



Outdoor Structures Australia

Practical solutions that enhance community design projects

SUBJECT: SHOTEDGE DECKING

The covered verandah is a recognised feature of traditional Australian architecture, providing an attractive appearance, as well protection for the external walls from the weather, in particular the heat of the sun. For above ground applications, timber has traditionally been used for the structure and decking of the verandah and with the current popularity of traditional architecture in new home construction (and the current trend of adding a deck to an existing high set home) timber decking has experienced a resurgence in popularity.

DESIGN CONSIDERATIONS

Moisture Content: Shotedge decking is usually seasoned to a moisture content of 15% or less. The moisture content of shotedge at the time of supply is not as carefully controlled by the producer as that of T & G flooring, as there should be a reasonable gap provided for in the installation of the decking and any shrinkage and increase in size of the gap associated with further moisture loss (from, say, 15% down to 12%) is not considered to be a problem. Should the decking be installed in drier inland areas (generally west of the Dividing Range) more care should be taken in the specification of the moisture content as the shrinkage associated with moisture loss (from, say, 15% down to 9 or 10%) may be considered excessive by the client.

Hardness & Durability: Satisfactory resistance to indentation and abrasion can generally be ensured by selecting a high density timber species, e.g. Hardwood. Lower density timber species, e.g. Radiata, are not as resistant to indentation and abrasion as hardwood and the extent of likely traffic on the deck should be considered before choosing the decking material.

Although most of the commonly available Hardwood species will give satisfactory resistance to indentation and abrasion, not all hardwoods are sufficiently durable to resist premature deterioration from fungal decay (rotting) as a result of regular exposure to wet weather. Most of the commonly available timber species have been tested and given a durability rating, which is a measure of the ability of the heartwood of the timber to resist fungal decay and insect attack. The sapwood of timber is always assumed to be of low durability (durability 4). The sapwood of many (but not all) timber species is able to be preservative treated to improve its durability up to (and in many cases exceeding) the durability of the heartwood. Preservative treatment will not improve the durability of the heartwood of low durability species. Only timbers of minimum Durability 2 should be used for exposed decking.

Commonly available Hardwood species generally have a durability rating of 2 or more, and generally have sapwood that will accept CCA preservative treatment. **Lower durability Hardwoods, such as Brush Box (durability 3), should only be used where fully protected from wet weather.** The decking on the outside of a covered verandah, on which rainwater could fall, would not be considered to be fully protected.

Radiata and Hoop Pine are of low durability, but have sapwood that will accept preservative treatment, and should only be used as decking if protected by an approved treatment process e. g. CCA (Copper Chromium Arsenate) or LOSP (Light Organic Solvent Preservative).

Although the heartwood of cypress pine is durability class 1, the sapwood is only regarded as durability class 4 and will not accept CCA preservative treatment. Although available as decking, we recommend that cypress only be used where fully protected from wet weather.

Floor Joist Sizes: Although, in most cases, verandah joist lengths are less than 2.4 metres, where applicable, we recommend that the size of floor joists be determined giving attention to Note 4 on the TRADAC floor joist tables which states that, For spans greater than 2400mm, a floor joist size used at the maximum span given by the table may exhibit excessive Abounce®. To avoid excessive Abounce®, joists may be one size greater than the tabled values.® (Our emphasis)

A timber floor joist spacing of 450mm is normally used for 19mm Hardwood decking and would also be suitable for 22mm pine decking. The joist spacing referred to is not applicable for flooring fixed to metal joists.

Moisture Induced Movement: Timber is a hygroscopic material and will absorb and lose moisture in response to local changes in atmospheric moisture content. The flooring will react to these changes by swelling during wet periods and shrinking during dry periods. The gap allowed between boards in the installation of decking is normally sufficient to ensure that moisture induced movement is not a problem.

Sub-floor Ventilation: The provision of adequate sub floor ventilation is important for the satisfactory long term performance of timber decking. Excessive humidity in the sub floor area resulting from a lack of sufficient ventilation or from damp soil conditions can result in swelling and cupping of the decking, possible decay of the decking and/or structural members, and increased risk of termite attack.

Where the ground is excessively damp due to poor drainage or seepage, drainage must be improved to correct the problem.

ON SITE STORAGE

Timber decking must be protected from weather damage, while stored on site, prior to installation.

Any storage shed or protective cover must be waterproof, but should also provide for a free-flow of air so that the timber is not affected by excessive heat build-up. Because of the potential for excessive heat build up, black plastic is not considered a suitable long term covering. Protective coverings must not trap condensation, and outdoor storage areas should be chosen so that there is no possibility of water pooling under the covers, which could result in moisture uptake into the boards.

Inadequate covering can result in:

- (a) water marking, which may remain visible under clear finishes.
- (b) moisture absorption, which can result in problems with movement at a later stage and/or
- (c) excessive heat build-up, which can cause distortion of the timber.

PREPARATION

Timber decking, exposed to the weather but left uncoated, will be affected by sunlight, and will absorb moisture during wet weather and give off moisture in the dry.

