

# DISASTER RECOVERY: TEACHING TEXTILE SALVAGE TECHNIQUES TO THE FIRST RESPONSE TEAM

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**ABSTRACT**—At small museums and historical societies, conservators are not often first on the scene after a disaster, but are soon after called upon for expertise in recovery techniques. Staff and volunteers, who are likely to make up the first response team, need to know salvage procedures for various materials in their collection. Material-specific response and recovery training provides conservators, collections staff, and volunteers with an opportunity to focus on particular problems they are likely to confront in an emergency, and aids in disaster planning. Training gives the response team the information needed to prevent or alleviate damage. Hands-on practice sessions and training using mock disasters increase confidence, allow refinement of technique, and demonstrate how various recovery methods effect options for subsequent conservation. This paper presents some techniques critical for the salvage of fire- and water-damaged textiles, and suggestions for teaching the techniques of emergency response to the team of museum staff and volunteers.

## INTRODUCTION

It is shocking to see what happens to museum buildings, collections, and staff during emergencies. Disasters, large or small, are contrary to all the normal, careful museum collections care and conservation procedures. Emergencies are by definition unpredictable: the objects that museum staff have been entrusted to protect are threatened or damaged; equipment may be out of service; we feel like we don't have time to think.

The problems encountered in an emergency can seem like a waking nightmare of possible museum collection damages. Learning to identify and anticipate types of artifact damage is an essential aspect of disaster preparedness, and in the event of an emergency, leads to appropriate emergency handling routines and correct choice of salvage technique. For textile collections, the problems confronted may include heavy soils, soot and plaster deposits; structural damage such as tears, splits and fabric losses; significant loss of fabric strength; dye bleed and transfer; and growth of microorganisms.

As conservators, we are especially well suited to train disaster response teams in emergency preparedness and response. An understanding of materials allows us to predict how objects will respond to hazards like water, mud, and oily airborne soils, as well as various methods of packing and moving. Also, experience with lab recovery treatments makes us keenly aware of how handling and treatment during the immediate post-disaster-recovery period effects

the options for subsequent conservation treatment. Seeing artifacts in the lab following a disaster we may think: if only more support had been given while moving this rug; if only this silk banner had been rolled rather than folded; if only an interleaving barrier had been used to prevent transfer of bleeding dye; if only workers had worn gloves and respirators, and so on. Lab treatment can inform recovery practice, and conservation information makes up much of the foundation of good disaster response. By anticipating possible damage, and teaching museum staff how to respond, conservators can help prevent hazards and alleviate damage.

My early experiences with disaster recovery at the Textile Conservation Center included working with fire-damaged and water-damaged textiles that arrived at the Center for treatment. It became clear early on that the handling methods and treatments used during the immediate post-disaster-recovery period significantly effected the options for subsequent conservation treatment. For example, careful handling and packaging of needleworks, which had been exposed to sooty soils, helped prevent deep smudging of soot into the fabric. These textiles were much more successfully cleaned than items that were not as carefully packed, and which had more deeply embedded soot. A variety of these textiles were surface cleaned with a HEPA vacuum cleaner and the dry sponges used for fire clean up (Hackett 1999, Moffatt 1992).

The purpose of this article is to set forth specific disaster recovery techniques and to emphasize the importance of teaching salvage



methods that are specific to the collection type. The information included focuses on textile materials and is only part of the guidelines needed for a disaster response effort.

#### SALVAGE PRINCIPLES AND PROCEDURES

Training for material-specific response offers guidelines and experience for dealing with specific artifact concerns. Each material type (furniture, textiles, photographs, etc.) will have individual needs and salvage procedures, although training in a variety of materials will demonstrate obvious parallels that provide reinforcement. For textiles, the salvage procedures that I've found to be the most important are:

- Establishing priorities
- Handling and moving techniques
- Working with limited resources
- Dealing with soil, soot, and smoke damage
- Removing water from soaked items
- Drying techniques
- Minimizing dye staining
- Preventing soil transfer

#### ESTABLISHING PRIORITIES

More a principle than a salvage procedure, establishing priorities is a logistical necessity. While somewhat difficult to teach in a lecture or demonstration, the importance of establishing priorities is immediately obvious in a mock disaster. Building security is a priority. Stabilization of the building environment may be less obvious, but is also essential. If building security and a stable environment can be accomplished, it may not be necessary to move artifacts at all! Once the need to move artifacts has been ascertained, it is essential to establish clear passage and efficient moving routes. Moving fragile artwork cannot go smoothly if there is broken glass covering the main path to the truck.

