

JL AUDIO®

Ahead of the Curve™

Bedtime for Bondo

2002 MERA Training

2002 MERA Training - Bedtime for Bondo



Section I: Making the Plug/Model

This section will show the process of building a plug/model for a plaster mold. This will represent what the final fiberglass part will look like.

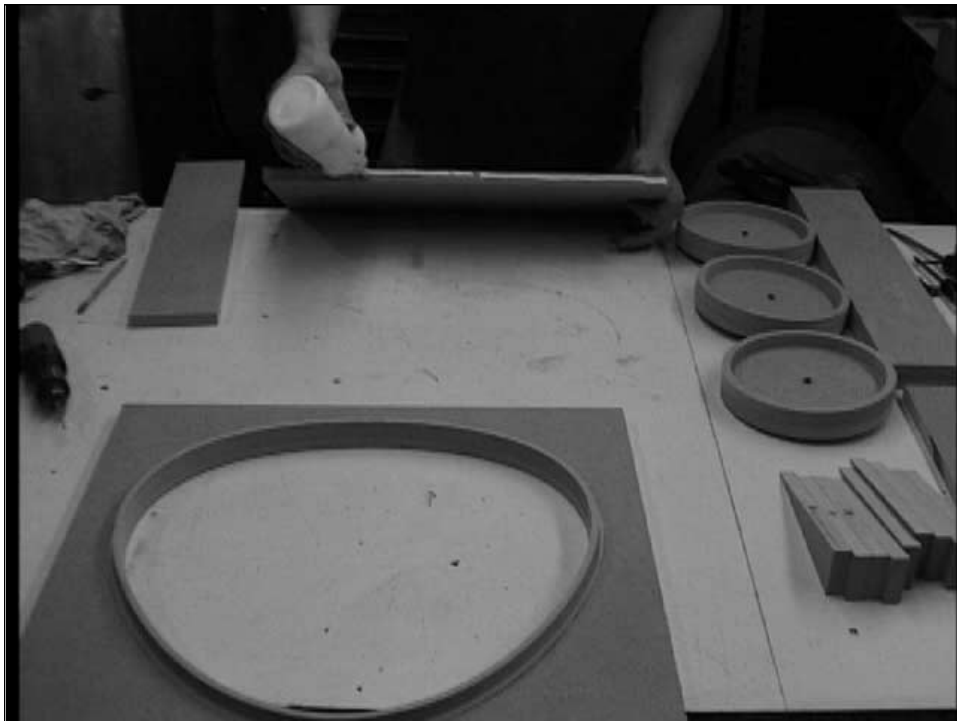
2002 MERA Training - Bedtime for Bondo

1



Here are the wood parts that will be used to construct our plug/model.

2



We begin by assembling the frame of the plug/model.

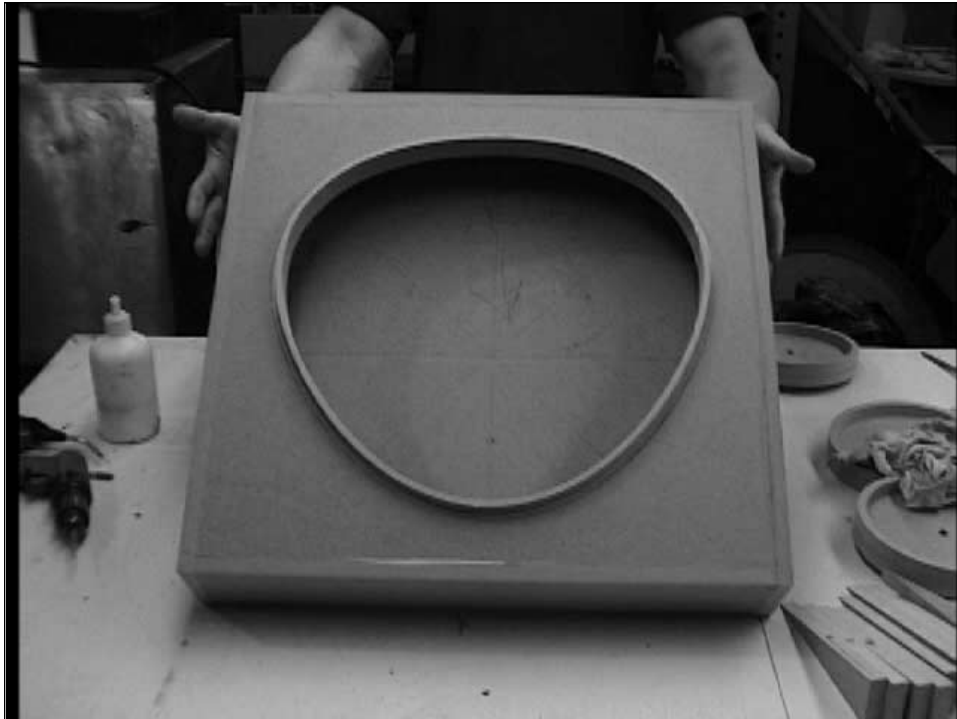
2002 MERA Training - Bedtime for Bondo

3



The plug/model is assembled using wood-glue and nails.

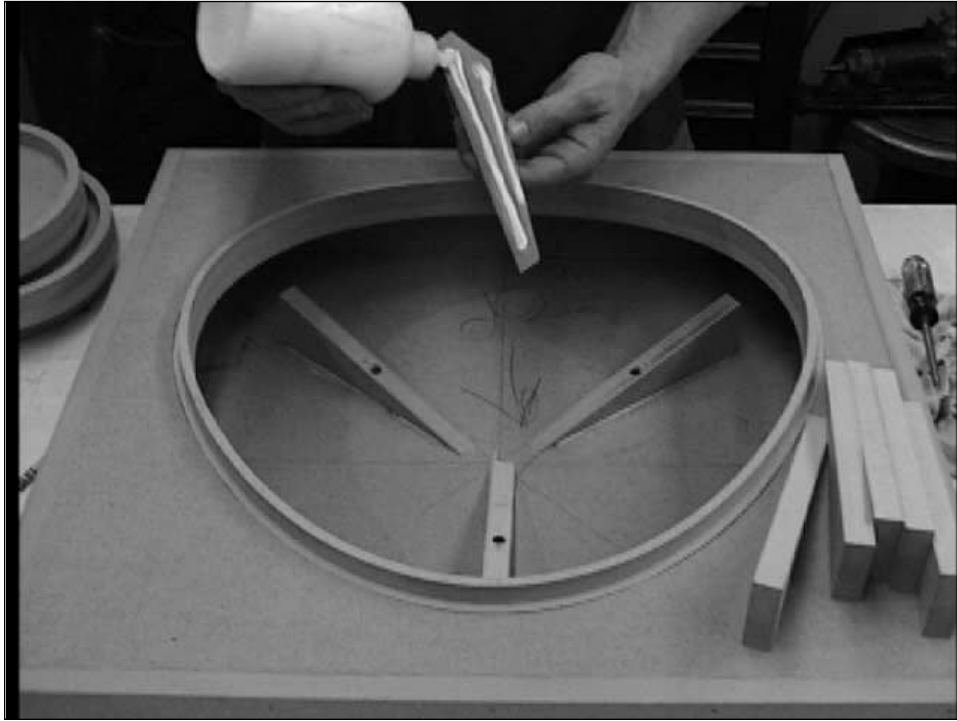
4



Here is the finished frame of the plug/model.

