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How To : Animate Clay

Model and Puppet Making Tutorials



Moulding and Casting

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Moulding and Casting

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Introduction

This is the first in what will hopefully be a series of tutorials. In this tutorial I will be looking moulding and casting parts for sets and puppets. We will be looking at how to go about moulding both one and two part moulds as well as talking about the benefits of RTV over latex for a mould and we will be looking then at how to cast resin parts from these moulds, including slush casting, which I will explain in the casting section of this tutorial.

What Material?

The first thing we will need to look at is the choice of material to make your mould. While there are several choices to use the more common of these two are Latex and RTV (Room Temperature Vulcanised) Silicone Rubber. While latex has its place in making moulds I would personally only recommend it when you need to take a casting from an object that is awkward to fit in a mould and then only to use to produce a casting from it immediately as latex can deteriorate very quickly if exposed to UV light.

RTV moulding compounds are a form of silicone rubber that has been treated to stand temperature variations, these compounds come in a variety of grades, that include smoothness, softness, strength and temperature. As with everything in life it becomes a trade off the stronger the rubber the better it is if there are deep under cuts but it tends to be less smooth and the smoother the rubber the more detailed (in theory) a mould you will get, yet these tend to be soft and can easily tear. The same goes for the temperature resistance, though if only resin is being used this is not so critical but if white metal is needed to be cast you have to make sure that it is suitable for that use.

For the main part of this tutorial we will be looking at making moulds using a RTV compound, while I will be trying to make all of my references to cover any type of RTV compound, some of them will be specific to the system I am using and it is important to read the instructions on the rubber that you purchase as ratios of rubber to catalyst (the chemical that causes it to set) can vary greatly.

Health and Safety

Normally as you will find out in these tutorials I have an odd sense of humour and don't take much in the way of modelling to seriously, for me it's a hobby and fun and not something to spill blood over but this section is the one where that goes this is the one aspect of modelling I do take very seriously. Ok I know a lot of this is basic common sense to most modellers, but I feel it is important to point this out. **PLEASE** remember that what we are using here are chemicals and can be dangerous if not used properly. I don't want to put anyone off I have been using this stuff for years and have had no problems. Always wear gloves and use these materials in a well ventilated area and **ALWAYS** wear safety glasses, I've never had any of this stuff in my eye but I'm sure it's not very pleasant. That done with we can now move on to the fun part creating some models.

Mould Making

The first section of this tutorial we will be looking at how to make the different type of moulds that we will be using in the second section. We will look at what you will need to create these moulds and how to make a one part mould a two part mould and lastly a slush casting mould.

What Will I need?

The basics for creating each of these moulds will be the same, so the basic materials for creating these will be identical.

Tools

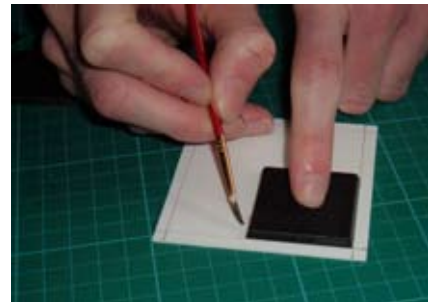
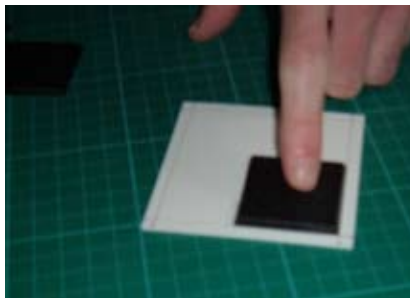
Modelling Knife
Ruler (preferably Steel to measure and use as a straight edge for cutting)
Pencil for marking the plastic
Helping Hands

Materials

RTV Silicone rubber
Plastic Cup
Measuring Cups
Scales (I would recommend a digital one)
Lolly sticks
Brass Rod
Super Glue
Gloves
Kitchen Towel
Sheet of Styrene Modelling Plastic

Making the Form

We will be beginning this tutorial with the construction of the form, a fancy way to describe a box to stop the goopy rubber covering the table and invoking the wrath of your partner. Once we have our stuff ready we can begin to create the box that we will make the mould in. the first step to do this is to put the 4 bases together to measure them making sure they are the right size (injection mouldings can vary from time to



time) then cut out a piece of sheet styrene 10mm by 10mm larger than the bases, this is so we will have lip around the mould thick enough not to break but thin enough as not to waste the RTV compound. Next we have to mark a 5mm border around the edge of the sheet we have just cut out and then glue the bases inside the border we have just created.

At this point I usually like to “grout” the bases using modelling clay, this is entirely optional, once done we can proceed to making the walls of the moulding box for this project a wall height of 10mm is a good size. Cut out two lengths of sheet styrene 10mm wide, by the length of the base you have just glued the bases to, now glue these into place. The next step is then cut another two lengths at 10 mm wide and as long as the



base plus the thickness of the other walls. Once these two walls are glued to the base and the other two walls

we know have a box ready to make the mould.

The One Part Mould

Here we are going to be creating a simple one part mould for this mould we will be creating a section of flooring. The idea for this came to me while I was in my local Games Workshop store, while looking at the figures it dawned on me what great flag stones the 40mm square bases on these figures would, and coming in various sizes you could even create some nice patterned floors.

Although there are several different ways that you could assemble the squares or hexagonal bases to form a floor, I decided that for the purpose of this exercise that a basic grid of 4 square bases would be the easiest to go through so that we could concentrate on the process of making multiples of them in resin. To begin with we need to make sure we have everything we need to produce the finished piece.

