

ONE PART MOLDING AND CASTING – 2018

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HANDS ON CLINIC

Today we will be making two molds from masters I have furnished. Then we will make two castings from those molds. One casting with resin and the other with Hydrocal. Here is the order will work on this. At any point raise your hand for help. I will try to walk around checking your progress. Also, you have paper towels as this gets messy at times and I have provided rubber gloves for the same reason. You will have to share the tubes of white glue. Also, I will need the masters and the Legos returned for future clinics at the end of our session. We have two and a half hours for this clinic. Also included in the box is a hand out concerning basic information on molding and casting. We will go over that while the first mold is curing.

1. Set up your work area. Spread out the plastic table cloth to protect the hotel's tables. Set out the piece of Masonite or plywood. It is for building your mold box. Set your Legos in one place. Then arrange the 7 cups of chemicals. 1-4 are the RTV Rubber, 5-6 are casting resin, and 7 is Hydrocal. Also, your mixing cups, stirrers, paper towels, and rubber gloves.
2. Apply a little bit of white glue to the bottom of the factory panel master and place on the sheet of Masonite and plywood.
3. Build the mold box for the **factory panel** mold using the Legos supplied. Here are the arraignments for each scale. The mold box should have 1/8 to ¼ inch clearance around the master.



4. O Scale



HO Scale



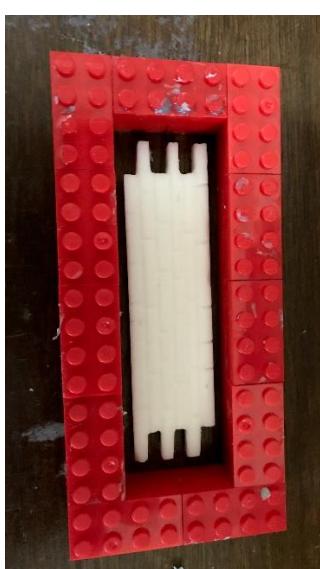
N Scale

5. Then glue the Legos mold box also using a small bead of glue on the inside of the edge of the Legos. The purpose of the glue is to keep the mold rubber from leaking out of the mold box or under the casting.

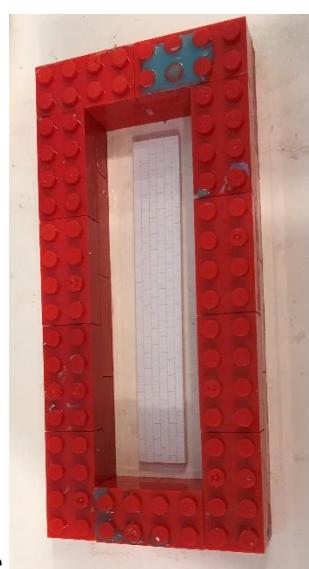


6. You have four containers of mold rubber, white part 1 and blue part 2. The part 1 and 2 with the most rubber in them is for the **factory panel** and the Part 3 and 4 are for the **Cut Stone** mold.
7. So, look carefully at the 1 and 2 and see if the white and the blue appear to be equal amounts of each. If they aren't please let me know and I will top off the short one so we are dealing with equals parts within reason. The chemicals are somewhat forgiving but always try for equal parts. Do the same check for 3 and 4 and 5 and 6.
8. Mix the White and Blue parts (1 and 2) together in the plastic cup furnished using the wood stirrer. Mix good scraping the sides with the stirrer but no longer than one minute as the rubber hardens fast.
9. Slowly and carefully fill the mold box with the mixture. Run a small stream all around the casting. We have just 2-3 minutes to pour. Do not over fill the box. It should be about an 1/8 inch or so from the top of the bricks.

10. Now it has to dry and set. So, I will go over the basics based on this handout and answer any questions. We have about 30 minutes to go over this to give the mold time to set.
11. Now that this mold has cured, you can remove the Legos carefully from the rubber mold. Then we will remove the casting which you lightly glued down. I will then pick up those castings for use at a future clinic.
12. First, we lightly glue down the **Cut Stone** masters. Then we will build a mold box for the **Cut Stone** casting. The O, HO, and N boxes are shown below. Again, apply glue to the inside of the mold box as shown in 5 above.