Exposure to direct sunlight will eventually result in the surface colour of uncoated timber changing to silver grey. Moisture movement will cause the boards to swell and shrink, producing small cracks (surface "checks"), and possibly cupping. Uncoated timber remaining damp for extended periods may also develop dark discolouration due to the presence of surface mould.

Pressure impregnation of timber with CCA preservative, whilst giving long term protection against insect attack and decay, does not prevent colour change, surface checking of the timber, or other effects of weathering.

We recommend that timber decking exposed to the weather be protected with a suitable coating for extended service life.

If a natural appearance is required, the finish (generally a long term water repellent or decking oil) should be applied, all round each board, in accordance with the manufacturer's instructions, before installation. For a stain finish, the first coat of the selected stain should be applied all round each board before installation, being careful not to overload the surface, and to brush out any excess stain. Refer to AFinishing@.

Natural finishes should be known brands, rather than Generally, a wide decking board, say 136mm, is used on the outside on the verandah. The extra width allows for an overhang over the Afascia board@ while ensuring the board can be suitably fixed.

home made recipes, and should meet the requirements of Australian Standard AS 1607.

WARNING: Linseed oil, or mixtures containing a large proportion of linseed oil, should never be used as a natural finish on timber decking, as the oil encourages the growth of mould and fungi which will discolour the timber. Removal of surface mould is difficult, and it is often necessary to scrub the cladding with a timber cleaning solution and stiff brush before re-coating with a suitable finish.

Paint, and some pigmented stain finishes, cannot be applied over water repellent preservatives and the compatibility of different systems should be checked before use.

If the decking is to be finished with a paint system, it is advisable to seal each board, **all round**, with either a primer/undercoat system, or the first finish coat (depending on the manufacturers instructions) before installation. Ensure that the intended paint finish is recommended, by the manufacturer, for use as a decking paint (and hence has been formulated for the purpose) as some exterior paints may not be sufficiently abrasion resistant.

Whatever finish is to be used, it is important for the satisfactory long term performance of the decking that the cut ends be well sealed prior to installation.

Suitable preparation is possibly more important for CCA treated pine than it is for CCA treated Hardwood, as there is more movement of moisture in and out of pine, with the associated danger of board distortion.

Whether a natural or stain finish, or paint system is used, the manufacturer's recommendations for application of preparatory coats must be followed carefully to achieve the best result.

INSTALLATION

Decking boards should be laid continuously along the verandah and not as a large number of same length boards across the verandah. Over time should any deterioration occur, it is then only necessary to replace the small number of runs which have been exposed to the weather rather than all the boards whose ends have deteriorated.

It is important to check the straightness of the shotedge, from a number of string lines, as it is laid, as variations are obvious when looking along the verandah.

Use a spacer, for example a nail, a flat washer, or a strip of some material, say aluminium, to form the gap between the boards (between 3 and 5 mm depending on personal taste). It will probably be necessary to cut the last board to suit the remaining gap.

The first run of boards is normally checked into the back of the posts and any variation in the positioning of the posts can be allowed for by varying the depth of the cut.

Although the information contained herein concentrates on the shotedge decking itself, the following information may be useful,

- the verandah bearer must be set out straight, and parallel to the external wall of the house.
- if the bearer is to be checked into a timber post the depth of the check may need to be adjusted to allow for minor variations in the straightness of the run of posts.
- a 75mm bearer is generally checked into the post 50mm with a 25mm forward projection and a 50mm bearer is generally checked into the post the same 50mm with no forward projection.
- fix the verandah joist at the house side first and use the joist to straighten the bearer to a string line. Nail the joist to the bearer before cutting to length (to a string line) to avoid splitting the end of the joist.
- in the case of bearer and joist construction the verandah joist is generally 25 mm smaller in depth than the house joist to allow a step down from the house to the verandah to ensure that water does not enter the dwelling from the verandah.

Below are some suggestions for the protection of structural timber and decking exposed to the weather,

- structural timber and decking used externally, which contains sapwood, should be suitably protected by an approved treatment process such as CCA or LOSP to protect against premature deterioration.
- all cut ends and checked joints must be sealed to prevent moisture absorption into the end grain of the timber (which can lead to premature deterioration of the timber through rotting). This is particularly important where the members are to be painted as any moisture absorbed into the end grain cannot dry out, which can accelerate the process of deterioration. For CCA treated timber which is not to be later painted, a suitably colour matched exterior acrylic paint (or long term timber preserver such as Koppers CN Emulsion) can be used as a sealer.
- it is strongly recommended that the top edge of each joist be sealed, with, preferably, two coats of an exterior acrylic paint (or long term timber preserver) before fixing the decking. This will reduce the absorption of moisture into the top of the joist thereby prolonging its effective life.
- all cut ends of the decking must be sealed, to prevent moisture absorption into the end grain of the timber. If the decking timber is to be finished with a decking oil or decking stain, the cut end can be sealed with a clear product such as a polyurethane. If the decking is to be finished with a decking paint, the same decking paint can be used as an end grain
- gun nails which are of a size and type which may provide sufficient hold-down for fixing decking are almost always zinc plated, not hot dip galvanised, and the nail would suffer from premature deterioration,

sealer.