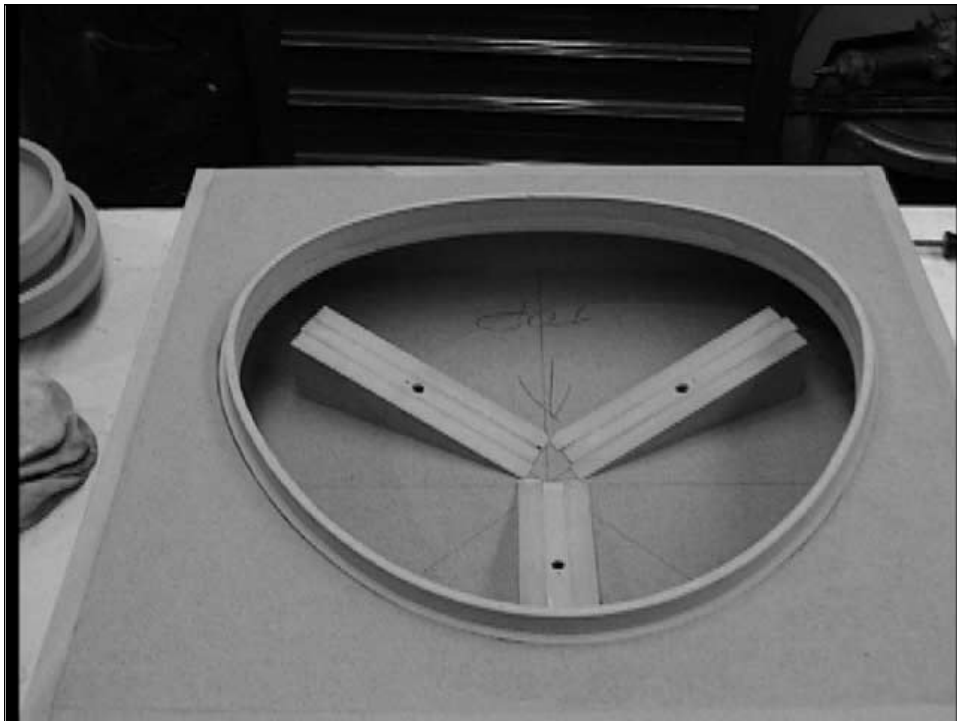
2002 MERA Training - Bedtime for Bondo

5



Next we begin the assembly of the platforms that will hold the wood discs in place.

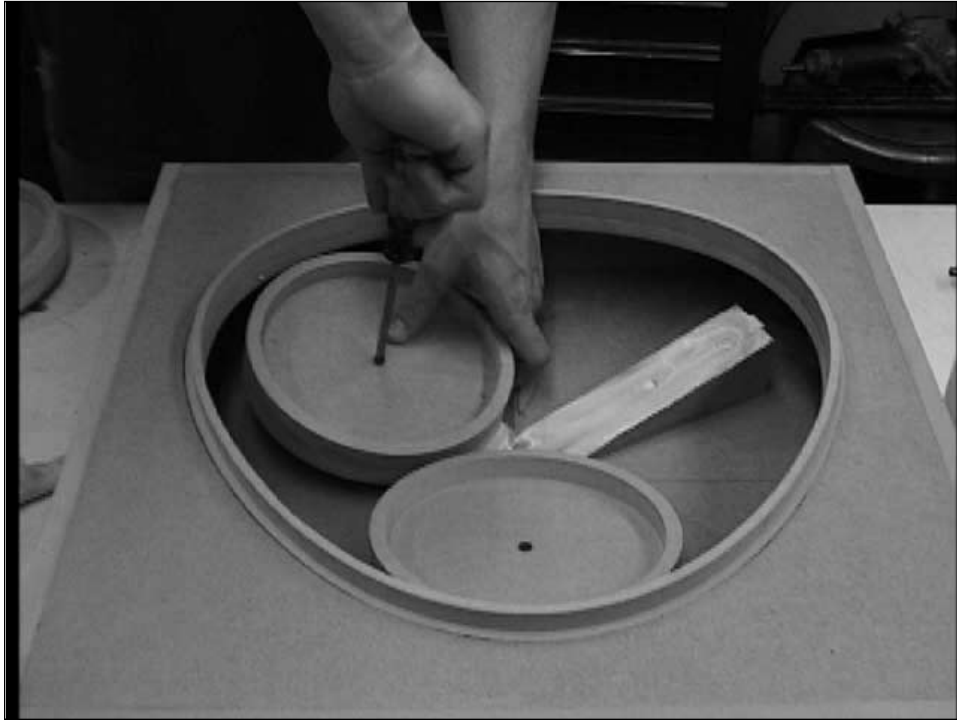
6



With the platforms in place, we are ready to install the discs.

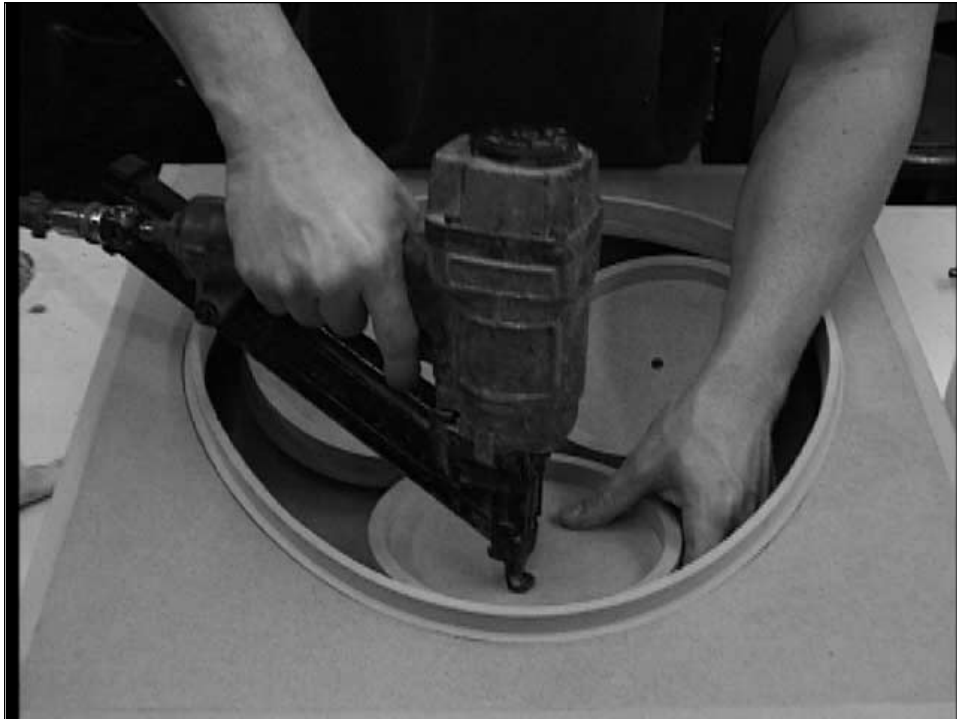
2002 MERA Training - Bedtime for Bondo

7



Positioning the discs onto the platforms.

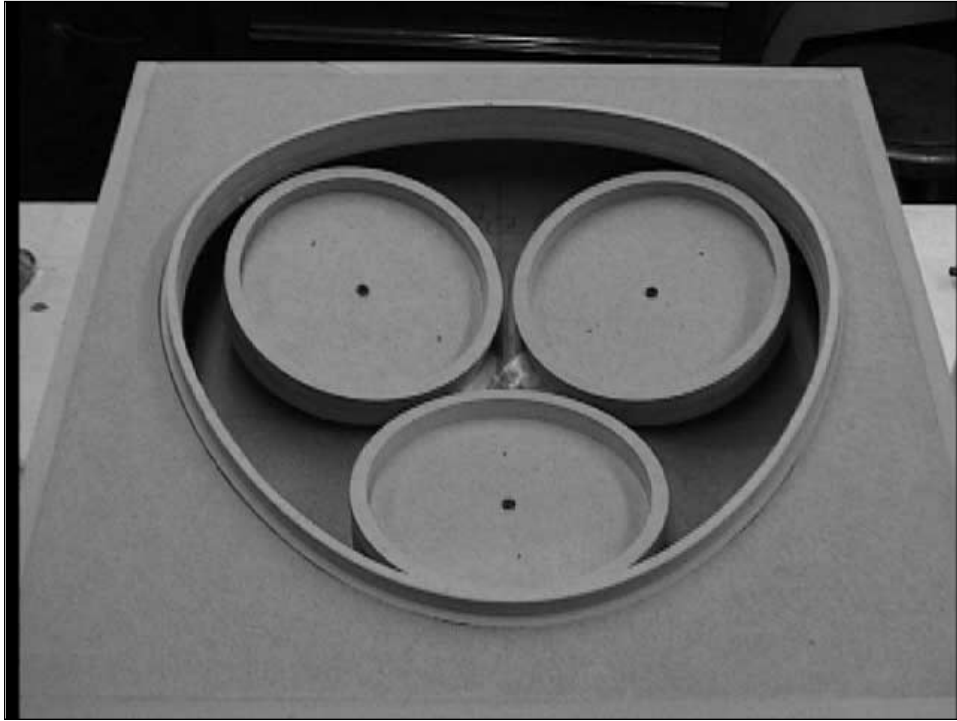
8



Nailing the discs in place.

