Article: How would you mount a Rambaramp?
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HOW WOULD YOU MOUNT A RAMBARAMP?

Christine Del Re and Paul Countryman

Introduction

In 1986, the Field Museum of Natural History in Chicago embarked on a major renovation program of its permanent exhibition galleries, in preparation for its Centennial in 1994. Part of this exhibition renovation program included the reinstallation of its world famous Pacific ethnographic collections. The first section of the exhibit, entitled "Traveling the Pacific", opened to the public in November 1989. The second phase, called "Pacific Spirits", was completed a year later.

The Figure

One of the objects chosen for installation in "Pacific Spirits" was an ancestor figure from Vanuatu called a Rambaramp (Figs. 1-3). Vanuatu, a group of islands in southeast Melanesia, was known prior to 1980 as the New Hebrides. It lies to the northeast of Australia and is located between the Solomon Islands in the north, and New Caledonia in the south. This figure presented both the Conservation Division and the Design and Production Department with unusual mounting and display challenges, which will be the focus of this paper.

Purpose, Cultural Significance and Technology

A Rambaramp figure was a commemorative statue, or rather a memorial figure, that was made of a man who had died; when it was produced, the skull of the deceased was incorporated into the figure. The actual size of the figure, its decoration, and the care with which it was executed depended on the rank that the deceased had achieved in one of Vanuatu's male-only secret societies. In fact, all of the designs painted on the figure, and all of the decorative elements on it, reflect the rank and status that the man had attained while living. The Rambaramp figure traditionally resided in the men's ceremonial house of the village and was brought out to participate in important ceremonies that took place in the village.

Materials and Technology

The Rambaramp figure is made with a human skull; a human hair wig; two necklaces, one of fiber and one of oliva shells; a spider conch shell for its proper right hand; and the jaw of a young pig for its proper left hand. Its torso, arms and legs have an interior structure of bamboo poles wrapped with multiple layers of pandanus leaves. The layers of pandanus leaves appear to alternate in direction -- one horizontal and one vertical -- with the topmost visible layer of pandanus leaves on the torso and legs oriented vertically. This final layer was then bound horizontally with thin bands of another plant fiber.

Covering the pandanus leaves is a layer of what is referred to in the literature as a vegetable paste, made of coconut milk, breadfruit juice, and ground creeper root. The paste was then painted with black, white and two different shades of red. The pattern, as already mentioned, depended on the rank achieved by the dead man during his lifetime.

The head is made from a human skull which contains both human and pig's teeth. The skull, like the body and torso, was also covered with vegetable paste. The paste was modeled to resemble as closely as possible the deceased person it is representing, and then painted. Atop the skull sits a human hair wig made on a cane framework.

A palm leaf sheath is wrapped around the ankles of the figure, which has no feet. When used outside of a men's house in Vanuatu, the figure would have been displayed by sticking the bottom of the legs directly into the ground.

Condition

The overall condition of the figure was fair to poor. There were a number of structurally weak areas: both "hands" were only loosely connected to the arms, the head/neck attachment was insecure and unstable, and both of the arm/shoulder joints appeared to be unstable. These four unstable areas were, not surprisingly, those areas that were secured with vegetable fiber lashings. The vegetable paste layer in these areas was broken, damaged and coming apart. There was considerable movement in all of these areas, but nothing actually appeared to be in immediate danger of falling off. In fact, the movement of the arms had caused considerable damage to the pandanus leaves and vegetable paste on the proper right hip

It seemed safe to assume that the weaknesses seen in these areas were caused by obvious inherent vice in the manufacture of the piece, aggravated by 100 years of improper mounting conditions. The Rambaramp figure had been displayed vertically with no secondary support systems from 1892 until the recent past. We assume that the figure was mounted simply by placing pipes up the bamboo in the legs.

The leg/torso connection was solid, as was the torso proper. However, multiple layers of pandanus leaves were broken in the upper chest area underneath the fiber necklace. The vegetable paste layer had been lost from this area. The structure of the upper chest in general was weakened, but it was not falling apart.

