
Wood Products Victoria Ltd

Guide to Assessment and Repair of Flood Damaged Timber and Timber Framed Houses

(15 February 2011)



Image source: www.safm.com.au

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Please refer to the Victorian Building Commission website for important information relevant for both practitioners and those home owners who have been flood affected – **The Building Commission is the statutory authority that oversees the building control system in Victoria.** (www.buildingcommission.com.au)

1. ASSESSMENT OF DAMAGE

Prior to any assessments or repairs being commenced, a licensed electrician must undertake an electrical safety inspection. A plumbing safety inspection should also be undertaken by an appropriately licensed person. In addition, an inspection and assessment of structural damage to buildings and houses should be undertaken by a competent person such as a registered structural engineer, building certifier or licensed builder. Where structural damage has occurred repair should be undertaken in accordance with and under the direction of professional advice. For those insured check with your insurance provider before entering or making any changes to the property.

Some important timber and timber related issues to consider when assessing structural damage include:-

- Scoured out footings/foundations and supports (check that dried out mud/silt is not hiding damage)
- Cracked or broken members
- Loose joints and connections
- Adequate seating and bearing of members
- Gaps between support points and joints
- Damaged tie-down connections
- Damaged sheet bracing (lining materials)
- Damaged trusses and truss plates
- Truss plates not firmly seated in timber
- Girder trusses (trusses that support other trusses)

NOTE: Where fast flowing water has impacted on the dwelling, joists and bearers may have shifted/twisted and walls and windows may be out of square etc. Any excessive misalignment should be corrected before new cladding or lining is installed.

Failure to address or correct these types of faults could severely affect the future structural performance of the building.



Footings scoured out by fast flowing water

¹ Acknowledgement and thanks to Timber Queensland Ltd for the base document used in the preparation of this Guide.

2. TIMBER AND MOISTURE

2.1 Mould and Decay

Timber and wood based products that have been totally immersed in water for prolonged periods will not decay or be subject to fungal deterioration due to lack of available oxygen. When the water has receded, it is important to clean the timber as soon as possible of all silt and mud etc and then allow the timber and wood based products to thoroughly dry out as quickly as possible with good ventilation. If power is available, fans, air-conditioners or de-humidifiers can assist with this process.

The space **under suspended floors** must also be immediately drained and dried out. Make sure all ventilation points are clear of debris and dirt and if necessary used 'forced' mechanical ventilation (blowers) to assist in the process.

If timber or wood based products remain damp or wet for prolonged periods and air (oxygen) is available, mould (dark staining) and eventually decay can occur, particularly in low durability timber such as untreated pine. Significant degradation or decay of timber is usually preceded by evidence of surface discoloration by moulds or stains, but if these are easily scraped off with a knife and the timber is sound underneath, it is not of concern. Degradation or decay in timber will be indicated if the wood has become soft and spongy or is easily penetrated with a knife or screwdriver. If there is concern about the potential for mould or possible health impacts, the application of a chemical treatment (mouldicide) can be considered – refer back page.

The use of products such as **chlorine (pool)** etc should be avoided for the prevention and treatment of mould due to possible corrosion impacts on metal connectors and fasteners.



Although heavily discoloured with surface mould and blue stain, the pine timber is still sound as shown by scraping back the surface layer



Decayed timber is soft and spongy and can easily be penetrated with a knife or screwdriver

2.2 Swelling and shrinkage

Timber and wood based products that have been saturated will swell. When these products dry out they will shrink. The amount of swelling or shrinkage will be dependent upon the type and species of timber or type of wood product and time exposed to water. Where timber has swollen, such as in flooring, it may also have secondary effects such as cupping and pushing out external walls or movement of joists and bearers.

The time that it takes for timber that has been fully saturated to fully dry out to a 'dry' condition will vary considerably depending upon timber thickness, density and the level of ventilation available. Higher density timbers, such as hardwood, will take longer to dry. 'Forced' ventilation as noted above can speed up the drying process.

3. KITCHEN CUPBOARDS, VANITY UNITS, LAUNDRY UNITS etc

Where possible retain undamaged bench tops such as granite or stone, sinks, basins and tap-ware for re-use.

If of relatively recent construction, these units are likely to have been made from a composite wood based board such as particleboard (Chipboard) or medium density fibre board (MDF or 'Craftwood') with either a two pack or other type of overlay veneer or surface finish.

