



Outdoor Structures Australia

Practical solutions that enhance community design projects

SUBJECT: TIMBER CLADDING

DESIGN FOR CLADDING

To obtain the best possible performance from timber cladding, the designer should give preference to building styles where the cladding is sheltered by wide eaves or verandahs. This will give weather protection to the cladding itself, and provide increased comfort for the occupants by reducing heat build-up on the walls. A stud spacing of no more than 450mm should be used in the frame design to minimise the risk of distortion of the cladding.

Consideration should be given to the installation of suitable thermal insulation behind the sarking, to reduce heat transmission from the external walls to the interior of the house. AWall Batts® are designed specifically for this purpose, and are specially manufactured so that they will stand up in the wall cavity, and not sag with time as ceiling batts would.

STORAGE & HANDLING

Timber cladding must be suitably protected from weather damage 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 cladding is not affected by excessive heat build up. 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:

- water marking, which can be difficult to cover with transparent finishes,
- moisture absorption, which can result in problems with movement at a later stage,
- excessive heat build-up, which can cause distortion of the cladding.

Ensure that the cladding is stacked level, well clear of the ground, and evenly supported at 450mm intervals to prevent bowing and sagging.

PREPARATION

Timber cladding, 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 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.

Generally, it is recommended that all timber cladding exposed to the weather be protected with a suitable coating for extended service life.

Depending on the final appearance required, the surfaces of the cladding exposed to the weather should be suitably sealed and prepared so as to provide a suitable base for subsequent finishing coats.

The cladding should also be sealed on surfaces not exposed to the weather, to prevent moisture movement which can result in board distortion.

If a natural appearance is required, the finish (generally a long term water repellent) 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®.

Water repellents should be known brands, rather than 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 cladding, 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.

Short-term water repellents such as Bar-D-K, will act as a sealer on surfaces not exposed to the weather, eg. the rear face. However, Bar-D-K will only give protection in full sun and rain for approximately 6 to 8 weeks before the waterproofing coating of wax breaks down. Further applications to unseasoned boards may be necessary until

shrinkage stops and the finish coats are applied. If the finish coats are to be applied before the wax coating has broken down, sanding, or washing with Mineral Turpentine may be necessary for the next coat to be effective.

For these reasons, we would recommend the use of the intended natural or stain finish as a sealer for cladding rather than Bar-D-K (or similar products).

If the cladding is to be finished with a paint system, it is advisable to seal each board, all round, with a primer/undercoat system, before installation.

In the case of unseasoned cladding, one coat of the selected paint finish should then be applied to the surfaces which will be exposed to the weather when installed, including that part which will be covered by the overlap, (so that shrinkage does not expose the undercoat, which can be damaged from long term sun exposure, causing possible paint adhesion problems).

Although seasoned products will exhibit little, if any, shrinkage, it would be advantageous, though not essential, to also apply one coat of the selected paint finish to the surfaces exposed to the weather, including that part which will be covered by the overlap, 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.

Cladding should be suitably protected until required, correctly sealed and prepared, and then installed without delay.

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.

SARKING

Sarking is a waterproof material that is fixed to the studs directly behind external cladding. The primary function of sarking in walls, is to direct any water that may have penetrated the cladding back to the outside of the structure. It also provides a draught proof barrier to keep wind driven rain or dust out of the wall cavity.

Wall sarking is fixed on the outside of the studs, from the top plate down, and over the bottom plate and flashing, or otherwise, in accordance with the manufacturers instructions.

Only vapour permeable, fire-retardant, building paper should be used as sarking behind timber cladding.

For this application, the use of aluminium foil type sarking should be avoided, as trapped vapour may wet the back of the cladding, possibly causing cupping and distortion.

Wall sarking is not a substitute for properly installed cladding and it should never be regarded as the principal means of weatherproofing.

FASTENINGS

Selection of the correct fastening nails is important to the performance and appearance of timber cladding.

Hot dipped galvanised or other non-corrosive nails should always be used to fasten timber cladding.

Plain steel nails should not be used, as they are likely to rust, causing, unsightly stains, and gradual deterioration of the timber around the nail.

Flat head nails may be used to provide additional restraint of treated pine and Western Red Cedar cladding. Silicon bronze nails, although expensive, produce a superior appearance when Western Red Cedar is coated with a natural or stain finish.

When using gun nails, particular care must be taken to ensure that the head type, shank size and length, and protective coating, is suitable for the cladding being fastened.