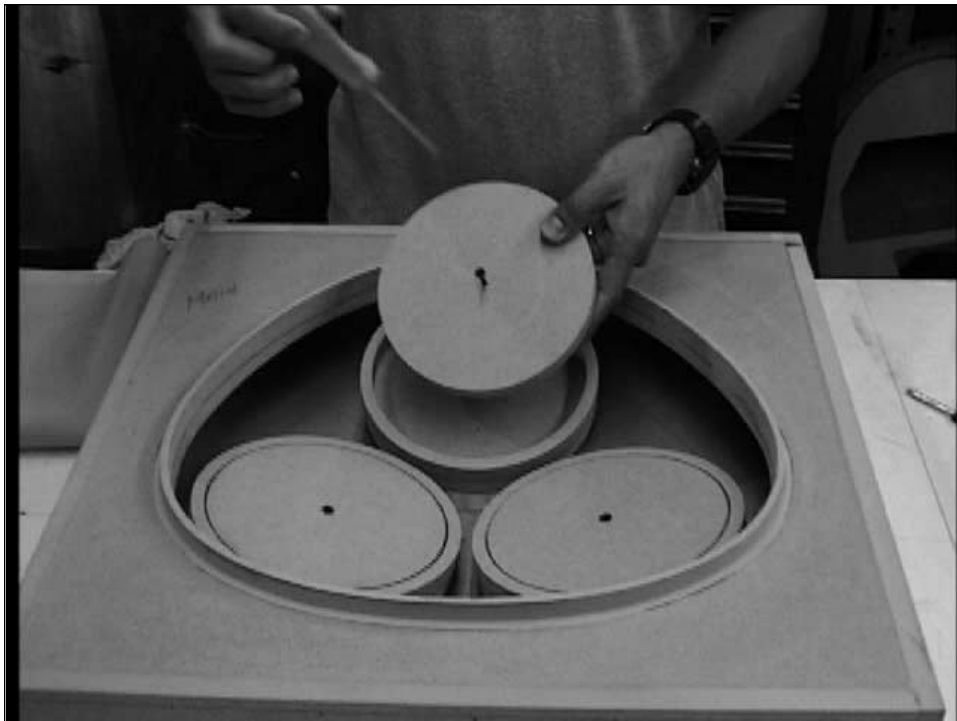
2002 MERA Training - Bedtime for Bondo

9



The plug/model with all three discs in place.

10



Aligning the second set of discs that will hold down the grille cloth.

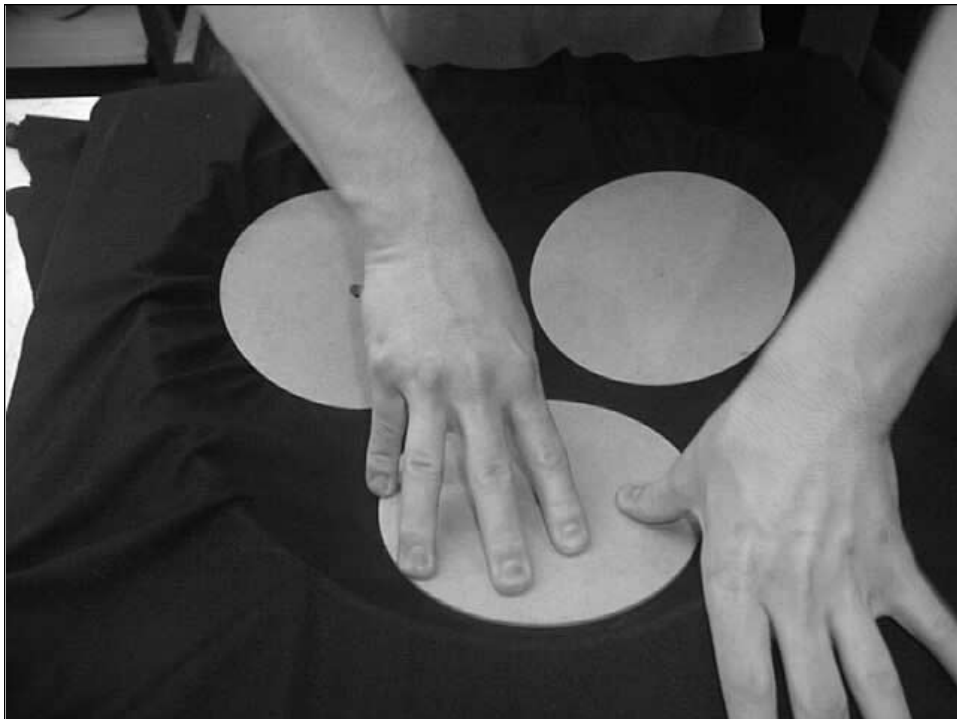
2002 MERA Training - Bedtime for Bondo

11



With grille cloth over the plug we position the first disc in place.

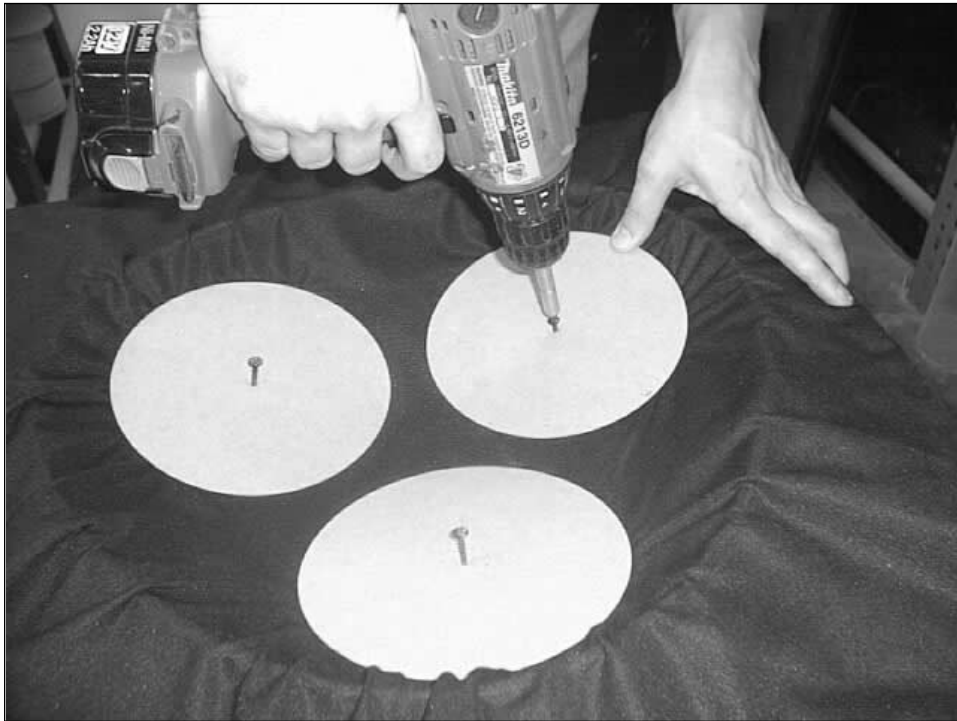
12



Positioning the second and third discs.

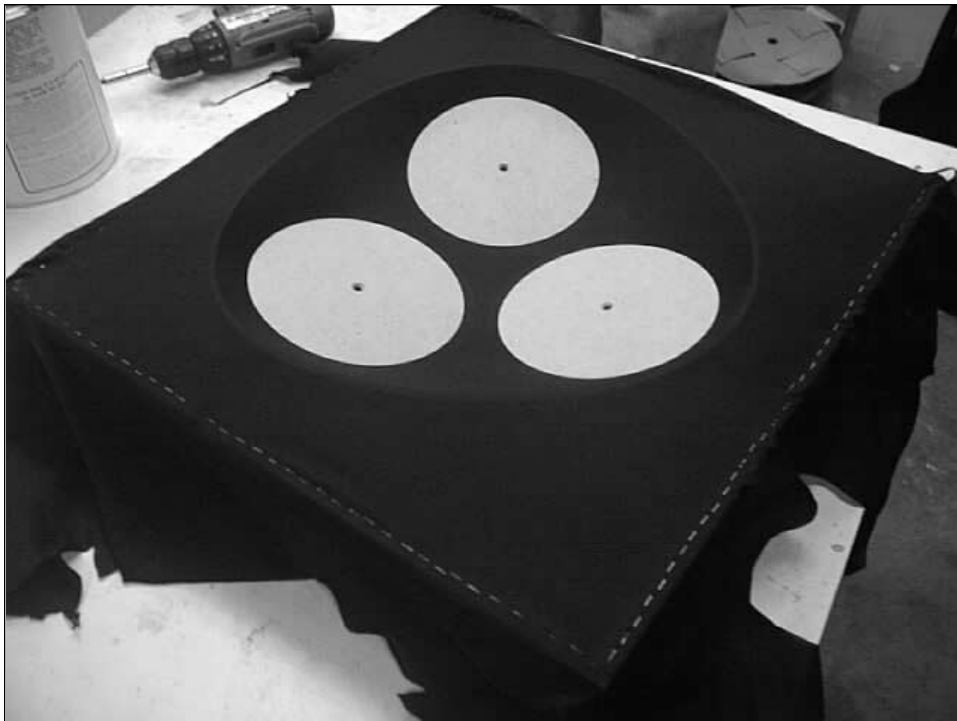
2002 MERA Training - Bedtime for Bondo

13



Securing the secondary discs in place.

