Article: Non-adhesive fills for wood
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NON-ADHESIVE FILLS FOR WOOD

Tamsen Fuller

1. Introduction

This paper discusses non-adhesive fills for objects made of wood. Recently I have had the opportunity to treat a series of wood objects which have developed splits and other distortions. Most of the artifacts are of recent origin, and there was no history of the way in which the splitting would behave over time.

I was reluctant to create inappropriately rigid fills for wood pieces which might be still active, and I was equally reluctant to end with a failed system based on adhesives and fillers which could be difficult and possibly damaging to undo. I am also frequently reluctant to spend a lot of time on any one problem because, frankly, life is too short and the objects too many. These foam fills take minutes of concentrated time, compared to repeated intervals of time spent waiting for solvents to evaporate, smoothing adhesive-filler materials, and inpainting.

My work over the past few years has included many preventative conservation projects, i.e. packaging systems for storage and transit. These have given me experience with polyethylene and polypropylene in many forms and the ways in which these may be fabricated to meet specific needs. I commonly use foams, fluted sheets, films, tubing, and rods, and also frequently use these materials to make supports for objects during treatment. In storage, the usual white or translucent color of these materials is desirable for reasons of light reflectance, pest control, and generally sterile appearance.

Many of the physical attributes of the foams and other materials make them as attractive for use in treatments as they are in packaging solutions--reasonable cost, ease of fabrication, flexibility, and light weight. The problem with these materials in interventive treatments is that they are difficult to surface attractively because most of our adhesives, resins and paints will not adhere to the surface of polyethylene and polypropylene. It is clear, however, that if these foams could be made cosmetically acceptable, they could be valuable additions to our treatment arsenal for splitting and distorting wood.

Another problem is the lack of durability of foam fills which are soft and held in place only by friction fit. However, these same qualities made these fills harmless and totally reversible. During the course of the following treatments, I began to question the notion that I have held in the past that fills must be hard, color durable over the next 100 years, and resistant to damage from handling, washing, etc. Does it in fact matter so much if these mechanical fills fall out or become abraded as long as they can be easily and quickly redone with no damage to the object?

2. Case Histories

Kenyan medicine man self portrait

This contemporary portrait sculpture was purchased in Kenya and brought immediately to the Eastern United States. The arm was broken in transit, and there were radial splits in the side of the face and the front of the base. Within minutes the splits were filled with pieces of white 2 inch plank Ethafoam (polyethylene foam) and surfaced with 1/4 inch black Volara (polyethylene foam) adhered with hot melt adhesive. A soldering iron quickly produced a texture on the surface of the Volara.

Tau Tau figure

The same owner had collected this figure from Sulawesi. It had also developed a radial split in the face but was a lighter surface color which could not be mimicked by available foams.

The splits were filled with Volara 2A white polyethylene foam. The surface was colored with Liquitex acrylics and dry pigments worked over and into the surface with brushes and a heated soldering iron. Because the figure remains on the owner's darkened stairwell and is not touched, this was a successful treatment.

Tau Tau rack

By coincidence, the next treatment was another Tau Tau artifact, a miniature rack with figures. The rack was the problem, coming apart as the fresh wood distorted and its bark came off (Figs. 1, 2).

The gaps between the back slats and the frame were filled and the upcurved slats supported with pieces of Ethafoam polyethylene foam. Pressure was brought to bear with pieces of Coroplast (corrugated polypropylene sheet) held in place with pointed lengths of polypropylene welding rod (Figs. 3, 4). The ends of the rod were heated to curl the end so that it protruded less and put more pressure on the Coroplast washer (Fig. 5).

Thickened Rhoplex N580 acrylic emulsion was used to adhere pre-tinted Japanese tissue over the white foam where it showed through to the front of the rack (Fig. 6). Used as a contact adhesive, that is, applied to both substrates and allowed to dry before joining, this adhesive was a successful bonding agent.

The system is visible from the side and top, but the object is not viewed from these directions while on display in the owner's home (Fig. 7). From the front, the white materials are camouflaged, and with the Tau Tau figures in place, the owners were pleased.

