VINTAGE RADIO



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How to repair Bakelite cabinets

Up till now, restoring a valve radio set with a broken Bakelite cabinet was regarded by most people as a lost cause. Bakelite is a very brittle material and is hard to glue satisfactorily. Right? Wrong! Read how it can be done.

What an absolute shame it is when the inside of the set is in good condition but the cabinet is broken. How many sets are there that cannot be restored due to a broken case? How many have been consigned to the rubbish heap because what was once a beautiful cabinet is now a pile of broken junk? The value of a set with a broken cabinet (or dial scale) is almost nil.

Wouldn't it be wonderful if the cabinet from a Bakelite radio could be repaired and made to look like it did when it was first sold? Too right – you say – but it can't. Well I thought so too – they were beyond redemption if extensively damaged.



However, a fellow member of the local vintage radio club, Ralph Robertson, has shown that even badly broken cabinets can be effectively repaired.

Each collector cum restorer has his or her particular area(s) of expertise and one of Ralph's is the restoration of Bakelite cabinets. Many fine examples of his art are displayed in his collection.

For the purposes of this story, I applied his methods to an STC A-141 mantle set with a badly broken cabinet. This is the same make and model as the set featured in last month's article. In fact, if you have a good look at the photos in last month's article, you will see that it is the same set! We'll bet that few readers noticed that the cabinet had been extensively repaired.

Repairing the cabinet

I've taken nine photos to demonstrate the stages of this repair and as you can see, it is a real wreck to begin with. In fact, the cabinet would normally have been consigned to the garbage bin.

Basically the cabinet was in two halves, with the grille in several pieces and unfortunately some pieces were missing. Photos 1 & 2 show the wreck. As well, there was a chunk missing out of the top at the back. Having looked at this disaster it was time to start the restoration. Before you start, make sure you keep all the parts in a box so that none get lost.

The first step is to thoroughly clean all the pieces of the cabinet. Clean, warm, soapy (kitchen detergent) water with cloudy ammonia in a ratio of about 9:1 is used with a scrubbing brush and an old toothbrush to get all the gunk off. Rinse each piece under cold water until it is clean. Small cracks need to be slightly prised apart and a pin or similar item slipped into each crack so that it can be cleaned to the best of your ability. The toothbrush is the best item for thoroughly cleaning out the cracks or any of the cracked surfaces. Glue will not adhere through dirt and grime, so it is imperative to be very thorough.

Now the job of gluing the cabinet together is undertaken. While the method to be described is not suitable in all cases, it will be a good starting point and restorers can adapt the method to individual cabinets.

Photo 3 shows the cabinet and the bits necessary to hold it together as the glue hardens. You need a length of cord and a large rubber band cut out of an old car or bicycle inner tube. Get one from your favourite tyre store. The cord is tied to the rubber band as shown and the cord and band are wrapped around the cabinet to be glued. The cord is attached to the other side of the rubber band and its length adjusted so that reasonable tension is applied via the rubber band to keep the cabinet firmly together. It is removed after the glue hardens.

Have a trial run with the rubber band setup before applying the glue to the broken edges of the cabinet.

Having worked out how you will hold the cabinet together, dismantle the cord and rubber band and start the gluing process. Apply a bead of Araldite (TM) along the surfaces to be joined so that the glue is not proud on the outside surface of the cabinet, if at all possible. It dries a different colour to the cabinet and will show up as a visible line.

Surplus Araldite can be wiped off with a cloth moistened with acetone. On the inside it doesn't matter. This is not always an easy task as it is gooey and seems to go everywhere except where you want it and, of course, there is limited time to do the job.

I've normally used 5-minute Araldite but with the rubber strap employed, the longer setting version could be used. If you have any doubts about the freshness of your Araldite, open a new batch. Leave the glue to harden over several hours with the holding strap on. Then take the strap off and check your progress so far.

It is best to glue only one section at a time and leave just a small gap in the other surface to be joined as shown in the photograph. A couple of matches





Photo 3: during gluing, the cabinet is held under tension by a cord and rubber band arrangement while the Araldite sets. Only do one join at a time.

will keep the second break apart. The Bakelite tends to distort when broken, so by doing the repair one surface at a time it is possible to align them more accurately and get a stronger join.

Small cracks can be prised apart and a pin fitted to allow the glue to penetrate, as shown in photo 3 - in this case, above where the dial scale fits. Remove the pin as soon as the glue has filled the space.

I have had some problems with the Araldite not having as much strength as expected. To get the maximum strength, mix the two components thoroughly, stirring them until the mixture goes milky. Continue mixing



Photo 4: ice-cream sticks were shaped and glued into the speaker grille gaps. Don't laugh, the end result is effective.

until the mixture again becomes clear, then apply it to the joins. The joins are now reasonably strong although not as strong as the areas where no breaks had occurred.

The speaker grille in this cabinet was a real mess, looking a bit like a fighter who had most of his teeth knocked out. There were some pieces still with the cabinet and these were glued back into place with Araldite. The cabinet was stood on end so that the weight of the grille pieces would not cause them to move as the glue set; a messy job.

