MAMOD FOLIO #1 – Repair of Damaged Boiler Bungs (Boiler Inserts)

Based on comments from the internet and as seen on YouTube videos from the Mamod factory, the threaded boiler bungs on the Mamod SL locos are “sweat soldered” with paste, which uses a very small amount of solder on an already fragile brass boiler...say what you will about Mamod, but they had cost savings and ease of assembly down to an art. Years of age, hard water and galvanic reactions do not help in this case either. This, with a combination of excessive force when removing fittings including the dome-nut can either cause cracks in the solder at the boiler/bung joint which become steam leaks, or the bung becomes completely dislodged within the boiler and “spins freely”.

This bulletin will discuss a method of repair which should only be undertaken if you have soldering skills (for plumbing) and mechanical abilities. This should also be done with the understanding of you are working on a small brass pressure vessel and improper repairs can render the boiler unsafe. Proper pressure testing with water vs. steam after the repairs is suggested. If in doubt, replace the boiler.

OK, you have a Mamod with either a crack/leak, or the bung becoming completely unsoldered from the boiler. In either event, you will now be unable to get the dome-nut, safety valve, whistle, etc. removed from the boiler, as either it is already spinning, or with enough effort, it will be shortly...and the question of “how do we remove the part and/or save the boiler?” This is one of those rare events where having the fitting stuck in the bung works to our advantage for the repair...read on!

While in theory these repairs can be done (and I have done) them with the boiler *in situ*, it would be easier to work and to prevent any other damage (you will be using a pluming torch) to the loco to have the boiler removed. With practice, one can completely field strip a Mamod in under 15 minutes...I consider this a valuable life-skill for Mamodry within the steam/16mm community.

Things needed if one wishes to proceed include the following:

- Plumber’s flux and plumber’s solder
- Propane or MAP gas torch as used for household plumbing. This is “low temp” work, you do not need silver or hard solder.
- A pair of locking pliers or even large pair of forceps/hemostats (assorted locking hemostats are a much needed tool for Mamod assembly and disassembly, they are great at holding those hard to reach nuts and screws).

• Wire brush, either a small one with a handle or preferably one in a small motor tool such as a Dremel.

• You will need replacement fiber washers and/or O-ring for the fitting(s) you plan to remove also. I recommend every Mamodist keep extras of these on hand anyhow.

• Finally, you need to do this in a lit, well-ventilated area without flammable materials, liquids or gasses nearby. Most plumbing solder at least here in North America is now lead free, but some older solders still contain such. Without definitive information, to err on the side of safety, we will assume the Mamod solder contains lead so please wash your hands after the project and refrain from eating or drinking as well.

• Spray bottle of water.

• Sand/emery paper or small machinist files.

Once you have gathered up the bits and removed the boiler from the loco as stated above (you were warned otherwise), proceed as follows:

Step 1 is the removal of any and all paint around the existing bung. We want to get the brass on the boiler as clean as possible. This is where the small brushes and preferably motor tool come in handy. You should see some traces of solder also, feel free to remove as much as you can, but don't worry about small amounts remaining. Remove about 1⁄4" or more out from the fitting. You will be using a torch so other paint damage IS going to occur. Some recommend using the torch to soften that nearly indestructible paint Mamod used in the 1980s, if you do so, proceed with caution.

Step 2, we are now examining the boiler shell itself, if there are additional tears or damage other than just the broken solder joint, it may be best to contact your friendly Mamod bits or seller for a new Mamod/ MSS boiler, or buy an upgraded silver-soldered one from one of the suppliers of such. I have locos with either; there are plusses and minuses to either approach.

Step 3, if it is just a crack or failure of the solder joint, the next thing we will do is secure the boiler in a position where we can work without moving the boiler with clear vision and access to the fitting. I suggest VERY LIGHTLY gripping the boiler in a bench vise or the like. I have done this with the boiler heat shield in a vice also.

Step 4, add a small amount (a little bit goes a very long way) of flux to the joint and heat it with the torch. Propane or MAP torches will work but we only need to flash-melt the flux to clean the joint. This will be done quickly with little heat. This operation will also tell you if you need to remove more paint or not...you will. Step 5, keeping in mind we now have a warm/hot boiler (OUCH!) we now we need to grab the whistle, safety, dome-nut, Goodall valve or whatever fitting is in the failed bung with the hemostats or gripping pliers, again LIGHTLY, but enough to hold the fitting. You may also need a brick or some other item to rest the tool on to hold the fitting in place and the bung in the boiler. This makes life easier unless you somehow have a third arm. I would not suggest an assistant as we don't want to blast them with the torch accidentally.

Step 6, return the torch keeping the flame at the bung/boiler joint. Remember your inner "cone" of the flame is the one giving you heat. Also remember we want the "work" not the "flame" to flash the solder. Watch closely to see if the existing solder melts. DO NOT USE EXCESSIVE HEAT OR YOU RISK DAMAGE AND/OR MELTING THE OTHER FITTINGS. Once this occurs, remove the flame and then use the heated work to melt the solder the bung-boiler joint, ensuring we do NOT solder the dome-nut, whistle, etc. into the fitting. As with any soldering work, use as LITTLE solder as possible. It should "flash" and fill the joint via capillary action. If it forms blobs or balls, the work is too cold....remove any traces of the solder, re-flux, and re-flash with solder once hot. Ensure the entire fitting is soldered all at once; you do not want cold-joints.

Step 7, is the hardest one...give a few light sprays of the water to quench the work....and walk away. Of course we want to inspect our handiwork, but please... go do something for a while, we want the joint to properly cool back to room temperature before we mess with it too much.

Step 8, the bung "should" be in place now in the boiler. Depending on the condition of the loco and the boiler fittings, they may just twist right out, but if we have a lot of corrosion or calcification in the boiler, they may take a bit of work to properly remove...with care not to re-tear the bungs.

Step 9, once any fittings are removed, file or sand any excessive solder and replace any seals, O-rings, etc. for the fittings removed from the boiler. I would strongly recommend replacing any safety valves which were heated with a torch as a matter of operational integrity and safety.

Step 10, it is recommended one check the boiler to verify the solder joint integrity. I will not tell you to do this with steam...it is too risky. This can be done with very low pressures of air with a sealed boiler in a bucket of water (like a bicycle tube) or even better finding someone who tests model boilers for assistance. These can be found with assistance from the 16mm NGM or other model engineering groups.

Step 11, once the boiler is known to be good and you have repaired any paint damage, to quote that famous series of amateur automotive repair manuals....refit in the reverse order of removal... and reassemble your loco with the pleasure of knowing you have completed a repair using skills versus just simply replacing an item.

Note, not all boilers are salvageable. You may need to cut-up a boiler to retrieve the fittings out of the boiler in some cases. Consider using the ruined boiler for some “lineside scrap” on your garden railway....the kind of stuff one finds around locomotive facilities.

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