

Mould Maintenance

We'll address iron moulds here as they comprise about 99% of my mould stash. The majority of them are old Lyman or Ideal moulds.

No matter how experienced you are as a bullet caster, you will encounter uses for this section on mould maintenance. This may be especially helpful if you dabble in bidding for moulds on E-Bay as sooner or later, you'll get burned.

Having said that, I'll make a statement that I've never gotten a mould off the Bay, a gun show or from somebody's junk box that I haven't been able to restore to make bullet that cast and shot acceptably. Only two sets of blocks sit on the bench right now and someone has been at them with a mill but I haven't given up on them completely.

Most old moulds respond to gentle care like a stray dog to a good meal.

Some of the things I look at when I receive a mould are:

Hardware

Many moulds are received with hardware that is not factory. Much of it is the wrong thread and many screws have the slots "buggered" with improper screwdrivers. A short visit to Lyman's web site will correct this. I maintain a few spares of everything as I'm always trading around on moulds.

Always inspect the lock screw on the side. Many are missing and the older slotted versions are usually bugged beyond use. Many have been replaced with a screw of questionable lineage or source. Replace this with a newer cap socket head design. This makes for easier adjustment with a hex wrench when the mould is hot and you need to tighten the sprue plate.

Inspect the sprue plate pivot screw. This is a screw with a stepped shank and I've encountered 10-32 thread versions and 10-36 thread versions. It can be duplicated in a pinch by re-tapping to 10-32 and using a 10-32 screw from the hardware with a short spacer but you have to have the spacer to insure proper functioning of the sprue plate.

The newer Lyman moulds come with a Bellville washer installed and that's it. The concave side goes down on top the sprue plate and holds the sprue plate flat and at the same time allows it to pivot. Older Ideal and Lyman moulds came with a lock washer instead but this lead to gouging of the sprue plate and didn't hold it flat. This lock washer is needed and is no longer offered by Lyman as parts for the single and double cavity moulds. It is offered on the four-cavity mould hardware list so order from there.



L to R: Sprue plate, Bellville Washer, Lock Washer, Sprue Plate Pivot Screw

The proper hardware stack up for good casting is the Bellville washer concave side down and topped by the lock washer. This insures good spring tension and allows the plate to move freely but under tension.

After installing the hardware, heat the mould with a dozen casts or so and touch the hardware with a lump of beeswax. This will provide long lasting lubrication to the pivot parts. Don't overdo this lubrication, as it will work into the bullet cavity if used to excess and cause wrinkles on the cast bullet.

Remove Burs

The next operation I do with a new mould is to inspect for burs, dinged places and wear spots on the mould.

I usually degrease and place the plates on a flat surface and go at them with a fine stone. Several strokes with a flat stone will show where any trouble spots are.

Usually, bright spots will appear around the hole for the alignment pins. This indicates that your pins may be out of alignment. I'll normally drop a countersunk screw through the hole and chuck the shank in an electric drill and give it a couple of turns at slow speed. This will throw a slight bevel on the mouth of the hole. Then the stoning can continue to remove the burs thrown up by the alignment pins. This burring is normal as it's very hard to close the mould halves in a precise manner each and every time. It should be removed periodically as eventually it will build to the point where it affects the dimensions of the bullet because the mould halves won't close properly.

I normally hit all of the outside edges of the mould in case it has been dropped or dinged and remove any rough or raised places. The sprue plate is laid flat and stoned. It may be slightly warped but we'll talk about fixing that later. I've never had a sprue plate that has required replacement.

The top of the mould can then be stoned. Remove any leading from the mould top and sprue plate with bronze wool and some Ed's Red and then stone with a flat stone.



Beveling Mould Block Edges with Stone

The final stoning is to enhance venting. On the top edge of the block where the cavity hole is, bevel the edge where the blocks fit together with about 3 strokes with a fine stone. This should only be done to the point where you can see a fine, shiny line when you hold the mould half up to the light. This will eliminate any venting problems at the top. Repeat for the other mould half.

