Historic England

Emergency Response Plans for Historic Buildings

Part 3: How to treat and store objects after an emergency

What is an Emergency Response Plan (ERP)?

An emergency is a sudden, unpredicted event that can cause disruption or damage, such as fire or flood. Emergency Response Plans (ERPs) help ensure readiness by setting out what needs to be done to safeguard people, buildings and contents should an emergency arise.

Your own ERP

Your ERP needs to be specific to your building and its requirements. The plan should be tested and reviewed annually, and improvements or revisions incorporated as needed.

The forms and documents included here can be used to put together your own ERP tailored to your own requirements.

How to use this document

This is one of three documents about ERPs. The first covers how to be prepared for an emergency; the second details what to do in an emergency; and the third deals with how to treat salvaged objects after an emergency.

Staff will need to be trained about the emergency response plans, and key staff such as the duty manager and salvage operation coordinators will need copies of the relevant parts of the ERP.

Part 3

Part 3 looks at how to handle items salvaged from flood or fire, and includes general information on the different types of emergency conservation treatments that are used, and how they are applied to different materials:

- common treatments (air-drying, freezing, treating mould)
- treatment summaries by material type

These documents can be adapted for your own site.

Further advice

See our website for further advice: HistoricEngland.org.uk/advice/technical-advice
For queries and further information email: emergencyplanning@HistoricEngland.org.uk
Salvage and disaster recovery training: HistoricEngland.org.uk/services-skills/training-skills/heritage-practice-residential/emergency-planning-salvage/

Common Treatments For Salvage Items

Air-Drying

Air-drying involves objects being spread out over an area and dried through air movement or dehumidification.

This method of drying can be carried out in-house. It is cheap, but labour intensive and requires space.

Preparing the room

Remove any wet materials eg. stationery, boxes, curtains or carpet.

Open windows and bring in fans to circulate air or close all windows and use dehumidifiers. Ensure damp air or water is vented/ drained out of room.

The drying effect can be intensified with a wind tunnel, a tunnel of plastic protection boards or sheeting with fans at one or both ends (Ensure air from fans is not aimed directly at fragile items).

Washing lines can be put up for hanging or pegging (using plastic pegs) strong, but damp sheets of paper.

Plastic, perforated racks or airing racks are ideal for air drying objects as they provide support and allow airflow.

Rinsing

If the objects are heavily soiled, the worst of the dirt can be removed by brushing or rinsing off, taking care not to introduce dirt to clean areas (eg. keep books shut).

Treating the objects

Assess books and paper based material first. (Heavily waterlogged books should be frozen if possible)

Treat books in the following order:

1. weak and wet books
2. weak and damp books
3. strong and wet books
4. strong and damp books

Consider the fragility of paper and fastness of dyes.

Support all areas of fragile items, either on a board or by holding together loose fragments with a gauze bandage.

Remove paper clips, string or ribbon (and keep bagged and labelled) to prevent staining or stress on the object.

Soft or rounded objects such as costumes and baskets need to be padded out to their normal shape before air drying. Nylon netting can be used for this.

Books that are strong enough can be stood on their spines and the pages fanned out. Turn them up the other way after a while. See ‘Books’ sheet for other options.

Flat items such as maps, newspapers, documents and plans can be dried flat between blotting paper, as long as the inks are not running. Change blotting paper regularly.

Common Treatments For Salvage Items

Freezing

Wet objects will be susceptible to mould growth within 24 hours. To prevent this, freezing is an option.

Some objects cannot be frozen – for example, materials that have water-soluble components such as watercolours, some dyed textiles and documents with water soluble ink – please check the following treatment sheets organised by material type.

The freezing process can take a long time, and once frozen, you may not have access to the material until the treatment is completed.

Procedure

Books can be packed for freezing in plastic containers or cardboard boxes. The books should be packed spine down in a single layer. If there is time, wrap every second item in waxed or freezer paper to prevent the covers sticking to each other.