Conservation and Exhibition Criteria for the Mount

1. Conservation Criteria

Before we began to evaluate the artifact, the Conservation Department felt that, given the ephemeral nature of the artifact, the only way to guarantee the long-term preservation of the object would be to display it in a horizontal position.

The evaluation, which included both examination and handling of the artifact itself, and a thorough examination of two full sets of X-rays, was done in collaboration with the mount makers who would be responsible for mounting the object. This assessment showed that the head was not laterally stable on the figure and was quite heavy, thus making the object itself top-heavy; and we were uncertain about the amount and strength of the internal bindings. Furthermore, we were concerned that the constituent materials, which were almost entirely dried plant materials, had become desiccated and brittle over the years, and as a result could not be expected to maintain their support and structure indefinitely. In addition, the object had been displayed inappropriately for a very long time. An unknown degree of stress had been placed on the materials and the object itself as a result of these old mounting methods.

Having assessed the results of our examination, we decided that the figure required a well-designed mount that would fully support it, and that specific parts of the object needed support with separate brackets. Each hand required a bracket that would support it, along with the weight of the entire arm, so that the vegetable paste would not continue to fracture in those areas. The head and neck needed their own support, as did both legs. We also wanted to make a body cast for the object to support it in its entirety, since we felt that no matter how stable the artifact appeared at present, the materials that the figure was made from would not be able to support their own weight indefinitely.

2. Cultural and Curatorial Display Criteria

After consultation with the Director of the Vanuatu Cultural Centre, our exhibit developer stipulated that the eyes of the rambaramp figure be located so they would be above the eye level of any female visitor to the exhibit. No woman may look down upon a Rambaramp! We therefore needed to determine the average height of our typical female visitors, in order to meet these cultural height and eye-level criteria.

Our exhibit developer also felt very strongly that the figure be displayed in an upright, vertical position; as it had been for some sixty years previously. She emphasized the important fact that a Rambaramp was not considered "dead" in its cultural context; she felt that displaying the figure in an upright posture would make it look alive. This posture would help convey that message to the public. (We must confess we had considerable difficulty believing that any visitor would think this figure was anything but dead, even if it was in a vertical position!)

These were the conflicting criteria that we had before us when mount development began. As is often the case in conservation, balancing the long-term preservation needs of the artifact against its educational function in a public exhibition was going to be a challenge.

At this point, taking into account requests from the Developer, in a spirit of compromise, we recommended that the figure be displayed at a 45-degree angle to ensure the long-term preservation of the piece.

Mount Materials

1. Conservation Criteria

The conservation criteria that the mount material had to meet were ones familiar to all of us. The material should be inert and stable, and not generate any degradation products that might be harmful to the artifact over time; however, it also needed to be strong.

Given the delicate and fragile nature of this particular artifact, we felt that it could not tolerate very much handling while its mount was being made. We wanted a material that could easily be manipulated, would readily conform to the curves of the figure, and that would cradle the artifact as completely as possible to support its dry and brittle fabric well into the future.

We also left open the option of raising the angle of the object slightly, if the mounting system that was developed could support the piece sufficiently to allow for the weight transfer.

2. Mount Shop Criteria

The mount shop had to meet its own criteria in making the mount for this object. The usual round and flat metal stock that was often used for mounts would not be wide enough to provide adequate support for the entire piece. The use of Plexiglas was ruled out for a number of reasons, largely because it would not be possible to fit the Plexiglas adequately around the piece due to its fragile nature, i.e., the object could not be handled the way a piece of wood or bone could be to fit the Plexiglas around it. It also seemed that the Plexiglas would have to worked in rather small pieces to get it to fit adequately, and then these smaller pieces would need to be joined together.
Initially it seemed that making a polyester resin and fiberglass cast would be the ideal solution, but the potential safety hazards of using such large quantities of polyester resin in our mount shop facilities could not be adequately addressed with the resources available at that time.

