

# BOTTOMS UP! (SOME SOLUTIONS FOR SUPPORTING SPRUNG SEATS IN HISTORIC UPHOLSTERED FURNITURE)

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## ABSTRACT

Conservators treating 19th and 20th-century upholstered furniture frequently confront seats with broken (jute) webbing and unsupported springs or seats with stretched and weakened webbing. Traditional methods of repairing sprung seats did not preserve all upholstery materials. As emphasis on the conservation of upholstered furniture developed, conservators devised alternative approaches to supporting sprung seats. In line with current conservation ethics, these newer approaches are as minimally interventive as possible. This paper focuses on methods of supporting sprung seats that have been used in the textile and furniture conservation labs at Peebles Island Resource Center (New York State Office of Parks, Recreation and Historic Preservation) for seating furniture in the collections of the New York State Historic Sites. The paper traces and credits inspirations for these methods and presents some solutions developed in other labs.



## INTRODUCTION

Seats with broken webbing and springs falling out of the bottoms are the bad dreams of conservators treating 19th and 20th-century upholstered furniture. When traditional upholsterers treated historic upholstered furniture, they would typically remedy this problem by removing the webbing, replacing it with new webbing, and re-securing the springs to the new webbing. Alternatively, upholsterers would redo the entire seat—working, as for new upholstery, from the frame up. Do-it-yourself repairs often featured multiple layers of webbing and/or boards fastened to the seat rails to support springs. These methods, especially re-webbing done by skilled upholsterers, were effective, but were not without preservation problems. The most significant problems were the loss of historical evidence (caused by removal of original webbing and nails) and loss of physical stability in the seat rails (caused by removal and replacement of the large upholstery tacks used to attach the webbing).

In line with contemporary conservation practice, upholstery conservators have developed some less intrusive methods. Over the last fifteen years or so, a number of solutions for these sprung seats have been developed in many labs, but relatively few have been published.<sup>1</sup>

Since the need for a “Bottoms Up” treatment usually becomes apparent when a conservator is faced with broken webbing and unsupported springs hanging out of the bottom of a seat, it is fairly obvious that one must usually devise a two-part treatment. In the first part, one compresses the springs, and in the second, one supports them.<sup>2</sup> For some seats, a third part, stabilizing or supporting fragile webbing, is also necessary. Since supporting webbing typically involves common textile conservation stabilization techniques, it will not be discussed in any detail here.