Pine decking is often supplied Areeded i.e. with ridges dressed along the length of each board. Although often laid reeded face up, reeded decking is actually intended to be laid reeded face down so that the reeds form an air gap above the joist to allow any moisture to escape. Also, by laying the reeds downwards, any splinters of timber formed by the reeds will not be hazardous.

Fastenings: Selection of the correct fixing nail is critical to the satisfactory long term performance and appearance of timber decking. The recommended minimum nail sizes for fixing decking to Hardwood joists are shown below:

For 19mm Hardwood - 50 x 2.8 Galv. Bullet Head Nail

For 22mm Softwood - 50 x 2.8 Galv. Flat Head Nail

Note: All nails to treated Softwood joists should be deformed ring shank nails.

All boards are to be fixed with two nails per joist.

(Source: ATRADAC Timber Framing Manual[®] W33 - 41, 3rd Edition, Table 5.2.3.)

Alternatively, 65x2.8mm Galvanised Bullet Head nails can be used to fix hardwood decking to softwood joists.

We recommend that decking only be hand nailed and that only hot dipped galvanised or other non-corrosive nails be used.

Plain steel or zinc plated nails should not be used, as they are likely to rust, causing staining and the gradual deterioration of the nail and the timber around it.

TRADAC Timber Framing Manuals do not offer gun nailing of decking as an alternative to hand nailing. Although not conforming with this requirement, it is common practise for decking to be fixed with gun nails. Our experience is that this practice often produces an unsatisfactory result, for a number of reasons

- gun nails cannot be relied upon to pull the decking board down onto the joist, allowing the board to move on the joist.

- the thickness of the nail shank does not provide sufficient hold-down to prevent the board moving in response to weather extremes, in particular the heat of the sun.

(The rocking of the boards under foot traffic will then result in the gun nails working their way out of the decking. Re-nailing will only be effective for a short time, before the process is repeated)

especially in contact with C C A treated timber. Gun nails may also have an inappropriate head configuration for fixing decking.

50x2.2mm Finishing T-Nails must not be used for fixing timber decking.

NOTE: Proprietary systems such as National Nails ADecklock® may also be used for fixing decking. The manufacturers recommendations for use must be followed carefully for best results.

FINISHING

After the decking has been laid, finishing coats are generally applied to further seal the top surface of the decking for protection against the effects of the weather

NOTE - For advice on the use of Linseed oil based products as natural finishes refer to "Preparation".

Stain finishes should be applied to a Arun® of a number of boards, along the full length of the decking, and not across the full width of the decking. The gap between the boards can then be used to separate each run, so as to avoid an overlap of stain finish which would result in a variation of colour density.

A common problem with the application of stain finishes, is that the stain is applied too heavily and is not completely absorbed into the timber as it should be.

Overloading the surface® covers the grain of the timber, and produces a stronger colour than intended when the stain was selected. The resulting "surface coating" is often glossy and uneven (blotchy) initially, is unstable in the long term, and will weather off unevenly.

Apply only as much stain as the timber will absorb.

Do not load the brush or roller too heavily and push the stain well out along the timber. After allowing a short time for the stain to absorb, A dry brush® over the existing work to even out any patchiness resulting from irregular application or variations in the rate of absorption into the timber.

If more stain has been applied than the timber will absorb, brush any excess onto unpainted sections or remove by wiping with a soft cloth.

Where decking is to be coated with a natural or stain finish it is recommended practice to drive the nails flush with the top of the board so that there is no depression in which water can pool and soak into the timber. Should the nail head become slightly Aproud® of the surface, due to the board shrinking, the nail can be lightly driven, after, say, 3 months (under normal conditions), so that it is again flush with the surface. Where the decking is to be painted, nails may be lightly punched as the paint will seal the grain of the timber.

In areas of high temperature, pale coloured finishes are recommended, as they reduce the possibility of board distortion and premature deterioration of the finish due to excessive heat absorption.

Whether a natural or stain finish, or paint system is used, the manufacturer's recommendations for

application must be followed carefully to achieve the best result.

MAINTENANCE

If a natural appearance is required, liberal application of a long-term clear water repellent preservative or decking oil will help to maintain the timber in good condition, although the timber will inevitably Agrey® due to the effects of sunlight. The colour of the timber can be restored by the application of a stain finish. Successive applications over a period of time should result in a build up of water repellent preservative compounds in the timber surface and an extension of the maintenance interval

Natural and stain finishes are normally re-applied when the timber loses its water repellency. It would be expected that recoating would be required every 12 months for decking oils and up to every 2 years for stains. Generally, the decking closest to the outside will be more affected by the weather and may absorb more of the finish when recoating, with less (or in some cases negligible) absorption in protected areas. Care must be taken to make allowance for this varying absorption when re-coating so as to avoid overloading the surface in the protected areas.

Regular cleaning of the decking should be by dry methods such as sweeping rather than washing.

Timber has long served as an attractive and durable decking material and satisfactory long term performance can best be assured by giving careful attention to good design and to correct methods of storage, installation and finishing.

(The above information includes material which has been drawn from TRADAC and NAFI publications)

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