Cameroon table

This table from the Cameroons is carved from a single tree trunk and has a round slab top, carved cats as the legs, and an open circle as the base. The top and the base have many radial splits. The splits in the top were filled with black Volara and wax was used as a surfacing agent. A heated soldering iron was used to slightly melt the polyethylene foam and the wax together. Since this treatment, I have used dry pigments alone, first brushed over the surface or picked up on the heated iron tip, to tone the foam, again heating and melting the surface of the foam to incorporate the pigment.

Stabilizing the bottom splits was a different type of problem, as the splits were both completely separated as well as quite narrow, some only .2 cm. wide. In addition, the interior of the splits was often splintery, and the lack of tensile strength in the Volara polyethylene foam made it impossible to draw a piece of foam through the entire split. It was found that two pieces of 4 mil polyethylene sheeting could be drawn through the splits, however.

It then proved possible to roll out a sheet of Pliacre epoxy putty, place it between two larger sheets of polyethylene film, insert the film through the split, and begin pulling the pliable epoxy through the split. Once the putty/film sandwich filled the split, it was left for the epoxy to cure. The excess epoxy was broken away and finished with mechanical means, and the excess polyethylene film cut with scissors or blade. A heated spatula was used to produce complete retraction of the excess polyethylene film into the split in the wood. The epoxy was inpainted with acrylic emulsion paints.

The polyethylene film cushions the fill system, so that the rigid epoxy does not cause problems if the wood should move in response to RH changes. The system is mechanically reversible, because one split is considerably wider than the others and relatively straight sided. The fill in that split can be pulled out, allowing movement in the rest of the splits so that they can be widened and their own fills pulled out.

3. Conclusion

Polyethylene foams offer an alternative means of filling splits in wood objects. The foam fills are easy to shape, can be surfaced with heat, wax, dry pigments or acrylic paints, and require very little expenditure of time or money. Combinations of materials, such as Ethafoam and Coroplast, or polyethylene sheet and epoxy putty, may solve problems where a single material will not be adequate.

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Sources of Materials

Polypropylene welding rod:
United States Plastics Corp.
1390 Neubrecht Road
Lima, Ohio 45801
1-800-537-9724

Coroplast polypropylene sheet:
Coroplast, Inc.
4501 Spring Valley Road
Dallas, Texas 75244
214-392-2241
1-800-666-2241
Fax 214-392-2242

Rhoplex N580 adhesive:
Conservation Materials, Ltd..
1395 Greg St., Suite 110
P.O. Box 2884
Sparks, Nevada 89431
702-331-0582
1-800-733-5283
Fax 702-331-0588

