PACKING AND TRANSPORTING VERTEBRATE FOSSILS OVERSEAS

HUNT, ReBecca, Department of Geosciences, Augustana College, Rock Island, IL 61201; glhunt@augustana.edu

Abstract

In the summer of 2006, Augustana College shipped vertebrate remains of the holotype specimen of *Cryolophosaurus*, a prosauropod, and capitosaur, along with fossil plant material, to Japan. This fauna was one of the focuses of an Antarctic exposition at the National Science Museum in Tokyo. Therefore, the safe packing of these vertebrate fossils for overseas transport was vital for the future study of these remains and for the success of the exhibit.

The wrapping of small to medium sized material in foil to insure that any breakage would be held in place during shipping, while the use of styrofoam, bubble wrap, clamshell jackets and sturdy boxes to ensure stability during the shipment was originally planned. Expanding liquid foam that sets up rigidly was to be used to contour and hold the individual large remains.

The fabrication of crates for overseas importation must adhere to set guidelines by the

National Plant Protection Organization and the USDA. There are two official export treatment and marking programs used to meet the requirements of countries with import requirements based on the International Standards for Phytosanitary Measures—Guidelines for Regulating Wood Packaging Materials in International Trade (ISPM15). These treatments must have been applied to the wood products, and include Heat Treatment (HT) and the Methyl Bromide (MB) Fumigation Programs and the crates are marked by a certified inspection agency. This can be both a costly and time consuming venture, though there are several ways to avert these issues. One would be to have crates constructed by a certified shipping agency which can fabricate and treat these crates at a reduced cost. Other methods included fabricating your containers from a non-wood product. Due the added cost of self-fabrication of the crates, we choose to have the crates constructed by a certified shipping agency; Icon Group, Inc. Packing was conducted on premises by the author and Icon personnel.

Introduction

In the winter of 2006 Bill Hammer of Augustana College was approached to loan fossils from the Transantarctic Mountains to the National Science Museum of Tokyo for an exhibit focusing on research efforts in Antarctica. The fossils needed to be appropriately packed and crates had to be constructed for the journey to Japan and back. The investigation into the crate building process reviled much that we were unaware of, regarding the guidelines and standards that one must meet to have wood crates certified for exportation. Ultimately the decision was made to have the crates fabricated by an outside agency. The crates were fabricated by Icon Group, Inc. and packed by the author and the group. The fossils arrived at their destinations unscathed with no incidents, making the packing methods used here a success.

Figure 1: Example of the crate used to ship fossils from Augustana College, Rock Island, Illinois, to the National Science Museum in Tokyo, Japan.

Methods & Materials

Crating

The fabrication of crates for overseas importation must adhere to set guidelines by the National Plant Protection Organization and the USDA. There are two official export treatment and marking programs used to meet the standards of countries with import requirements based on the International Standards for Phytosanitary Measures — Guidelines for Regulating Wood Packaging Materials in International Trade (ISPM15). Heat Treatment (HT) and the Methyl Bromide (MB) Fumigation Programs must be applied to untreated wood if it is intended for international travel and have a quality mark applied by a certified inspection agency (see Figure 2). This can be both a costly and time consuming venture.

Figure 2: Interpreting a Quality Mark a) Trademark - the identifying symbol, logo, or name of the accredited agency. **b) Facility Identification –** product manufacturer name, brand or assigned facility number. **c)** Heat Treated Mark. **d) Country Code –** the two letter ISO Country abbreviation. **e)** Approved international symbol for compliant wood packaging material. **f)** Identification for use as dunnage (may be spelled out). Information from: American Lumber Standard Committee http://www.alsc.org/greenbook%20collection/WPM_facsimile.pdf

It was discovered during the course of this investigation that most of the wood one can purchase at your average chain home improvement store already has had their wood treated, unless otherwise stated. This should obviously be checked before acquisition. Due the added cost of self-fabrication of the crates, we choose to have the crates constructed by a certified shipping agency; Icon Group, Inc. The crates were constructed from a double-sided medium density overlay wood panels with plywood facing, full batten construction, bolt plates, with silicone caulk seals on the interior seams to prevent moisture entering the cavity, as well as a gasket to seal the lids, tray-packs and forklift skids. The crate interior has custom 2 ¼ inch thick ethafoam padding to secure the internal foam boxes that contain the fossils and absorb any shock from transit. The wood used to build the crates was pretreated and therefore did not require the certification mark.

Figure 3: (above) The two crates fabricated by Icon Group, Inc. Internal view shows lid gasket and ethafoam padding used to secure the foam boxes. (below) Foamcore boxes secured within the crates.

There are several other ways to avert issues that may arise for using non-treated wood, including fabricating your containers from a non-wood product. Past methods employed have included the use of aluminum, styrofoam, plastic and prefabricated shipping containers (Carpenter, Personal Commun., 2006; Viegas, Personal Commun., 2006). It has also been suggested that "plastic wood" made from 100 post-consumer HDPE (high-density polyethylene) could be used for crate building (Amaral, Personal Commun., 2006). At the current time this can only be purchased as lumber and not in sheets. HDPE is also susceptible to warping and bowing with heat, bringing the structural stability of a heavy load into question (Mason, Personal Commun., 2006). Hopefully advances in technology will help to make this environmentally friendly alternative more structurally stable for use in a high range of products.

Packing

The fossils were packed in boxes constructed of ½ inch foamcore board with glued and taped seams, and a hinged lid that is secured with Velcro tabs. The interior of the foamcore boxes are lined with softer charcoal colored G-60 foam to help contour to the shapes of the individual fossils. The fossils were then wrapped in a protective soft sheet of Tyvek to act as an inert moisture barrier and placed within the box, to be followed by custom cut G-60 foam supports. The boxes were placed within the interior ethafoam padding of the crate. Other methods considered for this project consisted of wrapping the small to medium sized fossil material in foil to insure that any breakage would be held in place during shipping. The use of styrofoam peanuts (contained in separate bags), bubble wrap, clamshell jackets and sturdy boxes to ensure stability during the shipment were considered as possible alternatives. Expanding liquid foam that sets up rigidly and contours to the individual fossils was also considered. All of these methods have been used successfully in the past by various other parties (Cavigelli, Personal Commun., 2006; Fox, Personal Commun., 2006; Mason, Personal Commun., 2006; Woodward, , Personal Commun., 2006).

Figure 4: (above, left) Fossils packed in a foamcore box, surrounded by G-60 foam separators and bedding. Fossils are then wrapped in a protective sheep of Tyvek to act as a moisture barrier (above, right) and then surrounded with additional G-60 foam (below, left) to keep movement to a minimum and to protect the fossils from breakage. (below, right) A example of the foamcore box indicating the location of Velcro closures (**A**), along with glued and taped seams (**B**).

Results

The crates received very good attention during the shipping process and no damage was done to the fossils or the crates themselves during shipping and unpacking. This method of packing has proved to be successful for the transportation of multiple types of fossils overseas and back again.

Acknowledgements

The entire preplist for their continued support and assistance – particularly Jane Mason, JP Cavigelli, Brett Woodward, Greg Brown, Scott Madsen, Marilyn Fox, Bill Amaral, Jim McCabe, Ken Carpenter, and Pedro Viegas. I would also like to thank Bill Hammer for allowing me to accompany the fossils to and from Japan; Icon Group, Inc.; Patrick La Quaglia at Masterpiece International, Chicago office; Chisako Sakata, Shin-ichi Fujiwara, Makoto Manabe, Reiko Horikoshi and the The Asahi Shimbun.