If these units have been inundated, and swelling has occurred, they will require replacement as the swelling that has or does occur with the wood based composite is not recoverable and also damage may have occurred to the surface finishes and their attachment to the underlying board.

If water levels have only covered the kickboards and not wet the carcass of the cupboards, kickboards can be removed and the area under the cupboards cleaned and dried and new kickboards installed.

Moisture, silt and mud, etc. will also be trapped behind these units so they may need to be removed to gain access for cleaning and drying out of the underlying cavities and frames.

4. ROOFS & WALLS

Where timber frames have been inundated, it is important that they should be cleaned (washed down) and allowed to dry out as quickly as possible. For frames that are enclosed in cavities (behind wall or ceiling lining), the lining will need to be stripped and removed to allow access for cleaning, removal of insulation and to allow adequate ventilation for drying out.

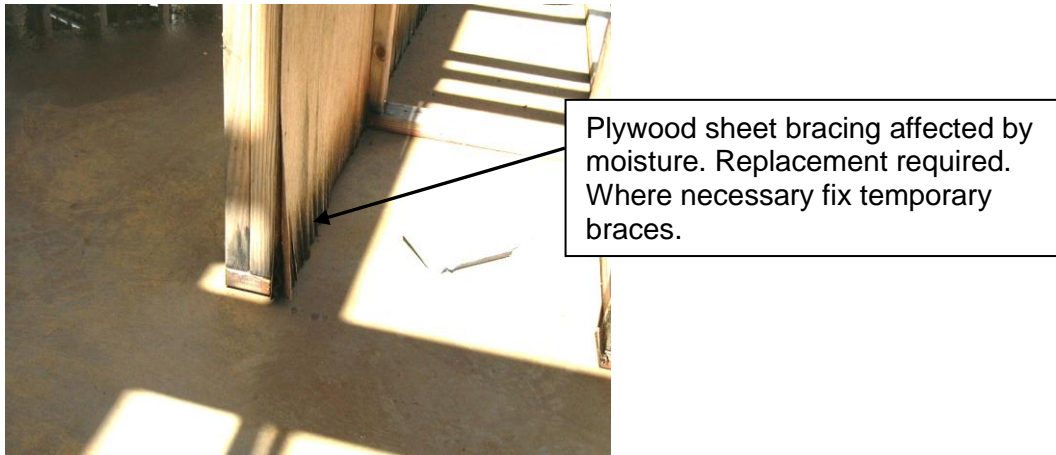
Irrespective of the need to access frames for cleaning etc, **most lining products** that have been inundated (T&G VJ, plasterboard, plywood, hardboard ('Masonite'), medium density fibreboard, etc) will need to be replaced.



Lining should be removed to at least 300mm above the highest level of inundation (or further if required for adequate re-instatement of the lining i.e. half wall height or full wall height). Inundated bulk (batts) wall or ceiling insulation will need to be removed and replaced during cleaning and repairs.

In houses built after about the mid 1970's, **wall bracing** using wall lining materials (plasterboard, plywood, hardboard and fibre cement etc) as the brace may have been used. Where wall linings are stripped, temporary diagonal timber braces (70x35 pine) at 30° to 60° should be nailed to the top plate, bottom plate and studs to each wall to maintain the house's bracing strength prior to re-instatement of permanent bracing and wall lining.

NOTE: In older houses in particular, some roof and wall sheeting and some vinyl floor coverings may contain asbestos. Do not sand or cut these products. Removal and disposal of these products must be undertaken by specially licensed (Class B) contractors.



5. LAMINATED BEAMS, LVL, 'I'-BEAMS AND STRUCTURAL PLYWOOD

These products are manufactured using 'waterproof' glues so short term inundation should not adversely impact on their structural adequacy. Inspection of these can be undertaken to establish if any delamination in the glued joints has occurred. If significant delamination has occurred then their structural integrity may have been compromised and replacement or repair may be necessary. As these products dry out, it is possible that seasoning checks will develop, however these checks, unless they are deep and continuous such as adjacent to glue lines in laminated beams, should not impact on structural integrity.

Structural plywood such as flooring and bracing (and exterior plywood cladding) that are manufactured using 'waterproof' (phenolic) glues, should not be structurally affected, but if 'bubbling' or delamination of veneers is noted they will need to be replaced.

6. TIMBER FLOORS

NOTE: Before any timber floors are re-laid, the services of a professional floor installer should be used to measure and check the moisture content of any underlying substrates (plywood, particleboard or concrete) to ensure that it is suitable for the new flooring to be laid.