People on the first-response team must be able to make order of what may be a very chaotic situation. In teaching the team to establish artifact priorities, asking questions will help determine some of the most important curatorial

and conservation concerns. What artifacts are the most important or rare? Which are the most fragile? Thousands of items may be wet, but are they equally wet? Perhaps some things are not wet at all. What can be safely air dried? What can be frozen? This type of mental sorting will help to establish order, and can be made a part of training exercises and discussions, as well as mock disaster exercises. It is essential in a real disaster.

#### HANDLING AND MOVING TECHNIQUES

The basics of careful artifact handling are a critical part of salvage training. Throughout lectures, demonstrations, and practice sessions, participants should be reminded of the obvious: old fabrics are fragile even when they are dry, and are much more fragile when wet. In an emergency, the supply of recovery materials may be meager compared with usual array of preservation supplies that are available to assist with handling and moving collections. The response team must learn to identify the needs of fragile materials and respond with ingenious solutions. As part of training, problem solving exercises should allow participants opportunities to predict how materials in their collection will respond to various stresses, and what type of handling and protection will prevent damage.

In general, object handling should be minimized in order to prevent damage. Textiles that were in storage when the disaster occurred should be examined for degree of wetness, but can often be moved in their boxes even if the boxes are wet. If boxes or rolls are intact, they should not be disturbed, except to check contents and log the accession numbers. All textiles should be adequately supported for moving, using boxes, trays, and platforms. If larger items are found without storage boxes or tubes, two people can move them safely to the packing area using a length of sturdy canvas (much the same way that an injured person is moved with a litter). If fragile items must be folded, pad the folds with tissue paper or blank newsprint to prevent splitting.

In demonstrations and disaster drills it is important to have a variety of materials to represent the range of textile collection problems. Delicate items that have been folded, once wet, may be far too fragile to attempt unfolding. Some items (i.e. hooked rugs) may be thought to be among the sturdiest, but will readily split and shred if folded or moved without support. These



<b>Structural Damage Loss of Strength Fabric Tears, Splits, Losses</b>	
<u>Recovery Methods</u>	<u>Recovery Materials</u>
<ul style="list-style-type: none"> <li>• <b>Limit handling</b></li> <li>• <b>Provide structural support</b></li> <li>• <b>Prevent crushing, abrasion</b></li> <li>• <b>Prevent stretching</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Rigid trays</b></li> <li>• <b>Platforms</b></li> <li>• <b>Fabric slings (canvas)</b></li> <li>• <b>Tubes</b></li> <li>• <b>Boxes</b></li> </ul>

Table 1.

hidden weakness are impressed upon the response team trainees once they have a chance to see it for themselves. In one exercise, after participants seriously damaged a hooked rug by folding and moving it in haste, we moved it a second time without damage, by carrying it to the drying area supported on a cotton sheet.

Heavy items like tapestries and carpets are especially susceptible to structural damage because of their weight. Five or more strong people may be needed to roll and move a large carpet, and caution is needed to avoid injury to team members. If possible, large tubes should be used to support the weight of these items (Table 1).

#### WORKING WITH LIMITED RESOURCES

Working with limited resources is a subject that can be addressed in a lecture, or illustrated in demonstrations, but it becomes most meaningful in a disaster exercise. For textile salvage, absorbent blotting materials will usually be at a premium. The response team needs to learn specific ways to economize: extremely soaked carpets might be drained on the side of a hill, or water might be removed with a sponge before using precious cotton sheets, toweling, or other blotting materials.

The issue of working with limited resources also presents an opportunity to discuss what one might do in cases of very extreme emergencies. Through a salvage exercise we learn that, if necessary, we can wring the water out of our (recovery supply) cotton sheets and use them repeatedly. But what if we have no sheets? Would we be willing to use a bedspread from the museum's collection to save another invaluable item? These possibilities (and the judgement calls about possible dye and soil transfer) should

come up for discussion in disaster response training.