Textile items can be laid out flat with tissue or freezer paper rolls in the folds.

Ensure that freezer paper is used to separate items if you need to have one on top of another. Use long boxes or boards to transport items.

A commercial blast freezer is ideal as it drops the temperature quickly and has a large capacity. For a small amount of material a household chest freezer with a temperature of −10°C can be used (as long as it does not auto-defrost).

After the freezer has been packed do not open until you are ready to remove the material.

When transporting material from the freezer to the freeze drier, a freezer truck should be used.

Alternatively there are disaster companies who will take crates of wet material for immediate freezing. These companies can also offer freeze or vacuum drying.

Once frozen the following procedures can take place.

Freeze drying

In a vacuum chamber the water is turned from solid (ice) to vapour. As there is no liquid stage, ink running is minimised.

Vacuum drying

Similar to freeze-drying, but the temperature in the vacuum chamber is above 0°C so there is a brief water stage.

Common Treatments For Salvage Items

Treating Mould

Mould spores are almost everywhere and can cause a major mould outbreak on water damaged material.

Checking for mould

Mould can grow in less than 48 hours.

Check if the material feels damp and/or there is a mouldy smell.

Dirt, dust, stains and cobwebs can look like mould, but in the early stages of growth, mould appears as a fine web of filaments (hyphae). In later stages, the mould develops a bushy appearance; the fruiting bodies containing spores can be seen under magnification.

Test by brushing with a pony-hair paintbrush to see if the mould is dry and powdery (dormant) or soft and smeary (active). Active mould will continue to grow and damage collections. Dormant mould will cause no further damage unless an increase in relative humidity to 70–75% or more causes dormant spores to germinate and the mould to become active again.

Foxing on paper is a closely related phenomenon that can be confused with mould. Foxing involves various agents of bio-deterioration, including mould. Its appearance is characterised by red-brown stains in either discrete spots or irregular splotches, usually with no visible hyphae or mould structure. Like mould, it appears in susceptible papers exposed to high relative humidity.

Stopping mould growth

Reduce the humidity. Mould may form in an area with relative humidity of 65% if there is poor ventilation. Mould will grow and remain active when the relative humidity reaches or exceeds 70–75 %.

Keep conditions cool. Heat makes mould grow faster.

Dry or freeze wet collections. Freezing will not kill the mould but it will stop it growing until a conservator has a chance to dry and clean the material.

Use cold air fans to increase the ventilation.

Consider the health risks. Exposure to mould can lead to debilitating allergy even among people not prone to allergies.

Do not use bleach or domestic products. These will cause additional damage to objects and will not keep the mould from recurring.

If in doubt contact a conservator.

BOOKS

HANDLING

Precautions	Beware
Wear gloves if possible. Pack into crates or heavy duty bags. Also pack any shelf list for an inventory. Consider using a book chute for first floor libraries.	Do not over-fill crates, books are heavy.

Order of removal to safe area

1. Priority Items from room/s of greatest risk
2. Vellum
3. Take from top shelves first unless bottom shelf is in water

Protection *in situ* (if items cannot be removed)

Leave books on shelves, but try to cover front of bookshelves with polythene.

FIRST AID

Separate wet from dry

WET	DRY
Keep book shut. Rinse if dirty, keeping shut. Consider freezing, see below. If strong, fan books open and stand on top or bottom edge, stand on driest edge first (as strongest.) Never stand on front edge. Turn book upside-down to opposite edge every few hours. This is best done in a wind tunnel to aid drying; or lay books flat and interleave with blotting paper every 5 mm. Change blotting paper as soon as wet. When a book is dry, but still cold to touch, place flat on solid surface with weight on top to minimise distortion.	Take to dry area and keep dry. Pack in labelled crates, flat, spine to fore-edge. Fill voids with padding to stop books moving.

FREEZE IF WET?

Yes. If very wet or dyes are running, or large number of books that cannot be air-dried. Wrap in freezer paper and pack in labelled crates spine down.

