

Repairing flood-damaged houses

It is common for major storms to be accompanied by flooding that can result in significant damage to houses. When the waters recede, the repairs must begin, but what is involved?

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PHOTOGRAPH - FAIRFAX NZ.

BEFORE ENTERING a flood-damaged house, check that there is no immediate danger from:

- continued flooding risk
- damaged structure
- electric shock - supply should be discontinued until initial checks have been carried out and the supply and installations are confirmed as safe

- leaking gas - supply should be discontinued until checked and tagged as safe
- overflowing drains or sewage systems.

Check for contaminants

Floodwater may be contaminated by silt and sewage that is deposited as water recedes. In rural areas, it may also deposit animal carcasses. To minimise contamination risk:

- ensure that the sewerage system has been checked and presents no danger to health - floodwaters can enter the sewer drains via gully traps or via toilet pans and shower wastes that are below the flood level
- pump out flooded aerated water treatment systems and septic tanks, and clear silt from disposal fields
- bury or remove accumulations of faecal matter and dead animals
- only drink purified water until a safe water supply has been restored.

Stripping out

Where water has entered the basement and living areas of the house, the aim is to remove all items that are wet or holding



PHOTOGRAPH - FAIRFAX NZ.

water and those that may prevent the drying out of concealed spaces as quickly as possible. Nothing that can hold moisture and prevent or slow the drying process should be left in the house.

Items that are likely to have got wet and need removal include the following:

- Furniture and floor-mounted or low-level appliances.
- Carpets and vinyl flooring.
- Full-length curtains and drapes.
- Wall linings up to 300 mm above the flood level - where a house has been briefly (2-3 hours) flooded with clean water, linings may only need to be removed from insulated walls.
- Insulation - all wet insulation, except polystyrene, must be discarded.
- Ceramic tiles that are laid over particleboard, timber flooring or fibre-cement tile underlay.
- Overlay wood-based floor finishes.
- Possibly paper-based wall underlay.
- Fixed gas heaters.
- Clear finishes to timber and particleboard - to assist the drying.
- Medium-density fibreboard (MDF), particleboard and customwood cabinetry and trims - skirtings, kickboards, architraves,

kitchen cabinetry. It is likely that these materials will have swollen as a result of immersion.

- All electrical outlets that have been under water - wiring is likely to remain usable.
- Built-in furniture.
- Cladding at the base of the wall for brick veneer and weatherboard cavity-based cladding systems to allow cleaning of the cavity. For weatherboards, remove the cladding to 300 mm above the flood level. For bricks, the cavity can be accessed by removing bricks from the bottom course.
- Potentially all of the wall cladding for cavity-based EIFS, stucco, flush-finished fibre-cement and flat sheet cladding systems - it is likely to be easier to remove all of the cladding rather than remove a section along the bottom and then try to match existing cladding.

Some building materials may sustain wetting for short periods of time without causing permanent damage, but they should be dried out as soon as possible.

Floodwaters are unlikely to reach ceiling level, but if they do, there may be structural issues that must be evaluated by a building inspector or engineer. Linings and insulation are also likely to need to be removed.

Building consent

Under schedule 1 of the Building Act, work that needs to be carried out urgently, such as removing linings to allow a wall to dry, may be done without a building consent. Where bracing sheets are partially removed, some temporary bracing of the walls may be required.

Engineering input may be required, particularly where lower-level linings are removed from a 2-storey building.

Disposal

Dispose of all absorbent items that are contaminated or unable to be reused.

Cleaning

Once stripped out:

- hose the wall framing cavities - silt or contamination may be in the framing
- hose out under fittings that have not been removed such as baths, metal laundry tubs, showers and timber kitchen fittings
- scrub exposed floor surfaces - for particleboard flooring, some swelling may occur at sheet joints
- scrub down wall linings that have been under water but are not damaged
- clean out drained and vented cavities by gentle hosing ➤

- wash down the surfaces of remaining exterior cladding to remove any dirt from the surface that may slow the drying process. Surface cleaning can be done with detergent and water - use a cloth or soft bristle brush to clean timber weatherboards and a stiff nylon or bristle brush to clean brickwork and concrete blockwork. Rinse detergent off thoroughly after cleaning.