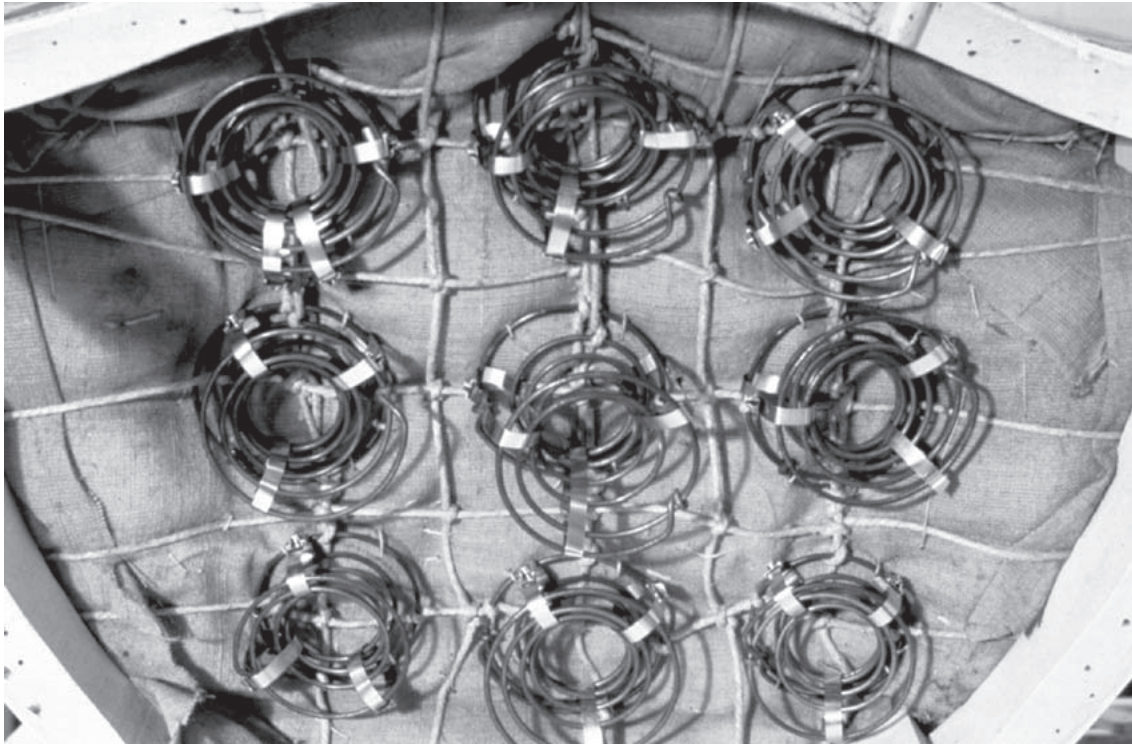


FIG. 1 Bottom view of sprung seat showing springs compressed with coated steel cable ties. Courtesy New York State Office of Parks, Recreation and Historic Preservation, Staatsburgh State Historic Site.

#### COMPRESSING THE SPRINGS:

##### MATERIALS

Compressing the springs is necessary to reduce strain on the show cover and other upholstery materials and to preserve the webbing, if it is still intact. Compressing the springs restores the profile of the seat. Most often springs that have become untied, or decompressed, create too high a profile on the seat. Compressing the springs may also be necessary to reduce stress on the seat rails, but this worry seems to be anecdotal, or theoretical. Sometimes, and this too may be a theoretical worry, conservators have chosen to remove the springs because they felt they were too heavy for the chair frame.<sup>3</sup>

Conservators want to tie the springs so as to have just the right amount of compression—enough to reduce the stress on the webbing (if it remains) and the upper layers of the upholstery, but not so much as to distort the upholstery profile. Some conservators also prefer to work with materials that are obviously not original.<sup>4</sup>

At Peebles Island, cable ties, a non-traditional but easy-to-use material, were used for an early spring compressing project. An intern in the furniture conservation lab first used nylon cable ties, but after speaking to a representative of the company who said that these have a short life span, he switched to using coated steel ties (fig. 1). The coated steel ties have some advantages—they are quick to use and fairly easy on the fingers. They also have some disadvantages: they are expensive, at about 90 cents each, and like most cable ties, they are only adjustable downwards. (The much less expensive nylon cable ties can be used as temporary ties, then replaced with the coated steel ties when the adjustment is right.) The coated steel ties are large and bulky and leave long tails, which must be cut off and carefully bent to avoid damaging other materials.<sup>5</sup>

Most significantly, the coated steel cable ties absolutely do not work if one is trying to compress springs around intact webbing. They take up too

much room and cause damage to the webbing as one works them in. For the early treatments discussed above, the dust covers and original webbing, which had largely separated from the frames, were removed, vacuumed, labeled, and placed in collections storage. Peebles Island conservators now believe that this approach is too intrusive and that the cable ties are most appropriate for a seat where the webbing is already lost, or even for one where the springs have already been separated from the seat.

To compress springs on seats with original webbing, Peebles Island conservators currently prefer to use three different colors of 20/2's linen cords together. This creates a tie that is strong, takes little space, and is clearly different from original (traditional) upholstery materials. A waxed polyester whipping cord would also work well for compressing the springs.

#### COMPRESSING THE SPRINGS:

##### METHODS

Describing the materials used to tie the springs only conveys one part of the problem. How to get those ties in place and how to adjust the springs safely to the appropriate height are the next problems one must solve. This step takes a huge amount of patience, the sort that would make one say, "yes," when a lay visitor says, "Oh, you must have tremendous patience to do this work." It helps to have a fiber optic light that can be positioned to provide light at the top, now base, of the springs and a couple of pairs of long, curved hemostats, one for each hand. One must thread a tie through the center of the spring, pass it around the top of the spring and back outside to the bottom of the seat. Typically, this is done while the seat is lying on its back or upside down, as one peers through the gaps in the webbing to find the right locations.