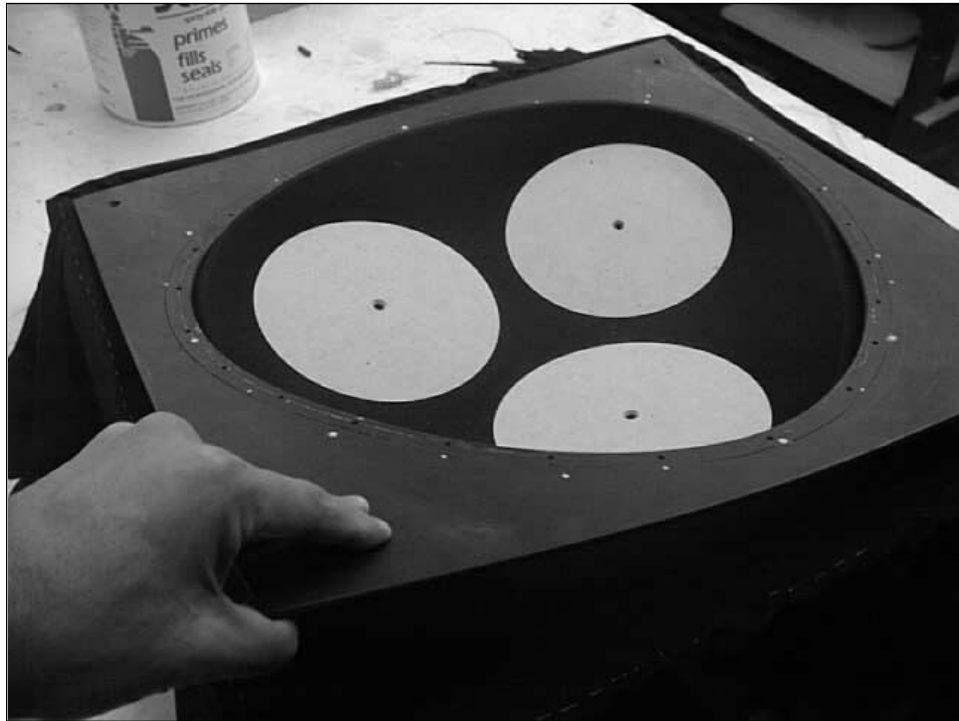
14



The cloth is then stretched and stapled along the sides of the plug/model.

2002 MERA Training - Bedtime for Bondo

15



Positioning the ABS/plastic platform.

16



Securing ABS plastic platform.

2002 MERA Training - Bedtime for Bondo

17



Applying fiberglass resin to the cloth.

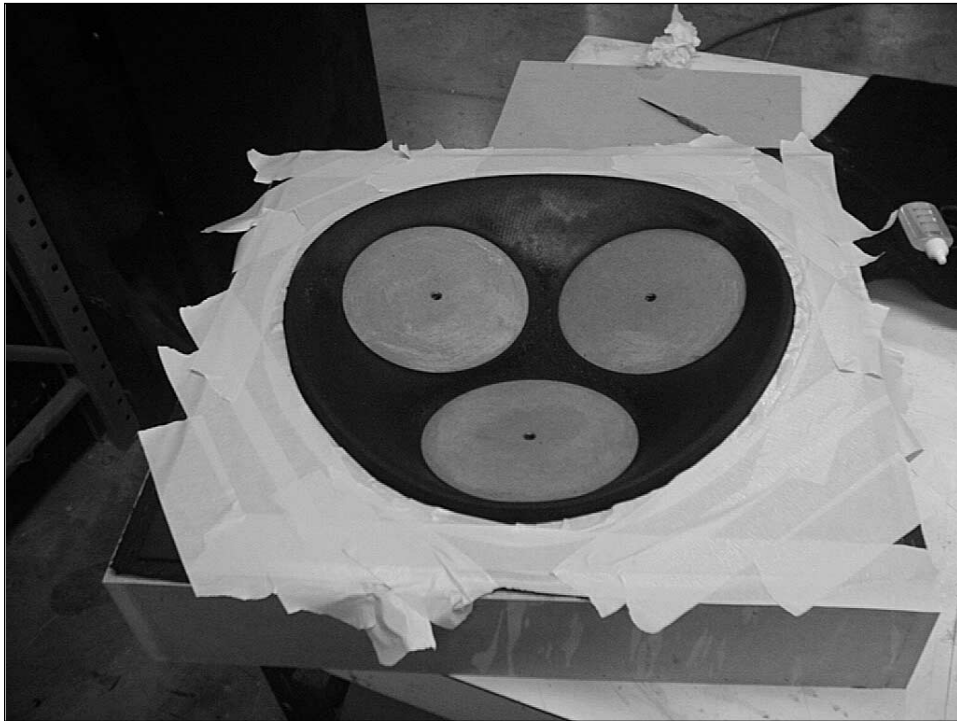
18



After the resin hardens, the plug/model is ready for the next step.

2002 MERA Training - Bedtime for Bondo

19



The plug/model is masked off and is ready for the primer fill.

20



Applying the primer fill with a spray gun.

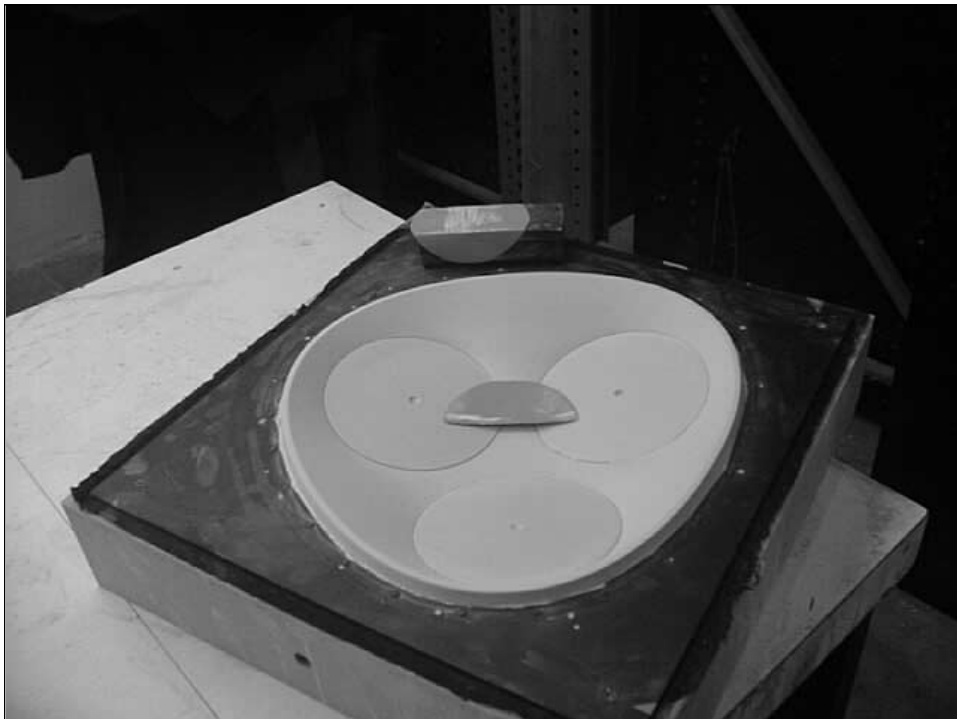
2002 MERA Training - Bedtime for Bondo

21



We applied four even light coats of primer fill.

22



After the the primer fill dried, we sanded it down with 220 grit sand paper.

2002 MERA Training - Bedtime for Bondo

23



After sanding the primer, clay is used to fill the gap and create a smooth radius between the primer surface and the ABS/plastic.

24



The plug/mold is now ready for the plaster.

2002 MERA Training - Bedtime for Bondo



Section 2: Making a Plaster Mold

This section will show how to prepare and construct a plaster mold from the plug/model.

2002 MERA Training - Bedtime for Bondo

1



Spraying a coat of Pam on the plug/model as a release agent.