CERAMICS AND GLASS

HANDLING

Precautions	Beware
Wear gloves. Remove lids or loose parts. Check for repairs, old adhesive can fail if heated or wet. Pick up from bottom, using both hands. Do not pick up using handles or knobs. Pack into crate, separating pieces with bubble wrap. If broken, put pieces into padded envelope.	Be careful of sharp, broken edges.

Order of removal to safe area

1. Priority Items from room/s of greatest risk.
2. Items standing on furniture that needs to be removed.
3. Remainder of items.

Protection *in situ* (if items cannot be removed)

Move to wall, into fireplace or under furniture.

Place on plastic sheeting.

Protect from water with plastic sheeting or bubble wrap.

FIRST AID

Separate wet from dry

WET	DRY
Rinse if dirty with clean, cold water. Blot surfaces dry with paper towel, **do not** rub Air-dry if still damp. Archaeological glass stored in water should be kept in water.	Take to dry area and keep dry. Wrap in labelled acid-free tissue. Store in safe place.

FREEZE IF WET?

No.

FURNITURE

HANDLING

Precautions	Beware
Wear gloves if possible. If large and heavy dismantle if time. Remove drawers, contents can be left in with spaces padded. Lock or tie cupboards shut. Lift by lowest weight bearing member. Don't use handles to lift.	Make sure there are enough people to carry furniture. Use carrying straps to aid lifting of large furniture.

Order of removal to safe area

1. Priority Items from room/s of greatest risk.
2. Furniture blocking routes to other priority objects or exits.
3. Remainder of items.

Protection *in situ* (if items cannot be removed)

Move to stand next to wall.

Raise off floor using chocks.

Cover furniture with wool underlay (if available) and waterproof sheeting.

FIRST AID

Separate wet from dry

WET	DRY
Remove any detachable upholstered parts, rinse if necessary then blot and air dry. If easily removable, take off any metal components, dry with kitchen towel and put in labelled bags. Rinse, or sponge clean any dirty wooden components then blot with kitchen towel. Air dry slowly to prevent warping and shrinkage. Hold veneers in place with weights or clamps, protecting surface with tissue or waxed paper.	Take to dry area and keep dry. Store in safe place. Cover with labelled dustsheet or polyethylene sheeting.

FREEZE IF WET?

No.

Do not freeze painted wooden objects or musical instruments.

LEATHER

HANDLING

Precautions	Beware
Wear gloves. Place on bread tray/ board or support underneath.	If leather is wet tannin can stain, wear protective clothing.

Order of removal to safe area

1. Priority Items from room/s of greatest risk
2. Remainder of items

Protection *in situ* (if items cannot be removed)

Place near walls and cover with polythene.

FIRST AID

Separate wet from dry.

WET	DRY
Support on board or in a tray at all times. If dirty rinse with clean, cold water. Drain and blot with kitchen towel. Objects such as bags can be reshaped and padded with nylon netting. Air dry. Do not dry with heat. Consider freezing.	Take to dry area and keep dry. Wrap with labelled acid-free tissue or polyethylene. Store in safe place.

FREEZE IF WET?

Yes, but only if freezer does not go below −10°C.

METALS

HANDLING

Precautions	Beware
Wear gloves. Check priority sheets for details of chandelier or lantern hanging systems. Pack small metal objects into crates with a loose-fill packing material to support and protect them, allowing as much air circulation as possible.	Metals objects can be heavy. Check electricity supply to lighting is disconnected.

Order of removal to safe area

1. Priority Items from room/s of greatest risk
2. Remainder of items
3. Door furniture

Protection *in situ* (if items cannot be removed)

Fixed and large items should be covered with polythene.

If items can be moved, place on polythene by walls and cover with polythene.

FIRST AID

Separate wet from dry.

WET	DRY
Remove excess water by blotting with kitchen towel. Do not blot if there is an applied finish; air dry keeping flaking surfaces horizontal. Air-dry as quickly as possible, unless there is an organic component, then air dry slowly. Small items can be placed in a sealed box with silica gel.	Take to dry area and keep dry. Wrap in acid-free tissue and pack into labelled crates. Store in safe place, preferably with a low relative humidity.