6.1 Solid T&G strip floors direct to joists on bearers

The flooring may continue to swell or expand across the boards for a period of time even after the water has subsided as moisture moves deeper into the timber. After cleaning, assess the extent of swelling and or tenting of boards (lifting off the supports). Check to see if there is still clearance between the edges of boards and the bottom plates of walls (usually under the skirting board) and to see if the flooring has expanded and started to push wall frames out at the bottom. If necessary relieve the pressure on walls by removing or cutting out perimeter boards. Eliminate any trip hazards that may have arisen due to tenting of boards or lifting of nails etc.



Allow the flooring a minimum of 4 months to dry out before re-assessing. Gaps between boards are highly likely to occur as the floor dries out, however the structural adequacy of the flooring is not likely to have been compromised and floors may be lived on in the meantime.

Following re-assessment, consideration can then be given to rectification in accordance with industry recommendations which may include the following options:-

- Re-sanding and polishing
- Overlaying with a new thinner overlay timber floor
- Replacing the floor with a new timber floor
- Installation of alternative floor coverings

6.2 Plywood flooring on joists and bearers

Plywood, because it is cross laminated, is relatively stable (resistant to expansion) in respect of moisture uptake. Flooring plywood is also manufactured using 'waterproof' glues so delamination of the veneers due to moisture is unlikely to have occurred.

After cleaning, assess the extent of swelling and or lifting of sheets off the joists. Check to see if there is still clearance between the edges of sheets and the bottom plates of walls (usually under the skirting board). If necessary relieve the pressure on bottom wall plates by provision of relief cuts in the sheet edges as close to bottom plates as possible. Eliminate any trip hazards that may have arisen due to lifting sheets or nails and screws etc.

Allow the plywood flooring a minimum of 4 months to dry out before re-assessing and any rectification that may be required. The structural adequacy of the plywood flooring is not likely to have been compromised.

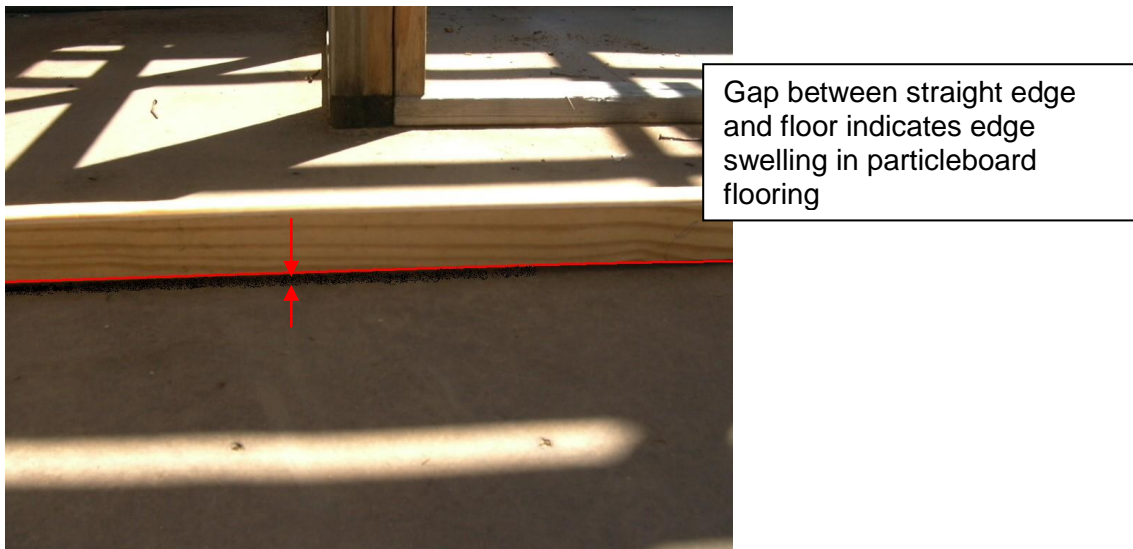
6.3 Particleboard ('chipboard') floors on joists and bearers

Particleboard flooring is more susceptible to moisture induced swelling than timber or plywood, particularly at sheet edges and depending upon the type of particleboard may have suffered loss of structural integrity (some boards are manufactured using moisture resistant glues). There will be only minor loss of swelling when the particleboard dries out.