2



Wiping off excess Pam with toilet paper.

2002 MERA Training - Bedtime for Bondo

3



We added plaster to the water for the molds' skin coat.

4



We mixed the plaster with our hands, making sure it was all dissolved.

2002 MERA Training - Bedtime for Bondo

5



Pouring the plaster onto the plug.

6



We brushed the plaster from the center of the plug/model outward. This will prevent the plaster from sliding, causing a flawed mold.

2002 MERA Training - Bedtime for Bondo

7



We made sure that the entire surface of the plug/model was covered with plaster.

8



We checked the skin coat to make sure that it was hard enough but not completely dry for the next coat of plaster and hemp.

2002 MERA Training - Bedtime for Bondo

9



Making hemp patties (6" in diameter) from our hemp batch.

10



We made enough hemp patties to cover the entire surface of the plug/model. The hemp patties will reinforce the plaster mold when it dries.

2002 MERA Training - Bedtime for Bondo

11



After mixing the second batch of plaster, we soaked the hemp patties in the plaster one at a time and applied them to the plug.

12



The plaster patties were applied from the center out. This will ensure a uniform thickness throughout the entire mold.

2002 MERA Training - Bedtime for Bondo

13



After applying the plaster we let it dry.

14



Once the plaster dried and cooled down, the excess hemp and plaster was trimmed with a razor knife.

2002 MERA Training - Bedtime for Bondo

15



To release the plaster mold from the plug we inserted wood or plastic wedges in between the plaster and the plug/model surface at different locations.

16



We worked our way around the plaster lightly tapping the wedges with a hammer until the mold released.

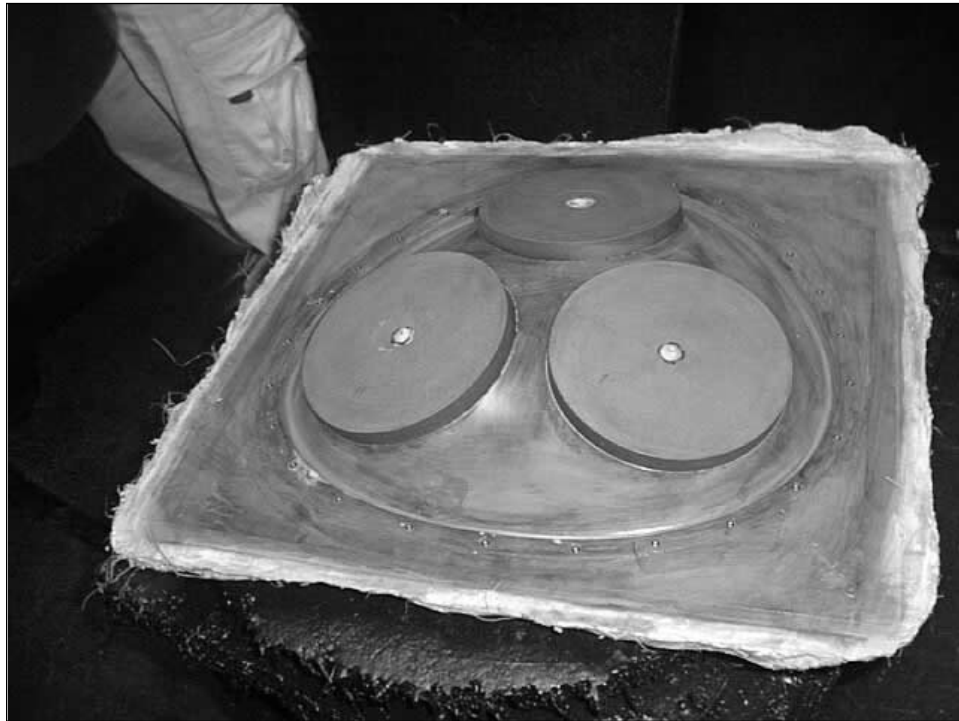
2002 MERA Training - Bedtime for Bondo

17



Removing the plaster mold away from the plug.

2002 MERA Training - Bedtime for Bondo



Section 3: Preparing the Plaster Mold

This section will demonstrate how to prepare the plaster mold for the final fiberglass part.

2002 MERA Training - Bedtime for Bondo

1



Before preparing the plaster mold we sealed it with shellac.

2



Once the shellac was dry, we repaired unwanted holes in the plaster mold. This can be done with glazing putty or clay.

2002 MERA Training - Bedtime for Bondo

3



The impressions that were made for the mounting holes were drilled out to accommodate screws to mark the final fiberglass part.

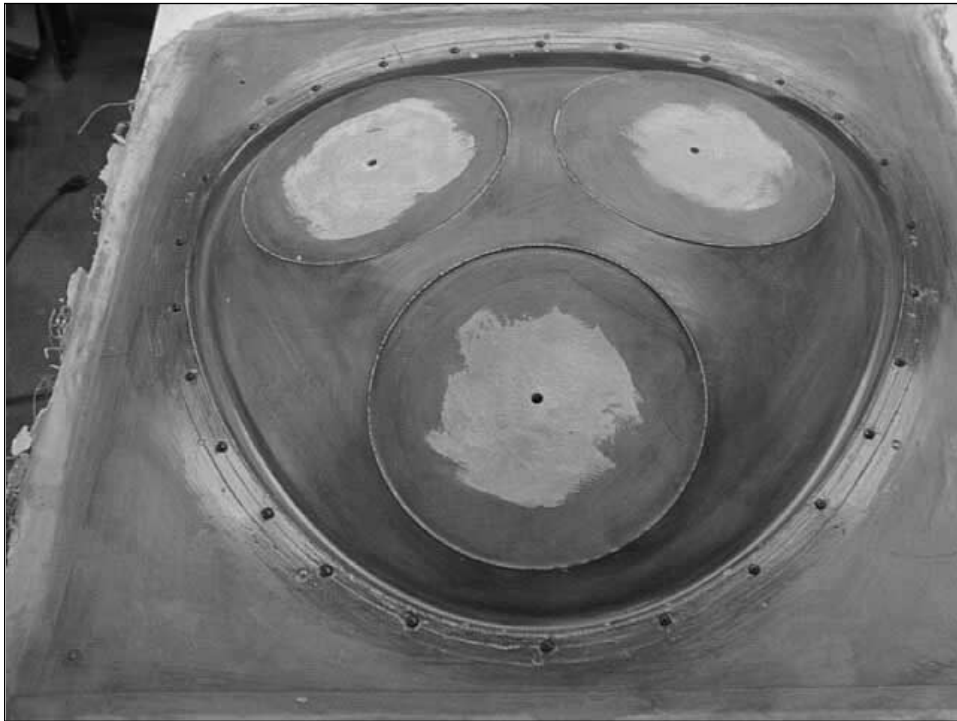
4



We then shellaced the holes that were drilled out in step #3.

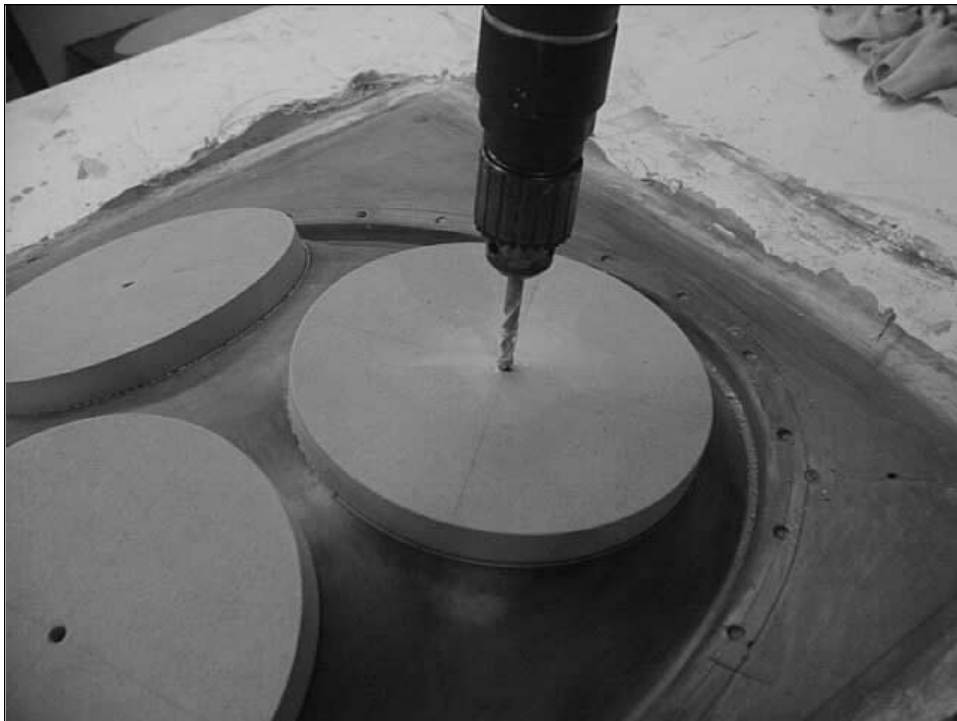
2002 MERA Training - Bedtime for Bondo

5



The pan head screws were bonded in place with hot glue.