FREEZE IF WET?

No.

NATURAL HISTORY

HANDLING

Precautions	Beware
Wear gloves. Handle by bases and support at all times. Keep all information with the specimen.	Specimens and taxidermy can contain hazardous materials, arsenic, mercury etc, so always wear respirator and protective clothing.

Order of removal to safe area

1. Priority Items from room/s of greatest risk
2. Remainder of items

Protection *in situ* (if items cannot be removed)

Place near walls and cover with polythene

FIRST AID

Separate wet from dry.

WET	DRY
Taxidermy can be dried with a hair-dryer on a cool setting accompanied by a gentle rearrangement of fur and feather with cocktail sticks. Remove botanic/herbarium specimens from enclosures, recording any information. Blot to remove excess water and air dry slowly.	Take to dry area and keep dry. Wrap with labelled acid-free tissue or polyethylene. Store in safe place.

FREEZE IF WET?

Yes, anything with seeds to prevent germination.

PAINTINGS

HANDLING

Precautions	Beware
Wear gloves. Check priority card for hanging/ security system. Check priority card for the number of handlers required. Support from the bottom of the frame, do lift from the top. Frames can get soft when wet, limit handling.	Paintings can be heavy, do not move unless there are enough people. Use ladders safely.

Order of removal to safe area

1. Priority Items from room/s of greatest risk
2. Remainder of items

Protection *in situ* (if items cannot be removed)

Drape polythene in front and behind painting.

FIRST AID

Separate wet from dry.

WET	DRY
If possible, remove from frame in safe dry place. Lay horizontally, paint side up on blocks to allow air circulation. Do not remove painting from stretcher. Lay wet panel paintings flat and support under weak areas. Ensure nothing touches the paint surface. Do not dry with heat or in sunlight.	Take to dry area and keep dry. Store in safe place. Stack vertically, face to face or back to back. Stack no more than four deep, in descending order of size, using pads of acid-free tissue to separate frames.

FREEZE IF WET?

No.

PAPER

HANDLING

Precautions	Beware
Wear gloves. Use polyester film to remove paper from water, slide underneath. Place damp paper flat on a sheet or in a bread try, using sheet or tray for handling. Wet paper is very fragile, keep handling to a minimum.	Lots of wet paper is heavy, do not overload trays. Dyes can run and stain.

Order of removal to safe area

1. Priority Items from room/s of greatest risk
2. Remainder of items

Protection *in situ* (if items cannot be removed)

Place near walls and cover with polythene

FIRST AID

Separate wet from dry.

WET	DRY
Air-dry flat, interleaved with blotting paper, either as individual sheets or in small piles (5 mm high). Change blotting paper as soon as wet. Do not unfold or separate sheets that are stuck together or very wet; or consider freezing, see below. Lightweight pamphlets can be hung from a line with plastic pegs.	Take to dry area and keep dry. Put in sturdy, labelled crates. Store in safe place.

FREEZE IF WET?

Yes, if large volume of wet paper or hand coloured prints or inks are bleeding. Separate with freezer paper and freeze immediately.

WET FRAMED PAPER

Remove from frame in a safe, dry place unless stuck to glass. If paper is stuck leave on glass dry horizontally, glass side down.

If paper can be removed, dry as for wet paper.

Bag and label any tacks, pieces of frame or cord.

PHOTOGRAPHS

HANDLING

Precautions	**Beware**
Handle by holding edges. Keep image side of photo away from any contact with other surfaces. Place into bread crates/crates for quick removal.	Mould can quickly grows on photographs, wear appropriate PPE.

Order of removal to safe area

1. Priority Items from room/s of greatest risk
2. Remaining photos in bulk.

Protection *in situ* (if items cannot be removed)

FIRST AID

Separate wet from dry.