13. O Scale



HO Scale



N Scale

14. Now while the second mold it is curing we will proceed with the **Factory Panel** casting process.
15. Using the sharp scissors, I asked everyone to bring, carefully trim any little rubber "flaps" where the rubber leaked under the casting.
16. Now we are ready for making our first castings. First, we will make a casting of the **factory panel**. A similar building is shown on this handout except we will use a printed window instead of Grandline windows as shown in the photo.
17. Mix Part 5 and 6 in a clean cup using a clean wood stirrer. Here again the resin sets pretty fast, so stir no more than a minute. It should now look smooth and almost clear.
18. Then carefully pour in a small stream into the **factory panel** mold. Use the stirrer to carefully break any bubbles. Watch carefully and don't over fill the mold. You have to look carefully at it as it rises to the top of the mold. Shortly thereafter it will turn white and will be warm. After about 20 minutes it should be set.
19. Hopefully by now the second mold is cured. Also trim it with your scissors in the same manner as before. Please return the castings and the Legos to me for use in a future clinic.
20. In the meantime, take the cup containing the Hydrocal and using a wood stirrer mix just enough water into the small cup to get the mixture to look about like cream but not soupy.
21. Carefully pour the mixture into the **Cut Stone** mold again not over filling.
22. The Hydrocal casting will harden in about 20 minutes also.

Please return my original casting and the Legos to the front. The two molds and your two castings are yours.

Time allowing, we will have a question and answer session and a brief explanation of two-part casting.

Mold Making

Molding Supplies That I Use

Smooth-On Silicone Mold Making 30 Trial Size 2.8 lb. \$24.99 (Amazon) Two equal parts so easier to measure.



Cast-A-Mold 25T Silicone Rubber Quart \$51.49 (Amazon) 1:10 two parts. You can also purchase it for Specialty Resin online. They have a 30T at the same price but can be demolded in 8 hours rather than 16 hours of the 25T. Amazon doesn't carry the 30T



Currently and for the clinic I am using MicroMark's 1 to 1 Express. I can be demolded in less than an hour. However, you have to work fast. They also have a 1 to 1 Rapid that only takes 4 hours.



These products are called RTV or Room Temperature Vulcanizing rubber/silicone.

For building a mold box I use the larger Lego 2 x 4 blocks (EBay or Amazon) and white glue

Steps to making molds

1. Create your master. I generally use styrene to build a master. I also copy commercial items for my own use e.g. tunnel portals. Be aware that when doing single part castings one surface must be flat without any details. If you require details on both surfaces you must graduate to two-part casting. See the section below on two-part molds.
2. I lightly glue the master on a smooth surface with white glue. This keeps the master from floating when the RTV rubber is poured. If the master is not perfectly flat, you will need to weight it down until the white glue dries or use a stronger glue.
3. Build a wall a $\frac{1}{4}$ " higher than the master with Legos. I generally run a small bead around where the Legos touch the surface so it won't shift with white glue.
4. Measure out the two parts in separate containers. Mark your containers A and B. Pour the two parts into another clean container. Mix your RTV. Mix till no streaks of color are seen. For example, the Alumilite parts are Red and Blue so when mixed you get a nice even purple color. Some people recommend then pouring into another clean container but I don't. Just mix well. Also I have never needed mold release when making molds. However, if dealing with a porous material I would seal it in some manner and perhaps use mold release.
5. Then pour the mixed RTV into the mold carefully so as not to introduce bubbles.
6. Allow the RTV to settle out evenly and do not disturb till it is time to demold.

- When removing the master from the mold (demolding), be careful not to tear the mold. You will likely have to trim the mold of small pieces of mold that may have flowed in between the seams in the Lego blocks. Use a sharp pair of small scissors and/or a sharp knife.
- When not in use store your molds flat and in a clean place.

Casting

Casting Supplies That I Use

Alumilite Amazing Resin \$16.43 for 16 oz. (Amazon) Two equal parts At Alumilite site price is \$20. However, you can buy at the Alumilite site two gallons for \$122.00 including shipping. 48 cents per ounce vs. 79 cents per ounce in the 16 oz. size.



White Hydrocal. Available in Hagerstown at Steffey and Findlay in 50 pound bags or at most hobby stores in smaller sizes. You can also order it online at www.shelfield-pottery.com for \$58 including shipping for 50 pounds.