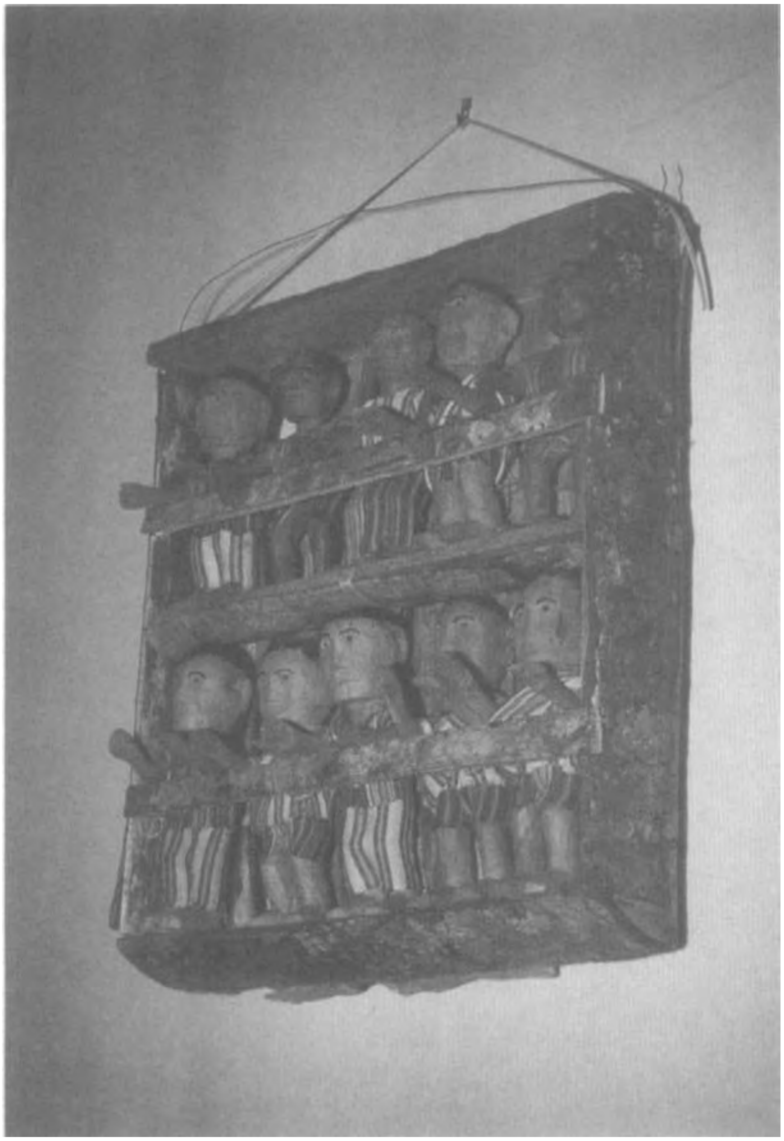

Figure 1. The Tau Tau rack and figures after treatment.

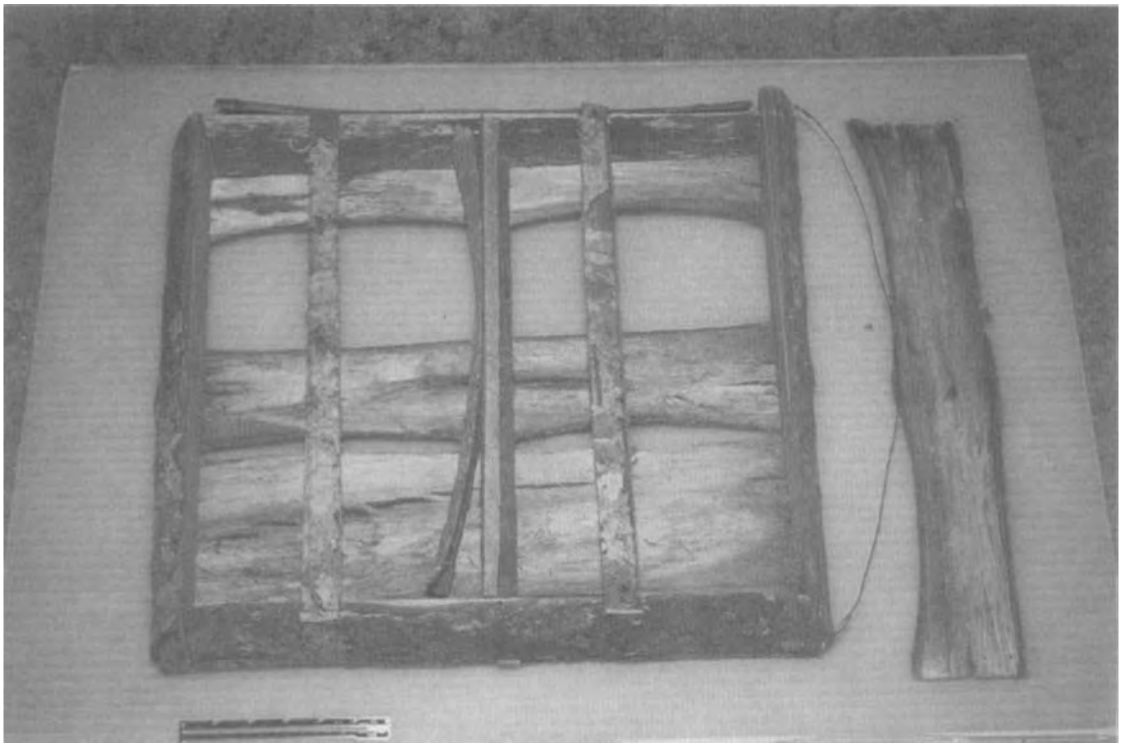

Figure 2. The rack before treatment, showing the warped back.

