



Australian
Forest
Products
Association

SAFE STACKING of TIMBER

Guidance Material

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Introduction

Improperly stacked timber presents a danger to employees, contractors and public within the vicinity of the storage area. Unstable timber stacks can collapse or lead to falls from heights and have resulted in avoidable product and property damage and serious injuries and fatalities. All employers and employees have a role to play in adopting a cautious approach to site operational practices and ensuring a safe workplace for themselves and visitors.

Risks associated with timber stacking are commonly attributed to:

- Storage surface area being uneven or not able to sustain loads;
- Storage area not appropriately located within site and environmental limitations;
- Excessive stack height and unstable configuration;
- Stack quality and integrity;
- Interaction between mobile plant and stored product; and
- Inadequate management of stack risks.

Australian Forest Products Association (AFPA) has produced this guidance document on safe timber stacking as a practical reference for employers and employees. This guidance material applies to all timber stacks including those located in the open or under cover.

Although not mandatory, the purpose of this document is to provide general guidance in identifying and managing exposure risks associated with stacking timber. The guidance material has been developed in consultation with timber industry and safety representatives and provides a general overview of commonly adopted practices for the safe stacking of timber and reducing risks to employees, the public and others.

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1.0 Risk Based Approach

No two sites are the same and will vary in size, configuration, operations, equipment, volume and nature of timber products etc. As such, a risk-based approach should be considered before adopting any guidance provided within this Document.

Generally, to ensure the safe stacking of timber is achieved it may be necessary to adopt higher levels of controls in situations that are not consistent with the guidance provided in the following Sections.

Managers and employees involved in timber stacking operations, should be competent and familiar with risk assessment principals so that hazards can be identified and the associated risks effectively controlled.

2.0 Storage Surface Area

Poorly selected or maintained storage surface areas can result in ground subsiding, cracking, or being flooded any of which can compromise the stability of timber stacks. The ground surface of the timber stack storage areas should be:

- Level with only a slight slope (ideally less than 2 degrees) allowing for drainage;
- Constructed of concrete, asphalt or compacted surface areas which are considered most suitable;
- Able to manage load weights without subsidence or cracking;
- Positioned away from site locations subject to environmental factors such as flooding and high winds; and
- Periodically inspected and maintained.

3.0 Location

Inappropriately located timber stack storage areas may pose a risk to pedestrians (i.e. site workers and visitors) and mobile plant operators (i.e. forklifts and truck drivers). The following should be considered in the selection of timber stack storage locations:

- Exclude access to general vehicle and pedestrian traffic;

- Reduce risk of collision and damaging stacks by maintaining adequate accessibility for forklifts, trucks and cranes;
- Use of exclusion barriers (i.e. bollards) to further reduce risks to workers and mobile plant operators from falling and collapsing timber;
- Maintain mobile plant traffic surfaces (i.e. keep firm and level as possible);
- Allow access for emergency response (i.e. ambulance and fire);
- Lighting and use of fixed mirrors for blind-spots;
- Location to Powerlines;
- Location to Fire suppression systems including the impairment of overhead sprinklers;
- Spacing between pack rows for employees' access for Inspections, docket reading and stocktakes;
- Distance between packs within a row to assist in avoiding pack damage from fork tine protrusion or impact;
- Location to boundaries and the risk to public; and
- Positioning away from neighbours, boundaries or public access areas.

4.0 Selection and use of Bearers

The use of damaged or poorly selected and positioned bearers can lead to deformation of timber and instability of stacks. The following considerations should be applied in the use of bearers for supporting timber stacks:

- Bearers should be straight, similar in length, and thickness and width;
- The length of bearers should be identical to the width of the timber stack;
- Bearers may be timber, concrete, or steel and must be able to withstand the weight of the timber stack;
- Bearers should be sufficient in number and proportionally placed along the timber stack to prevent deformation that may lead to stack instability; and
- Bearers should be inspected and either maintained for serviceable condition or replaced.

5.0 Stacking Height and Configuration

Limiting the height and controlling the configuration of timber stacks reduces the risk of falls and collapse due to structural instability, impacts from mobile plants and external forces such as wind. As a general rule, height to base ratio of 4:1 should be the maximum applied under optimal storage surface area and location conditions.

Timber stacks should be square or rectangular in configuration with the centres of gravity directly in line with the bottom pack (see Figure 1). There should be no 'staggered' or 'offset' timber between vertically stacked stacks (see Figure 2). Timber stacks comprising of variable lengths should be configured so that longer stacks are always below shorter stacks and aligned with a common flush edge on one side (see Figure 2).

A risk-based approach should be adopted in either increasing or reducing timber stack heights from the 4:1 ratio with consideration to block stacking, indoor and outdoor storage, uneven surface levels, site area limitations, mobile plant access and reach capacity; pedestrian walkways, existing overhead structures and potential for adverse environmental conditions.