Cleaning Mould

By this time, I'm usually itching to cast. Notice that I haven't cleaned the mould yet. I'll use bronze wool and Ed's Red on the outside initially to remove the worst of the crud and then I usually wait until after casting to see what I need to do. I let the heat do most of my work. The majority of the moulds you get have had some attempts at maintenance some time in the past. Much of the crud may be old grease combined with rust. Fire up the pot and run maybe 25 casts and see what you have. Cast "dummy" bullets until the mould smokes all over and then cast about 10 more. This will normally loosen most of the crud. Then, I let the mould cool and have at it with bronze wool and Ed's red. This removes about 90% of the crud. The remainder I will take care of after my casting is done as it will also burn off due to the heat of casting. If there's rust in the cavities, it should be loosened by now. I sometimes use a bronze cleaning brush in the cavities with either a hand drill or an electric drill at very slow speed. Really stubborn deposits can be removed by using a brass or bronze countersunk machine screw chucked in a Dremel tool. This allows you to get into the corners of the grease grooves and remove built up deposits. Do this very carefully at low speed and don't overdo the process.

Replacing missing alignment pins

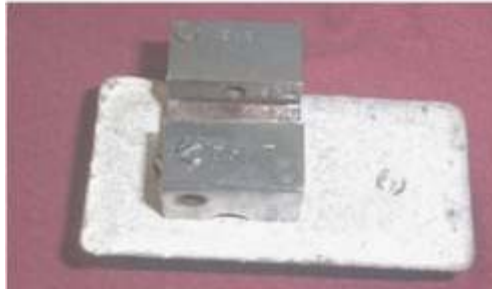
Occasionally, you'll receive a mould that will be missing an alignment pin. Lyman is not very sympathetic to us old guys resurrecting moulds they made in the past that should have been long ago discarded so they'll not be of much help in the matter.

Measure the diameter of the remaining pin if there is one or if both are missing, measure the diameter of the hole. Order some water hardened round stock from Brownell's that is slightly larger in diameter than your hole. Measure an existing pin on another mould and cut to length. A Dremel tool with a cutoff wheel is great for this. Polish one end flat using the cutoff wheel or using a file with the pin chucked in an electric drill or drill press. The length can be off some as most is hidden in the mould anyway and there's usually a lot of adjustment room. Take a file and slowly turn a rounded end similar in profile to the existing round end of the alignment pin. Polish with emery cloth. With a fine file and the pin in the electric drill, turn the pin to the point where it just starts to fit in the hole and measure with a good micrometer. Turn the remainder of the pin to this diameter.

Using a brass hammer and a brass punch of the correct diameter, drive the pin in to where it looks like it should be. Check for fit.

Now, you're ready to align the pins.

Adjusting Alignment Pins



Ingot with Drilled Holes Used for Anvil

Take one of your lead ingots and drill several holes in it a little larger than the diameter of the alignment pin and insure that they are on the flat side of the ingot. This will be your anvil for pin adjustment.

Take your mould halves which have been stoned and cleaned and fit them together. Hold them up to the light. If you see daylight between the halves, the pins are protruding too much. Place the mould half with the pins in it on its back on the lead anvil and gently tap the pins using a brass hammer and a brass drift. You'll feel the pin move. Make the light test until the light is gone and the mould halves fit together perfectly.

Next, fit the mould halves together. Holding a half in each hand, attempt to twist them rubbing the mould faces together. If there is any play, the alignment pin is seated too far in. Place the offending pin in one of the holes you drilled in the ingot and using a brass hammer and a correct sized brass drift, gently tap the alignment pin out through the access hole in the back of the mould block. Again, you should feel movement. Make the twist check again and continue until there is no play between the two mould halves.

As a final check, do the light test to be sure that you can see no light.

This is a complicated operation but you should end up with a mould with no play between the halves and no light visible.

Be aware that heat affects the mould metal and occasionally, the alignment pins will loosen and drift out of alignment and this process is required so make the check occasionally when using the mould.

Bent sprue plate

Occasionally, you'll encounter a mould with a bent sprue plate. This does happen and it's usually from neglect or poor mould maintenance.

My cure for this is to place it on a flat surface and gently tap it to a more or less flat configuration using a hammer.

Bent sprue plates are caused by several practices. One is lead buildup between the sprue plate bottom and the mould face. You're casting too fast and the bullet doesn't have time to cool. Eventually, this will bend the plate and will get worse with time.

