

Care of timber and wood-based products on building sites

Timber is one of the commonest materials on a building site but is often one of the least respected. Bad handling and poorly organised storage are major causes of damage and wastage, which can be in the order of 10%, and sometimes as high as 20%. This has a consequent impact on costs, particularly for 'specials' or materials with a long delivery time, as replacements or remedial works may delay completion and result in financial penalties. However the problem of material wastage is not just a financial issue, it is also an environmental concern and with the current high emphasis on sustainable construction it is important to take all reasonable measures to reduce it.

In addition, poor handling and storage procedures represent a health and safety hazard. Because timber and board materials can be heavy and bulky, when accidents do occur they can be serious. Good, well-organised site storage practice, which follows all relevant Health & Safety guidelines will help to minimise these risks. (Further advice on the

safe stacking and handling of wood products is available from the HSE; www.hse.gov.uk).

Although timber is reasonably resilient and can withstand a certain amount of abuse without damage, a lack of care both before and during the construction process can affect wood products adversely. The main problems are

- ◆ Changes in moisture content due to excessive wetting or drying which can cause subsequent problems in-situ eg shrinkage
- ◆ Distortion and physical damage
- ◆ Deterioration including, splits, decay, discolouration
- ◆ Corrosion of metal fastenings.

Often adequate care is given only to those timber products that are visible in a building whilst those that are unseen are frequently left unprotected. However proper storage and handling should ensure that the final performance and appearance of all timber and wood products is as intended.

Moisture content

Wood naturally contains moisture; the amount varying with the temperature and relative humidity of the surrounding air. This can lead to changes in dimension and in some physical and mechanical properties if there is a mismatch between the moisture content of the wood and its surrounding environmental conditions. All wood-based products, including joinery and panel products, as well as solid timber, are subject to this change to some degree and it is particularly important when timber products are used in a centrally heated building.

By observing a few simple rules about the correct specification of moisture content and by careful site storage 'drying out' problems such as shrinkage, distortion and staining can be averted. In situations involving high class joinery or other prestige work, proper care takes on special significance.

Further information on the moisture content of timber and its importance is given in another Wood Information Sheet, *Moisture in timber*.

Moisture content at time of installation

Ideally it is desirable to introduce all timber and wood based products into the building at their in-service moisture content but in practice this is rarely possible. If, however, timber is ordered so that the following moisture contents are not exceeded at the time of installation, reasonable freedom from shrinkage problems may be expected providing that the correct site conditions are created and maintained.

Wood-based panels may require conditioning in the building before they are installed (see Board materials).

Table 1 Recommended maximum moisture contents at installation

Use	Moisture content
Carcassing timbers	22%
Flooring timbers: * - Softwood utility - Hardwood, decorative - with underfloor heating *	18% 10 - 12% 8 - 10%**
Internal joinery Unheated Buildings Buildings heated to 12 – 21° C Buildings heated to over 21° C	12 – 16% 9 – 13% 6 – 10%**
External joinery	12 – 19%

* More specific low moisture contents will have to be specified for continuously heated buildings and underfloor heating. Advice should be sought.
** Joinery at an average of 6 – 10% moisture content may only be available by special order and should be the subject of special protection and storage to maintain its condition.

Care in manufacture and delivery

Joinery and other wood products should be manufactured with the timber at the recommended moisture content indicated above. If wood products have to be stored before delivery to site they should be kept in conditions that will maintain the correct moisture content and goods should be adequately protected during transit. This should ensure that they are delivered to site at the correct moisture content.

To avoid prolonged site storage and double handling, delivery should be phased to coincide with the progress of work. Suitable handling methods should be used to ensure that timber and wood products are not damaged during loading, transit and unloading.

Storing timber on site

General principles

If storage on site cannot be avoided then the following principles should be followed:

- ◆ Timber stores should be located sufficiently close to construction works to be convenient but in a location where they are secure and cannot be damaged by construction works or traffic.
- ◆ Timber or wood products should never be stored on site without protection. Storage and handling should be appropriate to the product (see below). Timber and wood products must be stored under adequate cover, which should protect the products from the weather but be sufficiently well ventilated to prevent condensation. Special arrangements will be needed for high value items or those dried to a special moisture content.
- ◆ A new building is not as a rule a good place to store timber, even for a few days. The atmosphere in it will be too damp until all concrete, mortar and plaster have had time to dry thoroughly unless the building is of timber frame construction in which case there will be little or no use of wet trades.