Next, it was necessary to make some more grille pieces and in this case ice-

cream sticks made almost ideal replacements. These were slightly shaped and cut to length, then glued into place – see photo 4. Using a small needle-nosed file it is possible to file away the excess glue once it has well and truly set.

Painting the grille

The ice-cream stick grille can now be painted. Before doing so, clean the area to be painted with methylated spirits. The ideal paint is oil-based, with a satin finish. This is not always possible to obtain in small tins. I had some black matt and some mission brown gloss enamel which I mixed



Photo 5: the interior of the cabinet before fibreglass was applied to strengthen it. A strip of fibreglass matting is shown in the foreground.

together. It was only necessary to add a very small amount of black to the brown to get a reasonable match to the colour of the cabinet.

With a small artist's brush, paint the ice-cream sticks and let them dry. There was a small amount of excess glue in a corner near the grille which I couldn't remove, so I also painted this to keep the cabinet a reasonably uniform colour.

Once the paint is dry, use a small fine-toothed file to file down the irregularities in the paint finish. Paint and file around three times but don't file or sand the last coat of paint. The finish will now look almost identical to the original Bakelite.

Strengthening the cabinet

The next step is to strengthen the cabinet as the glue bond is not over the whole of the broken edges and hence is not as strong as the rest of the cabinet.

Fibreglass matting and general purpose polyester resin are used to strengthen the joins. On the inside of the cabinet where the breaks were, chip away the excess Araldite with a knife or wood chisel. With 800 grade or similar wet and dry paper, sand along the glue joins for about a centimetre either side of the joins, then clean up with methylated spirits.

The full list of materials and tools used for the strengthening of the cabinet are general purpose polyester resin, catalyst hardener, fibreglass matting, pigment to suit the colour of the cabinet, acetone and a small stiffbristled brush. The resin may be available in tins as small as 250ml and the hardener is usually available in bottles of around 30 to 50ml. Pigment comes in 50ml bottles or larger (you'll use very little of it).

Fibreglass matting is available in a variety of widths and density and a suitable type is shown in the photographs. Acetone is available in tins from around 250ml. Brushes and other materials are usually available from hardware stores. Alternatively, check with organisations that deal exclusively with fibreglass materials.

The pigments are the hardest to obtain and may need to be ordered in. Dark brown is a good colour to start with but red and black may be necessary as well, as the exact colour may need to be made by mixing various colours.



Photo 6: the missing section of the cabinet was replaced with resin applied to a strip of celluloid or acetate. The materials used in the repair are shown alongside it, less the fibreglass matting.

To match the colour of the Bakelite, put a small amount of the pigment on an inconspicuous part of the cabinet so that you can carefully compare the two. By adding red and/or black it should be possible to match most dark Bakelites. If you have trouble obtaining the materials locally, it could be worthwhile contacting Solid Solutions, 19 Ardena Court, Bentleigh, Vic 3204. Phone (03) 9579 2044.

We are now at the stage of strengthening the cabinet. Cut a small strip of fibreglass matting around 20mm wide, as shown in photo 5, to match the length of the repaired crack. Pour one or two teaspoons of resin into a 35mm plastic film canister, then add around five drops of hardener and mix it well. Do not use too much catalyst/hardener as it will cause the polyester resin to shrink. A 1% hardener by weight ratio equals one drop per five grams of resin. A 2% hardener by weight ratio equals two drops per five grams of resin and so on. The 1% mixture has a pot life of around 30 minutes and the 2% mixture around 15 minutes at 25°C.

With a small stiff-bristled paintbrush, brush the mixture onto the sanded-down area along the glued joint, then place the matting along the joins. Put more resin onto the matting, working it into the matting by dabbing with the paintbrush so that it is thoroughly saturated with resin. The fibreglass can be pushed around to get it exactly where you want it. Then leave it to set.

Clean the brush and the film canister container with acetone. The resin does not stick to the plastic. Further coats of resin can be put over the original coats and sanded so that an extremely smooth finish is obtained. The sanded area of the resin goes white but when another coat is applied, it reverts to the colour of the resin or if it has been pigmented, to the colour of the pigment.

Plastic surgery

That is the easy part. The next stage is the replacement of the missing bit of the cabinet. Obtain an acetate (celluloid) sheet from an art material supplier. The sheets are around 600mm square. Alternatively, you can use celluloid from a shirt box, or similar. Cut a piece just a bit bigger than the piece of cabinet that is missing.

Attach it over the missing bit of the cabinet with masking tape – see photo

6. This photo also shows the materials needed to do the repairs.

Fortunately this is a simple curve, so the sheet will follow it without problems. However, be quite careful in ensuring that the acetate sheet follows the curve precisely and is flush with the Bakelite that it is attached to. If it isn't, the resin will seep between the acetate sheet and the Bakelite and give a step in the finish where the resin and the Bakelite butt up to one another. The resin will not adhere to the sheet.

Where curves are complex, a Plaster of Paris mould would need to be made. I won't go into how to do complex curves in this article – let's just get a simple one right.