The second cause is improper hardware on the mould. This will cause misalignment of the sprue plate to the mould face and result over time in a bent plate.

The proper hardware is: sprue plate, Belleville washer, concave side down, lock washer and the sprue plate pivot screw. The Belleville washer puts flat, uniform pressure on the plate, the lock washer puts adjustable, even spring tension on the Belleville washer and the pivot screw holds the whole mess together. Again, after about 10 casts, touch this hardware with a lump of bees wax and it smoothes up and usually lasts for the entire casting session.

After you have straightened the sprue plate, cleaned it and the mould top, added the proper hardware, spray the mould top and entire sprue plate with spray moly. This will prevent the lead from sticking unless you again get very fast and open the mould before the bullet is hardened. Cast and the plate will still give symptoms of being bent. Continue casting and after it has heated for a while, the plate will flatten out because it has the proper tension on it under heat and you'll start getting perfect bullets.

Scaling Mould Top

Once in a while, you'll encounter a mould that has a base defect. Someone may have dropped it or someone may have attempted to remove a gas check shank and had some drill chatter which leaves flashing on the bullet base. Sometimes, it affects the bullet and sometimes, sizing takes care of it.

Not an easily corrected problem at home. I've encountered many attempts on moulds where home "mould smiths" tried with a flat file. With a \$25-50 mould in the balance, it's better to have a professional do it.

Strip the mould halves including the sprue plate stop pin. This pin can usually be removed with vise grips cushioned with leather without marring it. Sometimes, it helps to heat the mould. They're installed with a friction fit so they will come out.

Stone all surfaces except the top. Insure that the pin alignment is adjusted properly. Take to your local machinist and ask him to scale the top of the mould for you. He'll set it up in the vise and dial it in so that it's flat and then take a fly cutter in a mill and take .002-.003" off the whole top surface or whatever you two decide that you need to correct the problem. I've done several with problems like this and it results in a mould that casts bullets with perfect bases.

You can try with a file, but you're on your own and it's well worth the \$5-10 the machinist will charge you.

Missing Sprue Plate Stop Pins



Mould with Replacement Sprue Plate Stop Pin

I once received a 31140 double cavity mould with the sprue plate stop pin missing. Again, no help from Lyman was forthcoming. If you're not picky, carry it to the local hardware and find a tension pin or spring pin that's slightly larger than the diameter of the hole. Tap it in and it will remain there as long as you need it.

If you're real picky about mould appearance, make one using a section of water hardened drill rod and turn it down using an electric drill and file. "Works good lasts a long time".

Cracked or Missing Knobs on HP Pins — I think at one time, we're all plagued by this problem. Again, Lyman will not stand by their product and help us out. In this case, you can normally get a machinist or woodworker to help out and replace the knob.



L to R: Home made Knob, factory knob

A facsimile knob can be turned from a round wooden knob available at hobby stores and it's a fairly simple matter to drill out the old pin and replace with a new knob and pin or in my case, I use a 4-40 screw to secure the knob in case I want to replace it again.

Again, one of the hobbyists on the cast bullet forums may be able to help and get your mould back in operation with a manufactured replacement if you feel this is beyond your capabilities.

Mould Defects

We're entering an area here that is wide and varied. I attempted to recall the ones that I've encountered but some may be missing.



Bullets with Fins on Base

Fins on Bullet Base - This defect is normally caused by a loose sprue plate, a bent sprue plate or else a defect in the mould base section of one or more of the cavities. It can be corrected by tightening, straightening, cleaning or replacing the sprue plate or in the case of a damaged mould, scaling the mould top. The most common cause is casting too fast causing a lead build up on the mould top and sprue plate bottom which can be cured by cleaning and slowing down the casting rate and allowing the bullet to cool more before opening the sprue plate.



“Wings” (Flashing Between Mould Halves)

Flashing Between Mould Halves — This problem is normally associated with misalignment of the mould pins or can be caused by foreign material between the mould faces. Clean the mould faces. Stone the mould faces looking for burs around the alignment holes or perform a pin alignment. As a last cause, look for mould handles that are not a proper fit and don't allow the mould halves to close properly.