Minimum nail sizes for fastening are given below:

For Weatherboards - one nail per board at each stud

For hardwood and cypress frames -
65mm x 2.8mm (plain shank) galvanised hand nails, or
65mm x 2.9mm (plain shank) galvanised gun nails

For softwood frames -
65mm x 2.8mm (annular threaded) galvanised hand nails, or
65mm x 2.9mm (annular threaded) galvanised gun nails

For 19mm Chamferboard or Ship-Lap Cladding -
2 nails per board at each stud

For hardwood and cypress frames -
50mm x 2.8mm (plain shank) galvanised hand nails, or
50mm x 2.9mm (plain shank) galvanised gun nails

For softwood frames
60mm x 2.8mm (annular threaded) galvanised hand nails
60mm x 2.9mm (annular threaded) galvanised gun nails

(Source - TRADAC Technical Data Sheet 5)

50x2.2mm Finishing T-Nails are not suitable for fastening external cladding.

The gun nails mentioned above are framing nails which cannot be punched below the surface of the board, because of the size of the head. This fact may influence the user's choice of fastening method to achieve the required appearance.

Our experience is that hand nailing with the correct size galvanised nail has generally proved more successful than fastening with gun nails. However, where there have been problems with cladding fastened with gun nails, it has often been the result of incorrect nail choice.

INSTALLATION

Unseasoned boards should be fastened as soon as possible after delivery, to reduce the risk of cupping or splitting.

Timber cladding on walls should finish at least 150mm above ground level. Adjacent earth or pavement should be

sloped away from the wall, otherwise moisture uptake may occur, resulting in deterioration of the cladding near the ground.

The bottom edge of the bottom boards should be cut to slope inwards and upwards from the front face at an angle of 15 degrees so that water will be readily shed from the front edge.

The stops are attached first, positioned so that the bottom of the stop is at the same level as required for the bottom of the cladding, generally bottom of bearer or slightly above the bottom of the chamferboard flashing (to allow drainage). Run a stringline between the bottoms of the stops and check that there is no sag in the line. On long walls, it would be advisable to use a dumpy level to check that there is no sag in the line. Nails can be used for support if any sag present cannot be removed by tightening the line.

If using weatherboards, use a full length packing board to push out the bottom of the first weatherboard, so that it will be at the same angle as those above (see diagram following). To protect it from water damage, the packing board should be sealed all round, including end grains, and fastened a constant 10 - 15mm above the stringline. A packing board should also be installed above wall openings to maintain the correct angle.

The packing board can be planed before installation (or afterwards, provided that the fastener has been countersunk sufficiently not to damage planer blades) so that the angle on the front approximates the angle of the weatherboard, for a neater finish.

As the end grain of timber is particularly porous, **the ends of each board must be effectively sealed, prior to installation, to prevent moisture absorption during rainy conditions.** Moisture absorption into the end grain can result in paint peeling, and also premature deterioration through rotting, as the moisture is trapped in the board by the finish coats.

For natural or stained finishes, apply a liberal coat (or preferably two) of the intended permanent finish to the end grain.. For paint systems, apply a liberal coat (or preferably two) of primer/undercoat.

To prevent water entering the frame during rainy conditions, **joints between adjacent boards, and at timber stops, should also be sealed with a paint/stain compatible mastic or silicone sealant.** Place the mastic on the ends of the boards before installing and fastening.

After cutting to length and sealing, position the bottom of the weatherboard close to but not touching the stringline. Tack the board at the stop end while applying hand pressure against the stop, then tack in position along the stringline. Cut the rest of the boards for the run to length and tack in position along the stringline, until reaching the next stop, ensuring the joints are properly sealed, square and tight. Always nail the end of the board next to the stop first, so that any force required to instal the board does not bow the stop outwards.

Check the bottom of the board for straightness and adjust if necessary before nailing off.

Boards bowed upwards are tacked at each end and pulled down to the stringline when straightening the run. Boards

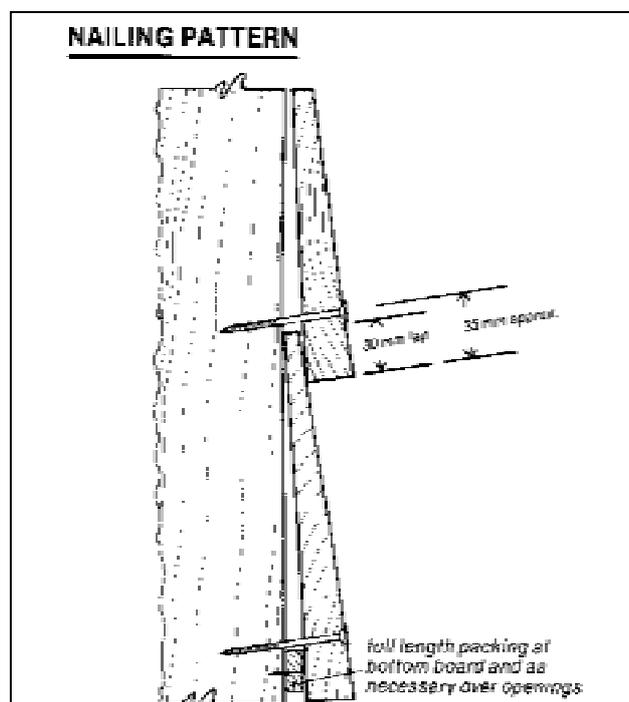
bowed downwards are fastened at the adjacent board or stop, then tacked to each stud, straightening as you go.

