

Timber in loft conversions

Timber can be used effectively in a variety of ways to improve the performance of any loft conversion. It can help to ensure compliance with Building Regulations for practical purposes such as energy-efficient thermal insulation, acoustic insulation and suitable access; and it can provide a pleasing aesthetic effect for any room in the roof. A well-planned and well-executed loft conversion not only increases the living space, it can also enhance the appearance of a property by using the natural beauty of wood.

Before you start the project

Any modification of structural roof timbers must be carefully considered, and any proposed changes to existing floor and wall structures must also be accounted for. Planning permission may be needed and The Building Regulations will apply, so it is advisable to seek advice from an architect, surveyor or structural engineer. Choosing wood that has an FSC (Forest Stewardship Council) or PEFC (Programme for the Endorsement of Forest Certification) logo on the label allows you to tell your customers that it is from sustainably managed forests.

Assessing the existing structure

Loft conversions usually increase loads on the building, so it is important to assess the strength of walls and floors to make sure they can support the extra load. You should get advice from a suitably qualified and experienced structural engineer.

There are many types of roof design. Traditional roofs, which usually consist of rafters and purlins spanning loadbearing walls, are easier to convert than trussed-rafter roofs. Trussed rafters have been increasingly used in roofs since the 1970s. However, in all cases you should never cut or remove any structural roof timbers such as rafters, purlins, struts or trussed-rafter components without the advice of a structural engineer.



Photo: Velux

Sustainable timber

Timber is the most sustainable building product available. It is naturally renewable - over 97% of softwood timber used in the UK comes from Europe, where the forest area is increasing by the equivalent of 90 football pitches every hour of the day and night.*

For reassurance for softwoods and hardwoods look for certification labels like FSC (Forest Stewardship Council) or PEFC (Programme for the Endorsement of Forest Certification).

Always ask your supplier about their responsible purchasing policies.

*IIED & ECCM, Using Wood to Mitigate Climate Change, 2004 and UNECE-FAO, State of the Europe's Forests, 2011.



This information sheet provides general advice only and is not specific to the requirements of a particular building project. It is the builder's responsibility to check compliance with Building Regulations and standards.

Planning permission

Planning permission will be needed if the loft conversion:

- changes the maximum height of the roof
- alters the pitch (slope) of the roof
- adds dormer windows
- is larger than 40m³ for a terraced property
- is larger than 50m³ for a semi-detached or detached property
- uses materials that are not similar in appearance to the existing property
- has balconies, verandas or raised platforms
- is for a property that is within a designated area such as a conservation area, world heritage site, national park or area of outstanding natural beauty.

If you are unsure whether or not you need planning permission, it is best to contact a case officer from the local planning authority.



Photo: Velux

Building Regulations approval

You will need to get Building Regulations approval for the loft conversion if:

- it provides extra living accommodation
- roof windows are to be installed
- structural members are to be removed or altered
- it forms a permanently accessible, floored storage area.

Building Regulations approval is not required for a loft conversion if the intended use is for lightweight storage only, provided that access to the area is by a removable or retractable ladder.

Party walls

If a loft conversion involves party/separating walls between semi-detached or terraced houses, it may fall within the scope of obligations under *The Party Wall etc Act 1996* and you should therefore seek advice from a qualified building professional to see how this could affect the project.

Bats

Bats and bat roosts are protected by law. If there are bats living in a roof, they cannot be disturbed or removed. If you see bats or bat droppings in the loft, you must notify the local Statutory Nature Conservation Organisation (see *Further information and advice*) to seek advice on protecting the bats before you start work.

Ventilation and thermal insulation

This sheet focuses primarily on the use of timber in loft conversions. It does not cover ventilation and insulation requirements, but these are important aspects of loft conversion in general for which you will need to consult the current Building Regulations before you begin your project.

Insulated plasterboard with insulation between the rafters may be the most energy-efficient solution. To meet the regulation U-values, you may need to fix battens to older houses' rafters in order to increase their depth and accommodate the required thickness of the insulation plus ventilation gap.

Strength grading for structural timber

The structural engineer's design may specify the removal, repair, replacement or addition of structural (loadbearing) timbers. Any timber that is used for structural purposes must be strength-graded.

Strength-graded timber is widely available from timber merchants and builders' merchants. Each piece of strength-graded softwood timber has a stamp, usually containing one of the following markings: C16, C24 or TR26.

Make sure the timber you are using for structural purposes has been stamped. Unmarked timber is unlikely to have been strength graded and is therefore not suitable for structural use. More information on grade stamps for strength-graded timber is available in the 'Timber strength and spans' *Choose and Use* information sheet in this series.

Notching and drilling for wiring and pipe work

Wiring and pipes for lighting, heating and electrical power may affect structural timbers because of the need to notch out or drill through the wood. Even a small amount of drilling or notching can significantly weaken the timber, so there are rules about where and how much a structural timber can be notched or drilled. Holes or notches should not be cut in any rafters, purlins or engineered timber joists unless justified by the structural engineer.