Incomplete Bullet Fill Out - This most commonly encountered defect and one that is most difficult to pin down. A lot of the diagnosis depends on where the incomplete fill out is. Incomplete fill out is a sign of poor venting, too little heat, too much heat or a limited supply of molten metal

I'll refer you to the section of this article on removing burs. Insure that the mould half tops have been beveled. This will insure adequate base venting. Next, insure that your mould vent lines are clean. This can be easily done with a machinists scribe. A single edge razor blade will do but the scribe is easier. A 3X visor makes this job much more enjoyable; especially for us older guys. If this operation doesn't cure the problem, look to over heating.

Overheating causes incomplete fill out; especially in larger double cavity moulds and large capacity moulds in small blocks. Lyman's double cavity 429421 and all of the larger .457XXX moulds in the small blocks are really bad about this. RCBS moulds being of a larger size are usually not as picky and easier to cast with. You're dumping too much hot metal in the mould for the block size to dissipate. When this occurs, slow the casting temp down drastically and you'll see the problem go away.

If you're willing to live with frosted bullets (and I am), try tilting the mould about 15 degrees to one side when you pour. Sometimes, you'll cure the problem and be able to obtain well filled out bullets but they will be frosty.

There's a kind of an art to pouring big bullets. You have to strike a happy medium between mould temperature, melt temperature and casting tempo or incomplete fill out will occur.

Under heating is occasionally encountered and it is easy to see why this would cause incomplete fill out. This condition is usually produces bullets that are shiny and wrinkled as well.

The last condition is an insufficient quantity of lead into the mould. This is normally encountered with Saeco moulds in my experience due to their smaller sprue holes and can be overcome by upping the melt temperature a little, cutting back on the lead flow and tilting the mould to one side maybe 15 degrees. Usually, it is not a problem that is encountered.

We have done experiments with thick sprue plates, plates with oversize sprue holes and have bolted aluminum cooling fins to the mould blocks. In each and every case, we noted an improvement of some sort but the improvement wasn't a cure all for this condition.

Basically, it boils down to proper venting, proper mould temp and proper melt temp combined with a realistic casting tempo.



Whiskers

Whiskers — When I see whiskers on a bullet at the mould halves, I know I'm getting a good fill. It can mean problems such as pin alignment, foreign material between the mould halves or the melt being too hot.

It is usually the latter in a properly maintained mould and slowing down the casting tempo will cool the mould and usually allow it to disappear. If a visible line is also present, look to the pin alignment process for correction.

Flashing around HP Pin — Occasionally, you'll encounter this problem on old hollow point or hollow base moulds. Due to the desirability of these moulds, we wouldn't think of getting rid of them. There are several things that can be done to enhance their performance.

The first operation is to stone the mould faces and condition the alignment holes and align the pins. This may cure the problem.

If not, the next step is to make a new pin for the mould or have one made. Again, Lyman usually won't touch the HP moulds or their accessories. A machinist can do the work but usually has to go through a long learning process. Usually it's better to contact one of the hobbyists on one of the cast bullet forums who dabble in mould repairs and have him make you a replacement pin assembly.

I have had a 429421HP and a 358156HP in this condition that had the pins worn down to the point where they allowed flashing around the cavity pin. Making a new pin assembly corrected the problem and restored both moulds to service.

Rough Cavities — You'll encounter moulds with rough and rusty cavities occasionally. If they're deeply pitted, sometimes, you can cast a slug and put a screw in the base and lap them out with a hand drill and valve-grinding compound. This is an extreme measure and I use it only when a cavity is pitted so badly that I can't use it otherwise as it enlarges the dimension in a non-uniform manner. I have one old 311329 Ideal mould that was a true basket case. I lapped it and now, the nose is still a little rough on one side but it has made some 1" groups with the 30/06 at 100 yards so I can't complain.



Polishing Cavities with Brass Screw in Dremel Tool

Normally, with a rusty or rough cavity, I'll clean with a bronze or brass brush in a hand drill followed by a polish with a small brass or bronze countersunk screw in a Dremel at low speed to enable me to get the corners good. A word of warning is in order here. **Don't use a steel screw for this job as it will cut meehanite like cheese.** In fact, I make cutters for opening bands out of steel screws and it cuts very fast despite its limited abrasive qualities.