It was at this point that we decided to investigate the materials used in the medical field to make body casts, since that was essentially what we wanted to do: to create a body cast to give adequate support to the object.

Orthoplast

The material researched and tested as a mount material for this object is called Orthoplast[1]. It is commonly used as a splint material for fracture and body braces. Orthoplast is made from trans-polyisoprene, a rubber product, and is a thermoplastic material softening at 150-170^{0}F. It has excellent strength and moldability properties, and can be formed at moderately low temperatures by warming it with water or dry heat. At this temperature (150-170^{0}F), the crystals melt and slowly reform. Recrystalization takes about 20 minutes.

Orthoplast is an unusual thermoplastic material, combining excellent formability, strength and cohesion in a way that simplifies the fabrication of even the most intricate mount designs. It is a durable yet versatile material that can be cut or molded to any shape when heated, and it will adhere to itself, or "self-bond," when hot. This bond is very strong and can withstand a 100 lbs per inch pull test.

The material can be riveted, strapped, bonded, hinged or butt-bonded to meet any mount-making needs; and it can easily be cut and molded to curved contours without wrinkling. Edges can be easily trimmed and finished. Setting time, from heating to complete cooling, is three to five minutes.

The use of Orthoplast for this particular application greatly appealed to us because it was so easy to deform at moderate temperatures, and it would conform so well to the object with little manipulation.

Technical Data [2]

The technical data available about Orthoplast states that it is made from *trans-polyisoprene.* Gutta percha and balata are natural products predominantly made of trans-polyisoprene. *Cis-poly-isoprene,* the isomer of *trans-polyisoprene,* is the composition of rubber directly taken from the tree. Isoprenes have a naturally occurring double bond and consist of pure hydrocarbons. <u>No</u> sulfur-bearing materials, mercaptans, or chlorine compounds are used in the manufacture of Orthoplast; only antioxidants are added during manufacture. Orthoplast will probably embrittle over time due to oxidation, but it seems that the process of embrittlement can strengthen the material, which we see as an advantage in our application.

In its most common application in the medical field, as a body brace, Orthoplast will develop stress cracks after 6-8 months of constant daily use. However, our application would be to keep the material under a constant static load, and not expose it to continual stress. Richard Green, a research scientist at Johnson & Johnson (the manufacturers of Orthoplast) felt that it would last as long as any other currently used rubber or plastic material. He also stated that if the material was worked and left for 2-3 years, it would embrittle through oxidation, and could not be re-worked and probably would not adhere to itself if reheated after oxidation, but he did not believe that it would otherwise lose its shape or deform (creep) over time.

Orthoplast comes in 18" x 24" plain sheets, and 24" x 36" perforated sheets. We used the larger perforated sheets for this project.

Testing

Orthoplast was subjected to three-months of (contact) Oddy testing, using the prescribed silver, lead and copper alloy blanks, and yielded good results.

Scott Williams of the Canadian Conservation Institute analyzed Orthoplast and found it to be composed of the hydrocarbon polymer trans-polyisoprene with amorphous silica inorganic filler. Hydrocarbon plastics generally do not produce harmful degradation products as they age. No extractable components or any other materials detrimental to its use in conservation were detected in the product. Based on his chemical analysis, he considers Orthoplast to be chemically suitable for use in conservation.

Mount Fabrication

Before work with the Orthoplast began, construction-paper patterns were made to define the outline and basic shape of the figure. Four patterns were needed for the full mount; these were then cut out of the Orthoplast with regular surgical scissors.

Before the Orthoplast can be worked, it needs to be heated with a heat gun; it can also then be solvent bonded with trichloroethylene. We used the solvent as a precautionary measure; it is not necessary to get the material to bond. The areas to be joined must be heated thoroughly. The working temperature is about 160°F, but the easiest procedure is just to heat the material until it responds. Curing time after application of the heat gun and solvent is five minutes. We used Tyvek or Mylar as a separating layer at all times between the object and the Orthoplast [3].