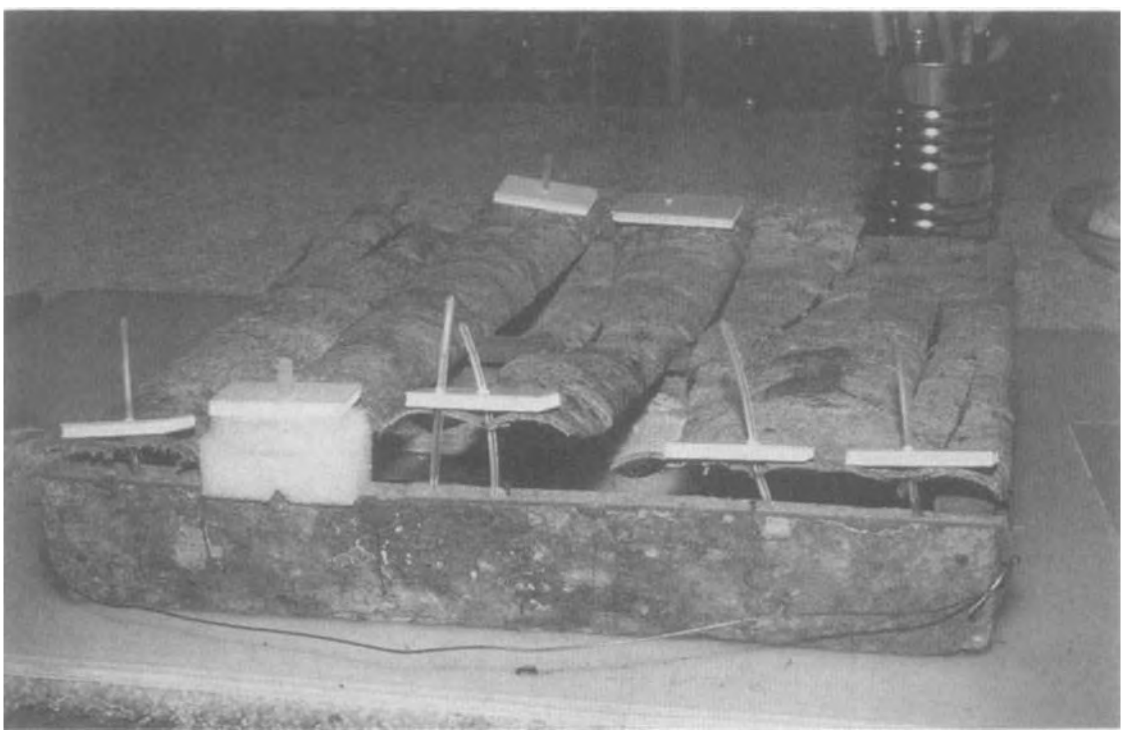

Figure 3. Clamping or pressure system with polypropylene rod pins and Coroplast.