- ◆ A shed or garage may be used for storing timber, but it must be clean, dry and well ventilated. Windowless lock-up garages or metal containers are not ideal.

Storage of environmentally certified timber products

Increasingly timber products are specified from environmentally certified (FSC, PEFC etc) sources. Where this is the case and a contractor intends to claim that certified products are used on a project they will need to check that the wood products/materials delivered to site have valid Chain of Custody documentation.

In addition where certified goods are stored on site (or on the worksites of project members) they must be clearly identified as such and stored separately from non-certified products. Certified wood products may or may not carry the logo of the Certification scheme and so may not be immediately recognizable as such. If this is the case, adequate identification is particularly significant.

Where relevant, goods should be identified by their certification status (eg FSC pure, FSC mixed, post-consumer reclaimed, other reclaimed, or FSC Controlled).

The physical storage recommendations for each product type recommended below should still be followed.

Carcassing timber

When there is no suitable building available, goods should be stored on firm level, well-drained ground – ideally with a slope of no more than 2°. The ground should be spread with a fine granular material such as sand or gravel

Timber should be stacked on bearers, which are in good condition, straight and of the same cross-section with their length equal to the width of the pack. Overlong or short bearers should be avoided. Bearers should be arranged so that the timber will lie flat, otherwise warping can result.

The stack must be covered with waterproof sheeting to keep off the rain, but in such a way as to allow free circulation of air and ability to dry, thereby overcoming condensation problems under the covering. If timbers do get wet then they should be restacked with thin sticks placed directly in line with the bearers to allow the timber to dry out. The covering is also essential to provide protection against direct sunlight.

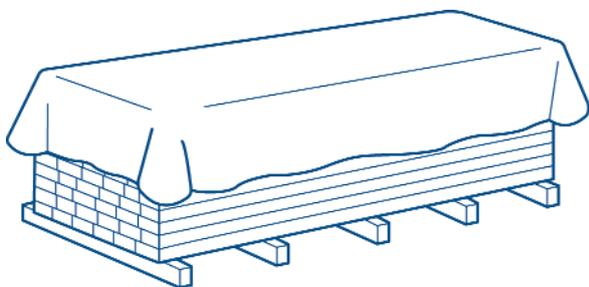


Figure 1 Carcassing timber stacked and covered

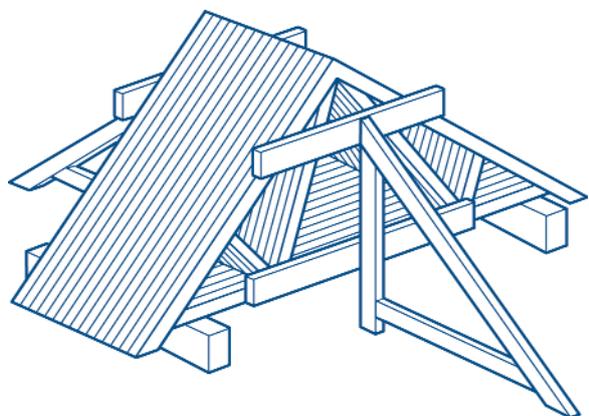


Figure 2 Trussed rafters: vertical stack before covering

Structural components

It is essential to store structural components, such as trussed rafters, timber frame components, I-joists etc, properly. They should be stored above ground on levelled trestles, stillages or other suitable bearers. Guidance on the correct method of storage for each type of component should be available from the manufacturer. Like carcassing timbers, structural components should be covered by a waterproof covering to protect them from rain and sun. Whilst providing this protection, attention should also be given to ensuring a good circulation of air around the components.

Trussed rafters

The delivery of trussed rafters should be organised to minimise storage time but if longer periods of storage are anticipated then they should be protected with covers that allow adequate ventilation.

Trussed rafters should preferably be stored vertically although horizontal storage may be used if this is unavoidable. When trussed rafters are stored vertically, bearers should be positioned at locations where support has been assumed to be provided in the design eg wallplates, and stacking should be carried out against a firm and safe support using suitable props.

Where trusses are laid flat, as a minimum bearers should be placed beneath each truss node to give level support and to prevent deformation or distortion. If subsequent bearers are placed at different heights they should be vertically in line with those underneath. Horizontal storage should be used for short-term storage only.

Whichever method is used it is essential that the trusses do not make contact with the ground or vegetation and should be stored to prevent any distortion.

