



Conserve O Gram

July 1993

Number 17/3

Crating Museum Objects For Shipment

The following method for crating objects for shipping was undertaken by Mesa Verde National Park staff for a traveling exhibit, *Gustaf Nordenskiold, Pioneer Archeologist of Mesa Verde*. As presented in *Conserve O Gram* 17/2, the objects in this exhibit were cavity-packed inside cardboard boxes in preparation for constructing the shipping crate and *floating* the artifact box within it. This package-within-a-package method provides a safe environment for objects during transit. For a further discussion of packing and shipping museum objects, see the *NPS Museum Handbook, Part I (Rev 9/90)*, Chapter 6.

Crate Construction

A crate constructed to transport museum objects needs to meet the following requirements: provide a barrier against water, absorb low-level vibration and high-impact blows, and facilitate easy handling. The floating, or double packaging, method of packing objects calls for an outer container, in this case, a crate constructed of plywood, with cushioning material of sufficient weight to support the object on the interior. Polyethylene foam (e.g., Ethafoam®) used in this project is among the best materials. Clean, unused newsprint and loose peanut-shaped plastic fill (e.g., Pelaspan-pac™) in sealed, polyethylene bags, never loose, are materials that accomplish similar results. These cushioning materials, into which the boxed object is nestled, will absorb vibrations and shock during shipment.

The interior size of the crate is determined by measuring the size of the box in which the object(s) is/are packed and adding to this measurement two to three inches on all sides to

allow for the cushioning material. If more than one box is to be shipped per crate, allow for Ethafoam or other cushioning material between each box.

Crates should be constructed and the Ethafoam cut in a separate space from the exhibit hall to minimize the amount of dirt and dust near the objects. At Mesa Verde National Park diagrams of the crates were prepared and given to the park carpenter who cut the plywood and assembled the crates. If facilities for this work are not available on site, it is possible to contract with a shipping company or local carpenter to construct the crates. In either case, exact measurements and specific instructions must be provided.

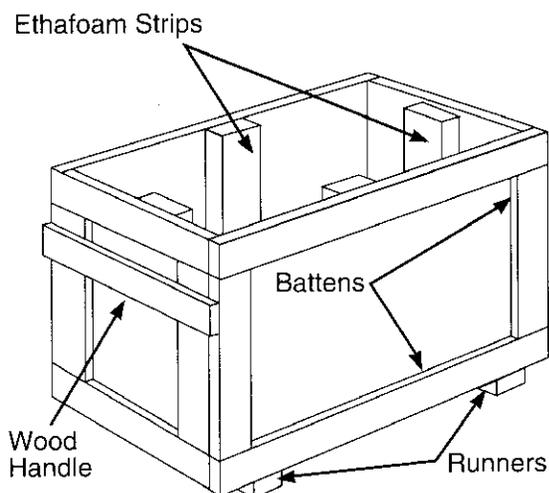
A crate made of 1/2" AC exterior-grade plywood (one surface finished, the other rough) is thick enough to protect most objects from possible blows encountered during shipment; however, 3/4" plywood may be needed for very heavy objects. The cut plywood is joined using waterproof glue and nails; 1" x 4" pine battens are screwed, nailed, or pneumatically stapled around outer edges.

The bottom of the crate extends to the outer edge of the battens and is attached with waterproof glue and nails. The lid also extends to the outer edge of the battens. Holes are drilled along the edges of the lid in order to attach it with screws. **NOTE:** Do not use nails to attach the lid to an object crate; the vibrations produced from hammering and removing them cause undue stress on the object(s) inside. In addition, the nails can be dangerous to the person who unpacks the crate.

Runners, usually made from pine or poplar

wood, should be attached with screws along each end of the bottom to raise the crate off the floor for ease in movement. One- to two-inch-high runners may be sufficient for crates that can be carried by two people. Runners on crates built for shipping large or heavy objects should be 4 to 6 inches high and bolted to the bottom. This will raise the crate off the floor high enough to allow it to be moved by pallet jack or forklift.

For ease in carrying and moving, crates should be fitted with handles. Handles can be made by attaching sturdy wood strips to the battens on two opposite sides, parallel to the top and approximately one-fourth the way down the crate. Metal handles also can be purchased for attaching to the crate.