When I get the cavities to the best condition I can, I cast enough bullets to get the cavities completely heated and then I spray with several coats of

spray moly. This seems to slightly fill some of the pits and make a smoother surface. After treatment of the cavities in this manner, I'll go over the moly and remove any excess, dried moly with a soft sharp wood stick. It kind of burnishes the metal surface and allows the bullets to drop better as well as preserves the metal.

Moly Coating for Preservation — During this article, you've heard me mention moly spray many times. It has some good qualities as far as lubrication and preservative. I don't particularly like it on bullets but that's just my opinion.

I have found that it's great for spraying mould tops and sprue plates to keep hot metal from adhering. Works great for that.

In the beginning, I said not to worry about cleaning a mould too much at first. Well, now we've cleaned a little and cast a lot and after finishing a casting run, our mould should be ready for the final cleaning as most of the surface stuff should be loose. Take dry bronze wool and go all over the mould and completely clean it. Just the loose stuff and don't take any blue off and don't take it down to bare metal unless the rust has flaked off and exposed it. Spray the entire outside of the mould with moly and sit it on top of the warm furnace to dry. Repeat at least once more and let dry and cool.

The moly sets up a coating that will preserve the surface and you'll have a kind of shiny dark surface and you will be able to read all lettering very clearly.

I follow this treatment with a light coat of oil and store the mould in a factory plastic box.

Mould storage/inspection — Mould storage will vary depending on the level of humidity in your area. Here in Kentucky, we're at about 68% humidity and I'm able to store my moulds with a light coat of preservative oil in their original container in my garage. Your area may need more precautions.

One of the better storage methods I've seen is to store your lightly oiled moulds in a .50 caliber ammo can with desiccant bags. With a light coat of preservative, these should last for about a year with no further attention.

One caution. Don't fall into complacency about mould storage. Get in the habit of inspecting moulds on a monthly, quarterly, and semi-annual basis until you see how your storage system is working.

Degreasing — One of the necessary operations that we must do on our mould prior to casting is degreasing them. Most of us use some type of preservative to prevent rust and this causes big problems when casting is started.

There are many methods that casters use for degreasing a mould. My degreaser is denatured alcohol in a well-vented area applied with an old toothbrush.

I then bring it inside when almost dry and place it on top of the back of the furnace. In a few minutes, it's completely dry and degreased.

Usually 8-10 casts suffice to warm the mould and burn out any remaining grease residue.

Adjusting RCBS Mould Handles — I've bought good, used RCBS mould handles at gun shows before that were either too loose or too tight. Either condition can be annoying and I want my handle tension like Baby Bear's soup....just right.



I was over at a friend's house several years ago and he takes a set of RCBS handles and puts them on the vise anvil and proceeds to beat on them with a big hammer. Now, this guy was a jeweler and that action was kind of out of character for him with good equipment.

When asked, he replied..... "I'm tightening the handles." He then demonstrated.

Placing the hinge screw on the anvil with the nut up and hitting the hinge bolt tightens the action of the handles.

Placing the hinge screw on the anvil with the bolt head up and hitting the bolt head loosens the action of the handles.

Not scientific but it works.

Repairing Loose Mould Handles — This is kind of a do it yourself home project because as far as I know, nobody makes replacement handles.

If I have loose wooden handles on my moulds, I'll normally drill and tap them for an 8-32 machine screw and install one in it.

If the wood is cracked, you'll have to be more innovative and find a guy with a wood lathe and have him make replacement handles and follow this route.

Whatever the problem, nothing is worse than a set of loose or cracked mould handles and the drill and tap method gets my nod for repairs.

Summary

I believe that one of the most satisfying experiences that a bullet caster can have is to find some old rusty, beat up mould with missing parts in a “good deal” box at a gun show or win some old neglected “jewel” in a discontinued style off one of the auctions and take it home and bring it back to a condition where it produces good bullets.

There is just a great satisfaction in that process to me. So, go forth, trade for/buy moulds and enjoy maintaining and making bullets with them as much as I do.

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