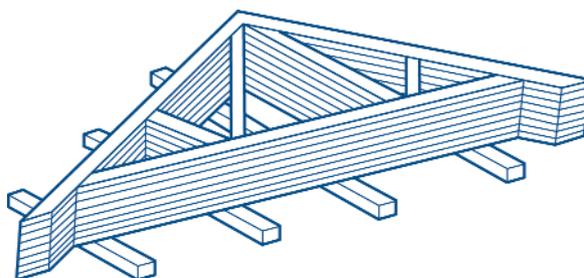


Figure 3 Trussed rafters: horizontal stack before covering

When lifting trussed rafters into place it is essential that they are lifted only at the designated fixing points to avoid overstressing/damaging them. Once trussed rafters are installed, the roof covering should be applied as quickly as possible to prevent unnecessary wetting.

Further information on the care of trussed rafters can be found in *BS 5268-3* and in the *Trussed Rafter Association's Technical Handbook* and its *Product Data Sheet Guidelines for the storage and erection of trussed rafters*.

Timber frame panels

As with trussed rafters, delivery of timber frame panels should be scheduled to minimise storage on site. If this is not possible then adequate storage on the ground on a dry flat base should be arranged. Timber frame wall or floor panels should be stacked sheathing or flooring side up on bearers positioned to provide adequate support, ensuring that the panels are out of ground contact. They should be covered with a weather resistant covering but the covering should allow free air circulation.

Panels should be stored in a logical order that matches the build sequence. If they are to be lifted into place it is essential that they are lifted only at designated lifting points to avoid overstressing/damaging them.

Further information on timber frame panels can be found in the TRADA Technology book *Timber Frame Construction*.

Joinery

Joinery is a precision made and costly building component that should be treated with respect. External joinery may generally be treated in a manner similar to that for structural components with support being chosen carefully to avoid warp or twist due to unnatural loading. Priming offers little protection against the uptake of moisture. Should the horns or any other sections of primed timber be cut off, the exposed bare timber should be re-primed. Similarly, in the case of timber that has been preservative treated, all cut ends borings, notchings etc should be liberally swabbed with preservative.

Ideally internal joinery and flooring should be kept in a heated dry store to maintain the correct moisture content. If that is not possible a garage or other dry and weatherproof storage area could be used, providing it is well ventilated. The stored components should not rest directly on fresh concrete and the material should be close piled and fully wrapped. Good ventilation is essential.

In general, joinery items should be stored flat on closely spaced bearers but in all cases the manufacturers recommendations should be followed. Protective coverings should be retained as long as possible and do not mean that components can be stored outdoors without further protection.

Factory-finished components, such as kitchen units and fitments, may be treated in a manner similar to that for internal joinery and flooring. Additionally, however, particular care is necessary to avoid damage, especially with completed units.

Board materials

Storage of wood-based panels in general follows the guidelines for internal joinery. External storage should be avoided wherever possible to avoid damage from wetting or high humidity and should not be permitted for 'interior' quality boards.

Panels should be stored flat and dry, off the ground to avoid any contact with moisture. Any protective wrappings should be retained. Where possible panels should be fully supported or, where this is not possible, on battens at maximum 600 mm centres. In the case of thin panels (6mm or less) it is recommended that they be supported on a thicker panel (eg 18 mm) under the whole area.

Bearers should all be the same thickness and should be vertically aligned, to avoid distortion. Ideally panels should be 'sticked' every 10 - 15 boards to allow through ventilation and sticks should be in line with the bearers to prevent distortion.

Care should be taken to avoid mechanical damage to board edges and corners, particularly of tongued and grooved boards. Avoid damage or dirt on the finished surfaces of pre-finished panels, which should be lifted from the stack and not slid across each other.

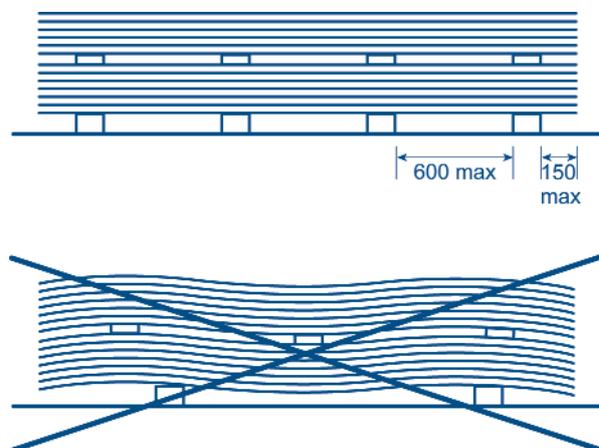


Figure 4 Panel products storage

For some types of panels which are manufactured at low moisture contents, it may be necessary to 'condition' them for a minimum of 48 hours prior to installation to allow their moisture content to rise as close as possible to the final in-service conditions. This can be done by loose laying (on floors) or stacking with spacers.