Because we were concerned about possible failure of the polymer over time, despite the fact that it would be used in a static load situation indefinitely, the mount makers decided to reinforce the Orthoplast body cast with a flat stock and half round steel support[4]. The steel support that holds the body cast and legs was welded together; the separate attachments for the hands and head were soldered. The support was bonded to the main Orthoplast support with small strips of Orthoplast that were securely solvent-welded to the back of the body cast (Figs. 2-3).

The supports for the legs were difficult to make. Previous mounting systems had damaged the ends of the original bamboo legs, and one leg was shorter than the other. Using a combination of a flashlight and the X-rays, we located the nodes in the bamboo legs, and found that both legs had previously had something pushed up into them which perforated the first node in each bamboo pole. Having discovered these existing holes in the nodes, we felt comfortable putting something else in as a support, provided it did not fit too tightly.

The materials chosen were 1/2" steel rod and a steel pipe into which the rod would fit. These were padded with ethafoam at the top. The pipe was inserted up to the first node; the rod passed through the hole in the node and stopped at the second node, which was unperforated. This arrangement allowed the figure to be supported in two places. An extension was added to the shorter leg so that the figure could stand on two legs of equal length.

The head was supported with flat brass stock; steel could not be used because it was too thick and the wig would not fit over it. The support was made in a cross pattern. A hollow half-sphere of Orthoplast was placed on the support to cradle the occipital bone at the back of the skull. The mount provides excellent bracing for the skull in that area. The wig then fits over the brass support.

The interior contour of the conch shell was duplicated using an annealed piece of 1/16" brass stock. The other mount for the jaw bone was made using the same brass stock. It has four little clips on which the jawbone rests; the mount does not actually grip the jawbone, but simply supports it from underneath while gravity holds it in place.

The two hand brackets are held in position with half-rounds of steel and tubular slip rings. The mount that comes down from the arm is made of half-round steel and has a set pin soldered into place. The hand mount, which is also made of half round steel, is held in place by a tubular slip ring that slides down into a set position. This in effect holds the two half-rounds together, and keeps the mount from pivoting. The two hand mounts are simply held in position by the slip ring; they can then be de-installed by sliding up the slip ring and removing the mount.

Mount Finishing

Because we were extremely concerned that the surface of the body cast might become tacky over time, and in response to aesthetic requests by the Design Department, the Orthoplast body cast was finished as follows. A layer of CODA, an acrylic film adhesive[5], was applied directly to the inside of the Orthoplast. To that we applied a layer of Testfabrics cotton velveteen, which had been dyed a light beige, in the hope that the mount would "disappear." The artifact was then separated from these layers by a sheet of Mylar that was cut in the shape of the figure. This ensured that the object would not be resting directly on the rubber-based material, should it became tacky, and it also served as a barrier between the Orthoplast and the object should it start to off-gas in the future.

Final Exhibition Appearance

Our final compromise in conservation was to allow the figure to be displayed on a 55 degree angle, since it seemed that the mount more than adequately supported all of the delicate and fragile areas. Raising the artifact to that angle did not seem to cause any perceptible gravitational shift of the materials in the object.

In conclusion I would like to say that we were very pleased with the results that we obtained working with this material on this particular artifact and under these conditions. We feel that the working properties of Orthoplast were ideal in these circumstances.

I would like to recommend that this material be considered for wider use in similar applications, especially where the object can be protected from its potential drawbacks -- with barrier layers, or a secondary support system. It also can be potentially very useful for temporary mounts, or other similar short term uses [6].

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(At the time this work was done both authors were employed at the Field Museum of Natural History)

Endnotes

1. Orthoplast, which is identified as a low temperature splinting material, is available from one of the large national orthopedic and medical supply houses such as Alimed (1-800-225-2610) or Sammons Preston (1-800-323-5547).

2. Technical information on Orthoplast was provided verbally by Richard Green, presently a consulting engineer with Johnson & Johnson. He was previously in the Research Department at Johnson & Johnson for 25 years. Address: Richard Green, Operations Department, Johnson & Johnson Professional, Inc., 501 George St./ED 206, New Brunswick, NJ 08901.