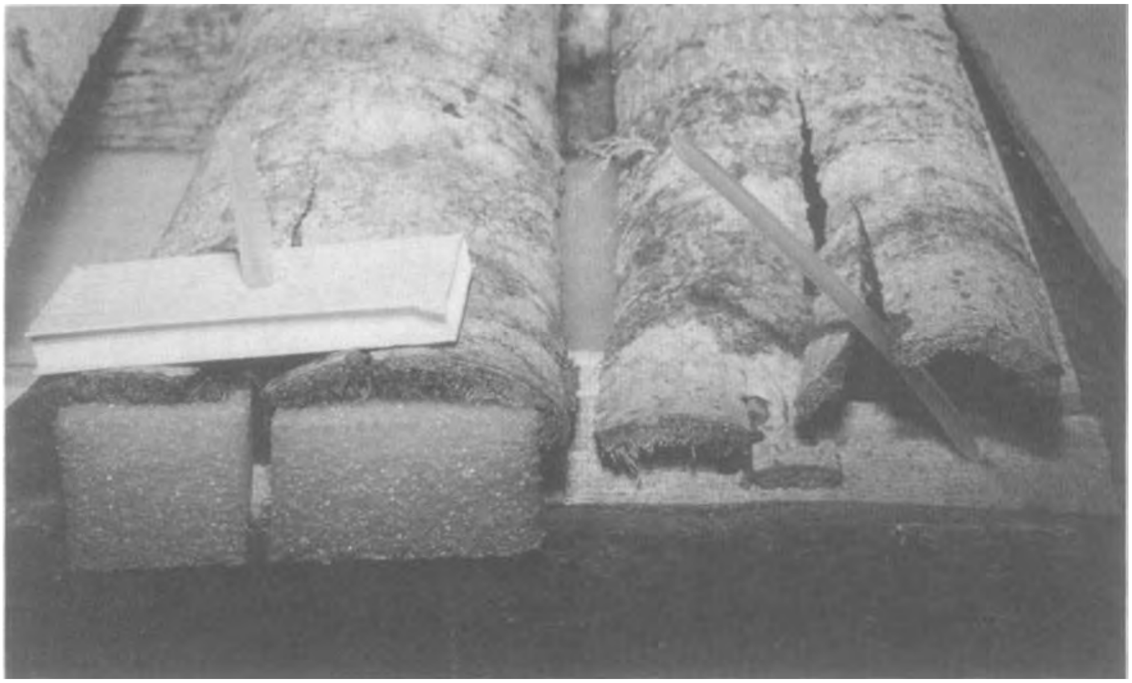

Figure 4. Same as Fig. 3, with the Ethafoam block wedges supporting the bark and completing the system.

Figure 5. The polypropylene rod pin is heated locally and curled to make a head.

Figure 6. The rack showing tinted paper adhered to Ethafoam blocks with Rhoplex N580.

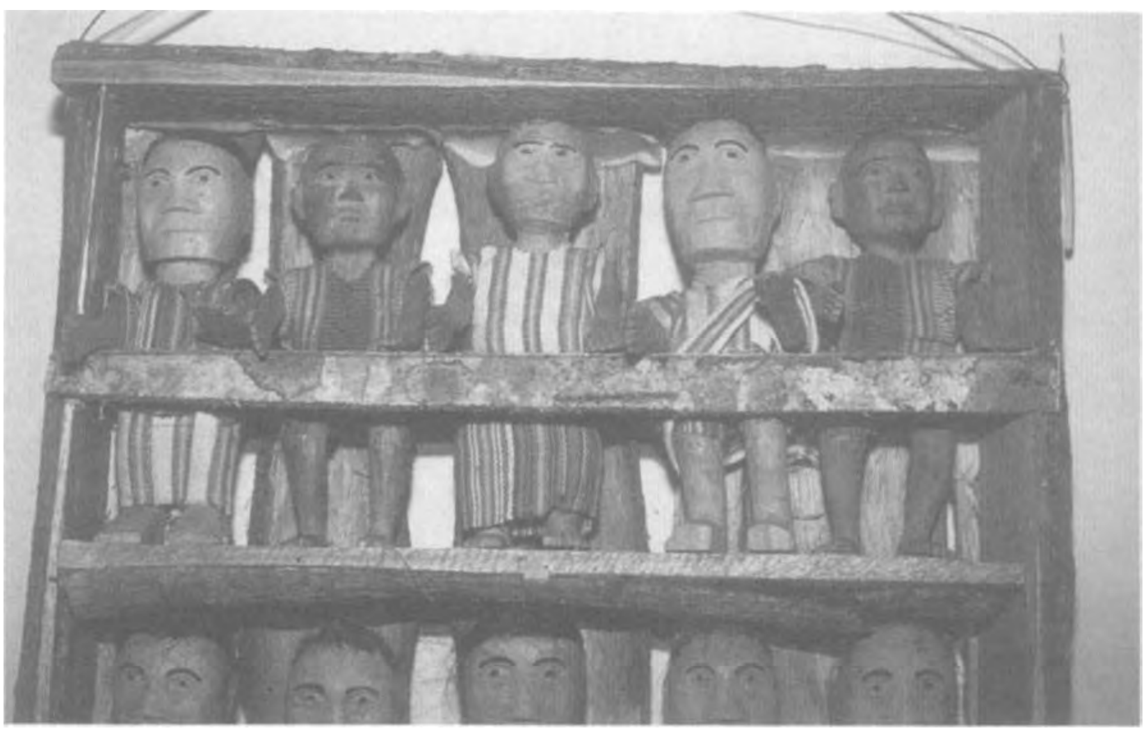

Figure 7. The figures installed, making the rack mends less noticeable.