Block stacking can provide a space saving option and generally is lower in potential of toppling. Depending on the ability of a forklift to directly access the second stack of a block stack a risk-based approach can be adopted in increasing the height to base ratio of 4:1 – however, ratios of 6:1 and 5:1 for high and medium load bearing surfaces respectively should not be exceeded. The method of removal of a timber stack from a block stack is important to maintain a safe configuration. The difference between the front facing stack to that of the second timber stack must not exceed a ratio of 2:1 (see Figure 3).

Where a designated walkway is directly behind an individual timber stack or block stack, a maximum height of less than 1.6m should be maintained to ensure safe visibility between forklift driver and pedestrians (see Figure 4).

Figure 1: Well configured timber stacks



Figure 2: Avoid staggering or offsetting stacking of timber

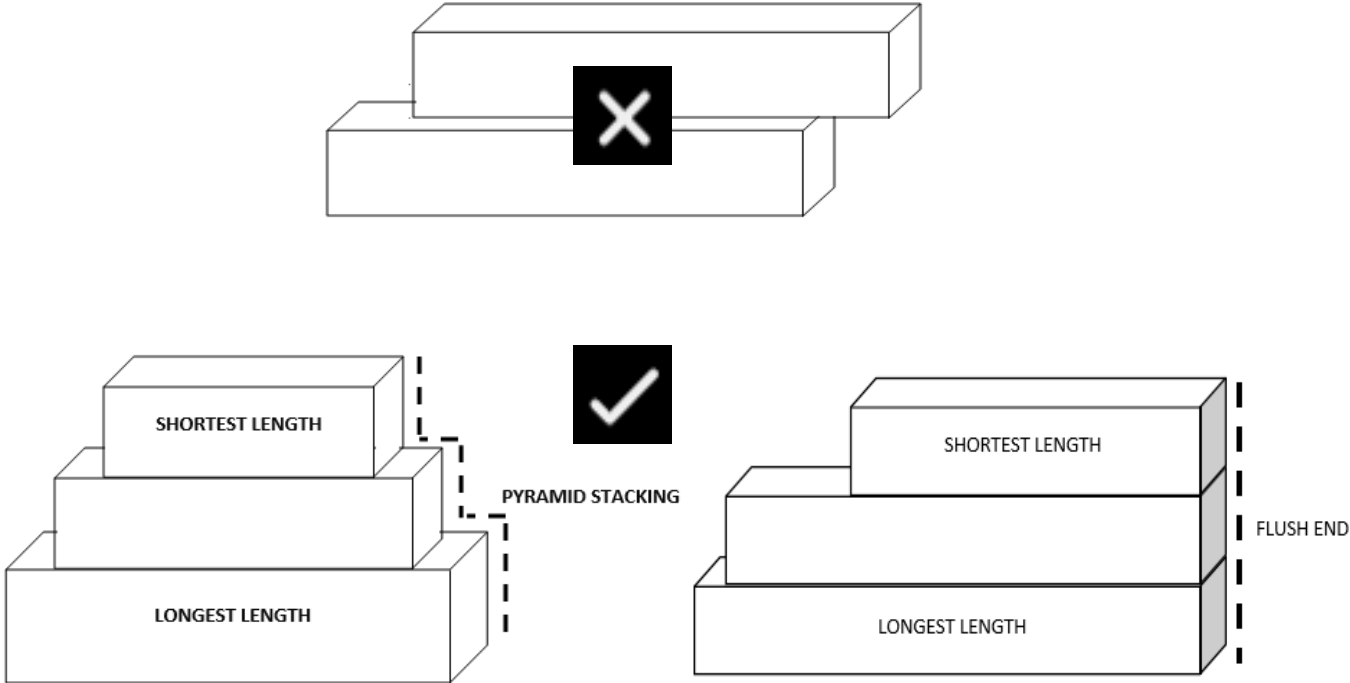


Figure 3: Removing Timber Stacks from Block Stacks

Note: This only applies if the second timber stack is accessible by a forklift

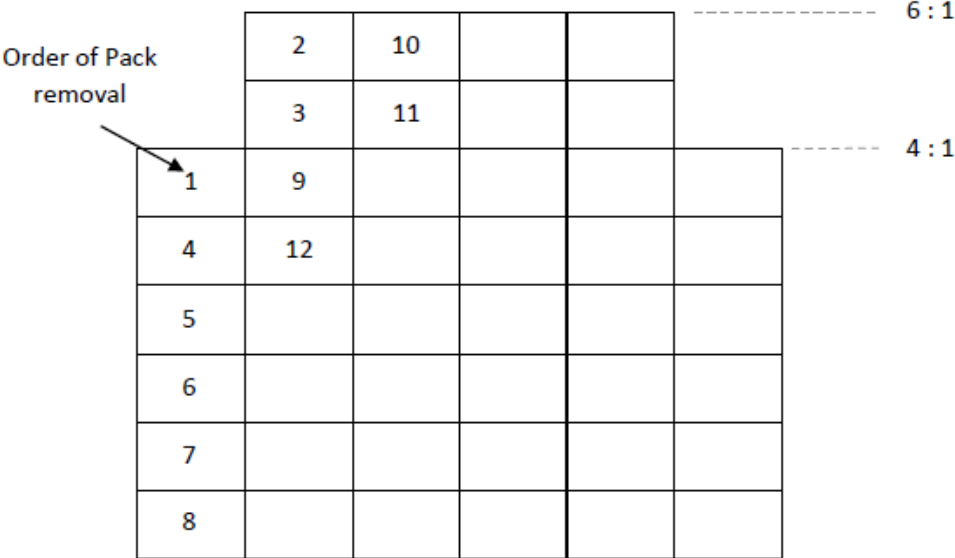
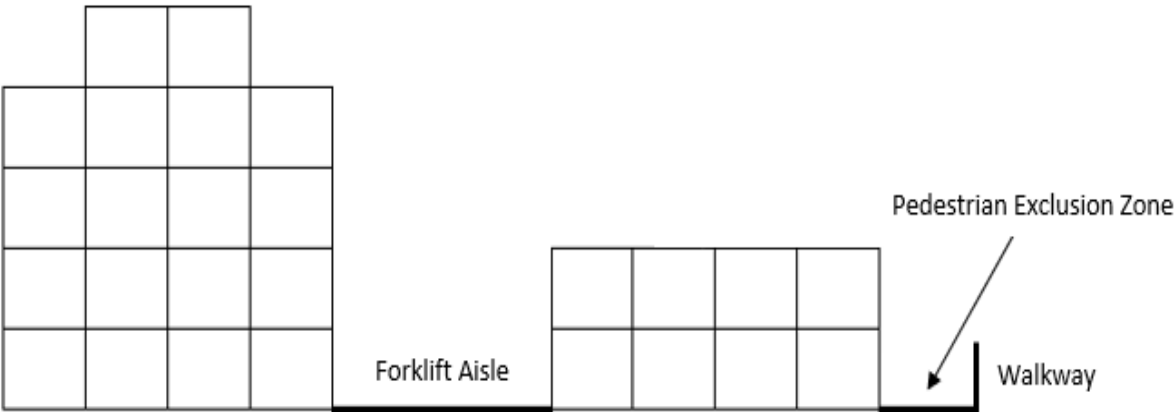


Figure 4: Maintaining Safe Visibility between Forklifts and Pedestrians



6.0 Stack Quality and Integrity

Site managers and supervisors are to ensure in accordance with the intent of this guide, that all products are packaged with sufficient tension to maintain integrity of the stack. Periodic inspection shall be undertaken to identify any deficiencies in the banding/strapping (i.e. loose bands and loss of pack shape) and packs should be re-strapped if straps are loose.

Damaged timber stacks may no longer be geometrically suitable and should be isolated from stack storage areas until any damaged timber, bands, straps, clips, or buckles can be replaced. Forklift operators should not stack packs that are damaged, unstable, or poorly packed.

Timber stack storage areas are often in open areas exposed to the elements and changes in temperature, moisture, sun, and wind can alter the product's moisture content and stability. The option of wrapping timber stacks prevents exposure to variable weather conditions while providing additional lateral restraint and highlighting damaged areas arising from handling of the stacked materials.

7.0 Training and Competency