Generally, two parts plaster to one part water. Or slightly more plaster.

Casting with Resin

- Set the mold on a level surface. Use a small level to make sure it is level. Don't guess!
- Label two small cups A and B. Mark your bottles of resin A and B. To determine how much resin is required you can fill the mold with water and then pour it out into a measure of some sort. Let say it takes $\frac{1}{2}$ cup to fill it. So label each of the small cups A and B at the $\frac{1}{4}$ cup mark.
- If the mold is larger than 2 x 4 inches I would suggest heating it in a microwave for 15 seconds to warm the mold.
- Now fill each cup to the mark with each respective A and B resin solution.
- Pour each into a large cup and mix carefully without stirring in any bubbles if possible.
- Then carefully fill the warmed mold with the mixture. Do not overfill as it is a pain to get rid of too much solution. If you overfill, try carefully scraping off the access. Some people place a piece of flat glass on top. I haven't had much luck with that so I try not to overfill the mold.
- One thing I do is to have other small molds sitting around that I can pour if I mix up to much solution. E.g. a mold for a chimney which I can use extras of.
- While the resin is hardening, it will generate some heat. Wait till it is cool and feels stiff. Experience will tell you how long but at least 20 minutes of more for a big item and 10 or so for a smaller item.

9. Carefully remove the now hard casting from the mold trying to avoid tearing the mold. If you overfilled, you will want to sand the flat side some to get rid of the extra resin.
10. The casting can be glued using CA. Styrene cement will Not work. I generally spray them with a primer first and then paint.
11. Be careful about storing resins. They should be stored in a low humidity area, not in an unheated garage or basement. Trust me I found this out the hard way.

Casting with Hydrocal

1. You would follow the instructions for Resin, level surface is important.
2. I generally spray the mold very lightly with a mist of water. Not sure it is needed but I think it helps.
3. Estimating how much to mix is a bit tricky so have a second mold ready in case you mix too much.
4. I find that 1:1 water to plaster is about right. Mixture should be easy to pour and not lumpy.
5. Pour carefully and slow as the mixture is prone to splash all over the place and on you. Trust me been there.
6. Let dry till very dry, no dampness what so ever. If you don't casting will crack. There again trust me been there.
7. Remove carefully and lay out for additional drying.
8. White glue or yellow glue works well on Hydrocal. Yellow works faster and is stronger.
9. You can stain or paint and then weather the casting. I like to spray with gray primer myself to seal the plaster.

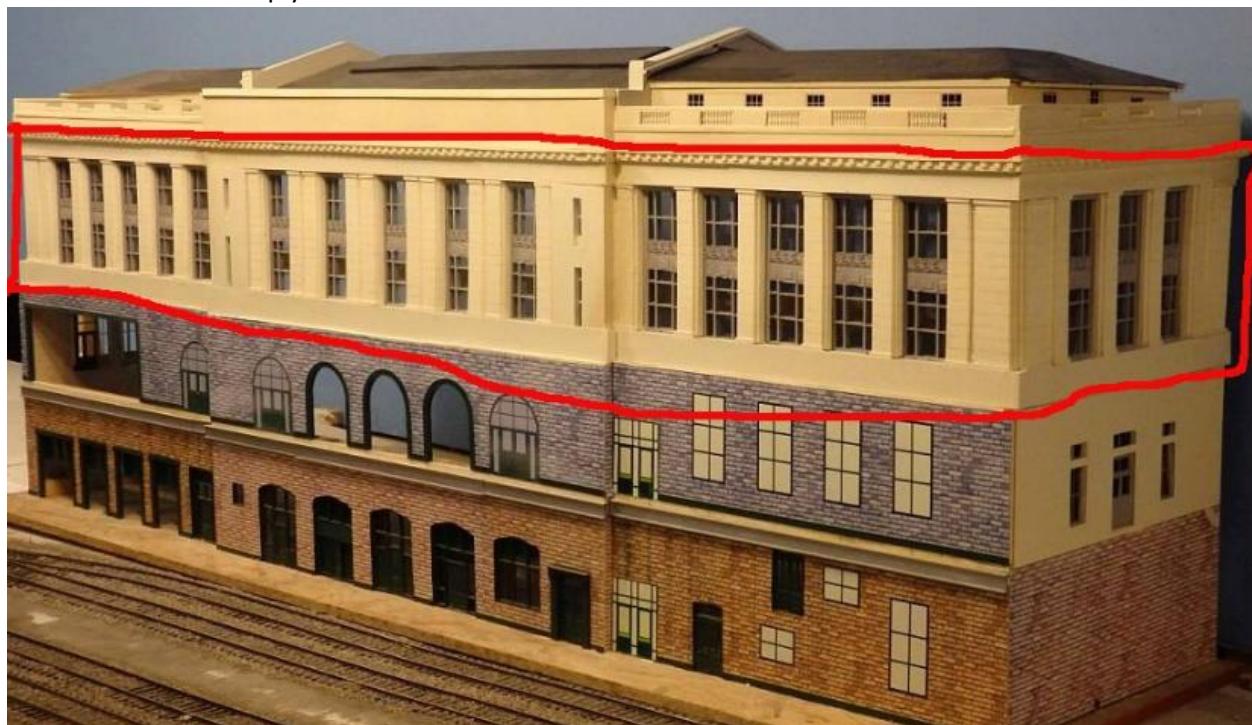
Why Cast?

