CONSERVATION ONLINE RESOURCE

Making Ethafoam Preservation Rollers for Storing East Asian Scrolls

Hanging scrolls and handscrolls are two of the most common formats for East Asian paintings. Their flexible structures are designed to be unrolled for viewing and rolled up for compact storage.

Of great concern for preserving these formats is the damage caused by rolling the scroll around a rod with a small diameter. This problem typically results in severe creasing and pigment loss.

Two paintings (above and right) damaged by being rolled around rods with small diameters.

To mitigate the problems caused by a small roller rod, a few methods have been devised to enlarge the diameter of scrolls when rolled. The most common solution in the West is the wooden roller clamp. First created in Japan a century ago, it is usually known by its Japanese name of *futomaki soejiku,* or simply *futomaki.* The roller clamp is clamped around the roller rod (below left) before the scroll is rolled up for storage (below right). Ideally, this will at least double the diameter of the rolled scroll, thereby reducing planar distortion and stress placed on the multiple layers of paper, silk, and adhesive that make up the laminate structure of the scroll.

East Asian Painting Conservation Studio
Freer Gallery of Art and Arthur M. Sackler Gallery
Smithsonian Institution
asia.si.edu

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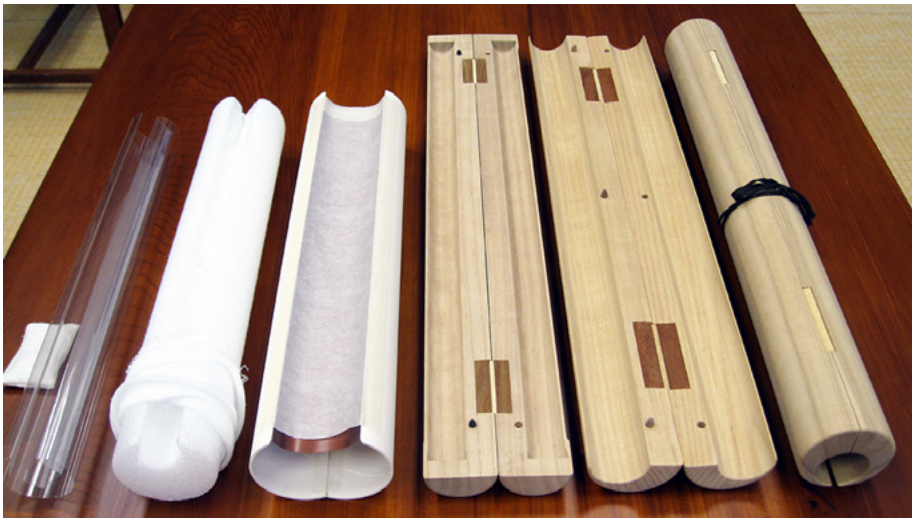
The simple, functional solution of the roller clamp has the disadvantage of being made from Paulownia wood, an acidic, off-gassing material. Also, roller clamps are often used incorrectly and are usually difficult and expensive to obtain in the West. With these concerns of material, function, accessibility, and cost in mind, East Asian painting conservators at the Freer Gallery of Art and Arthur M. Sackler Gallery have devised two alternative preservation rollers. One is made with Ethafoam and Stockinet, which is described here. Another is made with Mylar, which is explained at **www.asia.si.edu/research/dcsr/eapcs.asp**.



