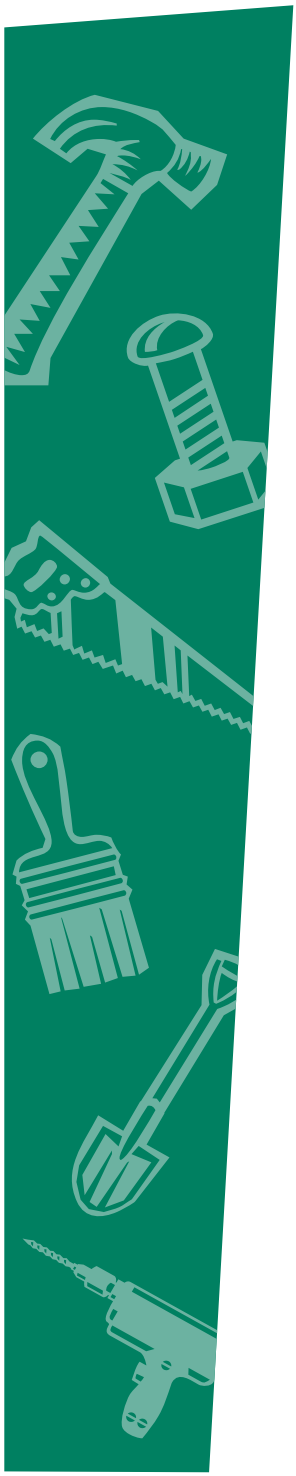
The University of Sydney
Faculties of Health Sciences and Architecture
The Home Modification:
Information Clearinghouse Project



Industry Factsheet:

Reeded (Ribbed) Timber for Decks, Ramps and Paths

Purpose

To assist service providers and trades people in the appropriate selection and application of materials for decking. The information sheet provides criteria that should be considered in determining the appropriateness of reeded decking in specific contexts.

This factsheet supplements the HMInfo Clearinghouse document "Industry checklist: Reeded (Ribbed) Timber for decks, ramps and paths". This factsheet highlights critical specifications and definitions for each criterion of the checklist in relation to housing which are typically class 1and 2 buildings. This factsheet is a starting point and does not attempt to provide exhaustive detail for each criterion. An understanding of basic construction principles, building codes and regulations is assumed.

Achieving satisfactory outcomes, as determined by the consumer, service provider and trades person, is more likely when the safety and dignity of consumers is considered at all stages of the project from conceptualisation through to post occupancy. This includes siting, design and construction of the deck, ramp or pathways.

Background

These guidelines consider best practice recommendations for safe and dignified access to private residence and common areas of units. The guidelines specifically consider issues in relation to the Building Code of Australia (BCA), Australian Standards on access and mobility (AS 1428) and minimising surface degradation of the timber.

BCA requirements for slip resistant ground surface are regulatory for paths of travel to the main entrance of a private residence and common areas in units. This includes decks, pavements and steps located on these approach paths.

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Background - continued

AS1428.1 is not regulatory for private residence. However, it does provide a useful baseline when designing for people with mobility impairment. In the event of injury resulting from design or construction, legally the onus is placed on the designer or builder to justify variation from this standard. For example, slip hazard increases with gradient. Therefore the coefficient of friction required to minimise the risk of slipping increases as the gradient increases. Consequently, the designer may be liable if a consumer slips on a ramp designed with a gradient steeper than 1:14.

A building should be approachable by everyone, including older people and people with a disability, in a safe and dignified manner whether they are residents or visitors to the property. Under the Disability Discrimination Act, those responsible for the construction and or the management of an approach path may be responsible for maintaining its accessibility. Therefore providing the consumer with *written* maintenance procedures is strongly recommended.

The risk of slip and trip hazards may increase with degradation of the timber surface. The primary factors influencing surface degradation of timber include UV light exposure, mechanical damage, shrinkage, splitting of timbers, frequent wetting and drying (weathering) and rot. Consequently, siting, design and construction methods impact on the rate of surface degradation.

Maximising safety of users and durability of timber may be enhanced through consideration of these factors during siting, design and construction phases and a regular maintenance program.

Siting

Approach

Access to the deck should be clearly visible to all residents and visitors approaching the dwelling. The path of travel should be considered from street and car park / garages.

