
The Well-Dressed Dinosaur: Clamshell Storage Jackets for Fossils

Paleontological preparation encompasses the excavation, revelation, and conservation of fossils. Once released from the rock that encased them for millennia, fossils tend to be fragile. And in the case of lithified dinosaur or infilled mammoth bones, they can also be quite heavy. So they often need specialized containers to protect and support them during their afterlife in museum collections.

Ethafoam-based cavity mounts, used for other fragile artifacts, work well for smaller fossils. But the big bones need sturdier support to prevent them collapsing under their own weight.

In the 1990s the Smithsonian's National Museum of Natural History developed a solution that, over several iterations, has become the standard for housing large or important fossils: the clamshell storage jacket.

Plaster — gypsum cement — has been a mainstay of fossil prep since almost the beginning: it is used for field jackets, casts, plaque mounts. It has long been the basis for creating supports for specimens, usually one sided cradles.

But when a researcher wants to examine a fossil, they often need to see every side, necessitating the removal of the specimen from such a support structure. This puts the fossil in peril, as handling is the number one cause of damage to collections.

Enter the clamshell storage jacket.



It is a rigid, form fitting container with a plush lining that completely encompasses the fossil. Think a violin case for a bone. Made from sturdy, nonreactive materials, it completely supports the fossil, protects it from multiple agents of deterioration, and ensures that, in most situations, the specimen never has to leave the jacket.

When a researcher wants to view one side, the jacket is flipped so the desired side faces up and only one half of the jacket needs to be removed. To view the other side, the jacket halves are joined and flipped over. With the current popularity of CT scanning fossils, if the jacket is constructed without embedded metal, the specimen can be scanned inside it.

I learned to make clamshell jackets while a contractor at the NMNH and have continued exploring this technique as senior preparator for vertebrate paleontology at the Natural History Museum of Los Angeles County. There are many possible variations to the procedure, based on material choices, conditions, and personal taste, but the basic principles for making a clamshell jacket are as follows:

The fully prepared specimen is usually buried up to its midline in a sandbox. The surrounding sand is smoothed to support a flange where the two sides of the jacket join. The fossil is readied for jacketing: large voids and undercuts temporarily filled, delicate parts padded to avoid contact with the jacket. The specimen and sand are covered in plastic film.



A single sheet of liner material —polyethylene foam or polyester felt — is cut to cover the specimen plus a margin on every side. Sandbags weigh the liner down atop the specimen while darts are plotted, cut, and bound to conform the liner to the fossil.

Feet and structural supports are pre-fashioned from felt, plank foam, or backer rod.

Fiberglass finishing veil is cut into panels, enough to cover the specimen plus margin several times, depending on the size and weight of the fossil.



With the liner fitted atop the specimen, a hard plaster like FGR95 is mixed, and panels of fiberglass dipped into it, then smoothed on top of the liner. The number of layers needed depends on the size and weight of the fossil. At a middle layer feet and struts are added. The jacket surface is smoothed in the very last moments before the plaster sets.



After the jacket has been allowed to set overnight, it is lifted off the specimen, the flange marked, then trimmed.

The specimen is then returned to the cleaned jacket and the process repeated to complete the other half.



Once the second half of the jacket has set and is trimmed, holes are drilled in the flanges to accept the bolts, washers, and wingnuts that will join the jacket halves. The exterior of the jacket is sealed with a thin consolidant and labeled with a pigment-based pen.

The clamshell storage jacket has been a successful strategy for housing large fossils for thirty years. As the technique becomes more and more widely adopted further innovations will be made, enhancing the conservation of these singular specimens.

Videos on the process can be found at:
<https://www.youtube.com/channel/UCC9-2xLHQWdcfRx-WLkpx8eg>

References:

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All photos by the author.