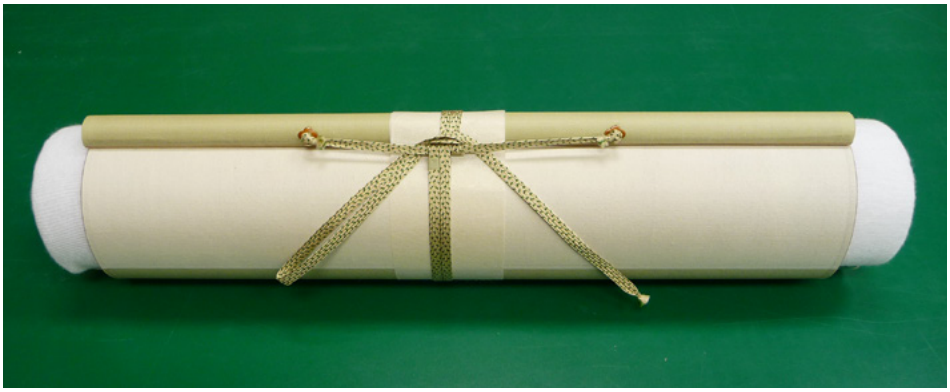
These modern preservation rollers are made of acid-free materials (left) or traditional Paulownia wood for roller clamps (right). From left are conservation rollers made of Mylar; Ethafoam with Stockinet; neutral paper tube with Japanese paper sling and scavenger insert; Paulownia wood roller clamp from Japan with closed ends; Paulownia wood with open ends; and locally harvested Paulownia wood for a roller clamp made in the United States.

The Ethafoam preservation roller is designed to adapt useful features of traditional wooden roller clamps to modern, inert conservation materials. It is also inspired by the modern methods and materials used for the display and preservation of textiles in the West. The preservation roller is easily produced with inexpensive materials and with tools that are readily made. In addition, it is comparatively foolproof to use because it has no front or back.

Preservation rollers made from Ethafoam are most suitable for large hanging scrolls, that is, 3 feet wide or more. Ethafoam is ideal for lightweight support of larger scrolls since it is a relatively flexible and soft material though rigid enough to provide needed support. Handling large scrolls can be difficult due to their weight and awkward size. They usually require two people to handle them properly. An Ethafoam preservation roller makes handling larger hanging scrolls easier and safer.

How to Make an Ethafoam Preservation Roller

Ethafoam preservation rollers are made with a diameter of either 3 or 4 inches. For hanging scrolls that are approximately 3 to 5 feet in width, a 3 inch diameter Ethafoam tube is used with a 4 inch diameter Stockinet cover. Scrolls approximately 4 feet wide or more are best rolled around a 4 inch diameter Ethafoam tube with a 6 inch diameter Stockinet cover (below left).



This preservation roller is made by cutting a channel down the length of the Ethafoam tube that is as deep and wide as the diameter of the roller rod. A mat knife is used to cut the parallel sides of the channel. A round loop knife (similar to a pottery trimming tool) is used to round out the bottom of the channel. The preservation roller is then trimmed to the width of the scroll, including the knobs. Polyester Stockinet is pulled over the tube, leaving an allowance of 3 extra inches at both ends for tucking back inside (above right). For preservation rollers intended for large scrolls wider than 5 feet, a shallow slit cut down the bottom middle of the channel will increase flexibility.

MATERIALS AND TOOLS

- Stockinet polyester tubing (4 or 6 inch diameter)
- Loop knives (made from metal, wood, and tape)
- Metal strapping or hacksaw blades
- Pencil
- Mat knife
- Ruler
- Straight edge
- Ethafoam tubing (3- or 4-inch diameter)
- Wooden support frame (optional)