This path of travel should comply with AS1428.1 requirements for a *continuous accessible path of travel* including but not limited to gradient, crossfall, travel distance, ground surface and abutting surfaces.

The minimum vertical clearance of an accessible path of travel should be 2000mm. Therefore consider possible encroachment of built elements such as eaves or ceilings and natural elements such as overhanging branches.

Where a change in direction occurs on a sloped area, the angle of approach must be considered. Maximum acceptable angles for change in direction relate to the difference between the two gradients. An angle of approach table, setting out complying angles, is provided in AS1428.1.

Differences in Elevation

The travel distance is determined in part by the provision of gradients that comply with AS1428.1 (maximum gradient 1:14 with landings at 9m intervals). Hence the change in levels between approach path and the deck height will impact on the total travel distance.

Energy conservation is critical to older people and people with a disability. Although each individual's tolerance may be different, AS 1428.2 provides guidelines for maximum recommended travel distances (60 – 100m).

Building and Engineering Services

The location of services such as water, telephone and electricity should be determined prior to design and construction. Damage or disruption to services is at best inconvenient to the resident while relocation of services can be costly.

Consider the location of services and the maximum span of timbers between supporting members when positioning piers. The maximum spans may vary with specific timber species.

Weather elements

Exposure to extreme weather conditions can be a contributing factor to falls. Where possible, consideration should be given to protection from sun, precipitation and wind. This may be achieved through construction of a cover over the path of travel.

Aesthetics

Appearance grade timber should be specified. Measure of strength alone through the F grade (maximum long term permissible bending strength) is not adequate. The F grade does not consider factors such as durability or appearance (fewer defects). Moisture penetration and fungal contamination into timber is more likely through defects increasing the probability of rot or mechanical weathering. The F grade then may provide a false cost benefit in not considering durability or appearance.

Family and consumers may be concerned about the perceived devaluing of the property where the new structure is not visually congruent with the existing structure.

The visual impact of the proposed structure to the existing structure should be seamless. Attitudes in relation to stigma and personal security may be influenced by an 'institutional' or ad hoc appearance.

Design

Material selection

Consider the qualities of various species of timber such as inherent strength, recommended maximum span, and resistance to weathering in the selection of appropriate timber. Although purchase price may be greater for more durable timbers the long term costs may offset by the reduced maintenance costs, reduced hazard due to weathering of timber and extended time between decking reconstruction.

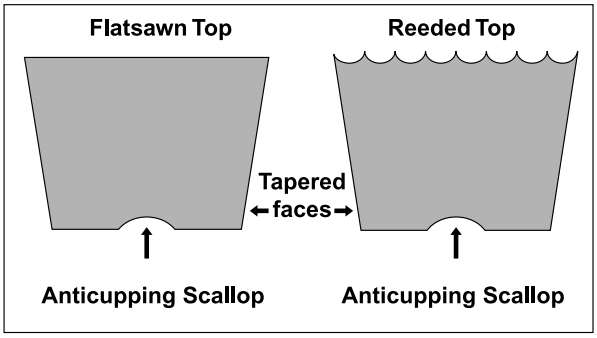

Diagram 1
Cross section showing timber finishes including anticupping scallop, tapered profile

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Anticupping scallops **diagram 1** extend the life expectancy of timber by increasing air circulation and decreasing the drying time. This means the likelihood of water entrapment between abutting timber surfaces is reduced. Consequently, the opportunity for moisture penetration and fungal contamination is reduced, decreasing the probability of rot or mechanical weathering.

Timber should be tapered with narrow face adjacent to support structures and broader surface uppermost. This minimises the risk of water and organic matter entrapment and promotes air circulation.

Although reeding decreases the durability of the timber, it also decreases the slipperiness when properly maintained. Slip resistance of timber has not been formally tested but it has been demonstrated that rough surfaces provide greater slip resistance than smooth surfaces. Reeded timber should then provide greater slip resistance than flat sawn top timber. However, maintenance is critical to improve the life expectancy and slip resistance of timber. Collection of organic matter and / or water pooling may increase the slipperiness of reeded timber and increase the likelihood of rot.