Providing workers with training and guidance in the safe stacking of timber will reduce the likelihood of incidents resulting in harm or fatality. Employers should ensure everyone involved in timber stacking operations are competent to do so. A competent person is one who has the necessary knowledge and skills to carry out the task, acquired through qualification, training or experience in the following tasks:

- Operation of mobile plant and truck driving;
- Assessing the suitability of ground surface;
- Effective and safe layout and housekeeping of stacking locations;
- Bearer selection and placement;
- Safe use and maintenance of timber stacking tools / equipment;
- Selection and use of PPE and safe-working rules around timber stacks;
- Safe stacking heights and configuration – for undercover and open storage;
- Hazard identification including the reporting of collapsed / partially stacks requiring reassembly or isolation; and
- Emergency procedures including fire and severe stack collapses.

8.0 Assessment and Management of Timber Stack Risks

Appendix 1 provides a field checklist for assessing the risks and suitability of timber stacking against information provided in this guide. If any of the assessments results in a 'No', a comment on the issue of concern and level of corrective action can be documented for verifiable completion. This assessment could be undertaken on a regular basis or immediately after any timber stacking incident.

Appendix 1: Field Guide - Timber Stack Risk and Suitability Assessment

Timber Stacking Inspection Guide (Guide Section Reference)	Yes / No	Comment / Corrective Action (Assessment Date)	Corrective Action Verified (Name/Date)
Are stack storage surfaces mostly level? (See Section 2)			
Any signs of ground surface damage (i.e. cracks or subsidence)? (See Section 2)			
Are stack locations safe for pedestrians/visitors? (See Section 3)			
Are mobile plant traffic areas in good condition? (See Section 3)			
Is there adequate clearance in and around stacks? (See Section 3)			
Are there adequate number of bearers? (See Section 4)			
Are bearers long enough and in serviceable condition? (See Section 4)			
Are stack heights and configuration safe to conditions? (See Section 5)			
Are stacks bounded / wrapped appropriately? (See Section 6)			
Is there any obvious damage to stack timber or packaging? (See Section 6)			
Other Observations to Report?			