Further information on the use, storage and conditioning of wood-based panel products is contained in the *Panel Guide*, accessible on the TRADA and the UK Panel Industries Federation websites.

Building programme

- ◆ Build to a programme that protects timber and joinery from the wet. Do not allow floor joists and roof timbers etc to stand exposed to the elements for longer than necessary.
- ◆ Glazing before fixing floorings, linings etc minimises the possibility of timbers being soaked and therefore reduces excessive shrinkage and twist (*Figure 5*).
- ◆ Plan deliveries to coincide with progress of work so as to avoid prolonged site storage. Prepare storage in advance.
- ◆ Check quality, specifications and moisture content of timber, and standard and finish at the time of delivery. This is the time to raise any points with the supplier.
- ◆ Ensure that proper protection has been afforded to the material in transit.
- ◆ Use proper mechanical handling equipment whenever possible. Do not damage the product, especially edges, corners and wrappings which should be maintained as long as possible. Instruct and train handlers and always supervise off loading.
- ◆ Timber can pick up moisture from wet trades so ensure as much time as possible for drying out the building before introducing kiln dried timber components,
- ◆ Heating should be introduced as soon as possible but care should be taken to ensure that only gentle heat is used at first.
- ◆ Ventilation at all stages of construction is vital.

Wastage and re-cycling

There are a lot of timber off-cuts produced from building sites, which get skipped with general building rubbish. Up to 25% of the average skip may be timber waste, which could be re-cycled or processed as an alternative product or a fuel source. Sites could consider having a timber only skip for this waste which should exclude any timber treated with a preservative or fire retardant as this should be dealt with separately.

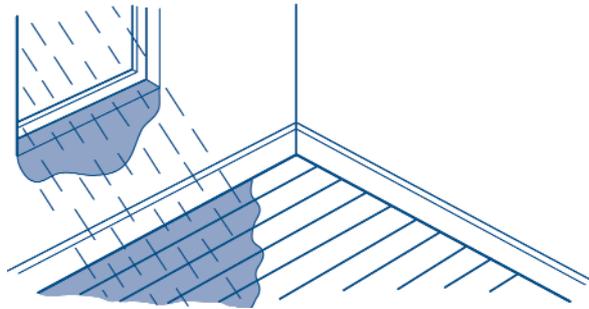


Figure 5 Rain through unglazed window

Further reading and information

TRADA Technology publications

Books

Huel Twist and Robin Lancashire. Timber Frame Construction. 4th edition ISBN 978-1-900510-56-1. 2008.

TRADA Wood Information Sheets

0 - 8 Timber frame construction - site control.
2/3 - 28 Introducing wood.
2/3 - 58 Sustainable timber sourcing.
4 - 14 Moisture in timber.

Other publications

Trussed Rafter Association. Technical Handbook. Site Installation Guide. 2005.

Trussed Rafter Association. Guidelines for the storage and erection of trussed rafters. Product Data Sheet No 3. 2007.

Wood Panel Industries Federation et al. Panel Guide Section 4.

Health and Safety Executive. Safe stacking of sawn timber and board materials Woodworking Sheet No 2. (www.hse.gov.uk)

www.trada.co.uk

The TRADA website makes TRADA's knowledge and experience available to everyone. It contains a huge resource of timber information which can be accessed at three levels:

All visitors can access the Suppliers Directory, Bookshop, Training, News, Commercial Services and limited Technical Information.

Registering on the site provides additional access to Technical Information and limited access to Case studies. This comprises a Library of full text and illustrations from over 300 TRADA Publications, a Timber Species database of information on popular timbers, and Timber Product pages.

TRADA members have access to the full resources, including a Timber Design Software Toolbox, full Case Study information with downloads, and Specification guidance. Only TRADA members' details are included in the Suppliers Directory and members also receive regular mailings of information and copies of publications.

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