Department of Environment and Heritage Protection

MINOR REPAIRS—TIMBER

This technical note describes the repairs to timber that may be carried out under the General Exemption Certificate—Queensland Heritage Places and outlines work practices that should be adopted for these timber repairs.

Background

Often the extent and manner in which timber is used in the construction and decoration of a registered place is an important part of its cultural heritage significance. The timbers found in older buildings are particularly valuable as these species are often no longer available or are uneconomical to purchase. Work methods incorporating earlier timber detailing keep alive the carpentry skills needed to undertake such work.

Repairs under General Exemption

Timber repairs approved under General Exemption include:

- patching repairs to timber elements
- fixing new members alongside existing framing members in concealed areas
- fixing supporting metal plates to existing members in concealed areas
- repairing a damaged portion of a timber element using a scarf joint (e.g. verandah beam or verandah post)
- partial replacement of floorboards
- replacing decayed fence posts in hardwood bedded to protect the base from decay, pre-coated with bituminuous-based compound or metal shoes in a concrete sleeve
- restumping provided that the new stumps match the existing timber and size, are replaced in the same locations and the building remains at the same level as existing, reusing antcaps and tie down angles
- reinstating timber details to match original.

Good practices for timber repairs

Under General Exemption, minor repairs to timber must be based on the principle of doing as little as possible and only as much as necessary to retain and protect the element. Repairs must match existing material, form, dimensions and profile and must not damage significant fabric. Good practices for timber repairs include:

- focusing on repairing rather than replacing timber fabric
- investigating the cause of the damage and endeavouring to correct this before commencing repairs
- patching and repairing rather than replacing.

If an element is identified as being beyond repair or timber elements are missing, the new material should match the original in both dimensions and physical properties such as species, moisture content, surface finish (rough sawn or dressed), sectional grain pattern and colour. Forestry experts can identify timber from a small sample.

Note that sometimes you may not be able to match some timbers as they are becoming increasingly rare and very difficult to obtain, for example, cedar and huon pine.

Matching the existing fabric will help the repair to look aesthetically correct and its physical properties of movement, moisture content and evaporation will closely resemble the original, reducing unnecessary stress in the structure when the older is bonded to the new.

Replace only sections of timber that are no longer capable of adequately performing their intended function. Only remove the minimum amount of timber, the replacement should be joined or spliced as required.

Repairs under General Exemption must not include a high proportion of the fabric of an element or place.

Where original timber elements have been replaced with modern, reinstate the original if this is known and can be matched exactly.

Keep records

Record all repairs, replacements and additions made to timber elements and fabric.

Maintenance and cleaning

Regular and consistent maintenance is the most cost effective and prudent way of extending the life of the timber components of a building or structure and helps conserve significant original fabric.

Neglecting or delaying maintenance encourages the natural agents of decay.

Maintaining protective coatings is an important step in conserving timber elements.

Coatings such as paints, varnishes, waxes and oils are the principal means of controlling swelling, as well as protecting and revitalising timbers. Most coatings act as barriers and prevent water penetration into the porous cellular structure of the wood.

No coating is totally impermeable to air or water vapour, so moisture can still enter and leave the wood slowly. Check external paint finishes for splitting or cracking that may indicate water penetration to the timber beneath.

Keeping the timber in a stable environment is important. Repeated wetting and drying of timber is harmful and will provoke rapid deterioration. Look in sub-floor spaces for signs of rot and termites in the flooring and framing. In roof spaces, look for evidence of leaks that may promote fungal growth.

Floor finishes

Traditionally, most polished timber floors were coated in tung oil and polished with beeswax. This traditional finish preserves the floor, is attractive and can be easily renewed.

Another common traditional floor finish for timber floors involved painting a black, brown or red japan border around the perimeter of a room and many older buildings contain evidence of this. This finish was used in entrance halls, on stairs and in most rooms and served as a frame for a carpet square or rug.

Under General Exemption only traditional finishes such as oils, waxes and japan borders can be used on timber surfaces.

The current popular practice of sanding timber floors and applying modern alternative protective coatings such as polyurethane or acrylics is not approved under this exemption.

The glossy finish of polyurethane can yellow and crack and wears off after a few years, requiring reapplication which in turn requires more floor sanding as the new coat will not bond to the old. Excessive floor sanding reduces the thickness of boards and weakens the floor.