Limits for notching and/or drilling of solid timber floor joists (minimum 150mm deep)	
Notching and drilling	
Maximum diameter of holes 0.25 times joist depth	Holes only on centre line in a zone between 0.25 and 0.4 of the clear span
Holes to be spaced apart by minimum three times hole diameter	Maximum depth of notch 0.15 times joist depth
Notches to top edge only, and in a zone between 0.1mm and 0.2mm of clear span	Notches and drilling at least 100mm apart (horizontally) on same joist
Drilling only	
Holes only in the safe zone between 0.25mm and 0.4mm (at both ends) of the clear span	Maximum diameter of holes is 30mm
Holes must be positioned along centre line of joist	Holes must be spaced apart by three times the diameter of largest hole
Maximum of eight holes per safe zone	No notching permitted

Stairs, windows and doors

When alterations to structural timbers are complete, wood can be used to great visual effect to enhance the appearance of the loft conversion. Wood fire doors, in addition to providing essential safety, can help with sound insulation.

Position of openings

If you are using room-in-the-roof trussed rafters, try to position the openings for windows so that they are between trusses. This can avoid the need to use extra timber, which will help to minimize costs. Dormer windows (for which you need planning permission) and stairwell openings are formed by placing multiple trusses or timbers either side of the openings and framing the opening with loose timbers. If you can position stairs parallel to truss spans, and keep windows opposite each other, it will help to keep things simpler and cheaper. Ideally, new stairs should be positioned to

carry on from the existing stairwell to help save space, and to avoid having to use part or all of another room to accommodate the new stairs.

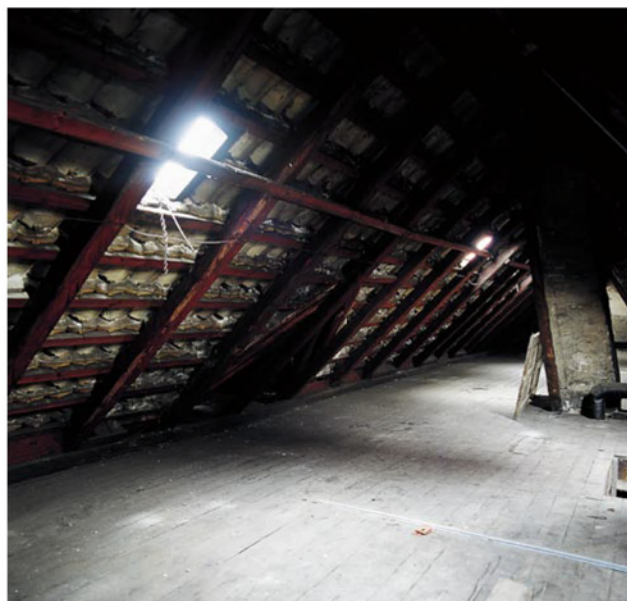


Photo: Velux

Stairs

In most circumstances, Building Regulations require minimum headroom of 2m above a staircase. In practical terms, this means that the top of the stairs often needs to be close to where the roof is highest, and this can affect the size and layout of the loft conversion.

Retractable ladders are not acceptable for habitable rooms in the roof because they don't provide constant access and a constant means of escape. However, there are four basic types of staircase you could use for a habitable loft conversion that are widely available in timber:

- conventional stairs
- spiral stairs
- alternating tread stairs
- fixed ladders

Spiral stairs and alternating tread stairs are a good solution when there is not enough space for a conventional staircase. However, they are only allowed to access one habitable room (as well as a bathroom and/or toilet in the case of alternating tread stairs, as long as it isn't the only toilet in the building).

Timber stairs are available in a variety of softwoods and hardwoods, so you can choose a lighter- or darker-coloured timber to suit the project – if you don't intend to paint the stairs,

use clear varnishes, lacquers or other coatings to enhance the natural appearance of the wood and protect it from wear and tear.

Not all the guidance in The Building Regulations is compulsory for sound transmission, but you may need to comply with *Approved Document E* if any additional work is required to meet the standard in the existing property.

Bespoke staircases can be purchased from joinery manufacturers. Alternatively, timber components for staircases such as steps/treads, stringers/carriages (diagonal boards), risers/kick boards (vertical boards), newel posts, hand-rails, balusters, etc are available from many timber merchants or builders' merchants and can be assembled on site.

When you are making a staircase for a loft conversion, Building Regulations apply. For example, in a multi-storey dwelling where the room in the roof is intended to be habitable and the stairs are the sole means of escape, the staircase will need to be constructed and enclosed so that it attains 'protected stair' status under building-regulation requirements.



Photo: E A Higginson & Co Ltd

Windows

An important part of any loft conversion is the upgrading and/or addition of windows. Lofts which may not have had windows at all when used for storage need them to let in natural light, for ventilation and for aesthetic value. Some of the best views from a house may be from the new loft room, so the owner will want to take advantage of this with beautiful windows.