After cleaning, assess the extent of swelling and or lifting of sheets off the joists. Check to see if there is still clearance between the edges of sheets and the bottom plates of walls (usually under

the skirting board). If necessary relieve the pressure on bottom wall plates by provision of relief cuts in the sheet edges as close to bottom plates as possible. Eliminate any trip hazards that may have arisen due to edge swelling, lifting sheets or nails and screws etc.

Allow the particleboard flooring a minimum of 4 months to dry out before re-assessing and any rectification that may be required. As a guide only, it is suggested that if sheet edges have swollen more than 5mm (i.e. would need to be sanded back by 5mm or more to get a flat floor) then the structural adequacy of the flooring has been compromised and needs rectification by either replacement or installation of a new structural floor over the existing particleboard.



6.4 Timber floors on concrete slabs (includes, overlay, T&G on ply or battens, direct fix etc)

Remove and replace as it is highly unlikely that an acceptable floor will be able to be obtained from the original floor. Moisture, mud and silt will have become trapped under the floor surface.

Once the flooring system has been removed and the slab cleaned, the slab should be left for a minimum of 3 months to allow for dry out. The moisture content in the slab should then be checked by a professional floor installer to ascertain if it is sufficiently dry to enable a new timber floor system to be installed. Moisture vapour barriers should also be considered prior to laying the new floor.

6.5 T&G, overlay or floating floors on plywood or particleboard on joists

These dual layer floors will take considerably longer to dry out than single layer floors. In addition to the considerations noted above for solid T&G, plywood, particleboard and also floors over slabs, it should be noted that the upper flooring surface of these floors will probably dry unevenly with a moisture gradient (low on top surface to high on underside of the flooring/sheet floor interface) that will result in significant cupping of the top boards.

It is considered unlikely that the upper floor surface of these flooring systems will be able to be re-instated to a level of finish considered acceptable for a feature floor. It may therefore be prudent to remove the upper layer as soon as possible to enable the structural plywood or particleboard substrate to dry out and be assessed for suitability of laying a new flooring surface over the top when appropriate.

It must also be considered that removal of the timber floor, where adhesives are usually used, may result in significant damage to the plywood or particleboard subfloors and their fixing to joists. In some instances the plywood or particleboard will need to be replaced.

Irrespective of whether the plywood or particleboard remains or is replaced, screw fixing to the joists is needed with particular attention being paid to ensure sufficient fixing is provided across the width of the sheets.

6.6 Wet area (bathrooms, laundries etc) floors laid over T&G, plywood or particleboard subfloors on joists

Under current and recent building regulations, these floors will have been required to have a waterproofing system above the T&G, particleboard or plywood. Typical waterproofing systems will include seamless vinyl flooring and, under tiled floors, waterproof coating systems such as fibre glass applied directly to the timber flooring substrate. These waterproofing systems will significantly inhibit the ability of the timber substrate flooring to dry out quickly. As such, these floors may require special attention to drying and or repair/replacement.

Also refer to the Australian Timber Flooring Association (ATFA) Information Sheet 31 – *Flood Inundated Timber Floors* – available at www.atfa.com.au

7. TIMBER DECKS

Due to their normal weather exposure conditions, timber decks are required to be constructed of durable timber and should only require a thorough clean and then allowed to dry. First ensure that the space under the deck is drained, all flood debris is cleared and the under deck space is dried out. If any decking has lifted or become loose, after it has dried out, it can be carefully lifted, if necessary, and re-nailed. A proprietary decking cleaner can then be used and then a compatible decking finish applied. If re-sanding the decking is contemplated, consideration needs to be given to this compromising the deck fixings used i.e. galvanised coatings on nails etc.



8. TERMITE MANAGEMENT

Flooding and inundation may have impacted upon (compromised) the termite management systems used to provide protection to homes and buildings.

8.1 Lightweight timber homes with suspended floors on stumps

Termite management of these traditional forms of construction (unless built in underneath) is usually by means of ground separation and the use of physical barriers such as ant caps and metal termite shields. These barriers and shields should be inspected to ensure they are not damaged or covered by silt or mud etc and that the building and any attachments do not provide concealed access for termites to get into the house – no other immediate action required.

8.2 Single or two storey houses on slabs

A licensed pest controller should carry out an inspection and assessment of the termite management system used and reinstate this in accordance with the requirements of the Building Code of Aust., relevant Australian Standard (AS 3660.1) and manufacturer's recommendations. Systems that are likely to have been compromised due to water, silt and mud build up etc include all chemical barriers and physical barriers such as stainless steel mesh ('Termimesh') and graded stone ('Granitguard').