Matching the pigment

The next step is to match the pigment with the colour of the Bakelite, by mixing various colours until the right colour is obtained. For most dark Bakelites a mixture of dark brown, black and red will usually achieve a good match. Some fibreglass outlets will mix pigments for a reasonable cost and this may be better than buying several tins or bottles of pigment.

I didn't have quite the correct colour pigment as can be seen in photo 7; my next cabinet repair will be better. This is then mixed into the next batch of resin and hardener used. This is



painted onto the underside of the acetate sheet. Once this has set, put another pigmented layer on.

Now cut a piece of fibreglass mat to overfill the broken section. Brush on another coat of resin, then lay the mat over the gap and overlap by about a centimetre onto the Bakelite either side of the gap. While it is still workable, put more resin onto the mat, making sure it is saturated. Use the paintbrush to dab at the matting, forcing the resin through any holes, thereby eliminating any air bubbles. Dabbing also eliminates any brush "drag". Allow to set, then place another fibreglass mat into the gap and do the same as for the first mat. Perhaps use a little less hardener so that the setting time is extended. If quite an area is to be built up, talcum powder can be used as a filler.

Once the resin has set, sand it so that it is reasonably smooth. Cut off any strands of fibreglass mat that protrude from the resin and clean the sanded material off. Coloured pigment can be added to the next coat but is not essential on the inside of the cabinet as the colour of the Bakelite still shows through. The last coat of resin will have pigment added to it to make sure the matting under it is completely disguised. Several layers of resin and fibreglass are applied until the material is around the same thickness as the Bakelite.

The edge of the resin and fibreglass along the rear edge of the cabinet was then sanded until it was straight and smooth. Photo 7 shows the cabinet with the acetate removed and ready to be sanded. Another light coat of resin is applied to the back edge so that it is virtually the same colour as the rest of the cabinet.

Repairing the cabinet exterior

It is likely that there will be a few bubbles in the glue on the outside surface of the cabinet. To get rid of these bubbles, use a reasonably fine file and working carefully, file the glue away. Be careful not to file the areas of the cabinet near the glued joint. The glue will file quite nicely and it is possible to get it nearly flush with the cabinet. If the join is perfect there will be no gaps, so the surface will be smooth and continuous with no bumps.

Finish off with fine wet and dry paper (grade 800 - 1200 - 2000). In many cases there will be some small gaps as the Bakelite may have splintered on breaking and have very small pieces missing at the break. It may be necessary to fill these tiny gaps with some coloured resin.

If for some reason the two sections of Bakelite on either side of the join are not level (this happens with some breaks), it is quite practical to use the file (with care) and the wet and dry paper to sand away some of the high side of the join to make it smooth. This is ultimately finished off with automobile cream cut and polish which will make the join hard to see – but not completely invisible. The cabinet looks a million dollars compared to what it looked before restoration.

The next step is to use very fine (grade 800 - 1200 - 2000) wet and dry paper (wet in water) to remove any light scratches. When rubbing, don't go too deep as it will put a dimple in the cabinet. If you can't get a scratch out, try using a spirit-filled colour pen such as a "Texta Colour" to tint the scratch.

Automotive cut and polish can also be used to remove the scratches but if you do use it you may need to use



Photo 9: this is the completed cabinet and receiver after its final polish. It's not perfect but would you have thought that the mess in photo 1 could be restored to this standard?

methylated spirits to get rid of the polish around where the spirit filled pen is to be used. The final polish won't be done until the cabinet is all in one piece.

The final polish

It's been a reasonably long process repairing the cabinet but it is really starting to look great when compared to the sorry heap of bits that we started with.

I have found that car cut and polish is very good for giving a cabinet that last little bit of a lift. Firstly, make sure that there are no obvious scratches. If there are, use the fine wet and dry paper to get these out if you can. Once they are gone and the cabinet is smooth but dull, it is then time to do the cut and polish trick.

Put some cut and polish compound onto a cotton rag and work on a small area of the cabinet, such as the top. Once it is nearly dry, use another cloth and polish the area with a circular motion – or rub the cloth backwards and forwards if there is a groove where you are working. Generally, do the cutting and polishing over the whole cabinet in sections, using the two cloths.

It can then be seen how the cabinet

has come up from the above photo.

It may be necessary to do further work on some sections to get all of the oxidised Bakelite off. The original rich Bakelite colour underneath the gunk will now be revealed – and doesn't it look good!

Fingers will mark the finish, so carefully polish the cabinet with a clean rag. Keep your fingers inside the cabinet if possible, to make sure the finish is not marred.

Well, that's about it. The cabinet, while not without some blemishes, is looking good as is shown in photos 8 & 9. The receiver has considerable nostalgic value to the owner and he was thrilled with the end result. What more could I ask!

Summary

The method that I have described in this article is not the only way in which a Bakelite cabinet can be restored. It is a method that can achieve quite satisfying results and save many a set from an unworthy end.

This was the first Bakelite repair job I have done with assistance and encouragement from Ralph Robertson. This shows that with care, you can confidently repair most damaged Bakelite cabinets. SC