A cover strip over butt joints at window and door frames is not needed if the jointing is neat. When fastening cladding on the next wall around a corner, make sure the boards are in the same line.

Boards above and below are not to be nailed together, so that each board is free to shrink and swell individually and so reduce the chance of cupping, cracking and splitting.

Weatherboards are fastened with only one nail per stud.

This nail should be driven as close as possible to the butt end of the board but it must miss the thin edge of the board underneath, (see below), otherwise, with the two outside edges fixed in position, an unseasoned board may split as it shrinks.



Nails should be driven with care. Heavy and excessive nailing, particularly with regard to nail guns, may distort the board and cause splitting during weather changes.

Pre-drilling of nail holes at the ends of boards is recommended to avoid end splitting.

Unseasoned cladding will shrink as it dries, and allowance must be made for shrinkage by providing a suitable overlap. Hardwood, Cypress, and treated pine weatherboards are normally lapped 25 - 30mm and nailed 5mm above the thin end of the board below. Western Red Cedar weatherboards are normally lapped 20 - 25mm and nailed 5mm above the thin end of the board below.

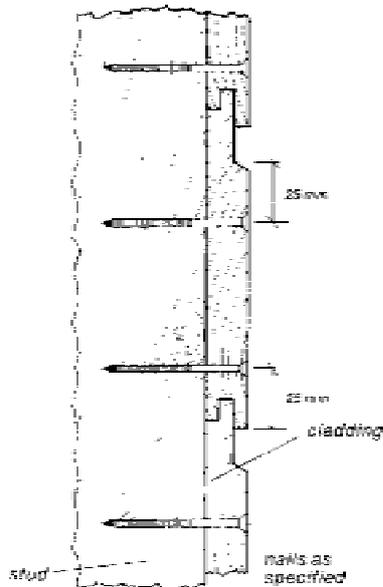
Before installing the next row, calculate the overlap required so that a full width board, less the overlap, will fit at the top. This will result in the same width of board showing from bottom to top. Mark off the effective cover of each board on the stops at each end of the wall and use these marks to run a chalkline to show the position of the bottom of each run of boards as you progress up the wall. The last board must be cut to produce the required (cover) width.

Wide unseasoned boards may develop cupping across

the face unless restrained, and unseasoned boards wider than 200mm should not be used.

Ensure the straightness of each row of boards by eye, and make any necessary adjustments before nailing off. On long walls, it would be advisable to use a dumpy level to check that there is no sag in the line.

Diagonal boards should be cut to length at an angle so that the joints are vertical once the board has been installed, (rather than being "squared off" as would be the case with horizontal cladding), to reduce the amount of water entering the joint.



Chamferboard and Shiplap profiles are sealed and installed similarly to Weatherboards except that no packing piece is required, no allowance is made for shrinkage, and two nails are used to fasten each board (Refer Figure 2, below). With the tongue facing upwards, the tongue and the groove are brought tightly together by using a chisel as a lever. As the overlap on these profiles is generally not altered, except slightly, say, to straighten up a row of boards, the last board must be cut to fit whatever space is left at the top.

Where the cladding abuts masonry, moisture can be prevented from being taken up by the boards, by leaving a small gap which is then protected by a cover strip set in mastic, or, alternatively, by sealing the ends of the boards and then sealing the joint.

FINISHING

If a natural appearance is required, liberal application of a long-term clear water repellent preservative will help to maintain the timber in good condition. Successive applications over a period of time will result in a build up of water repellent preservative compounds in the timber surface and an extension of the maintenance interval.

NOTE - Linseed oil, or a mixture of mineral turpentine and linseed oil, should never be used on timber cladding as a natural finish. Refer to "Preparation".

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 too heavily and push the stain well out along the wood. After allowing a short time for the stain to absorb, 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 cladding is to be coated with a natural or stain finish it is common practise to drive the nails flush with the outside of the board. Should the user require that the nails be punched and the holes filled, prior to application of a stain, the filler used must be carefully selected, as external fillers are often not recommended for use under transparent finishes.

Where cladding is to be painted, nails may be punched, the holes filled with a suitable exterior filler (not Linseed Oil putty), and sanded smooth prior to application of the finishing coats. Any damage to the undercoat or paintwork should be "touched up" so that there is an unbroken skin of paint on the front surface.

Once shrinkage has finished, (12-18 months), the final top coats can be applied after suitable preparation. 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.

Timber has long served as an attractive and durable external cladding, and satisfactory long term performance can best be assured by giving careful attention to correct preparation, installation and finishing techniques.

(The above information includes material drawn from NAFI and TRADAC publications.)