8.3 Termite treated framing

Some homes and buildings may have been constructed using H2 termite treated framing ('T2', 'True Blue' and other similar trade names 'Blue' treated timber framing) as a primary or secondary means of termite management. Some of these treatments rely upon an envelope of the termiticide preservative that is applied to the timber at the time of manufacture. Short term water inundation is **unlikely** to have compromised this envelope; however, it is still recommended that a licensed pest controller carry out reinstatement of termite management systems using an additional physical or chemical termite barrier system as noted above.

9. RE-BUILDING OR NEW STRUCTURES – RAISED TIMBER SUB-FLOORS

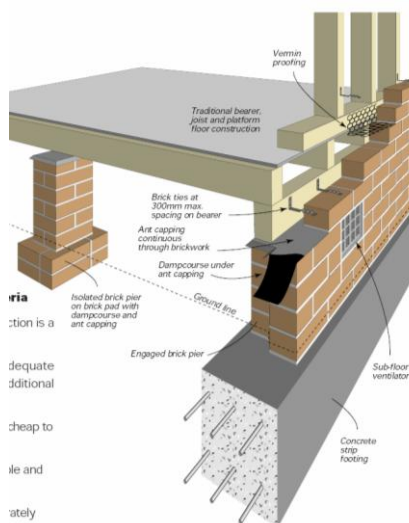
It is recommended that if total rebuilding is required, or construction is of a new home, that a raised timber sub-floor be considered rather than a concrete slab in the ground.

Apart from obviously lifting your home and possessions up above the ground away from unwanted ground flowing water – 'High & Dry', the additional benefits of a timber sub-floor include:

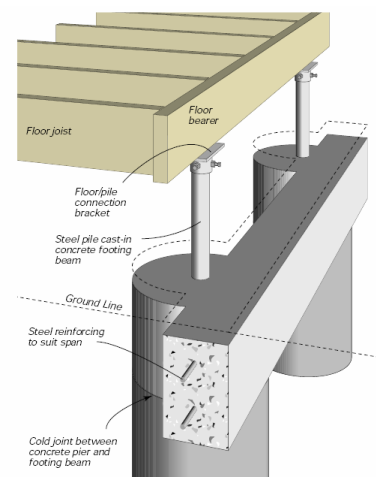
- Simple, economical installation of central heating, plumbing and electrical wiring
- Greater adaptability to later extension or alterations
- No need for bulk site excavation and special drainage
- Easier construction for split level designs
- No water seepage problems, because timber floors are "above the ground, above the damp"
- A range of timber floor systems on offer including insulation against winter cold and summer heat.
- Flexibility to choose either floor coverings or a polished feature floor



A wide range of construction options exist to suit any site soil conditions or any house cladding option.



Traditional raised timber sub-floor on brick sub-wall



Raised timber sub-floor on cast-in steel posts

10. FURTHER ADVICE AND VALUABLE INFORMATION

Further advice can be obtained from the following websites:-

Victorian Building Commission: Information about the Victorian Floods
<http://www.buildingcommission.com.au/www/html/7-home-page.asp>

CSIRO: Repairing flood damaged buildings
http://www.csiro.au/org/Understanding-Floods--ci_pageNo-2.html

Energy Safe Victoria
[Important Electricity and Gas safety advice in floods](#)

Master Builders Association
www.qmba.com.au

Housing Industry Association
www.hia.com.au

Insurance Council of Australia
www.insurancecouncil.com.au

Engineered Wood Products Association
www.ewp.asn.au

Australian Timber Flooring Association (ATFA)
www.atfa.com.au



AFTA brochure available at
<http://www.atfa.com.au/flood-crisis.html>



Acknowledgement and thanks to Timber Queensland Ltd for the base document used in the preparation of this Guide.

USE OF THIS INFORMATION

The information provided in this Guide is general in scope and relates specifically to timber and wood based products. More comprehensive information and advice particularly relating to legal and statutory obligations, health and safety issues, contractor licenses and insurance etc can be found at the relevant web sites listed. Wood Products Victoria Ltd and all other organisations and persons associated with it exclude all liability (including liability for negligence) in relation to the information, opinions or advice given in this Guide or for any consequences arising from the use of such information, opinion or advice.