MG Car Club
Washington, D.C. Centre

Get It Apart - Part 1

By Jim Lunson, tech committee

One of the real joys of restoring an old automobile is when you replace an old worn part with a brand new one and find the machine immediately perks up and works as well as it did when brand new, or often even better. Whether it is a new shock absorber, brake caliper, water pump, or merely a new valve cover gasket, there is a real satisfaction feeling when the new part fits right on perfectly and functions to bring that portion of the old car back to life. This satisfaction is probably why I enjoy restoring my MG and then driving it to appreciate my handiwork.

One of the biggest problems with changing out any part on an old car is not installing the new piece, but first getting the old one off. Being an old car, it is almost guaranteed that over time rust to some degree has formed on the part, bolt, sleeve, or whatever holds the particular part to the car. Rust is a reaction between steel and moisture (primarily moisture in the air) that eventually causes the steel to disintegrate into a powdery mass of iron oxide. One of the things that occurs during the early stages of this process is that the rust reaction with the steel causes the steel to swell. This is especially bad on screws, bolts, sleeves or any tight fitting piece on the car as the swelling causes the pieces to be bound tighter than ever to each other, making disassembly a real nightmare. There are a few tricks I have learned over the years that may help the situation.

Liquid penetrant: I have found the first step in removing a rusted screw or bolt that won't budge is to try the use of penetrants. These work to chemically dissolve the rust, relieving the pressure caused by the swelling. The trick here is to get the liquid into the joint where the rust is causing the bind. There are several brands of these penetrants on the market at the local hardware store. Below are the results of a survey Machinist's Workshop Magazine once did on the various products and the torque force needed to free up identical rusted bolts after treatment. The results are the end product of how well they dissolve the rust and how well they get into the joint to do the job. Interesting comparison:

ITEM	Force in ft/lbs
No Penetrant	516 pounds
WD-40	238 pounds
PB Blaster	214 pounds
Liquid Wrench	127 pounds
Kano Kroil	106 pounds
ATF-Acetone mix*	53 pounds

*ATF-Acetone mix was a "home brew" mix of 50 - 50 automatic transmission fluid and acetone (pretty volatile stuff but apparently really works).

Although I have not tried the ATF-Acetone mix, my experiences have found the results from this test, using all the other products at one time or another to be about right. I generally use Liquid Wrench, and have a bottle of both the liquid and aerosol spray handy all the time. The liquid works better, but the aerosol is good when access to the part is upward and the liquid wont flow there. The others cost more and I don't think work nearly as well. The importance is to get as much of the penetrant onto the offending part as possible and then let it soak in the joint for several hours if possible. This allows it to work on the rust. Also a few short raps with a hammer sometimes will cause minute openings in the rust to open where the stuff can seep deeper into the joint, freeing up more of the jam.

Once this is done, the idea is to put as much torque on the bolt or screw as possible, of course without shearing off the head. Often on moderately rusted bolts this treatment alone will do the trick where the bolt totally refused to budge before treatment. Just takes some patience or forethought to put the stuff on some time before you are ready to go to work.

If you apply too much torque, head will probably shear off. At least at this point, the part is released and you are then left with a stub of bolt to work with. But this is better than nothing as vise grips can often work to turn the shaft, plus you can now get penetrant much deeper into the joint. One trick at this point is to also try slightly tightening the bolt too. Since the head is gone, the pressure has been relieved and sometimes movement in this direction is easier than loosening the bolt, and once the rust bond is broken, unscrewing becomes much easier.

Heat: A second idea to get a bolt loose is the use of heat, usually through the use of a propane soldering torch. Often if the penetrant does not do the trick, applying heat to the part may help. The heat expands both the bolt and the hole into which it has rusted onto. Sometimes this expansion will break the bond between the two surfaces allowing the bolt to begin to turn. So fire up the torch, hold the flame on the bolt until it becomes red hot, let it cool, and repeat again. You can't see it, but expansion and contraction of the parts is happening. One note of caution with this technique is that there are a lot of flammable materials all over a car, so care must be taken not to get too close to either, oil, gasoline, grease, brake fluid, any plastic, including wire insulation or even the penetrant we tried first. Please don't use the torch to get the bolts loose that secure the gas tank or you may get the tank off much sooner than you want to. Often it is difficult to reach to even get to a bolt, not to mention trying to get a torch to it and not get the flame all over other materials. But with the proper treatment, this kind of heat will free a bolt that otherwise was stuck tight. Plus sometimes, a little heat will break some of the bond and then the use of penetrant again will get deeper into the joint and be successful at this point.

This is my first line of treatment when it comes to getting a stubborn bolt or screw loose. I have several more techniques I have learned while working on my cars which I will cover in later issues. These include excessive torque (pry bars), screw extractors, impact wrenches, and drilling out and rethreading. These methods all have a place, have tricks to make them work better, and cautions to avoid. In restoring or just working on an old car it will be inevitable that this stuck bolt problem will arise somewhere, and starting with these ideas may save some time, aggravation, and frustration, allowing you to move on to the much more rewarding process of installing new parts.