When working with intact but weak webbing, there is a serious risk of the webbing breaking, if one goes from uncompressed springs to compressed springs all at once. To reduce the risk, a temporary holder is required. Slip knots can work

for this, but the knots, or rather pulling the knots against fragile webbing to adjust the compression, may cut through the webbing. One can protect the webbing with wads of polyester batting placed between the webbing and the knots. One can also use small hemostats (with the batting), which work well but make a rather cluttered surface. Recently, a volunteer in the furniture lab devised a method to hold compression temporarily with heavy polyethylene sheeting cut into holders with slits. The ties can be threaded through the springs, then pulled through the slits in the plastic holders to hold the ties as the spring compression is adjusted. Once the final compression is made, the ties can be securely tied over the polyethylene holder.

It is useful to work with a support to permit the top profile of the seat to "float" above the work surface to avoid over-compression. There are several ways to judge when enough compression is enough, from measuring the finished height of the springs, to placing a straight edge across the springs (fig. 2), to eyeing the bottom of the seat (often the most successful). The furniture lab at



FIG. 2 Measuring to determine appropriate height of springs. Note support used to elevate seats to avoid over-compression or flattening of seat profile. Courtesy New York State Office of Parks, Recreation and Historic Preservation, Olana State Historic Site.



FIG. 3 It is helpful to have one person apply pressure to compress the springs while a second person ties the cords to hold the compressed height. Courtesy New York State Office of Parks, Recreation and Historic Preservation, Olana State Historic Site.

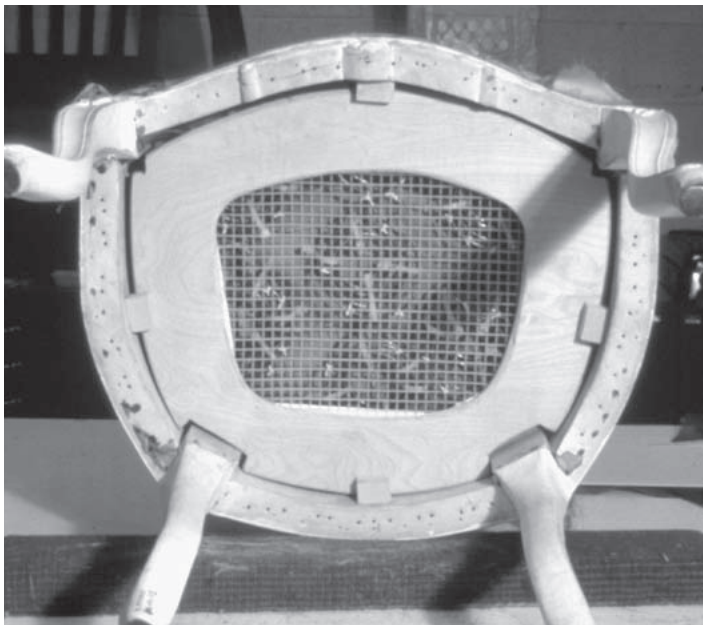


FIG. 4 Compressed springs are supported on a new inner frame stretch with polypropylene mesh. The new frame is secured to the seat rails with glue blocks. Courtesy New York State Office of Parks, Recreation and Historic Preservation, Staatsburgh State Historic Site.

Peebles Island and Kate Gill (of Textile Conservation Centre in England) have tried to make a clamp to measure the compressed springs or pre-compress them. However the clamps devised to date are either too large to fit between fragile strips

of webbing, or too delicate to stay in place and compress the springs as the ties are inserted.

Compressing the springs is sometimes most easily done by two people, one of whom is pushing to compress, while the other adjusts the ties (fig. 3). It works best to have all of the spring ties in place and looped through the plastic holders, but not yet compressed. Then, the center springs are compressed part way. This creates some slack in the webbing, so the outer springs can then be compressed to the desired height. Once these are securely tied, the center springs are compressed the rest of the way and tied.

#### SUPPORTING THE SPRINGS

The final step in a “Bottoms Up” treatment is to support the compressed springs. Originally, the webbing, stretched taut between the bottom of the seat rails, supported the springs. In these treatments, something must support the springs, usually above the level of the original webbing. For most of these treatments, it is necessary to compress the springs more than they would have been originally, in order to make room for this support.