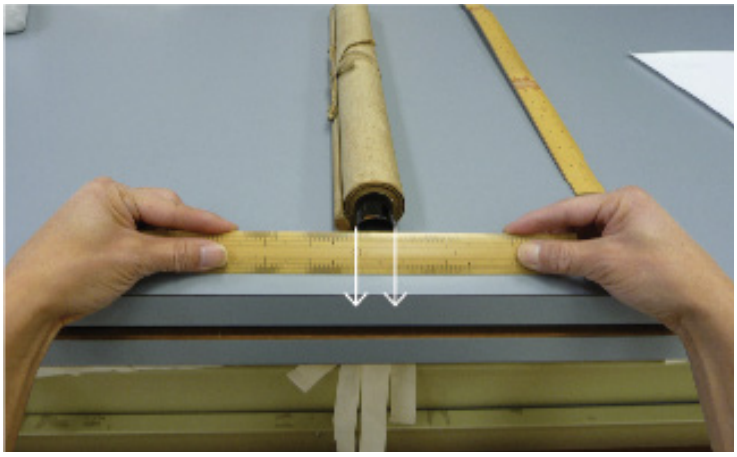
Making Loop Knives

Loop knives are used to hollow out the bottom of the channel in the Ethafoam tube. The roller rod at the base of the scroll should fit loosely when it sits in this channel. Since roller rods come in various diameters, it is necessary to have on hand two or three knives with rounded blades that correspond to the depth and width of standard roller rods (right). Measure the diameter of several roller rods to determine what sizes are necessary. Knives with blade diameters of approximately 1¼, 1½, and 2 inches are commonly useful.

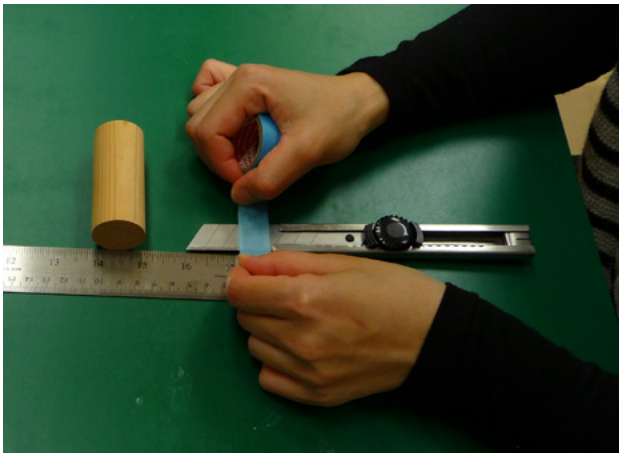
The round blades can be made from flexible hacksaw blades or metal pallet strapping available at hardware stores. Bend each blade over a wooden dowel of a different diameter to help make it round and to approximate the required diameter. To secure the size of each blade and to make a handle, fit the ends of each blade over a 6 to 8 inch length of wood that is sized to the preferred diameter of the rounded blade. For example, a 1½ inch rounded blade would work best with an approximately 1½ x 1½ inch square length of wood. While maintaining the depth and width of the rounded blade, secure the blade to the wooden handle with a heavy duty, fabric-backed, pressure sensitive tape. Duct tape is a good choice in the United States. Since the blade will want to spring open, tightly roll the handle with two or three layers of tape. (Another option is to secure the blade to the wooden handle with screws or wire before taping.) After the handle is secured, one edge of the blade should be sharpened with a grinder.

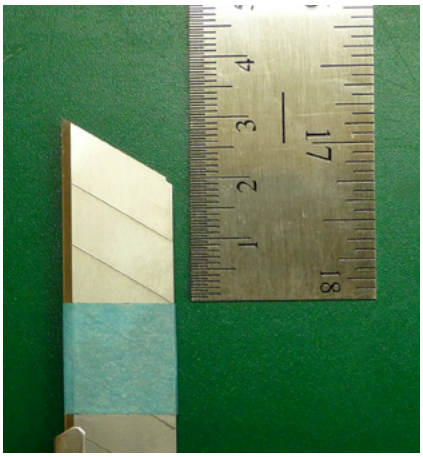
Measuring the Scroll

Two measurements are necessary to fit the Ethafoam preservation roller to the scroll: the diameter of the roller rod, and the width of the rolled scroll, including both roller knobs (right).



To begin, only the diameter of the roller rod is needed. If the knobs are straight, the diameter of the roller rod will be the same. For flared or odd-shaped knobs, measure the diameter at the base of one knob. In this case, the knob has a diameter of 1¼ inches.





To make cutting the channel more accurate, wrap tape around the blade at a length equal to the diameter of the roller rod. For this rod, the measurement is 1¼ inches (above).