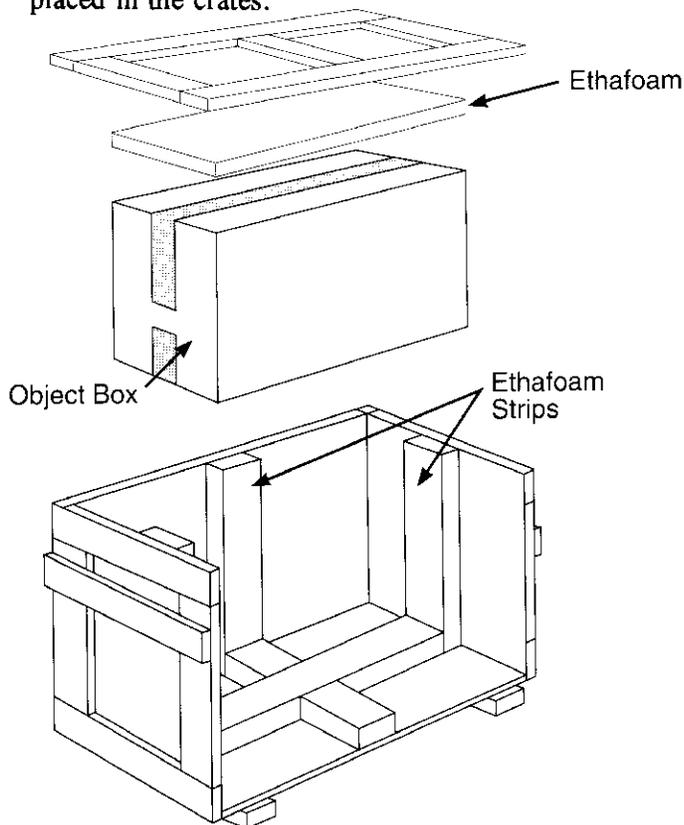
Both the interior and the exterior of the crate can be sealed to protect against moisture. The crate can be sealed with water-based aliphatic urethane (Polyglase Waterborne Finish) or polyurethane (needs two weeks to cure). When shipping a number of crates, all the exteriors can be painted the same color to facilitate identification during transportation and storage at the various parks, centers, or non-NPS institutions.

If strips of Ethaf foam are used for the cushioning material, they can be adhered with polyvinyl acetate (PVA) adhesive or double-sided tape to the sides and bottom of the crate. Ethaf foam can also be attached to the lid, or a loose sheet of

Ethaf foam can be placed on the top between object box and crate lid before closing the crate. This leaves the underside of the lid available for affixing instructions. Depending on the size of the crate, one strip centered per side or several strips placed at intervals may be necessary. Balled-up newsprint or plastic fill in bags (loosely sealed to withstand pressure difference if shipped by air and/or to a high altitude location) are packed snugly around the box so that the box cannot shift during shipment.

Packing the Crate

Once the objects are safely cavity-packed in boxes (see *Conserve O Gram 17/2*) the boxes are placed in the crates.



All object boxes should be clearly marked as stated in *Conserve O Gram 17/2*. Place an inventory of the contents of the crate and instructions for unpacking and repacking in an obvious location (e.g., taped or stapled to the underside of the lid). Include a return address in case the shipping label is torn from the outside. Copies of each enclosure should also be mailed

to the receiving park, center, or non-NPS institution.

Include in the instructions that all packing materials should be retained in case an object is missed. All packing materials should be stored in the crate after objects are removed and until objects are repacked for return. This procedure ensures that all packing materials are kept together facilitating the repacking. Before reuse, packing materials need to be inspected to ensure that there are no pest infestations.

Use an indelible marking pen to mark the Ethafoam or other packing materials with directions for removal during unpacking and for placement when repacking. A photograph stapled to the inside lid will aid the borrower to repack the crate for return.

Once the crate is packed and the lid is secured with screws, use stencils and indelible marking pens or paint to label each crate: number crates consecutively (e.g., *1 of 7*, *2 of 7*, etc.) on the lid and sides; mark crates with directional arrows, *THIS SIDE UP*, *FRAGILE*, or other cautions and warnings. Well constructed and neatly and clearly marked crates generally receive better treatment by shippers and receivers.

By using the above method for crating objects, along with the techniques outlined in *Conserve O Gram 17/2*, hazards inherent in shipping museum objects will be minimized. The success experienced by Mesa Verde National Park when shipping a traveling exhibit of 200 objects to five sites illustrates what can be accomplished with thorough preparation and planning.

Sources

Ethafoam is available from packaging suppliers. Contact Dow Chemical USA, 2020 Willard H. Dow Center, Midland, MI 48674, (800) 441-4369 for a local distributor.

Plywood, adhesives, metal handles, and stencils are available from hardware stores or packaging suppliers.

Polyglase Waterborne Finish is available from hardware stores and distributors or from Camger Chemical Systems, Inc., 364 Main Street, Norfolk, MA 02056, (508) 528-5787.

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