An early system devised at Peebles Island involved securing the compressed springs to a polypropylene mesh that had been attached to a new inner frame. The inner frame was then held in place with glue blocks on the seat rails (fig. 4). This method works best for seats with deep and wide seat rails, or for seats where the webbing was already lost before the current treatment began.

This method requires the most “give” to the webbing—probably too much to be used with intact webbing, although it would work if webbing has broken or is released on two sides to provide sufficient give.

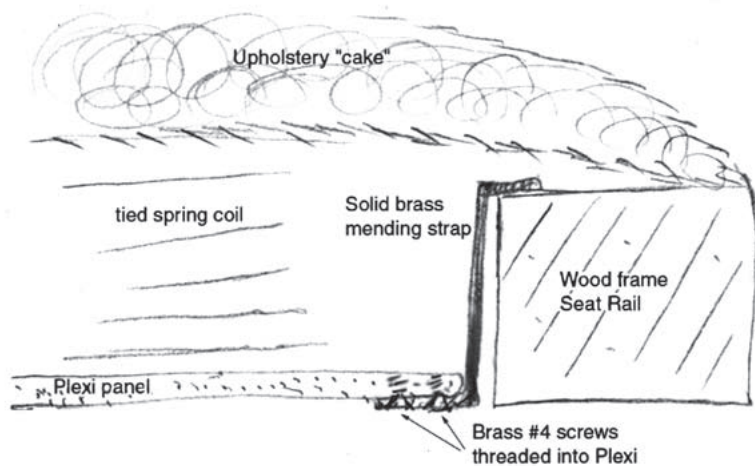


FIG. 5 Sketch showing placement of acrylic sheet and metal bracket used to support springs. Sketch by Deborah Trupin and David Bayne.



FIG. 6 Bottom view of chair showing acrylic sheet and brass brackets supporting compressed springs and plastic holders and three colored linen cords used to compress springs. Courtesy New York State Office of Parks, Recreation and Historic Preservation, Olana State Historic Site.

For seats with a narrow seat rail and a half-over the rail upholstery or with intact webbing, this method is less successful. For very narrow seat rails, one would have to compress the springs too much for safety in order to be able to fit the frame into the seat rails. For seats with intact webbing, there may not be enough clear space on the seat rails to attach the glue blocks to support the frame. On some seats it might be possible to screw support blocks into the seat rails, although most often this would be seen as too invasive.

To support the compressed springs on seats for which the frame support was not appropriate, Peebles Island conservators have successfully used acrylic sheet supports. A piece of acrylic sheet is cut to fit within the seat rails. Brackets that hang from the top of the seat rail support the acrylic sheet and thus the springs and profile of the seat. The brackets can be custom-made from stainless steel (14 gauge has been successful). If the length works, two brass mending plates can be joined with rivets and bent to the appropriate height. One can make a final adjustment of the height of the springs and profile of the seat by adjusting the length of the brackets. This system can be made more secure by pre-drilling holes in the acrylic sheet and using small screws to attach the brackets to the sheet (figs. 5 & 6).

Gwen Spicer, conservator in private practice, designed a particularly elegant solution for supporting a sprung seat. A sofa from the Doris Duke house at Rough Point in Newport had strong, modern webbing, but the springs still needed re-compression. Taking advantage of the modern webbing, Gwen and textile conservator Ann Frisina, made “buttons” out of Nomex® and used ties on long needles to run from the bottom of the webbing,

up the outside of the spring, through to the top of the underupholstery (the show cover had already been removed). At the top of the underupholstery, the tie went through another Nomex® “button,” then back down through the center of the spring. The ties were pulled and tied against the Nomex® “buttons” to provide the right amount of support. Pulling the buttons into place created small depressions on the top of the upholstery; these were filled with a layer of polyester batting before the new show cover was applied (figs. 7 & 8).



FIG. 7 Sofa from Rough Point, Newport Restoration Foundation, Newport, RI, before treatment. Courtesy Gwen Spicer and Rough Point.

