

# Disaster Recovery Specifications for Books and Paper Documents

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## I. Material-Specific Factors

- A. Paper is very absorbent; fragile when wet; books swell differentially (more at the edges); handmade paper dries flatter than machine made paper.
  - 1. Handle with care – avoid tearing wet sheets (e.g., careless leaf separation).
  - 2. Support wet material in transit; books and documents in boxes lined with black garbage bags; maps and files in their metal drawers.
- B. Coated stock paper needs special attention or it irreversibly blocks (self-adheres)
  - 1. Preferentially freeze for later vacuum freeze drying; or
  - 2. Air dry, interleaving each page with silicon release paper or waxed paper.
- C. Some manuscript inks and colored printing inks are water soluble & may irreversibly offset when wet.
- D. Wet books and documents are susceptible to mold (48+ hours); freeze or air dry immediately.
- E. Handmade book paper can be dried flatter than machine made book paper.

## II. Preparatory Actions

- A. Safety first; ensure building is safe to enter; no collection is worth your life.
- B. Documentation: photograph disaster for future reference (including insurance).
- C. Maintain sequential order when moving collections to improve tracking and reduce recovery costs.

## III. Moving Collections

- A. Dirty water (sewage, mud, etc., use gloves).
  - 1. Hold books closed and rinse in clean, moving water (outdoors, hoses in buckets) if available and time permits.
  - 2. If time is critical (due to large number of items), freeze now, thaw later, rinse, and re-freeze.
- B. Line standard archives boxes (12" x 15" x 10") with black plastic trash bags as a water barrier.
- C. Pack books spine down.
- D. Mark call number sequences or other identification on box sides boldly in magic marker; tape shut for transport.
- E. Stack boxes 3 x 3 x 3 on standard wood pallets (27 per pallet); wrap with commercial plastic wrap to stabilize pallet.
- F. Transport pallets by forklift to freezer truck trailer; load trailer one pallet high, leaving central walking path.
- G. If hot weather and collection size leads to mold threat, flash-cool the trailer using liquid nitrogen onsite.
- H. Ship collection to commercial freezer plant and store until ready to rinse or simply dry.
- I. Once stabilized, decisions can be made about replacing or drying damaged books.

## IV. Drying Techniques

- A. Air drying.
  - 1. Pluses:
    - a. Can be performed onsite and is relatively inexpensive.
    - b. Allows control of physical distortion; non-damaging to cellulose.
  - 2. Minuses:
    - a. Quantity of material that can be treated is limited by space and staff availability.
    - b. Labor intensive; requires ongoing monitoring.
  - 3. Air drying procedures:
    - a. Move material to a dry, secure location.
    - b. Outdoors (even in cold winters) is OK if protected from weather.
    - c. Dehumidify (20% RH) environment and circulate air as much as possible (de-humidifiers plus lots of fans).
    - d. Spread out material.
    - e. Stand books on end fanned open (use velo-binding combs to hold pages open). Monitor paper dryness by touch (especially in the gutter margin) and when semi-dry press hard overnight in book press, continuing to air drying each day until completely dry. Once completely dry, press for 7-10 days to reduce paper distortion. Interleaving with absorbent paper (e.g., newsprint, thin blotter [0.01 cotton blotter, available in rolls 40 in. X 50 yds. From Talas, 568 Broadway, New York, NY 10012; tel. 212.219.0770; email: [info@talasonline.com](mailto:info@talasonline.com)]; or Dri-Gel Artifex Eqp., P.O. box [319, Penngrove, CA 94951; tel. 707-644.1672; email: [info@artifexequipment.com](mailto:info@artifexequipment.com)]) can expedite drying.
    - f. Coated stock book papers – Interleave between every coated sheet (some books contain only small groups or single pages printed on coated paper) with silicon release paper, polyester

nonwoven sheets (e.g., pelon, Holytex, Bondina), or wax paper to prevent blocking. Air dry as above but avoid pressing until paper is dry to the touch. Books should then be pressed overnight and continue air drying next day until dry. Once dry, press for 7-10 days.

- g. Documents – if moderately wet, leave documents in folders and rack horizontally to separate and create plenty of airflow. If soaked, separate documents and dry wet folders next to material to avoid loss of sequential information. Replace wet folders with dry if feasible, and transfer labeling information.
  - h. Maps – move wet material in the map drawers. Limited number can be draped over monofilament or cotton clothes lines to air dry. Alternatively, they can be stacked between weighted (3-5 lbs.) blotters and boards (change blotter daily).
  - i. Photographs – can be air dried face up on a clean (blotter) surface. Can also be line dried, attached to stretched monofilament line with plastic clothes pins. Alternatively, can be stacked between weighted (3-5 lbs.) blotters and boards with polyester nonwoven sheets (e.g., pelon, Holytex, Bondina) between the blotter and the image to prevent adhesion.
- B. Vacme Press.
1. Pluses:
    - a. Excellent drying characteristics, especially for rare books; non-damaging to cellulose.
  2. Minuses.
    - a. Quantity of material that can be treated is limited by availability of bags.
    - b. Labor intensive; requires ongoing monitoring.
  3. Vacme Press drying procedures.

Books – interleave with absorbent paper (newsprint; white phone book paper), thin blotter, or Zorbix about every 10-15 pages, with most absorbent material on both sides of cover. Place in bag and remove air. Exchange wet paper/blotter/Zorbix every day or so until dry (may require 20 exchanges).
  4. Vacme Press and Zorbix available from: Nicholas Yeager, Artifex Equipment, Inc., 9595 Main St., #1, PO Box 319, Penn Grove, CA 94951, Cel. (707) 331-0237, [artifex@pipeline.com](mailto:artifex@pipeline.com) ; <http://www.artifexequipment.com>
- C. Vacuum Freeze Drying.
1. Pluses:
    - a. Efficient for treating large quantities of wet material expeditiously; non-damaging to cellulose.
  2. Minuses.
    - a. Requires transport to freeze drying chambers.
  3. Vacuum freeze drying procedures.
    - a. Transport frozen material to commercial freeze drying contractor (one source is: Belfor USA, Kirk Lively, Director of Technical Services, 2425 Blue Smoke Court South, Fort Worth, TX 76105 USA. tel. 817-535-6793; 24-hour toll free: 800-856-3333; <email: kirk1@us.belfor.com>; Web Site: [www.belforusa.com](http://www.belforusa.com).
    - b. Vacuum freeze dry at 4 torr, maximum temperature 40.5 C/105°F.
- D. Option; replace mold-damaged pages with photocopy duplicate pages.
- E. Repair paper, rebind as necessary.

## V. Smoke Removal

- A. Preferred: Dry ice blasting (Randell Heath, President, CO<sub>2</sub>LDSWEEP Dry Ice Blasting, 3612 Quail Point Road, Mountain Green, UT 84050; tel. 801-876-5432; <info@coldsweep.com>)
- B. Less effective: Wipe smoke off affected material with natural rubber sponges (e.g., natural rubber sponge for soot removal) stock #60142 Quality Rubber Co., 415 Metallic Lane, Sedalia, MO 65301 USA; tel. 660-826-4641, or 800 597-9947).