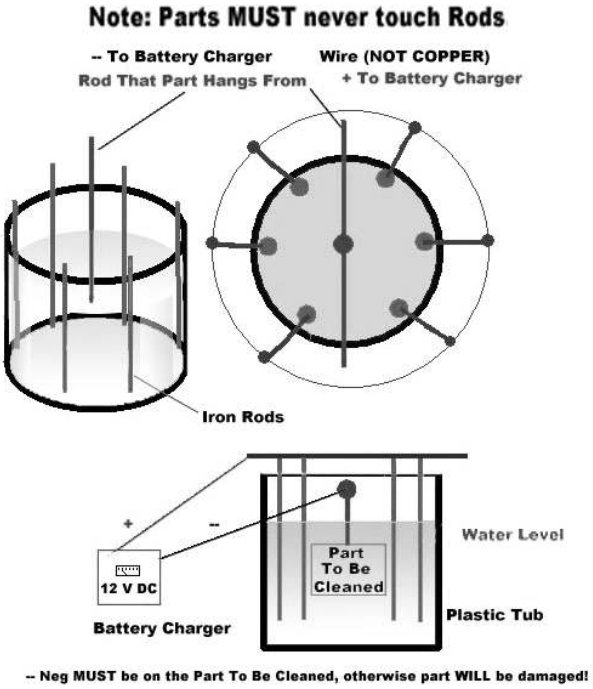


Figure 4 Diagram

The transmission turnbuckle (see figure 5) was so rusted it would have broken if I had forced it. But after a few hours of Reverse Electrolysis, it came loose with little force. Sheet metal works great in Reverse Electrolysis but big pieces will take a little more power; a bigger charger.

After you're done, spray the part with clean water. You may want to hit it with a wire brush a time or two. Prime it as soon as it's totally dry; otherwise it will start to rust again because it is bare metal. The solution can be used over and over again. Just add water to replace what is lost.

For large pieces it is possible to line a tub or trough with plastic sheeting. A small DC welder turned all the way down can supply power for larger projects.

Figure 5 After

B. Restoration

B-18 Molasses Stripping! *By Hal Douse*

Sounds like an ad for burlesque dancing girls, “Come see Ginger Cookie do the Molasses Strip.” We're talking use of an old time sweetener to remove rust. And, speaking of ginger cookies, my grand-dad made the best, I can taste them now.

The idea, from www.stovebolt.com, is simple. One enterprising group built a 4 by 4 by 8 foot tank out of plywood lined with heavy plastic so they could remove rust from big parts. For KMM we scaled the project down to a quart plastic dish like the ones your favorite dip might come in. The formula is one part molasses to five parts water, give or take. Clean the pieces before stripping. The mixture does not remove paint or grease.

Our test “mole” was an ancient hose clamp that did have bits of black paint on it. Into the mixture the part went for the recommended two weeks. It is also recommended that you don't do daily checks. Pulling the part out of the mixture and putting it back in slows the process.

The molasses stripper removed any rust that was not covered by grease or paint. We would normally show before and after photos of this grand experiment. For some reason my digital camera sees rust and grayish bare metal as being about the same color. Take my word for it or try it yourself, the old hose clamp was rust free ready for primer and paint!

How does this work, you of scientific mind may ask. We have formed a couple of theories. Molasses is a natural product like honey, and natural products contain living organisms which are good for many things. One of my grandmothers drank a small glass of warm water with molasses every now and then to keep her “regular.” As a small boy, I had no idea what regular meant. Now that I do ... but I digress. The tiny micro-organisms in the molasses may eat rust and many other things, one might assume. The rust gives the little devils the runs or kills them, which may explain the scummy looking brown stuff floating on top of the molasses after a couple weeks. The other theory is, it’s just nature’s magic!

There’s a product called Rustbeeter™ www.rustbeeter.com. Write them at:

618 Monroe Street
Fort Atkinson, WI 53538.
920-563-4048. (Evenings after 5:00)

We have not used this product so can only point you in its direction. Rustbeeter uses a byproduct from the processing of sugar beets to strip rust. It comes as dry powder that is mixed with water to form a slurry. According to the info on their website, the stripping process of Rustbeeter is quicker than the molasses strip approach. □