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Get It Apart - Part 2

By Jim Lunson, tech committee

Last month I went over some methods I have used to get stubborn bolts and screws on MG to come loose, all as part of changing out a worn part on the car and replacing it with a brand new one. There are a few more methods that can be tried in this pursuit, each with its benefits and drawbacks.

Excessive torque: One method of breaking loose a bolt that is frozen in place is the use of pry bars, or excessive torque as I like to call it. This is done by taking a normal wrench or socket set and by means of a pipe slipped over the handle end, greatly extending the length of the lever you have to pull against. This greatly increases the amount of torque you can put on a bolt. I have pipes of several diameters and lengths that I can slip put over most wrenches and handles... I call these my "persuaders" in getting a stubborn bolt to release. Remember the test results from the previous article on the force needed to free a rusted bolt. The first test required 516 lbs. of torque to work. This force is the equivalent of a 150 lb. person standing on the end of a wrench handle 3ft-5in long; a pretty strong piece of turning force in my opinion and not something you can get with a normal wrench. The extension gets this extra power. You have to keep in mind the limit of the socket or open-end wrench you are using as it can be easy to stress these items to where they snap off. You also need ample room to use this method. This method works very well on wheel lug nuts that were over-tightened by a mechanic changing tires or on parts that can be removed from the car and then disassembled on a bench. But this method has saved me in many instances where the increased torque is amazing in its ability to get bolts loose.

In looking at wrenches and wrench sockets keep in mind there are two types: six-point and twelve-point. The point number refers to the number of positions you can place a wrench over a bolt to get turning force. The advantage of the twelve-point is that you have twice as many places on the rotation circle to insert the wrench on the bolt. This is extremely important when working in tight spaces. The disadvantage is that the points are much shallower than the six-point style and when using excessive torque are more prone to either slip or round off the bolt head facets much faster than the six-point type. My socket wrenches, like most sets, are all twelve-point, but over time I have supplemented almost all the sizes with six-point sockets and try to

use these whenever possible to take advantage of the greatly increased grabbing potential these offer. It makes a difference.

Impact wrenches: A great method of getting a stubborn bolt loose is the use of a pneumatic impact wrench. These devices apply at most only about 150 ft lbs of torque, but they exert this pressure at the rate of about 100 times a minute. This constant loading and unloading of torque on a stuck bolt is amazing in its ability to loosen even the most stubborn. The problem with this device is that not every home garage has a strong source of air pressure and the wrenches and sockets used with them are special (the sockets are blackened high carbon steel rather than the shiny steel found in most wrench sets and are always six-point). I usually use this method as a last resort. Then I go to my favorite repair shop and beg the mechanic to "hit a specific bolt" for a few seconds. This method was particularly successful in loosening the large bolts on the ends of the rear axles of my MG to change the rear bearings and seals. There, I had used every pipe I owned and was applying probably about 640 lbs of torque (160 lbs @ 4 feet), all to no avail. My mechanic took about 10 seconds with his impact wrench to pop them loose. Retightened them by hand, drove home, and went to work.

Screw extractors: These items look like regular drill bits only with a reverse spiral thread. The object here is to drill a hole in the bolt that will not come loose and insert this extractor. As the extractor penetrates the old bolt, it tightens against the sides of the hole and grabs the bolt. And being reversed threads, as you twist the extractor ever tighter, eventually it turns the bolt in the loosening direction. These bits sound like a good idea, but I have never had much luck with them personally. First, you have to make sure the hole you drill in the existing bolt is exactly centered and aligned with the bolt shaft. Otherwise, when the extractor is turned, it is applying pressure at an angle and not truly unscrewing the offending bolt. It then will not do the job. The other problem is that these bits are made of very strong steel and hence are rather brittle. If you do not turn the extractor exactly correctly, they have a tendency to snap off, leaving you with not only a bolt that is stuck, but now with a very hard steel shank in its center, making it very hard to drill out. Only when I have a good clear access to the offending bolt do I try this method.

Drilling & rethreading: The final solution is to drill out the offending bolt or screw and replace it with a new one. This is difficult as it can often involve retapping the hole to restore the threads. Like the screw extractor step, drilling out a bolt on the

car is very difficult due to space and viewing angles. I have found that to get a really rusted bolt out requires a drill almost the exact diameter of the bolt. I usually start with a small drill and then enlarge the hole, getting closer and closer to the bolt size as I go. Finally, at the correct size, the bolt will collapse inward, freeing itself from the hole or nut. However, often the drill is not centered or not directly into the bolt and ruined threads on the hole result. Sometimes the threads are so ruined that to regain the holding power, the hole needs to be enlarged and the next size up bolt threaded into the new hole. This is tough going, as the new part to be installed may not have a hole big enough for the new bolt, requiring drilling the part also. Again, this is the last resort and requires great care to get successful results.

These are a few ideas I have used over the years to free up bolts on the old car. Again, it is most frustrating to get a new part for our MGs and then spend the majority of time not on its installation but in removing the old part, usually due to a bolt or screw having been in place for so many years, and frozen so tightly that it seems it will never come apart. Hopefully, these ideas will speed up the process somewhat, making the task easier and certainly more enjoyable.