3. Madeleine Fang of the Phoebe Hearst Museum of Anthropology has had success using a plastics welding heat gun to join Orthoplast. She used a Leister-Gibly model that heats to 100-600°C. One could also use a Makita Wall Stripping heat gun that heats to 1200°F.

4. Orthoplast has been found to become brittle with oxidation and through use. Previously heated and worked samples recently (January 1996) found in the mount shop of the Field Museum did crack when put under load. Therefore the original use and application of this material is still as recommended in this case study: under constant static load, and with a support system. However, I feel that its low working temperature and its ability to form easily over fragile and sensitive materials still offers considerable advantages.

5. CODA acrylic sheet adhesive is available from 194 Greenwood Ave., Midland, NJ 07432 (201-444-7755).

6. During the course of my follow-up research for the publication of the article a number of other similar materials have come to my attention. One is Orthoplast II (a polycaprolactone, R. Green, 1/96) which is less strong than Orthoplast but less expensive, and without the double bond (therefore with better aging properties). Another material is Aqua-Plast, a polyester material sold to the theater and crafts industry 1-800-526-5247 for information). A third possibility is a house brand of Aqua-Plast made by Alimed (see note 1. above) called Multi-form Clear Elastic (this is under development and may not be available yet). I think that all three merit testing and research by the conservation profession. It would also be useful to talk to doctors, physical therapists, etc., to find out what they are using for low temperature splinting materials, and investigate all of those for use in conservation and mount-making applications.

Figure 1. Rambaramp figure before treatment.

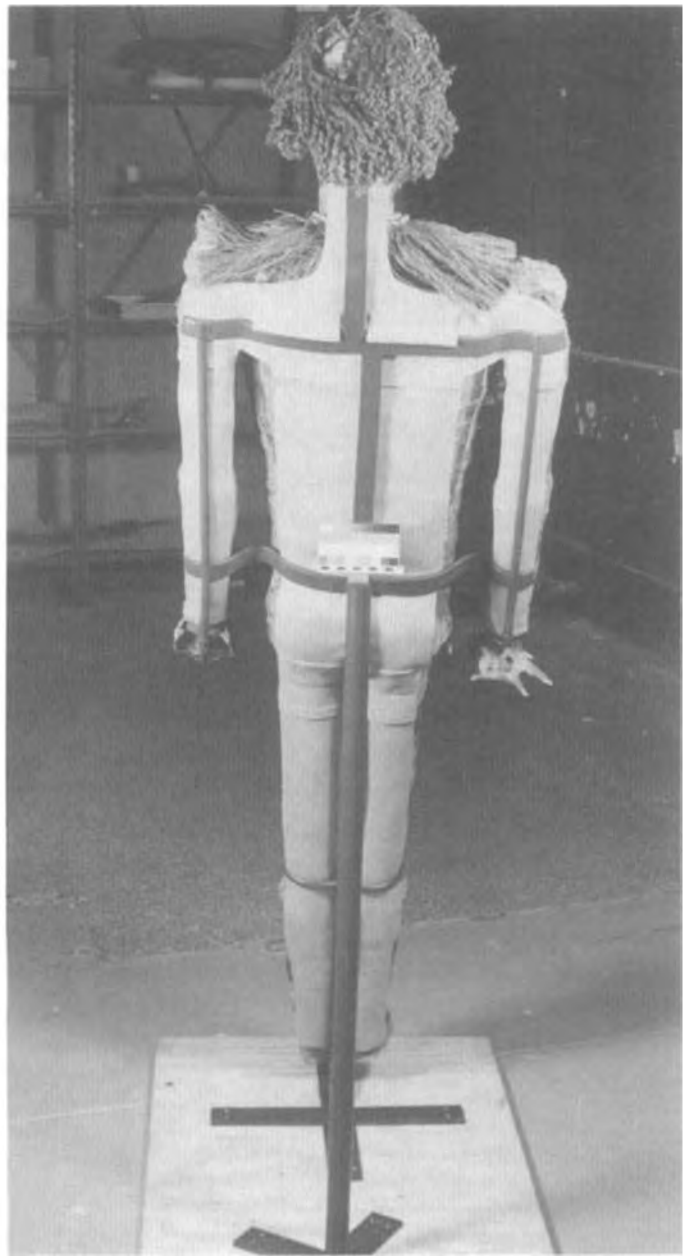

Figure 2. Rambaramp after treatment, back view.