Ground surface

Specification of correct foundations is critical in minimising maintenance and maximising the integrity of the structure over a greater period. Characteristics of the substrate such as stability of a slope, sandiness of soil or rock, dictate the footing and foundation specifications.

The substrate and topography also impacts on water escape. Design and siting should ensure water pooling does not occur on the approach path or decking.

Dimensions

Timber: The probability of defects increases with timber length and therefore the probable rate of surface degradation increases with timber length. Manufacturers' recommendation for maximum length is 700 – 1450mm although this may vary with timber species.

Decking: The appropriate width of the path of travel is dependent on the functional ability of the resident. As a guide, people who use a wheelchair require a width of 1540mm to complete a 180 degree turn while people with a mobility impairment using other walking aids require 1000mm (1200mm is preferred).

Gradient / crossfall

The maximum complying crossfall for any path of travel is 1:40.

The slip resistance of a surface decreases as the slope increases. AS1428.1 states, the steepest complying gradient is 1:14 with landings provided at maximum intervals of 9m (excepting threshold ramps, step ramps and kerb ramps).

Threshold ramps have a maximum gradient of 1:8 and maximum length of 450mm. A landing is not required at the top of a threshold ramp.

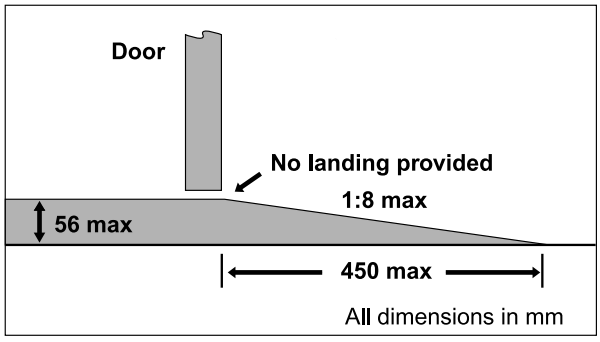

Diagram 2
Cross section of a threshold ramp

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Step Ramps

Step ramps have a maximum gradient of 1:8 and maximum length of 1520mm. A landing is required at the top and base of a step ramp. The landing at the base of the ramp should have a minimum length of 1330mm. The minimum landing length at the top of the ramp is determined by the clear door opening and direction of opening. These dimensions are provided in AS1428.1 Figure 12. For an outward opening door with a clear opening greater than 800mm, the required landing length is 1350mm minimum.

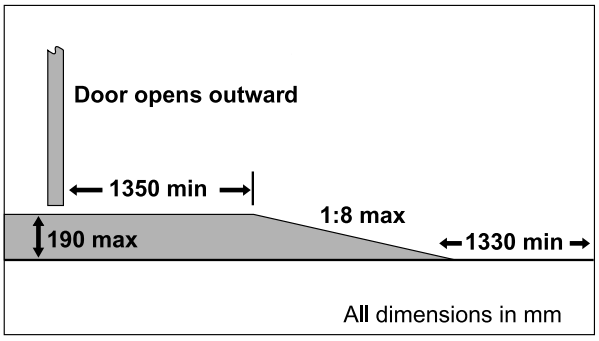

Diagram 3
Cross section of a step ramp

Handrails

Locating handrail support posts at piers helps to increase the stability and strength of the handrail.

Handrails are required on both sides of a path of travel with gradients from 1:19 to 1:14. Handrails are not required for slopes 1:20 to 1:33 where the abutting ground surface continues at the same level for a minimum 600mm.

Handrails should be rounded with a diameter of 30 – 50mm. Attachments should not restrict the passage of hand along the rail.

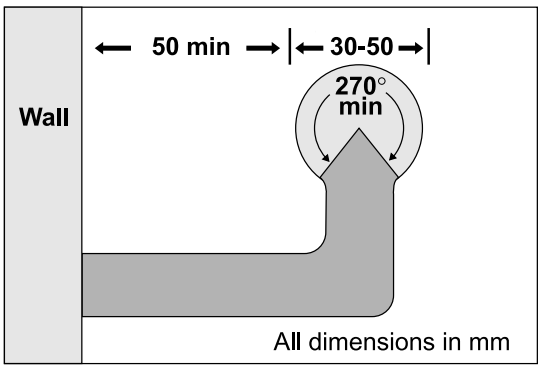

Diagram 4
Cross section of complying handrail

- 600mm min verticle clearance above handrail
- No obstruction to hand 15mm below handrail
- Height determined for individual need. Typically 865 – 1,000mm above nosing of tread or level ground surface

Kerb

Kerbs abutting the path of travel may collect leaf debris and restrict the escape of water.