6



We centered the discs to the plaster and drilled out a center bolt hole for each disc. These discs will be used to counter sink the woofer surface in our finished part.

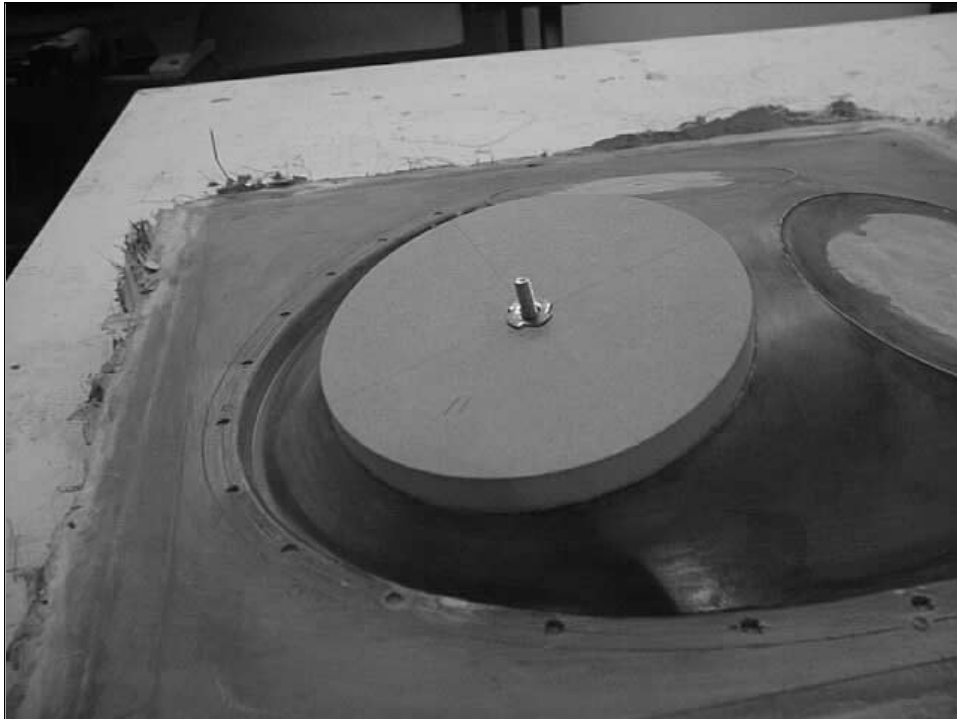
2002 MERA Training - Bedtime for Bondo

7



We made sure that the bolt holes were drilled out all the way through the plaster.

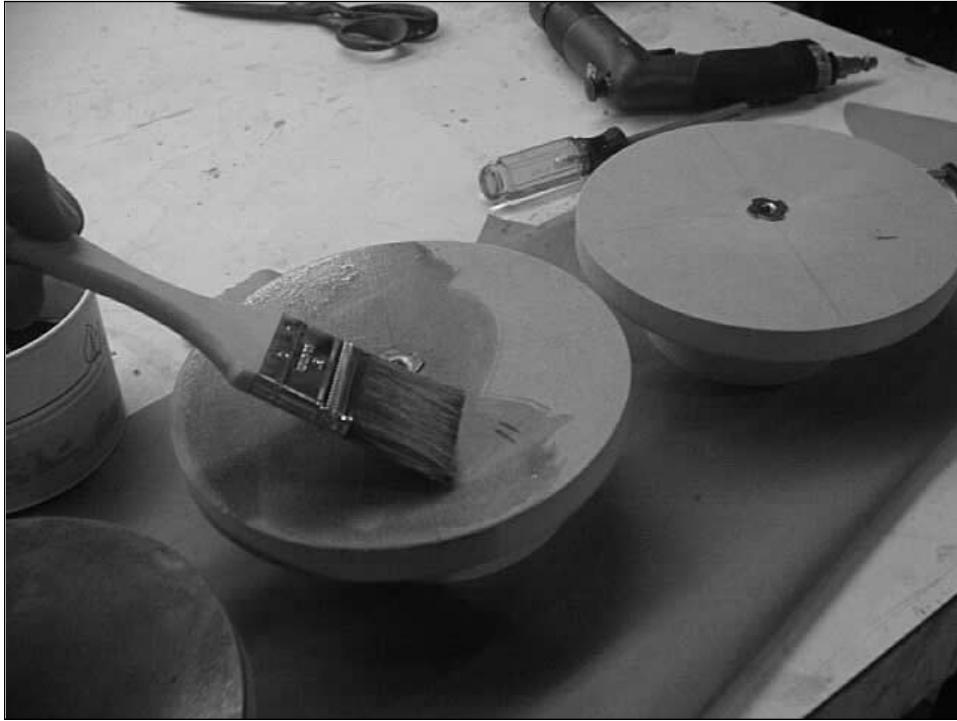
8



The discs were attached with T-nuts and bolts.

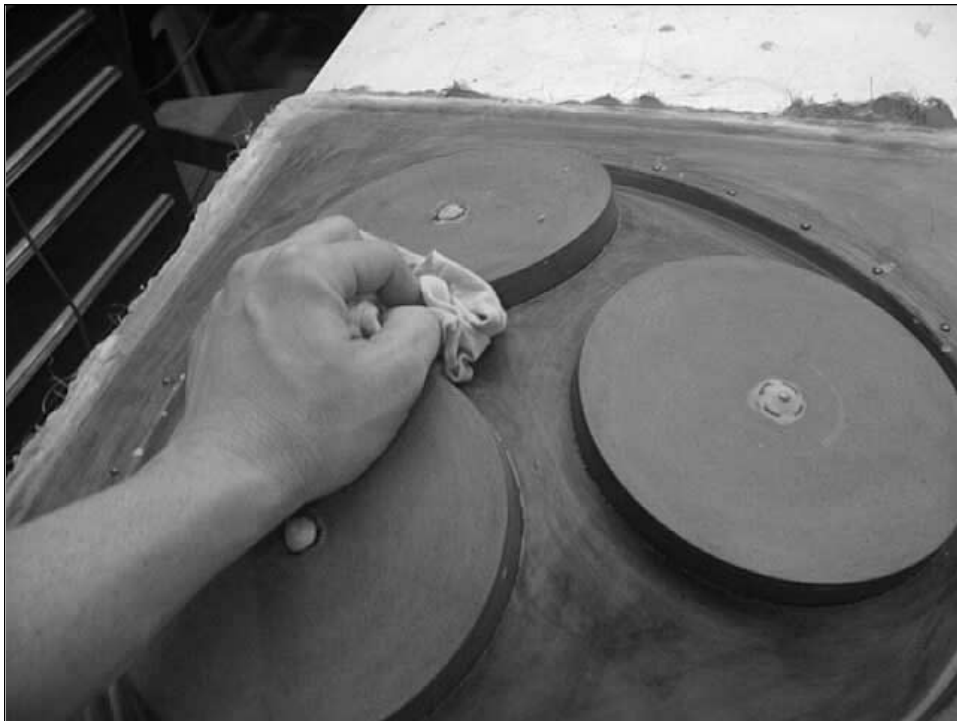
2002 MERA Training - Bedtime for Bondo

9



We sealed the discs with shellac.