Ok now this is where we get to the part that has to be done very carefully and precisely as the instructions lay out or we will have a goopy mess rather than a nice mould. I usually use X brand of Silicone rubber and the ratio of rubber to catalyst for this material is 2% now most rubbers will either tell you how much catalyst to use for a set quantity for this material it is 2ml for every 100g, which they kindly tell us is 80 drops. This does vary from material to material so check the instructions carefully.

The first thing that we need to do is lay everything out so that we have everything to hand, believe me



preparation is the key to this. Get the scales out and ready to weigh unfortunately I have never found a sure fire method of calculating how much compound is needed for a mould, for this project I used about 40 grams of silicon, place the cup on the scales and zero the scales now carefully weigh out the rubber and be ready with the kitchen roll to catch the drips. The next step is



to work out how much catalyst is needed for the rubber for this mould we will need 32 drops of catalyst measure these out, for a small quantity of rubber up to 100g I would say just do it into the cup you have poured the rubber into, but for more than that I would recommend using a secondary cup and then combining the two.



Now that you have got the two quantities measured out you need to thoroughly mix the two together, pull out the trusty lolly stick and start mixing, as I have said you need to make sure that the two parts are completely mixed and no catalyst is sitting on top of the rubber so do take a few minutes to do this. Once the silicone is mixed up it is time to make the mould, I usually paint a thin layer over the part to be moulded to get a nice good surface, this will avoid an excess of air bubbles in your mould. Then you will need to pour the rest of the



rubber over the part you are making the mould from, until the form is full, once poured it is advisable to tap the mould to encourage air bubbles to rise to the surface. All we need do now is wait until the mould is dry, this again varies from manufacturer to manufacturer and can range from an hour to over night, so be patient the wait is worth it. Once the mould is dry we can remove it from the form, to do this the easiest way is to remove one of the sides of the box and lift the mould out gently, we don't want to damage it at this stage. With the mould out of the box we need to let it fully cure, again this varies but most manufactures recommend 48 hours.

The Two Part Mould

The basics for this are pretty much the same for those of the one part mould except that instead of attaching the part to the bottom of the mould we will be placing it in the middle of the two moulds. The first thing we will need to get our part attached to the helping hands via a piece of brass tubing, this will help support



the part and provide a pour funnel, you may need to drill the part out to place this in, with this done it is a good idea to check the level of the part in the mould so that it is sitting roughly in the middle of the mould and can just be placed in once the rubber is poured. With this done and with the rubber ready to go we can fill the box to half way, we can then place the part to be moulded into the rubber, then using some small scraps of wood, place one in each corner, this will let us create locating points for the mould to make



combining the two halves easier. With this done all we can do now is let the mould set.



With the mould set we can prepare to make the second half of the mould, the first thing we need to do is use a mould release to coat the half of the mould so we can take it apart easily after, silicone loves to stick to it's self, with a thorough coating of this on it we can mix up the next quantity of rubber for the second half of the mould, repeat the first step here and fill the mould to the top and once again wait till the mould is dry. Once dry we



can open the mould up and take the original object out and leave the mould to cure.

Casting Your Parts

In this section we will take a look at how to cast the parts from the moulds we have made and I will also talk a little about the technique of slush casting.

Casting

With our moulds made we can move onto the casting of the parts, this is essentially the same for either type of mould so I will just describe the general principals of it here. With



casting the choice of resin is up to you I normally use alumilite for this type of work as it is easy to mix (1:1) is fairly odourless and sets up very quickly (about 5 mins) although this does have the side effect that it must be poured very quickly as it only has an open time of about 90 seconds which means that everything needs to be in place before you start mixing. The first step here is to get our A and B resin parts measured out carefully into the measuring cups to equal quantities, with



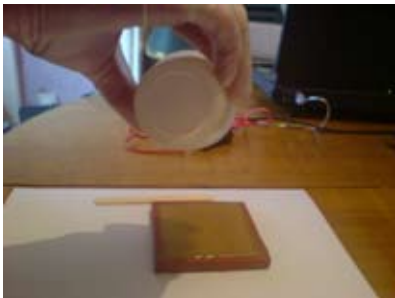


this done we can now pour these into the plastic mixing cup and begin to mix them



together this time will vary from manufacturer to manufacturer but with alumilite this is about 20 to 30 seconds.

The next step is then pour the mixed resin into the mould, I like to keep a lolly stick handy to level the surface out once the one part mould is done, with the two part mould it is not needed, once the mould is full give the sides a quick tap



again to help get some of the air out and stand back and watch the material set. Again this will vary from manufacturer to manufacturer but with the resin here it takes about 5 minutes. Once set the resin part can be removed from the mould and ready to paint, plate or what ever finishing is needed.

Slush Casting

With slush casting the process of casting is slightly different to that of other the other casting process, here we are creating a part that is both hollow and thin, a good example of the use of slush casting would that of making a shield, where the object is required to be thin yet it's over all thickness is quiet thick, so a hollow is required to obtain the depth of the shield and maintain its thinness for aesthetics.

With a slush casting mould there is no pour funnel even though it is a two part mould, we simply fill the mould to about $\frac{3}{4}$ full and place the top half of the mould on, this forces out the excess and fills the mould full, but be aware this is messy as the excess resin has no where to go but out the sides on onto the workbench so make sure you have plenty of kitchen towel down to absorb it, also not that this thinner mould will take a lot longer to dry than a thicker mould will.

And there it is a quick and easy guide to moulding and casting, if you have any questions on the process you can get hold of me [here](#) I hope you have found it useful and will look forward to more of these in the future