There are window energy ratings for loft conversions. In order to comply with Building Regulations, a minimum C rating (or U-value of 1.6) is required, though higher-rated windows are widely available. Either softwood or hardwood windows can be used to achieve 'best quality' or A rating. Wood windows are now manufactured to equal PVC windows in terms of thermal insulation: double- and even triple-glazed wooden units are available. Many people find timber-framed windows to be more attractive than plastic. Timber window frames typically come with warranties of 30–35 years, making them one of the best-lasting choices as well.

When installing a roof window, it is important to achieve an airtight seal at the perimeter to maintain the thermal performance of the roof. You could also think about using solar-control glass to minimize heat gain from the sun in hot conditions, or use a fitted blind. The 'Wood windows' *Choose and Use* information sheet in this series provides further detail on frame types and installation.



Fire doors

Fire-resisting doorsets, which include not only fire door leaves, but also the door frame, its ironmongery, intumescent seals and smoke seals, must be fitted to the converted loft room. Working together as an integrated system, they must be able to resist fire for 20, 30 or 60 minutes, according to Building Regulations.



Doorset manufacturers must have each design evaluated by a UKAS-accredited laboratory against a British Standard test. Certification schemes, like BM TRADA's Q-Mark Fire Door Scheme and the BWF-CERTIFIRE Fire Door and Doorset Scheme, ensure manufacturers' systems meet the requirements and all doorsets covered by the certificate are fit for purpose. Certified doors leave the factory with clear identification, like a label or a permanent plug in the door edge. More information on fitting fire doorsets is available in the 'Fire-resisting timber doorsets' *Choose and Use* information sheet in this series (see *Further information and advice*).

The main escape route should be through the house rather than through windows. Mains-wired (rather than battery operated), interlinked smoke alarms also need to be fitted, one on each storey – for further information, see *Approved Document B*.

Floors and decoration

Floor joists

If the loft was previously used for light storage only, rather than habitation, the ceiling joists in the loft floor may need to be strengthened. This requires larger and stronger timber floor joists to be added between the existing ceiling joists. These can be supported on the existing walls if they are strong enough, or extra timber support beams may need to be added. Again, check with a structural engineer.

Floor insulation

Floors in loft conversions can be upgraded to match the acoustic performance required for new properties. Loft insulation will normally be already present and 100mm of this should be kept in the void between the floor joists (if the density of the insulation is less than 10kg/m^3 it should be replaced). By using a wood-based board weighing more than 15kg/m^2 for the floor surface (for example, 22mm tongued and grooved chipboard or similar), an acceptable level of sound insulation can be achieved, and this can be further improved simply by using a suitably absorbent underlay and soft covering such as a carpet. For more information on installing timber floors, see the 'Wood flooring' *Choose and Use* information sheet in this series.



Timber for internal decoration

Wood panelling is a good alternative to wallpaper. It can be painted, stained, glossed or left unfinished. It can create particular styles in a room, from rustic beach cottage, to old-world manor, to sleek and modern penthouse.

Panelling can also be applied to ceilings, with the following advantages:

- reduces future maintenance requirements
- covers any irregularities in the ceiling (colour or shape).

Leaving wooden floorboards exposed is another popular way to enhance the beauty of a loft conversion. Besides looking attractive, wooden floors are:

- more hygienic than carpet
- easy to clean
- hard-wearing and durable
- anti static electricity

For more information on installing timber floors, see the 'Wood flooring' *Choose and Use* information sheet in this series.



Photo: Morley von Sternberg

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Further information and advice

Construction Products Association: Loft conversion project guide, RIBA Publishing, 2010, available from www.trada.co.uk/bookshop

Building Regulations

England and Wales Building Regulations:
Approved Document B (Fire safety) – Volume 1:
Dwellinghouses, NBS, 2006

England and Wales Building Regulations:
Approved Document E (Resistance to the passage of sound), NBS, 2004

These documents, as well as further information on planning permission and other regulations relating to loft conversions, are available from www.planningportal.gov.uk

Bat Conservation Trust

www.bats.org.uk/pages/contact_your_snco.html

The Party Wall etc. Act 1996

Explanatory booklet:
www.communities.gov.uk/documents/planningandbuilding/pdf/133214.pdf

The whole act:
www.legislation.gov.uk/ukpga/1996/40/contents

Other *Choose and Use* factsheets are available in this series, including 'Mechanical fixings for wood', 'Wood-based sheet materials', 'Sourcing sustainable timber', 'Timber strength and spans' and 'Fire doors and components'.

Visit www.trada.co.uk for additional technical advice if needed.

Choose and Use is a series of information sheets for builders produced by TRADA, The Timber Research and Development Association.

They offer up-to-date advice on how to select the right timber and timber products for different applications.

You can often save time and money by choosing the correct timber material or timber products as well as ensuring you comply with current Building Regulations and Building Codes. For more information about specific products visit www.trada.co.uk or contact your local supplier.