WET	DRY
The emulsion may become sticky, keep hands and other objects from touching the surface. Remove from plastic/paper enclosures or frames, unless stuck. Save all information. If dirty wash in a bucket or bowl of clean, cold water, agitating water over surface, or clean in light stream of cold water. Separate and dry as quickly as possible by hanging on a line with plastic pegs (do not peg over image) or, lay flat, image side up, on blotting paper. Do not use heat or sunlight to dry.	Take to dry area and keep dry. Wrap in labelled acid-free tissue. Store in cool place.

FREEZE IF WET?

No.

WET ALBUMS	WET GLASS NEGATIVES
Fan pages. Air-dry upright. Do not interleave.	Separate and lay image side up on blotting paper.

PLASTICS

HANDLING

Precautions	Beware
Wear gloves. Foams may absorb a lot of water and be heavy. Avoid surface abrasion and beware of any applied finish. Generally more than one plastic and/or other material involved in one object. Crate up items separated with bubble wrap.	Toxic and harmful chemicals may be present if item has been subjected to heat, some plastics may be very acidic. Some plastics will swell or dissolve in water.

Order of removal to safe area

1. Priority items from room/s of greatest risk
2. Plastics on priority items
3. Remainder of items

Protection *in situ* (if items cannot be removed)

Cover with waterproof plastic sheet.

FIRST AID

Separate wet from dry.

WET	DRY
Blot gently with kitchen roll but not if there is an applied finish. Remember that there may be trapped water in hollow mouldings. If easy, dismantle and store all components together. Remove and dispose of any batteries. Air dry with no heat.	Take to dry area and keep dry.Store away from direct sunlight and in a cool area. Protect from frost.

FREEZE IF WET?

No.

STONE AND PLASTER

HANDLING

Precautions	Beware
Wear gloves. Marble table tops should be carried vertically. Plaster is soft when wet, limit handling. Avoid surface abrasion and beware of applied finish such as paint or gilding.	Stone is heavy, use trolleys and barrows.

Order of removal to safe area

1. Priority items from room/s of greatest risk
2. Remainder of items

Protection *in situ* (if items cannot be removed)

Place near wall, with polythene underneath and over the object.

FIRST AID

Separate wet from dry.

WET	DRY
Blot gently with kitchen roll, but not if there is an applied finish. Air-dry. Monitor for any efflorescence of salts (crystals appearing on the surface).	Take to dry area and keep dry. Cover with labelled acid-free tissue or polyethylene. Store in safe place.

FREEZE IF WET?

No.

TEXTILES

HANDLING

Precautions	Beware
Place on dust sheets or polythene for support and use support for handling. Avoid excess folding. Carpets should be rolled, preferably pile side out. Limit handling, textiles are easily torn.	Wet textiles can be extremely heavy.

Order of removal to safe area

1. Priority items from room/s of greatest risk
2. Textiles on priority items
3. Remainder of items

Protection *in situ* (if items cannot be removed)

Roll carpets, wrap in waterproof sheeting and leave next to wall.

Wool is a fire retardant so use wool underlays to cover objects left *in situ.*

FIRST AID

Separate wet from dry.

WET	DRY
If dirty rinse in cold clean water. Consider freezing see below. OR, drain and blot with clean towels or kitchen towel to remove excess water. Do not unfold delicate fabrics. Do not stack wet textiles. Do not wring or twist. Remove metal elements if possible, but keep and label, or separate metal from textile with polyester film or polythene. Nylon netting can be used to pad out costumes and textiles to increase air flow. Place on netting, or in bread crates and air dry. Do not use heat to dry.	Take to dry area and keep dry. Roll carpets pile side out. Cover with labelled dust sheet or polyethylene sheeting. Pack textiles in labelled boxes lined with acid-free tissues. Keep folds to a minimum, placing rolls of acid-free tissue in folds. Separate textiles with acid-free tissue. Store in safe place.

FREEZE IF WET?

Yes, if a large number of wet textiles or dyes are running.