The issue of what materials can be used as salvage resources will also come up. One training exercise, which involved salvage operations at a historic house following a fire, was chaotic at the beginning of the day. Certain concerns about the building environment were overlooked in the confusion. Finally in the afternoon a trainee noticed that more windows should be opened to increase ventilation. When we did, several things were realized: (1) We did need the ventilation. It was warm, humid, and somewhat smelly inside the house. Some people had complained of slight nausea from the smoke odor; (2) It was realized that we had been carrying boxes the long way out the front door, when we could have been passing them right out the front window; (3) One participant realized that, with the addition of a paper or plastic barrier, we could use the window screens as carrying trays, which were in very great demand.

This idea of using parts of the building as salvage "resources" is something that came up again later in workshop discussions following this disaster recovery exercise. A number of curators felt that it would not be appropriate at some historic houses. But when it is, countless possibilities follow: with a couple make-shift saw horses, a door can become a work table, screens become carrying trays, and so on. The salvage team is always great at brainstorming the possibilities following an exercise, and such postmortem discussions are invaluable.

A question about teaching methods comes up regularly during discussions about the subject of working with limited resources. Trainers continue to debate the amount of salvage information and direction to be given to the response



<b>Soil, Soot &amp; Smoke Damage</b>	
<b><u>Recovery Methods</u></b>	<b><u>Recovery Materials</u></b>
<ul style="list-style-type: none"> <li>• Limit handling</li> <li>• Avoid smudging soil into fabric</li> <li>• Interleave &amp; wrap to prevent soil/soot transfer</li> </ul>	<ul style="list-style-type: none"> <li>• Blank newsprint</li> <li>• Clean sheets</li> <li>• Clean muslin</li> <li>• Brown paper</li> </ul>

Table 2.

team during training exercises. Some feel that trainers should hold back and let the response team discover things (like the window screens) for themselves, reasoning that when trainees make these discoveries themselves they will remember them forever. While that is perhaps true, it is also important to recognize that disaster drills are costly, and waiting too long to share good ideas wastes valuable training time. Trainers must find the appropriate balance.

#### SOIL, SOOT, AND SMOKE DAMAGE

Handling and packing techniques are very significant factors in the success of subsequent cleaning treatments for the removal of sooty soils. In conservation treatments, these fine particle soils are remarkably difficult to remove, and whatever can be done to limit smudging them into the fabric is good. Many types of interleaving materials can be used, including old sheets, muslin, paper and rolls of polyethylene. The goal is to use the barrier to prevent the transfer of soils from one area of a textile to another, and to prevent transfer between different pieces. For larger textiles (i.e. bedcovers or quilts) the entire surface should be covered before folding or rolling. Large sheets are ideal in this case, and hopefully there are some stored with the salvage materials.

Furnace backups are smaller-scale emergencies, but with similar problems. After a furnace backup, absolutely every surface will be covered with soot, and will require cleaning. Success in removing the soot will depend in part on whether it is smudged into the fabric. Examples from past disasters, and before and after photographs of treated textiles, help to illustrate this point (Table 2).

#### DRYING TECHNIQUES

Many appropriate techniques for removal of water from fabrics are possible. Some, such as draining and blotting to absorb excess liquid, are within the direct experience of most people. Other techniques come from conservation treatment, and require explanation and practice. If the number of textiles wetted in the emergency is manageable for available staff and resources, then air drying can be considered. Otherwise, the salvage operation will include packing in preparation for freezing. In either case, fabrics that are soaked with water will be heavy and vulnerable to structural damage. An attempt should be made to drain or absorb excess water before trying to open them up for drying.

Wet garments can be especially difficult to work with. Demonstration and practice helps disaster-response trainees see the problems in handling wet items, and identify appropriate recovery options. A soaked dress can be lifted out of its box onto some absorbent paper or muslin, and left without handling for fifteen to twenty minutes until water wicks out into the paper or muslin. Afterwards, the dress is lighter and can be more safely moved. Sometimes (if the paper is clean enough) it is possible to dry the paper to use again.

Techniques that are more difficult to understand require additional explanation and reinforcement in disaster training sessions. For example, I teach a technique for removing water from soaked chairs or sofa upholstery, and have made a set of slides to illustrate the technique. The slides simplify the technique into a set of steps and show trainees the intended outcome as follows:

1. Examine the fragility of the fabric surface and determine specific needs.

<b>Water Soaked Textiles</b>	
<b><u>Recovery Methods</u></b>	<b><u>Recovery Materials</u></b>
<ul style="list-style-type: none"> <li>• Drain</li> <li>• Absorb excess water</li> <li>• Blot</li> <li>• Use of drying cloths</li> <li>• Padding out 3D items</li> </ul>	<ul style="list-style-type: none"> <li>• Absorbent toweling &amp; sheets</li> <li>• Sponges</li> <li>• PVC tubes</li> <li>• Long handled squeegee</li> </ul>

Table 3.