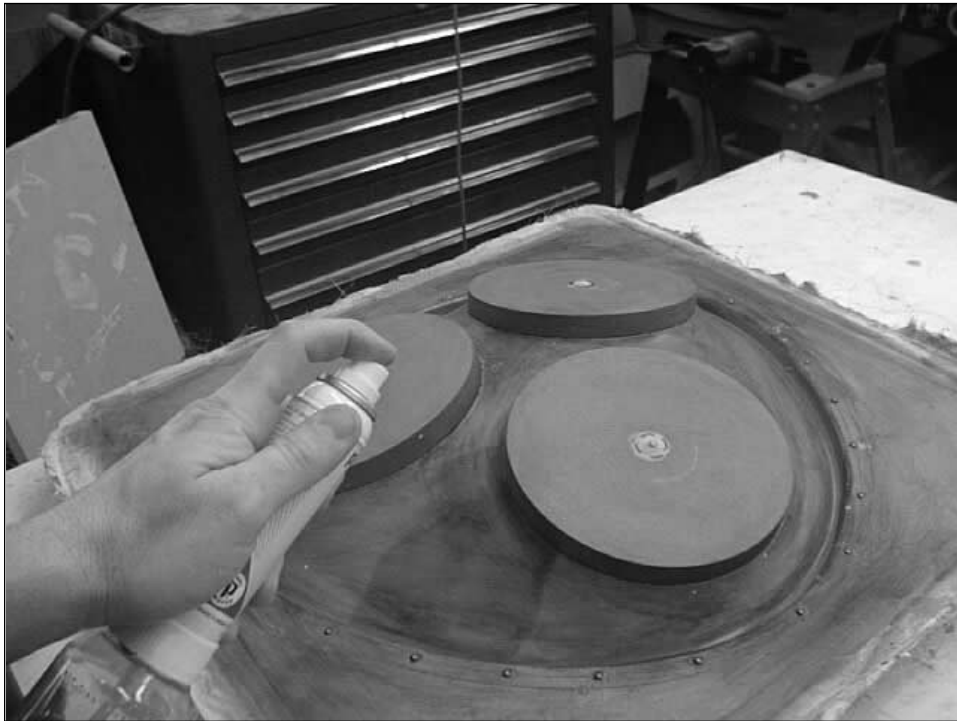
10



We applied clay to seal the bolt and T-nut area and we applied a couple of layers of release wax to the mold.

2002 MERA Training - Bedtime for Bondo

11



After waxing and buffing the mold we sprayed it with a coat of PVA.

12



The mold is now ready to fiberglass.

2002 MERA Training - Bedtime for Bondo



Section 4: Making a Fiberglass Part

In this section we will show how we applied the fiberglass to the plaster mold.

2002 MERA Training - Bedtime for Bondo

1



Before laying fiberglass, we applied a layer of gelcoat to the mold (about 1/32" thick). The gelcoat can be sprayed or brushed on.

2



Allow the gelcoat to sit for 30-45 minutes before laying the fiberglass.

2002 MERA Training - Bedtime for Bondo

3



We applied fiberglass putty to all of the sharp edges of the mold. This reinforces the edges and prevents air bubbles from forming in between the fiberglass and the gelcoat.

4



Here is the mold being "chopped" in our fiberglass department. Don't worry if you don't have a chop gun, you can lay fiberglass mat by hand.

2002 MERA Training - Bedtime for Bondo

5



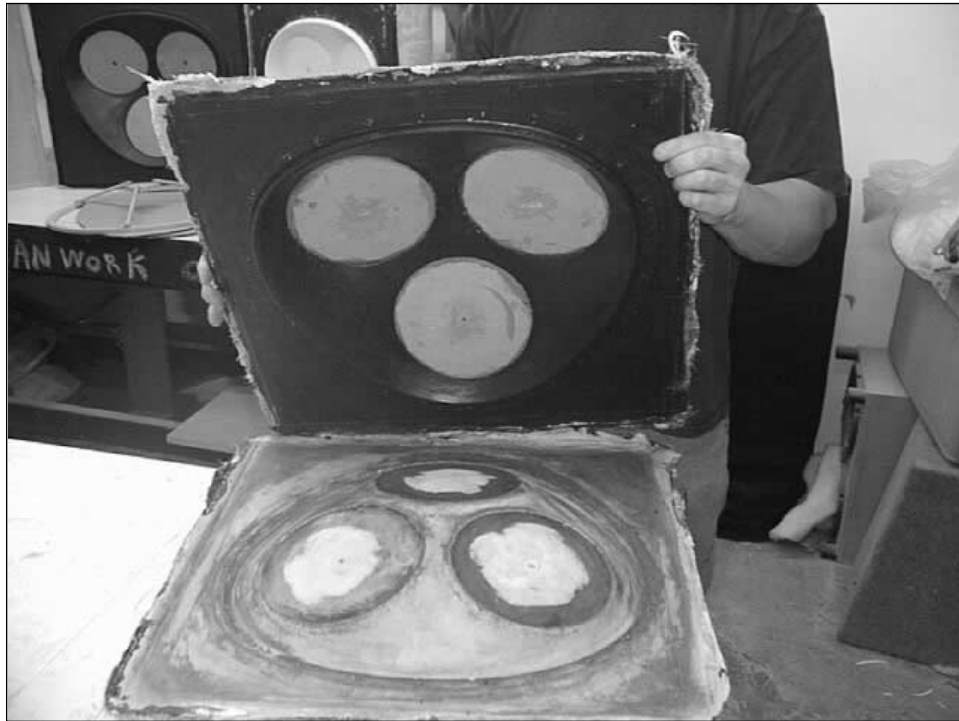
After the fiberglass was sprayed into the mold, we rolled it to get rid of any air bubbles. Air bubbles must be removed to ensure strength and rigidity.

6



The first layer is done. Once it cured, we sanded it down and applied a second layer of fiberglass. This will prevent the part from warping due to excessive heat.

2002 MERA Training - Bedtime for Bondo



Section 5: Releasing the Fiberglass Part

In this section we will demonstrate how we released the fiberglass part from the plaster mold.

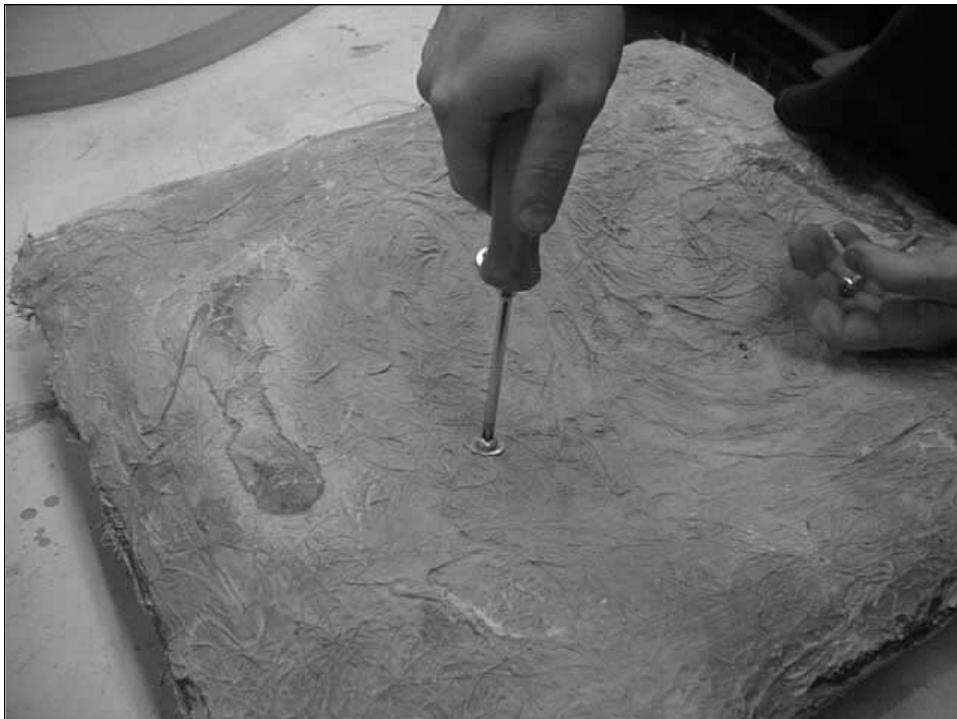
2002 MERA Training - Bedtime for Bondo

1



Here is what the part looks like after the final layer of fiberglass cures.

