



Use of Timber Stairs in Residential Buildings Exceeding Three Storeys

Purpose

BCA technical guidance notes are for the benefit of its members and the construction industry, to provide information, promote good practice and encourage consistency of interpretation for the benefit of our clients. They are advisory in nature, and in all cases the responsibility for determining compliance with the Building Regulations remains with the building control body concerned.

This guidance note is based upon information available at the time of issue and may be subject to change. The Approved Documents should be consulted for full details in any particular case.

Introduction

Approved Document B Volume 2 clause 5.19 recommends that in residential buildings over three storeys with a single escape stair, the stair should be constructed of materials of limited combustibility.

This is considered necessary for the following reasons:

- The stair is the only means of escape for residents on the upper floors.
- The risk to the stair as a consequence of an arson attack within the stairwell are significantly greater if the stair is made from a combustible material

However, research into the use of timber stairs in residential buildings provided evidence that timber can perform satisfactorily in a fire situation under certain circumstances.

This guidance is applicable to residential buildings of all types of building construction not exceeding six storeys or with a top floor less than 18m above ground level.

Key Issues and Research

Both Approved Document B Volume 2 and BS9991 have several references to the need to ensure a robust, fire resisting enclosure to a stairwell, to restrict the use and fire load of the stairwell and rooms accessed directly off it, and to provide vents to remove heat and smoke. The need for the stair itself to remain largely non-combustible is considered to be an integral part of this.

Table A7 of Approved Document B2 defines a 'material of limited combustibility' as:

'Any material which, when tested to the European Classification in accordance with BS EN 13501 Part 1, achieves a minimum classification of A2-s3,' or alternatively 'a material of density 300kg/m³ or more which, when tested to BS476 Part 11:1982, does not flame and the rise in temperature on the furnace thermocouple is not more than 20oC.'

Softwoods and MDF are unable to achieve this standard and cannot therefore be accepted as materials of limited combustibility.

However, research into the use of timber stairs was undertaken by BRE as part of the Timber Frame 2000 project, culminating with the 2009 publication of *Report BD2569 – Fire Performance of Timber Stairs*.

One of the conclusions of this research was that fire retardant timber treatment could be used, both impregnated and surface applied, to lessen the charring caused in a fire situation.

Guidance

There are three ways to satisfy the requirements of Part B in respect of staircases in single stair residential buildings exceeding three storeys.

1. The stair should comply with the limited combustibility recommendations of AD B Table A7.
2. Using a timber stair from a manufacturer who has obtained a suitable, independent third party approval from a UKAS accredited test house (e.g. the BWF/LPCB approval scheme for fire protected common stairs—www.bwfstairscheme.org.uk). The builder must provide evidence to the building control body that the proposed stair construction does not deviate outside the parameters of the third party approval
3. Where it is not possible or desirable to follow the first two options it would be possible to use a conventional timber stair where the builder can demonstrate that the following precautions are incorporated into the specification, design and installation of the stairs. These precautions are suitable for both straight and dog-leg timber staircases:
 - The building should not exceed six storeys with the top floor <18m above ground level
 - Stairs should be constructed using thermosetting type glue (e.g. Cascamite).
 - Stair construction should replicate that of the fire tested stairs from BD 2569, as follows:
 - ◇ Softwoods stairs should be—
 - ◇ at least of C24 strength
 - ◇ a minimum density of 470kg/m³
 - ◇ treads should be a minimum of 44mm thick and risers should be a minimum of 14mm thick
 - ◇ MDF Stairs should be—
 - ◇ should be of a minimum density of 720kg/m³
 - ◇ treads should be a minimum of 44mm thick and risers should be a minimum 12mm thick
 - The timber should be treated to upgrade its reaction to fire. Treatments can either be factory or site applied.
 - ◇ Factory impregnated products should be independently certified by a UKAS accredited test house to raise the spread of flame to a Class 0 standard or a Euroclassification of B when tested in accordance with BS EN 13501-1. Information to certify the performance and application of the treatment should be provided to the Building Control Body.
 - ◇ Site applied surface treatment should be independently certified by a UKAS accredited test house to raise the spread of flame to a Class 0 standard or should hold independent third party test certification which demonstrates that a Euroclassification of B is achieved for the required timber thicknesses when tested in accordance with BS EN 13501-1 : 2007. The treatment must be applied by a contractor approved by the manufacturer and must be applied to the top, sides and undersides of the treads and risers, as well as to all exposed surfaces of the strings, balusters and handrail.
 - Stairs should be underlined with a **single** layer of fire board providing a minimum of 30 minutes fire resistance, limiting the additional loading to the stair and ensuring that good fixity and integrity of the board is achieved.

Regulatory Reform (Fire Safety) Order 2005

Where a timber staircase is used in single stair residential buildings exceeding three storeys, the builder must ensure that information on the assessment, lifespan and retreatment of the timber stair is passed to the responsible person as part of the information provided under Regulation 38. This is to ensure that ongoing maintenance can be included as part of the end user's fire risk assessment.

Confirmation should be given to the Building Control Body that this information has been passed to the responsible person.