Sewer and stormwater drains may be blocked and require clearing or flushing. When water has drained from the ground surface, this should be fixed by a licensed drainlayer.

Drying out

Once all wet items have been removed and wet cleaning completed, leave doors and windows open as much as possible to allow airflow through the house and assist drying. Heaters help to speed up the drying process, but excessive heat can cause timber to dry too rapidly and consequently warp and crack. Natural airflow is the preferred method of drying materials.

Drying out, particularly in winter, is a slow process and can take 3-4 months or longer.

Under the floor

In some cases, only the subfloor space may be affected by flooding. Drain ponded water from under the house and then:

- increase the airflow by removing ventilation grilles in the foundation walls, taking off some baseboards, leaving access doors open and cutting back plants that obstruct vents
- remove any deposited silt where the level obstructs vents or covers the connecting bolts to braces or the silt is within 550 mm of a particleboard or timber floor
- remove insulation (including foil) where it has been under water - discard all but polystyrene
- check for foundations undermined by water flow.

Where water has entered the house, it may also be necessary to remove a portion of the

floor under baths and showers to remove silt.

Reinstatement

Once the building is dry, reinstatement work can begin in the following order:

- Replace cladding that has been removed.
- Reinstall insulation and electrical outlets.
- Resand particleboard and possibly timber floors to remove any swelling along joints.
- Reline and refinish the interior.
- Replace cabinetry.
- Lay new floor coverings.
- Install new or refurbished appliances and furniture - electric and gas heating systems such as water heaters, central heating units, heat pumps (exterior units mounted on the ground and floor-mounted interior units), electric and gas heaters, stoves and bench ovens, fridges and freezers that have been under water will probably need to be replaced.

Building consent

All reinstatement 'building' work must be carried out to comply with the New Zealand Building Code.

Repairs that will require a building consent include:

- structural work
- replacement of bracing
- replacement of a cladding system
- installation of external wall insulation.

Repair work does not require a building consent when replacement is with similar or comparable materials. This includes, but is not limited to, replacing:

- floors
- non-bracing wall linings
- doors and windows in the same openings.

Repairs to outbuildings not used for habitation, such as carports, garages, farm buildings and sheds, do not need a building consent.

Before you start

Requirements around reinstatement include the following:

- Waiting until the timber framing moisture content has reduced to 16-20% (18% for plasterboard linings).

- Removing any mould growth as a result of prolonged wetting. Wipe affected surfaces with a 10% bleach solution. Once dry, consider treating the timber with a proprietary, brush-on, anti-fungal treatment containing boron. If timber has rot or shows signs of mould growth, which may have been present before the flooding (i.e. blackening of the timber), it should be replaced before further work is carried out.

- For concrete floors, relay flooring once the moisture content of the concrete is less than 75% relative humidity, measured using a hygrometer - Edney gauge. For good quality concrete, it is unlikely that much water will be absorbed into the slab itself. A simple test can be carried out to give an indication of how dry a concrete floor is by laying a 1.0 x 1.0 m sheet of polythene (or rubber mat) on the concrete in an area away from direct sunlight and taping down all edges. Leave for 24 hours, then check for condensation on the underside of the polythene. If there is any, the concrete is too wet to lay flooring over.

- For brick veneer, a white salt or efflorescence may appear on bricks and concrete blocks during drying, but it is not a serious problem and should stop appearing once the wall is fully dried. Efflorescence can generally be brushed off with a bristle brush.

Upgrading

Carrying out repairs may offer an opportunity to improve the performance of the building.

Consider upgrading insulation or adding insulation to walls that were uninsulated. The Building Code Acceptable Solution H1/AS1 requires minimum wall insulation R-values for non-solid construction to be R1.9 for climate zones 1 and 2 (as defined in NZS 3604:2011 *Timber-framed buildings*) and R2.0 for climate zone 3. However, BRANZ recommends upgrading to the maximum R-value of R2.6 for non-solid wall construction for all three climate zones. ◀