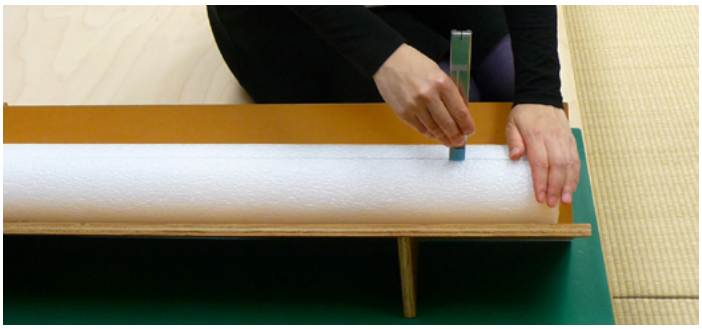
Transferring Measurements to the Ethafoam Tube

Choose an Ethafoam tube that is slightly longer than the width of the scroll for which the preservation roller is being made. Place the tube in the wooden support to stabilize it. (The tube can also be laid on a table and stabilized with weights placed along both sides.) Using a straight edge and pencil, draw a line down the center length of the tube.

Transfer the measurement for the diameter of the roller rod (1¼ inches) to the tube. Draw a second, parallel line down the length of the tube at that distance from the first line.

To make cutting easier and more accurate, transfer the diameter measurement (1¼ inches down and 1¼ inches across) to both ends of the tube.

Cutting the Ethafoam Tube



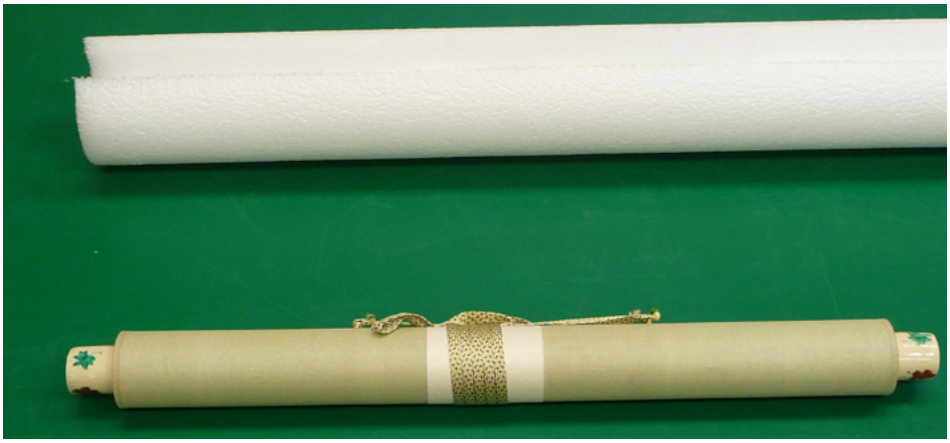
Holding the mat knife perpendicular to the tube, follow the pencil lines and cut along both lines. Start with long, shallow cuts that go deeper with each pass. Continue cutting until the blade is inserted up to the taped edge along the entire length of both cuts. Keep the blade perpendicular to the tube to help ensure the cuts are parallel.

To hollow out the channel, use the loop knife that has the same loop size as the diameter of the roller rod (in this case, 1¼ inches). Gently rock the blade of the loop knife back and forth while pushing against the Ethafoam. As you work your way down the channel, it will become easier to hold the tube vertically and push down through the remaining Ethafoam.