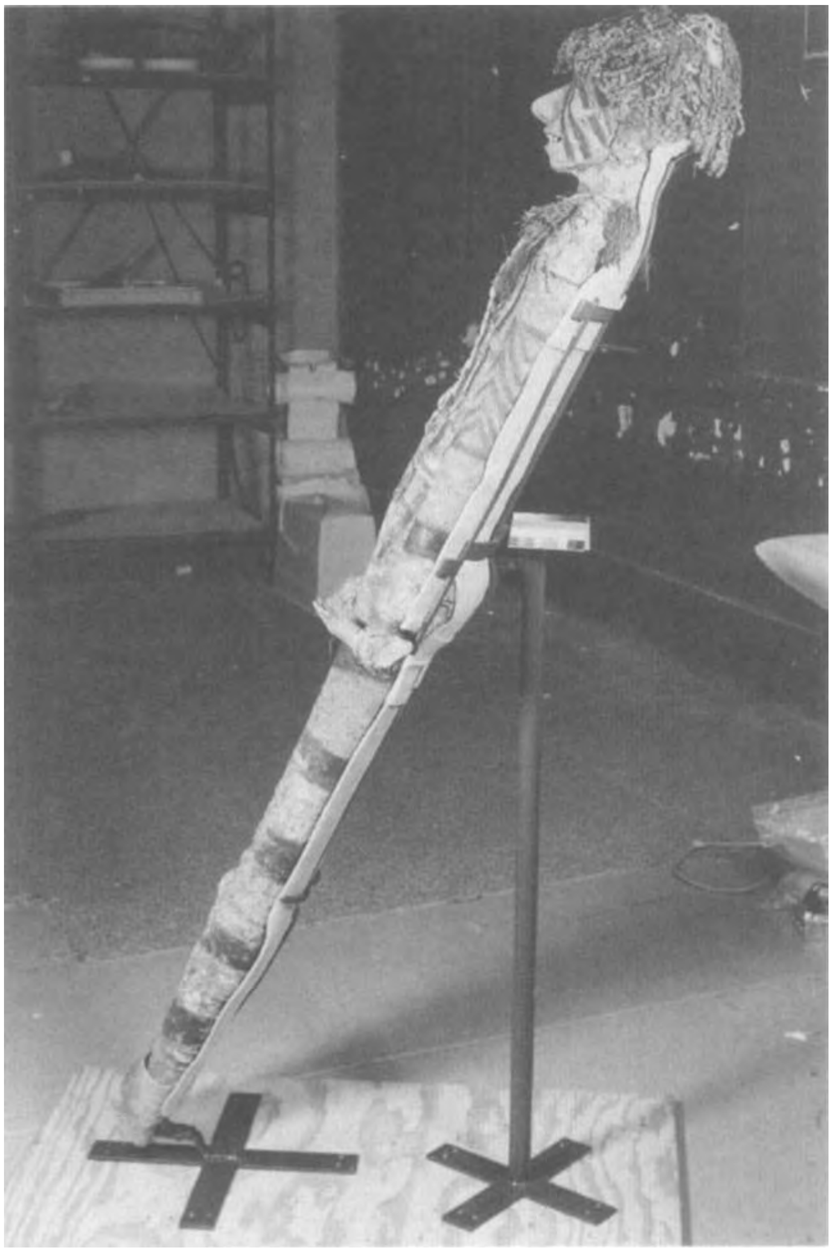

Figure 3. Rambaramp after treatment, side view.