#### SUPPORTING “DEAD” SEATS (SEATS WITHOUT SPRINGS)

The methods described above to support the compressed springs are also useful in supporting seat upholstery without springs. For example, at the Victoria and Albert Museum, Derek Balfour used acrylic sheet and brackets to support the web-

bing, sack cloth and stuffing of the 17th-century Hampton Court House settee; this project was the inspiration for the use of acrylic sheet supports at Peebles Island (figs. 9 & 10). At Harper’s Ferry, Jane Merritt, Gwen Spicer and Debi Belman designed an acrylic sheet support for the seats (webbing, sack cloth and stuffing) of early

19th-century chairs from Hampton House. In this case, there was enough space between the inside edge of the rails and the tacks holding the webbing to slip the acrylic sheet onto the top of the rails, eliminating the need for brackets.

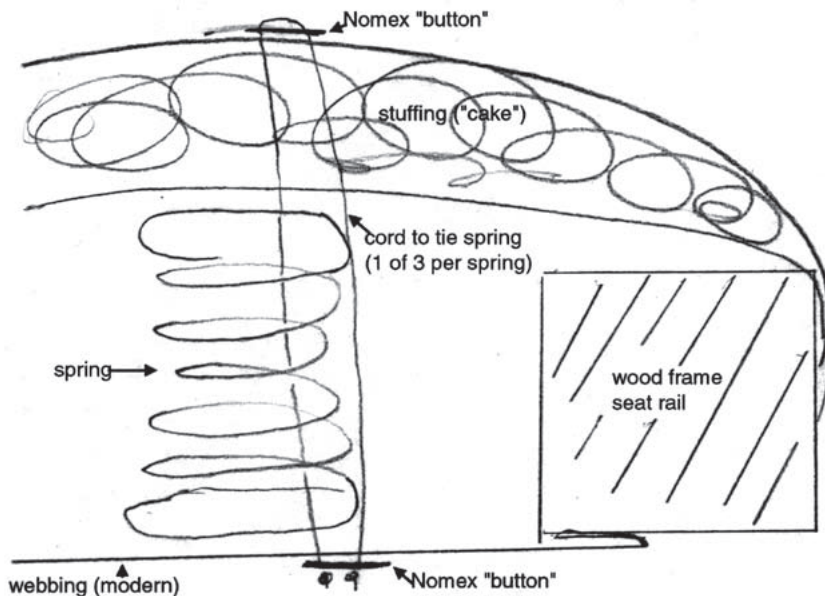


FIG. 8 Sketch showing use of Nomex® buttons and ties to compress springs on Rough Point sofa. Note that this method was feasible because of the previously installed modern webbing. Sketch by Deborah Trupin and David Bayne.

#### CONCLUSIONS

Successful “Bottoms Up” treatments preserve original seat frames and upholstery materials and methods. These treatments also help to restore the original appearance of seats. There are probably as many subtle variations on these “Bottoms Up” methods as there are seats needing support and



FIG. 9 Hampton Court House settee, after treatment. Courtesy Victoria and Albert Museum Picture Library.

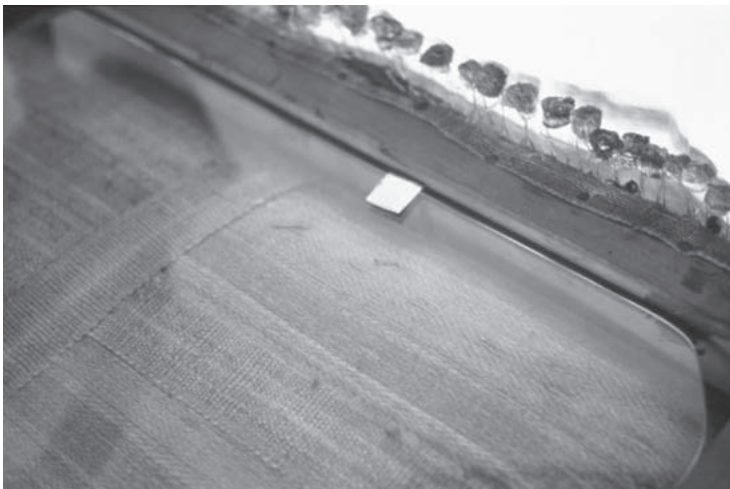


FIG. 10 Detail of bottom of Hampton Court House settee, showing acrylic sheet and stainless steel bracket to support 17th-century seat materials. Courtesy Victoria and Albert Museum Picture Library.

conservators devising treatments. It is hoped that the solutions presented here will also spur others facing these sorts of treatments to develop variations and improvements that can be shared with the rest of the field.

in good condition, the original spring ties remain secure, and/or there has not been any repair or replacement of the webbing. In these cases, it may not be necessary to compress the springs.

