

Fun With Plaster

A clinic by

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Hardshell

Hardshell is just that, a shell of hard material which form the base for model railroad scenery. Ideally the shell should be strong, lightweight, easy to install and inexpensive. No one method that I have seen meets all these characteristics, but for a non portable layout, a plaster shell gets close.

A plaster shell can be made thin enough so that it is not overly heavy and still strong enough to support the scenery and the occasional hand placed on it for support. To make plaster shell strong enough to deal with the forces placed on it for a portable layout, it has to be made too thick and heavy to be portable. Other methods based on urethane foams are more suitable for portability, but at significantly increased expense and the risk of exposure to harmful fumes during installation.

The method that I settled on after testing out several techniques that I found in various model railroad scenery books is the tried and true Hydrocal plaster soaked paper towel method. Its strong, quick, easy, has reasonable weight and there are no harmful fumes or chemicals involved.

Plasters

Since the method is based on plaster, some explanation of what plaster is and how it works is in order. Plaster is pure gypsum, a naturally occurring mineral. It has been ground fine and has had all the water baked out of it. Water is the key to the process. When water is added to the powdered plaster, a chemical reaction is initiated where the water combines with the gypsum and releases the heat that was added when the plaster was made. The reaction proceeds until a sufficient quantity of water is chemically combined and the material sets up into a hard mass. Any excess water in the mix then slowly evaporates out.

There are many different types of plasters, and Plaster compounds, formulated for special uses. *Hydrocal is just one of them, but it is easily the strongest of the bunch. I tried several types, casting plaster, Plaster of Paris, patching plaster and others. Each has attributes that make it work better than pure gypsum plaster in some special application, however, for hardshell, Hydrocal is the clear winner for strength..(*Hydrocal is a brand name that offers many different types of plaster **Cements**.)

Plaster and gauze combinations (Woodlands Scenics is one brand) are easier and less messy to apply, but their strength in thin layers doesn't come close to Hydrocal and they are at least 20 times more expensive to cover the same area.

Casting plaster is cheaper than *Hydrocal and does work better for making rock molds as it tends to bubble less and it takes stain better, however it is significantly weaker than *Hydrocal.

Patching plaster is intended to be made into a pasty mix that can be used to patch holes in other plaster surfaces. It has a much longer working time than *Hydrocal but is much weaker in thin layers.

If *Hydrocal has one drawback, it is short working time. It sets up **VERY FAST** so that you must mix small batches and work quickly. I find that I can cover less than 2 square feet in one batch.

The hardshell is intended to be a scenery base, not a finished surface. Therefore it not necessary to smooth it out completely. Bumps, runs and ridges are ok. The hardshell will be covered with another layer of plaster that can be smoothed and worked and provides a surface that looks more like dirt. This surface will then be painted with dirt colored latex paint and texturing materials (real dirt, ground foam, dyed sawdust or whatever) are applied over the paint.

Hardshell Support

I have tried several methods to support the hardshell and the easiest one is to make a grid of cardboard strips that conforms to the shape of the intended scenery. The grid is made with strips about 1" wide and about 4" to 6" on center. I use hot glue to attach the strips to the underlying support and to each other. Hot glue is both quick and strong. Clothes pins are used to clip the junctions for the 30 seconds or so it takes the glue to harden. On level or nearly level areas, I also add a finer grid of 1" masking tape between the cardboard strips to keep the plaster soaked towels from sagging between the supports.

I have also tried wire screen, hardware cloth, and chicken wire. these methods work equally well and some are quicker than others...try them all and see what works best for you.

Whatever the base material is, it will also need to be supported. I used wood risers from my benchwork and stapled or hot glued the strips to the risers. For smaller features, wadded up newspapers can make an adequate support, but the newspapers should be removed later as they constitute a fire hazard.

To support the plaster itself, paper towels are soaked in the plaster and then draped over the support. Regular heavy duty paper towels tend to tear too easily. I use a Viva* and Brawny* paper towel brands. These are very strong and soak up enough plaster so that only one layer is needed in most applications. It is only necessary to overlap the towels by 1/2" or so to join one plaster soaked towel to another one placed previously. At areas nearer the front of the layout, it may be desirable to overlay them by 50% to get two towel thicknesses so that the shell can stand the extra abuse it will get during subsequent construction and operation.

The Process

Mixing and using *Hydrocal is fairly easy, but you need to have the proper materials ready because once you mix a batch, you have to use it immediately.

You will need:

- A bag of *Hydrocal
- Two one cup measures
- **A cheap set of mixing bowls (I strongly recommend buying a new set and giving it to your wife before you take the old beat up set) Glass is best, followed by stainless steel and plastic. (because of clean-up)
- Paper towels, separated into sheets and cut in half and quarter sheet width strips (Don't Cheat here High quality/strength is a **must**)
- A spray bottle filled with water
- Latex gloves
- A drop cloth under the layout
- Masking tape protecting any existing track in the work area
- Newspaper covering anything that you don't want to drip plaster on
- Old cloths and shoes because you will get plaster on yourself as well
- Old paint brush

It is handy to have a laundry sink available in which to mix the plaster and clean up your tools at the end of each batch. If there is no sink available then a 5 gal paint bucket partly filled with warm water will do for cleanup. Use only fresh water to mix new plaster. By That, I mean don't try to use the water you cleaned up with to mix your plaster. This water sometimes referred to as "seasoned" will cause the plaster to set up differently. and quicker...(and trust me you don't want "quicker"!!)