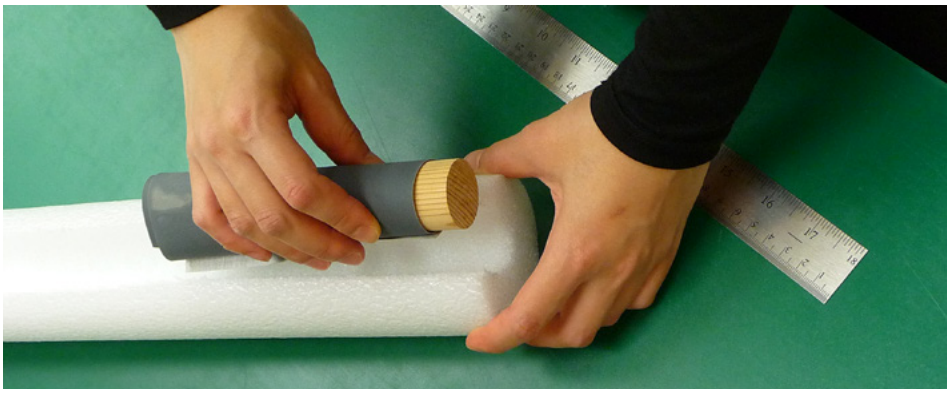
Remove the piece of Ethafoam from the channel.

Sizing the Length of the Preservation Roller

Measure the width of the hanging scroll, including both knobs.



Trim the Ethafoam tube to the same length.



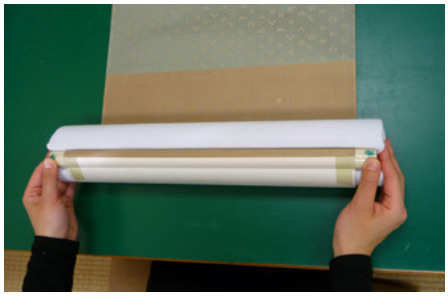
Smooth the channel and, if necessary, enlarge its size by running a short dowel wrapped with sandpaper along its length.

Covering the Ethafoam Tube with Stockinet

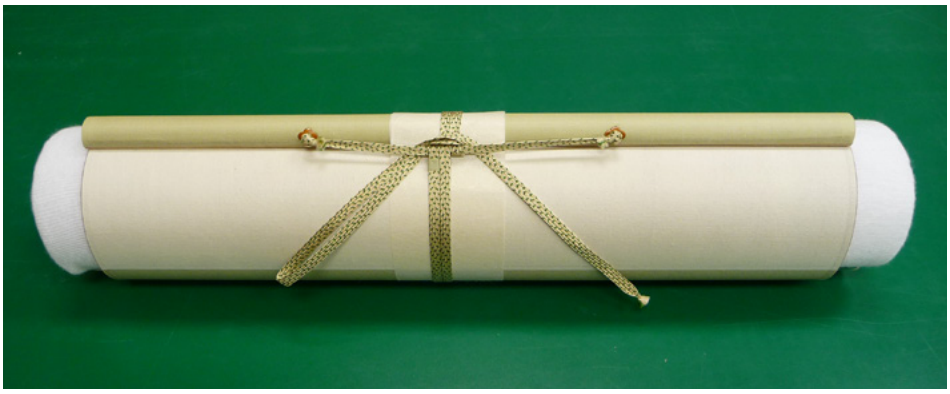
To cover the Ethafoam tube, cut a piece of Stockinet that is the length of the tube plus approximately 6 extra inches.

For an Ethafoam tube that is 3 inches in diameter, use Stockinet with a 4 inch diameter; for a 4 inch diameter Ethafoam tube, use 6 inch diameter Stockinet. The wider diameter of the Stockinet allows it to be easily pushed into the channel when the roller rod is set in place.

Center the Ethafoam tube inside the Stockinet with approximately 3 extra inches at each end. Tuck the extra Stockinet back inside the channel at both ends to complete the preservation roller (left).



Center the preservation roller across the bottom of the scroll. Lift the roller rod and gently push it into the channel, then evenly roll up the scroll.



Once the scroll is completely rolled up, secure it with the tying cord. The rolled scroll should look like this (above right).

For more information about safe handling procedures and for instructions to make Mylar preservation rollers and blue board storage boxes, please see our Online Resources at **www.asia.si.edu/research/dcsr/eapcs.asp**.