Simply said, to make more than one. If you only need one, don't make a mold. Generally, 3 or 4 items will pay for the mold and the resin. Do realize that RTV rubber isn't cheap, so don't mold unless you can make it worthwhile.

Some examples of buildings made with molds I have made so far.



Here is my 80% O Scale model of Penn Station Baltimore. I have indicated those areas that are castings made with resin from molds I made from my styrene masters. Columns, trim, corners, and windows are resin castings. The first floor and basement are $\frac{1}{4}$ " plywood with art work made with Model Builder software and Grandt Line windows and doors.



Three color light signals. I purchased the targets on EBay from China and wired the LEDs into them. The mast is made of styrene tubing. The platform for repairing signals is a casting and so is the Signal Cabinet. The ladder is Plastruct O Scale ladder. I have tried making PRR position light signal targets from resin but without much success. So, I will be 3D printing them as soon as I learn how to create 3D drawings for my printer.



Tunnel Portals, Abutments, and retaining walls. I purchased several portals and abutments and four retaining walls. A total cost of about \$100. Then I discovered I needed about ten tunnel portals, a few abutments, and about 20 retaining walls. Given the cost of the additional things I needed I choose to make molds and cast them in Hydrocal. Even with the cost of RTV rubber I save a bundle and I think the Castings look better than the masters because the Hydrocal does a better job of representing stone and mortar. Here are some examples but unpainted and painted and weathered.



Making A Simple Two-Part Mold

1. Place the head on a flat surface neck touching the surface. Neck needs to be flat, so the head will sit upright. Use a drop or two of white glue to hold it in place. Just enough so it won't move when rubber is poured in.
2. Spray the head with mold release. Amazon. Mann Release Technologies Ease Release. \$13
3. I build a box big enough to allow at least $\frac{1}{4}$ to $\frac{3}{8}$ room all around the object. I use Lego bricks to build the box. A bit of white glue so box will stay put but not much. The box should be about $\frac{1}{4}$ to $\frac{3}{8}$ s above the top of the head.
4. Mix a batch of Liquid Rubber to fill the box with the head in it.
5. Pour it in very slowly in a very small stream so it fills all the cracks and details on the head.
6. Let it cure.

Casting

1. After the rubber cures using a sharp knife cut the mold in half starting at the bottom and side of the neck, up to the ears, over the head, back down over the ears, to the bottom of the neck. Basically you are cutting the mold in half with the "parting" line between the front and the back of the head.
2. Then remove the head from the molded rubber.

3. Put the box back together and lightly secure with a rubber band so as not to distort the mold. Turn it upside down so the hole where the neck was you can pour into.

4. Mix and pour slowly the resin.

5. Wait 30 minutes and carefully remove the rubber band and separate the mold to remove the head.



The Ventilator ready for box



Building Lego Box



Finished mold after being cut in half



Mold ready to pour resin in.

FOR ADDITIONAL INFORMATION – JAMES@THEBECKHAMS.US

<http://JaysOScaleLayout.blogspot.com/>

My layout will be open on Sunday afternoon. Information should be available at the registration desk. Call me for additional information at 304 258-0782. I will be back home Saturday evening or catch me tomorrow around the convention.