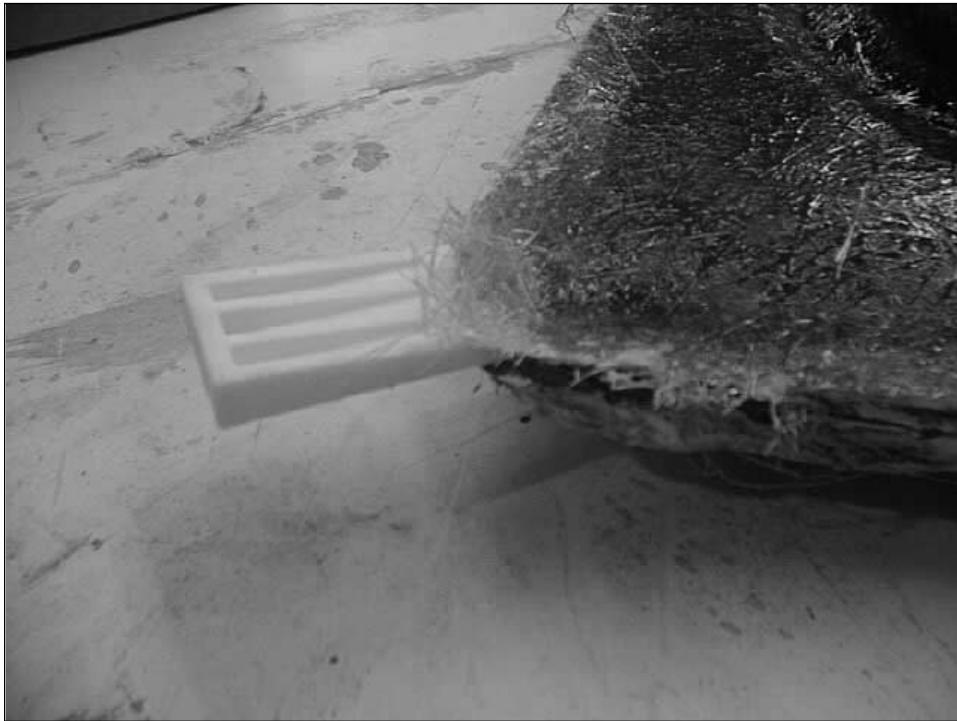
2



We removed the bolts that held the discs in place before separating the fiberglass part from the plaster mold.

2002 MERA Training - Bedtime for Bondo

3



Plastic wedges were used to release the part from the mold.

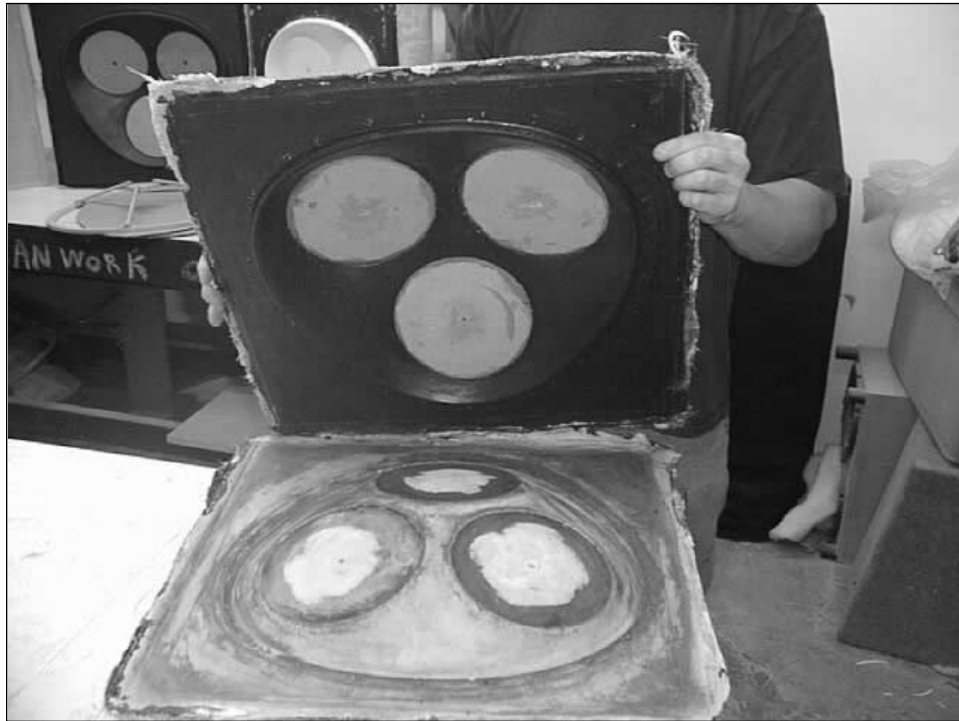
4



We lightly hammered the wedges into each corner until they released the part.

2002 MERA Training - Bedtime for Bondo

5



Separating the part from the mold.

6



We carefully popped out the discs using compressed air through the center hole.

2002 MERA Training - Bedtime for Bondo



Section 6: Trimming the Fiberglass Part

The final section shows how we trimmed and prepared the fiberglass part for painting.

2002 MERA Training - Bedtime for Bondo



We cut the holes out with a hole saw. They can also be cut out with an air saw.



Trimming the outside edge with a die grinder and a cutting wheel.

2002 MERA Training - Bedtime for Bondo

3



Drilling out the mounting holes.

4



Sanding the fiberglass plate with 150 grit sand paper.

2002 MERA Training - Bedtime for Bondo

5



We then filled any imperfections with glazing putty and sanded it smooth.

6



The finished part! Ready for primer and paint.

Parts and Materials:

Ultracal 30 (Plaster)
ABS (Plastic Sheet Material)
Grille Cloth (Think about it)
Hemp (Plaster Reinforcement, Not the smoking kind)
Klean Klay (Clay to round corners and repair)
Mold Release Wax (Releasing agent)
PVA (Polyvinyl Alcohol, Releasing agent)
Sandy (Hi-build sandable primer)
Fiberglass Putty (A combination of cabosil, resin and fiberglass chop)
Wedges (Wood or plastic)
T Nuts and Bolts (If you don't know, keep it to yourself)
Fiberglass Mat (High strength material, used for filling and laminating work)
Fiberglass Chop (Chopped fiberglass used for strength and rigidity to resins)
Fiberglass Rollers (A tool designed to eliminate air bubbles)
Polyester Resin (Hand-layup resin for manufacturing fiberglass structures)
Pam (Releasing agent, Great for cooking, we prefer butter flavor)
Evercoat Glazing Putty (Fills surface imperfections, Not everclear)
Shellac (Sealer)
Denatured Alcohol (Diluting agent)
Cabosil (Thickening additive to increase the viscosity of resins)
Gelcoat (Surface coat, providing a cosmetic enhancement for the laminate)
Plastic Pails (Duh)
Plastic Mix-N-Measure Pots (Plastic pail with easy to read measurement markings)
Chip Wood Brushes (Inexpensive disposable wood brushes)

Recommended Sources:

Freeman Mfg. & Supply (1-800-321-8511)
Select Products (1-800-458-6063)
Local Hardware Store (Home Depot, Ace Hardware, Lowes, ...etc.)
Local Auto/Marine Supply (Automotive/Marine paint and repair supply store)

Weight/Volumetric Additive Chart

Approx Vol.	% by Weight .01			% by Weight .10			% by Weight 1.0			% by Weight 1.2			% by Weight 1.8			% by Weight 2.0		
	g	cc	oz	g	cc	oz	g	cc	oz	g	cc	oz	g	cc	oz	g	cc	oz
1 quart	.11	.11	.004	1.11	1.11	.037	11.12	11.12	.375	13.35	13.35	.450	20	20	.675	22.25	22.25	.750
1 gallon	.44	.44	.015	4.45	4.45	.150	44.50	44.50	1.500	53.40	53.40	1.800	80	80	2.700	89.00	89.00	3.000
5 gallon	2.22	2.22	.075	22.25	22.25	.750	222.50	222.50	7.500	267.00	267.00	9.000	400	400	13.5000	445.00	445.00	15.000
1 drum	23.58	23.58	.795	235.80	235.80	7.950	2358.50	2358.00	79.50	2830.20	2830.20	95.00	4240	4240	143.100	4717.00	4717.00	159.00

Catalyzation

	Recommended @ 77°	Minimum	Maximum
Gel Coats	1.8%	1.2%	3.0%
Laminating Resins	1.2%	.9%	2.4%
Sandy	1.2%	.9%	2.4%

Minimum Application Temperature is 60°

Ultracal 30 Mix Ratio

38 parts water /100 parts plaster by weight

Shellac Mix Ratio

50 % shellac /50 % denatured alcohol

JL Audio Fiberglass Putty Recipe

Resin	1.01 lbs.	16.16 oz.	20 fl oz.
Fiberglass Chop	0.1 lbs.	1.6 oz.	.5 fl oz.
Cabosil	0.05 lbs.	18.56 oz.	24 fl oz.

JL AUDIO®

Ahead of the Curve™

(954) 443-1100 www.jlaudio.com



"JL Audio" and the JL Audio logo are registered trademarks of JL Audio, Inc. "Ahead of the Curve" is a trademark of JL Audio, Inc.

JL2003BBT03-2003 • Printed in USA