Assessing damage in timber

The common causes of damage to timber and the repairs that can be carried out under General Exemption are outlined below.

Timber repairs may be necessary to:

- rectify damage caused by borers and termites
- rectify deterioration caused by weathering, water penetration, wear and tear, etc
- reinstate previously removed details
- remove inappropriate modifications
- rectify damage caused by fire
- rectify or stabilise subsidence of footings, insufficient bracing and distortion of structural members.

Borers and termites

Borers will generally cause only minor damage to timber but they need to be monitored, identified and in some cases (in particular species) treated to avoid further damage.

Termites are a major hazard to timber buildings. Regular termite treatments and treatments for borers can be undertaken under General Exemption provided that the treatment does not damage significant fabric.

The repair or replacement of existing termite shields such as ant caps is essential to the control of termite infestations. When active termites have been effectively treated the damaged timbers should be conserved or replaced.

Water penetration

Timber is damaged by repeated dampening by water that will cause fungal rot. Keeping timber dry will prevent fungal rot. Some timbers, such as fence posts, are always damp and prone to decay. Using naturally durable timber in these situations will help slow the rot.

Weathering

Weathering is the repeated climatic cycle of wetting and drying, and heating and cooling. Ultraviolet light causes the timber to silver and the constant wetting causes surface checking and leaching.

Decay

Decay is common in joints that hold moisture such as:

- at floor level around the bottoms of posts
- at the ends of joists
- where fascias meet at corners
- at the ends of floor boards around the edge of the building.

Reinstating previously removed details

Only reinstate details where documentary or physical evidence exists. Match the original exactly. Enclosed verandahs often retain the original details within the enclosing walls.

Inappropriate modifications

Alterations to update or accommodate new facilities or building trends may have caused inappropriate modifications to be made to a registered place. Repair work may be undertaken to remove the inappropriate modifications and to reinstate original details. This work is not able to be done under General Exemption.

Fire

It is recommended that an assessment by a structural engineer be undertaken before commencing any repairs after a fire. Contact the department for advice on approvals that may be required for the proposed repairs.

Distortion

Distortion of structural members may have a number of causes such as movement due to stump failure or from insufficient bracing. Seek advice from a structural engineer before proceeding with any repairs. Repairs to distorted structural members are not be covered by General Exemption.

Methods of repair for timber

Understand how the timber frame is constructed and identify the cause or source of the damage before undertaking any repairs. There are a number of ways to repair timber. Some methods of repair are appropriate in concealed areas only.

Repair methods include:

- timber patches
- fixing alongside
- metal plates
- lap or scarf joints.

Timber patches

Timber patches can be used where an element is damaged but remains in good working order. Cut out the rotten or damaged sections of timber. Patches should be the same species as the existing timber and well-seasoned to avoid shrinkage. The grain in the patch should run in the same direction as the original. Ensure adhesives are suitable for the situation.

Fixing alongside

Framing elements that have failed may be repaired by bolting new members alongside the existing so they act as a splint or extension piece. Under General Exemption they can only be installed in concealed areas for example, concealed roof cavities or concealed sub floor spaces.

Metal plates

Metal plates can be used to join two pieces of timber where a damaged portion has been removed. Under General Exemption they can only be installed in concealed areas.

Scarf joints

A scarf joint can be used where a timber element has a rotted end or base, for example, the base of a verandah post. After the damaged portion has been removed, a new piece of timber can be spliced into the existing so they can be locked together. With scarf joints, the members must fit closely for strength and neatness and the splice or sloping cut is used to create a larger surface for fixing. A countersunk fixing can be used and concealed with filler and painted over. A scarf joint is an appropriate repair in areas where the repair is visible.

Fixings

Match the existing fixings. Ensure fixings are suitable for the application and are as unobtrusive as possible. Seek engineering advice where necessary.

Restumping

Only replace rotted stumps matching the existing stumps exactly. Do not change the height of the building when restumping.

New stumps should match the shape and size of the original. Durability grade one timber should be used with the sapwood removed to 300mm above ground level.

Reuse stumps where possible, for example, if the building is on a slope and only the bases of the stumps have rotted, it may be possible to reuse most of the stumps by removing rotted ends and moving them uphill. Only one row of new stumps may be needed.

New stumps should be placed in the same position as the existing stumps. Reuse antcaps and tie down angles. If replaced, antcaps should be match existing. Do not spike through antcaps.