#### ACKNOWLEDGMENTS

Thanks to David Bayne, Furniture Conservator at Peebles Island for his constant collaboration in the development, execution, and evaluation of “Bottoms Up” treatments. Thanks to Derek Balfour, conservator in private practice, London, UK and Gwen Spicer, conservator in private practice, Delmar, NY for sharing details and images of their treatments.

#### ENDNOTES

1. In *Upholstery Conservation (Preprints of a Symposium Held at Colonial Williamsburg)* there were a few references to stabilizing springs by tying them to new (linen) webbing; K. C. Grier and R. Sherin, “Borax Jobs and Hay Balers: Understanding and Conserving Cheap Upholstery Structures of the Victorian Era;” E. Lahikainen, “Working with the Evidence: Upholstery Conservation of a Nineteenth Century Sewing Chair;” N. Britton, “Treatment of an Iron-Frame Turkish Chair, a Case Study.” The most recent publication on upholstery conservation, D. Eastop and K. Gill, *Upholstery Conservation, Principles and Practice*, did not include any sprung seat treatments.

2. In some cases, rare in the experience of Peebles Island conservators, the springs are not causing pressure upwards, distorting the profile and stressing upholstery materials. Instead, the seat has collapsed because of webbing stretching or breaking. This seems to occur when one or all of several conditions are met: the spring cover is

3. Z. A. Perkins, "Conservation of a Leon Marcotte Side Chair," in *Upholstery Conservation (Preprints of a Symposium Held at Colonial Williamsburg)*.

4. Elizabeth (Betsy) Lahikainen has preferred colored (pink) thinner linen yarns to make the difference between original, traditional upholstery materials and new conservation materials absolutely clear.

5. The author has since learned that polypropylene "releasable" (adjustable) cable ties are available. These would reduce or eliminate some of the disadvantages of the coated steel ties.

#### REFERENCES

Gill, K. and Eastop, D. 2000. *Upholstery Conservation, Principles and Practice*. Oxford, UK: Butterworth-Heinemann.

Williams, M. A., Lahikainen, E., Gill, K. and Gusler, W. 1990. *Upholstery Conservation. Preprints of a Symposium held at Colonial Williamsburg, February 2-4, 1990*. East Kingston, NH: American Conservation Consortium.

#### MATERIALS SOURCES

Cable Ties:

Coated steel—Panduit, 17301 Ridgeland Ave., Tinley Park, IL 60477. 800-777-3300. info@panduit.com.

Nylon—Ideal Industries, Inc., Becker Pl., Sycamore, IL 60178. 800-435-0705. Ideal\_Industries@idealindustries.com

Reversible—Panduit, see address above. Panduit calls these "releasable" and notes that they are available in nylon and in polypropylene. They have part numbers that begin with "PRT."

Polypropylene—Panduit, see address above.

Linen cords: H. M. Nabavian & Sons, Inc., 11 West 30th St., ground floor, New York, NY 10001. 800-352-7510.

Polyethylene mesh: Internet Corp., 2730 Nevada Ave., North, Minneapolis, MN 55427. 800-328-8456

Waxed polyester cord: M. Speranza. 518-271-1054. ropemith@aol.com.

#### ABOUT THE AUTHOR

Deborah Lee Trupin, Textile Conservator for New York State Office of Parks, Recreation and Historic Preservation's Bureau of Historic Sites (Peebles Island) since 1986, is responsible for the conservation of the textile and upholstery collections of the 35 state-run historic sites. She received an MA in art history and Diploma in Conservation from New York University's Institute of Fine Arts, Conservation Center and began her upholstery conservation training during an internship with Elizabeth Lahikainen at the Society for Preservation of New England Antiquities. Address: New York State Office of Parks, Recreation and Historic Preservation, Bureau of Historic Sites, Peebles Island, PO Box 219, Waterford, NY 12188.