The latex gloves are required because Hydrocal soaks up water from wherever it can find it. If you use your bare hands, it'll dry your skin to a crisp in short second.

- Hydrocal is mixed two cups plaster to one cup water. I use two measuring cups, one for plaster and one for water so that I don't stick a wet cup into the plaster bag. You should measure the water first and add plaster to the water, This will help keep the dreaded "Lumpys" away.
- Also I want to add in here a little tip:
- When you do painting and airbrushing (Acrylics only) it seems you always have that extra "thinned" paint. Some out of the airbrush and some from.. maybe, a cleaning jar for your brush. What do we do with that?? well of course we toss it!! STOP! Save that "Dirty Water" . Find a container..(I use an old half gallon milk container) and just dump it in there. Now use this "dirty water" to mix your plaster. Why?..well we have all had the misfortune to have someone or something cause an "accident" on the railroad and chip the scenery. Now you have a nice weathered and sceniked area with a bright WHITE chunk in it. If you color your water before you mix it..it will look the same throughout... a minor chip will simply be blended in with little or no effort.

- If you don't use Acrylics..or run out of "dirty water"... Make some. I use india ink, acryil paint, and if you can find them..Latex paint dyes. These you can find at home centers and paint stores as long as it is water soluble it will mix fine with the plaster...also..don't worry about a "perfect" match in the dirty water department. you are only trying to darken the plaster mix to avoid the White chips effect.

I use only half a paper towel at a time.This allows you to work easier with contours and edges, Also the overlap on the towel edge adds a little strength. The towel is dipped in the plaster making sure that it is fully coated and then the towel is placed on the pre-wetted supports. It is important to soak the area where the towel will be applied so that the supports and previously placed plaster doesn't soak water out of the new plaster. (If you are using screen wire you can skip this step.) The plaster needs to absorb the water that was mixed in, if the water gets leeched away, the new plaster will be weak.

The half towel is placed in the desired location and the surface of the towel is then smoothed with the fingers and any folds are removed. Smooth over the joints of the towel and whatever it is connecting to. You might have to dip into the bowl and get a little plaster to use to smooth the edges of the towel. Then apply the next towel. The plaster will wet and bond to practically any porous surface.

When the batch is new, it has the consistency of light cream. By the time you get to the fourth towel, it will have started to set and be more like the consistency of sour cream. Coating the fourth towel will be a little more difficult and it will require more smoothing as the plaster may start to wad up on the surface of the towel. Mist it lightly with the spray bottle until you can smooth out the plaster. This is where the paint brush comes in to play...after you finish with the towel placement, dip the brush in the remaining plaster, and lightly coat the edges and smooth the towels. If the plaster consistency is getting too stiff at this point add a little water and thin it. Rinse the brush out and let dry. (If your brush gets clogged, by the plaster drying in it too soon, just wait untill it has set up then smack it a few times with a hammer against a hard surface (concrete floor works for me). the plaster will return to its Powder consistency and you can re-use your paint brush!

By this time, you will have dripped plaster everywhere, but hopefully most of it has landed on a drop cloth or newspaper.

Take the bowl back to the sink and wash off your gloves and the bowl. There is a major caution here. If you just flush the residual *Hydrocal down the drain, it'll set up in the drain and plug it solid in a short time. I wash my gloves and the bowl into a larger bowl in the sink so that most of the plaster settles down into the larger bowl. The overflow doesn't contain enough plaster to set up. I then flush the sink for a few seconds with water to flush the waste water past the sink trap. After a while, the bigger bowl gets a cruddy cake of plaster set up in the bottom, just pour off the water at the top and flex the big bowl over a trash can to dislodge the plaster cake.You must make sure that you have cleaned out your mixing bowl thoroughly. Any contamination, even hardened *Hydrocal, in the next batch will make it set up oddly.

**At the beginning of this section under what "you will need" I mentioned the mixing bowls and preferences. Glass is best because the hardened plaster will not stick to it as easily..same goes for Stainless Steel. Plastic on the other hand, because it will scratch as you mix more and more batches, will cause the plaster to bond itself to the bowl.

After the Hardshell has completely set up..(It will be cool to the touch) you can go back and over it with more plaster and work in terrains, rock castings, river beds, etc. A little tip here is that as you work your scenery , create a "production Line". That is you start with the base, add the hardshell plaster, add the terrain, rock castings, etc. To do this, only work in a small area at a time..then move on. As you get more hardshell on, use the remaining plaster in your bowl to go back over the previously set up Hardshell and add your terrains , smooth over joint lines etc. This eliminates wasted plaster in your bowl and helps cleanup. I use the paint brush and try to "paint " all of the remaining plaster in the bowl..somewhere.

NOW..go have some FUN WITH PASTER!!!!