2. Remove loose cushions and use absorbent cotton sheets or toweling to blot as much water as possible from both the cushions and upholstery.
3. Apply a one hundred percent cotton drying cloth (hopefully an available salvage supply). Carefully cover the entire upholstery fabric, and gently press the drying cloth into contact with the upholstery fabric. The goal is for the cloth to be in direct contact with the upholstery fabric for the duration of the drying period. The drying cloth should be placed flat (without wrinkles) in flat areas, and tucked deeply into the folds of the upholstery so that it will act as a wick, thereby moving water from wetter areas to drier ones. The water carries stains, soils, and degradation products with it, depositing them on the drying cloth.
4. After the upholstery is dry, remove the drying cloth.

During training, the participants ideally will see each technique three separate times: first, the technique is described in a lecture

illustrated by slides; then the disaster exercise presents an opportunity for participants to use the technique on a real piece of upholstered furniture; finally there is a demonstration using the same piece and reviewing the salvage goals and steps (Table 3).

#### MINIMIZING DYE STAINING AND PREVENTING DYE TRANSFER

Conservation treatment experience shows that drying methods can be expanded and refined to control dye staining and soil transfer that occurs as a result of uncontrolled drying. These techniques can be simplified and taught to disaster-team members. If textiles are air dried, the use of a drying cloth (described above for upholstery) placed in direct contact with colored fabrics, will wick bleeding dye into the drying cloth and help avoid staining. Evaluation of artifacts after the training exercise will highlight the importance of using absorbent cotton drying cloths, and maintaining contact between the textile artifact and the drying cloth. When good contact is achieved, staining will be on the drying cloth and not (or to a lesser degree) on the

<b>Water Damage Dye Bleed/ Transfer Bleeding of Soluble Inks/Markers</b>	
<b><u>Recovery Methods</u></b>	<b><u>Recovery Materials</u></b>
<ul style="list-style-type: none"> <li>• Minimize spreading: blot</li> <li>• Minimize transfer: interleaving barriers</li> </ul>	<ul style="list-style-type: none"> <li>• Absorbent toweling and sheets</li> <li>• Wax paper</li> <li>• Freezer paper</li> <li>• Polyethylene</li> </ul>

Table 4.



textile artifact. Without contact, the textile artifact is likely to be stained.

When textiles are being packed and moved, attention to the issue of bleeding dye will lessen damage. Along with draining and blotting to remove water, interleaving barriers such as wax paper or freezer paper can be used to keep bleeding dyes from transferring to other textiles. If items are being prepared for freezing this is especially useful (Table 4).

#### GOALS OF DISASTER RECOVERY TRAINING

What is the best preparation for an emergency? Ultimately, salvage techniques for textiles and other art must be placed within the context of a whole disaster recovery effort, which includes identification of staff roles, security, basic services for the response team, health and safety issues, building concerns, acquisition of supplies, artifact priorities, and salvage. The techniques described in this paper are specific to textiles, nonetheless they demonstrate the usefulness of "material-specific" disaster training that is needed for all specialties.

Ideally, training should be planned as part of emergency preparedness, but it can also take place during a crisis, and some instruction can even be given over the telephone. The training that builds the most confidence incorporates hands-on practice sessions that provide real experience. The firsthand experience gained in an emergency drill provides the best opportunity to learn and refine salvage techniques, increase confidence, and demonstrate how recovery methods effect the options for subsequent conservation treatment. While salvage exercises expose the very real limits of what can be done in an emergency, participants also realize that they may be able to do more than they thought.

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#### REFERENCES

Francis, K. 1990. Disaster Prevention, Preparedness and Recovery: Special Concerns for Museum Textile Collections. Federation

Files. Troy, New York: The Federation of Historical Services.

Hackett, J. 1999. Observations on Soot Removal from Textiles. *AIC Textile Specialty Group Postprints*, Twenty-sixth Annual Meeting, Arlington, Virginia. 63-69.

Moffatt, E. 1992. Analysis of "Chemical" Sponges Used by the Commercial Fire Clean-Up Industry to Remove Soot from Various Surfaces. *IIC-CG Bulletin* 17(3): 9-10.

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