When restumping, the floor of the building should be made level and any verandahs should be slightly sloped to allow water to flow to the outside edge. Put back all infill timber screens and battens, repairing if necessary.

Do not raise or lower the building when stumps are replaced.

Other things to be aware of

Bearers

Rectify the cause of bearer failure first. For example, if stumps have settled, bearers may have dropped or may not be bearing directly on stumps. Restumping and levelling may be necessary before repairing bearers. Often packing can be placed under bearers to re-level.

Verandah floors

Match the existing spacing between the boards. Where floors have deteriorated, boards should be replaced to span at least two joists. Protruding nails should be punched below the surface of the timber. Do not paint or varnish verandah floors that were not originally painted or varnished.

Painting a margin on exposed end grain prolongs the life of a verandah floor and is recommended even if not previously done.

A traditional recipe for finishing verandah floors is:

- first coat: raw linseed oil and terrabine
- second coat: 50/50 boiled or raw linseed
- third coat: boiled linseed oil and terrabine.

Nosing boards

Nosing boards usually overhang the floor fascia to allow water to escape. If either the verandah fascia or the nosing board have twisted this may not happen. Replace the twisted sections.

Nosing fillets

Sometimes nosing fillets were used under the nosing boards fixed to the face of the fascia. This detail should only be used if original.

Verandah posts

Modern timber sizes vary from those found in earlier timber, so when replacing or repairing posts timber may need to be dressed down from a larger size. For example, to obtain a finished dimension of 100 x 100mm, a 125 x 125mm member may need to be dressed down.

Chamfers and other details

When replacing timber elements beyond repair, details such as chamfers should be transferred and should match the original exactly. Other decorative elements such as beading, bases, mouldings and capitals should also match the original or existing exactly.

Balustrades and handrails

Missing or damaged balustrades and handrails should be reinstated or replaced only if original is known and matched exactly. If there is no physical or documentary evidence of the original balustrade, inserting new balustrading is not approved under the General Exemption.

Lattice and screens

If lattice screens are missing and original is known, match exactly. Screens should only be replaced in existing locations. Proposals for new screens or for screens where original is not known are not approved under the General Exemption.

Verandah brackets

If decorative brackets are missing or damaged and original is known, match exactly. Many reproductions are available but an exact match is necessary. A ‘near enough’ option is not acceptable. Do not insert brackets where there were none originally.

Weatherboards and chamferboards

Try to use second-hand boards in good condition. Often boards will have to be specially run as modern sizes and profiles vary from earlier ones. Be careful to match the stop beads at external corners.

Boards should be replaced in continuous lengths to span at least two studs. Where consecutive boards require replacement, joins should be staggered.

Verandah ceiling linings

When replacing damaged or missing linings, match the existing in profile and dimension. Do not use modern beaded v-jointed sheeting.

Stair treads

Damaged treads may sometimes be turned over and recycled. Be careful to maintain stumps and antcaps at the bottom of the flight.

Timber wall and ceiling linings

Take care with damaged tongue and groove boards, removing carefully so as not to damage the tongues and groove of adjacent boards. Do not use sheet products that mimic v-jointed boards. Do not gap-fill between the boards.

Trims (skirtings, cornices and architraves)

Patch, where possible, matching existing in timber species, profile and dimension. Be aware that restoration supply shops and some hardware stores stock a large number of decorative trim profiles that are similar but may not match earlier profiles or thicknesses. It is important to get an exact match. Sometimes, more elaborate profiles are a combination of skirtings joined together.

Floorboards

Floorboards should be replaced in continuous lengths to span at least two joists. They should be fixed using galvanised bullet head nails. Drill holes before nailing to prevent splitting boards. Do not glue or secret fix new boards. Where consecutive boards require replacement, stagger joins.

Joints

Where painting is required, paint joints in replacement timbers with primer before assembling.

Do not:

- use modern fixings such as triple grips where they can be seen—nails, bolts or coach screws should be used
- use modern tie-down solutions if more sympathetic techniques can be utilised—if modern tie-downs are necessary, they should be carefully concealed
- use epoxy fillers—use of epoxies is not approved under General Exemption as these should be used carefully and only where structural engineering advice has been sought
- cover over damaged timber sheeting with temporary sheeting as this may encourage termites
- surround timber members with impermeable materials like concrete.

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