Kerbs and kerb rails are intended to keep front wheels of wheelchairs on the path of travel. The kerb should not have a space of more than 20mm between 75 –150mm above the ground surface of the path of travel to prevent entrapment of footplates.

Finish

Commercial products are available to preserve the timber and to reduce slipperiness.

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Construction

Placement

Slip resistance is increase when the grooves on reeded decking run perpendicular to the direction of travel. However, water escape and comfort of travel for people using a wheelchair may be improved when the reeds run in the direction of travel.

Joints and abutments on the path of travel should be level. Construction tolerance is ±5mm.

Spacing between timbers should be sufficient to allow water to escape but not allow walking aids or shoes to become wedged. Manufacturers' recommended spacing at 5 – 12mm complies with AS1428.1.

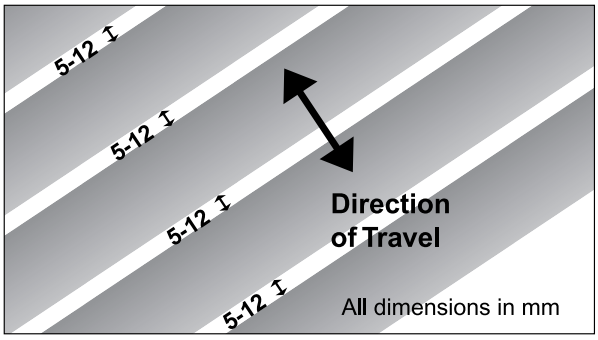

Diagram 5
Recommended spacing between timbers on a deck or ramp

Consideration should also be given to timber shrinkage as gaps between timbers and at joints may increase. Also in unseasoned timber, warping may increase trip hazards, particularly at joints. These effects can be minimised through use of seasoned timbersof similar thickness and by increasing the thread length on fasteners to enable tightening as required.

Fixings

Corrosion increases with exposure to weather, salt spray and timber treatments. Galvanised or stainless steel fasteners and brackets are preferred to standard metal to reduce the risk of corrosion.

Fixing on the underside of decking increases the longevity of the timber. However, maintenance such as tightening screws or replacing damaged boards becomes more difficult.

Reducing splitting of timber increases its longevity. Timber is less likely to split where fixings are located a minimum of 100mm from the end of the timber. Also predrilling before applying fixings reduces the risk of splitting.

Maintenance

A regular maintenance program increases the durability and longevity of the timber. The following maintenance is recommended for reeded decking.

Cleaning

Regular inspection for and removal of surface dirt and organic matter including leaf litter, fungal or algae growth

Removal of any pooling water

Refinishing

Recoat timber at required intervals to protect from weathering

Reapply non-slip product at required intervals

Movement & shrinkage

Replace damaged timbers

Tighten fasteners as required

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ADDITIONAL CONSIDERATIONS

Cover

In areas of heavy rainfall or frost, covered walkways, ramps or decking is recommended to reduce the risk of slipping.

Due to the reduced exposure to elements, covered walkways, ramps or decking may also assist reduce the risk of injuries.

Best practice indicates the provision of covers and application of non-slip products.

Alternative materials

Brushed concrete or steel mesh may provide a more suitable surface for residents who use walking aids such as crutches or canes.

SUMMARY

Decrease risk of rot

- Selection of appropriate timber
- Maximise water escape
- Minimise collection of leaf litter

Decrease risk of slip

- Selection of reeded timber and correct orientation
- Maximise water escape
- Minimise collection of leaf litter
- Provision of cover

Decrease risk of other hazards such as trips and falls

- Level surface for path of travel
- Complying gradients and cross falls
- Inclusion of handrails and kerb / kerb rails
- Appropriate gaps between timbers on path of travel

Minimise costs long-term

- Decrease risk of surface degradation
- Decrease injuries and accidents
- Ease of maintenance
- Incorporation of these issues at earliest discussion and conceptualisation stages of design

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