

Stains on timber and other surfaces such as paintwork, brickwork and concrete is a relatively common occurrence and can cause annoyance to both builders, home owners and others. These stains, are usually associated with weather exposed uses such as decks, handrails and fencing, and are usually a result of chemicals being leached from unprotected timber or reactions between the timber and other materials. Such staining can be minimized if precautionary steps are taken at the time of building. If staining has already occurred, this can usually be removed from most surfaces using some simple techniques.

HOW STAINS OCCUR AND HOW TO PREVENT THEM

Tannin Stains

Wood contains a variety of chemical substances known as extractives, that are soluble in water (or alcohol). Tannins make up part of these and, being water soluble, they are easily mobilised from the timber with wetting.

Most commonly used hardwoods, local and imported, contain reasonable to high levels of tannins, depending on species. Softwoods on the other hand rarely contain high levels of leachable extractives.

When unpainted or unsealed timber is used in situations where it is frequently wet by rain such as decking, cladding, fencing and framing, the water runoff may contain tannins which will cause brown stains on brick, concrete or painted surfaces.

Preventative measures include providing some form of protection from the weather or sealing the timber surfaces with paint or other sealing compound. Quality paint systems will be more effective than stains. Refer Technical Data Sheet #2 Finishes for Exterior Timber.

Staining effects will be minimised by using seasoned timber or by careful selection of species (see Table 1). If painting or sealing is proposed this should be carried out before the timber members are fixed in place, ensuring that end grain, holes, notches and joint areas are properly sealed. Fasteners should also be hot dipped galvanized or stainless steel.

TABLE 1. STAINING PROPERTIES OF SOME COMMON TIMBERS.

Non-staining timbers	Minimal staining timbers	High staining timbers
hoop pine slash pine radiata pine cypress pine white beech	spotted gum brush box	most Australian hardwoods kwila/merbau western red cedar

• These timbers must be preservative treated if used exposed to the weather or other moisture.



Photograph 1 - Unpainted hardwood causing tannin stains on concrete

Mould Stains

Dark stains can develop on seasoned hardwood and other species of timber decking and handrails etc that is exposed to the weather for a number of reasons including, iron tannate stains (reaction between steel and tannin in the timber - see below). Mould growth can also appear to stain timber. Moulds are fungi and their activity usually occurs on the wood surface. Airborne pollutants such as pollen and dust that provides a nutrient source where mould spores that are ubiquitous in the air can grow in the presence of moisture, including high humidity and the right temperature range.

Mould may re-infect timber that is subject to moisture or high humidity.

A recent job under construction that exhibited mould stains was with spotted gum decking that had developed extensive stains on the upper surfaces (see photograph 2). This decking had been coated on site using a 50/50 mix of linseed oil and turpentine. Linseed oil is a vegetable oil that is high in nutrients, so in the presence of moisture, air borne mould spores will start to grow and cause black stains, as occurred in this instance. Coating decking all round prior to laying is recommended for short term protection and appropriate products need to be used.

Another type of fungi are blue stain fungi. They can penetrate more deeply, mainly in the sapwood, and cause a pale blue stain that is almost impossible to remove. Blue stain fungi grow into sapwood that has a moisture content above 20-30%, and timber can be affected by blue stain fungi before it is dried after harvest.



Photograph 2 - Mould stains on linseed oiled decking

Iron Staining

Wood which has a high tannin content is liable to be affected by iron staining when it comes into contact with steel. Iron stains are blue-black in colour and result from unseasoned or wet timber coming into contact with iron based materials such as tin cans, unprotected nails, saw blades, metal strapping, filings or some sandblasting compounds.

To prevent iron staining occurring in timber it is necessary either to use seasoned timber and to keep it dry, or to use hot dip galvanized fasteners and keep iron based metals away from the timber. Coating the timber with a water repellent product may minimise the incidence of iron staining.

Timber that is constantly being wet by water runoff from an iron surface such as an old iron roof, should be coated with a finish which will prevent the iron contained in the runoff from staining the timber surface.



Photograph 3 - Iron staining due to ungalvanized nails (also nails are not appropriate type)

Alkaline Stains

Alkaline substances and chemicals such as ammonia can react with timbers high in polyphenolic tannins to produce stains. These resulting stains are normally brown in colour but not as prominent as iron stains.

To avoid possible staining of timber by products or chemicals which are strongly alkaline, the timber should be protected by some type of physical barrier such as paint.

Water Marks

During periods of heavy rain, water can sometimes penetrate the exterior cladding of a building and wet the back of interior wall linings. This may cause water staining on the internal surface of the wall lining as the moisture moves through it. Timber floors can also suffer from water staining if they have been rewet.

Good building practice will normally prevent any water staining damage on timber surfaces e.g. use of a moisture barrier in exterior wall cavities will prevent any unsightly water marks on internal linings.

REMEDIAL TREATMENT

Table 2 summarises recommended remedial treatments for the different types of stains.

Oxalic Acid

Oxalic acid is a mild bleaching agent and should be used as a 2 percent solution in either hot distilled water or methylated spirits. The solution should be stored in a glass or earthenware container. Chemical contact with the skin should be avoided at all times. Rubber gloves and safety glasses should be used when applying the solution and a mask worn when sanding the treated surface.

The solution is easy to apply with a paint brush. Any excess should be wiped off after 15 minutes and the surface allowed to dry overnight. This process may need to be repeated several times. Once the desired result has been obtained, the surface may be neutralised with a 0.5 per cent borax solution if the acid is likely to affect gluing or finishing of the timber.

If iron staining is the problem, household bleach could be tried before resorting to oxalic acid.

Hydrochloric Acid

Diluted hydrochloric acid (10 per cent) may also be used to treat stained timber surfaces. The same precautions applying to oxalic acid should be followed.

Sanding

Some surface stains can be removed by sanding the timber surface. This is recommended for damage caused as a result of water staining.

TABLE 2. REMEDIAL TREATMENTS FOR STAINS.

Stain	Treatment		
	Oxalic Acid	Hydrochloric Acid	Sanding
Tannin		×	
Mould	×		
Iron	×		
Alkaline	×	×	
Water			×

SAFE WORKING

Working with timber produces dust particles. Protection of the eyes, nose and mouth when sanding, sawing and planing is highly recommended. Refer to tool manufacturers for safe working recommendations for particular items of equipment.

DISPOSAL OF OFFCUTS AND WASTE

For any treated timber, do not burn offcuts or sawdust.

Preservative treated offcuts and sawdust should be disposed of by approved local authority methods.

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