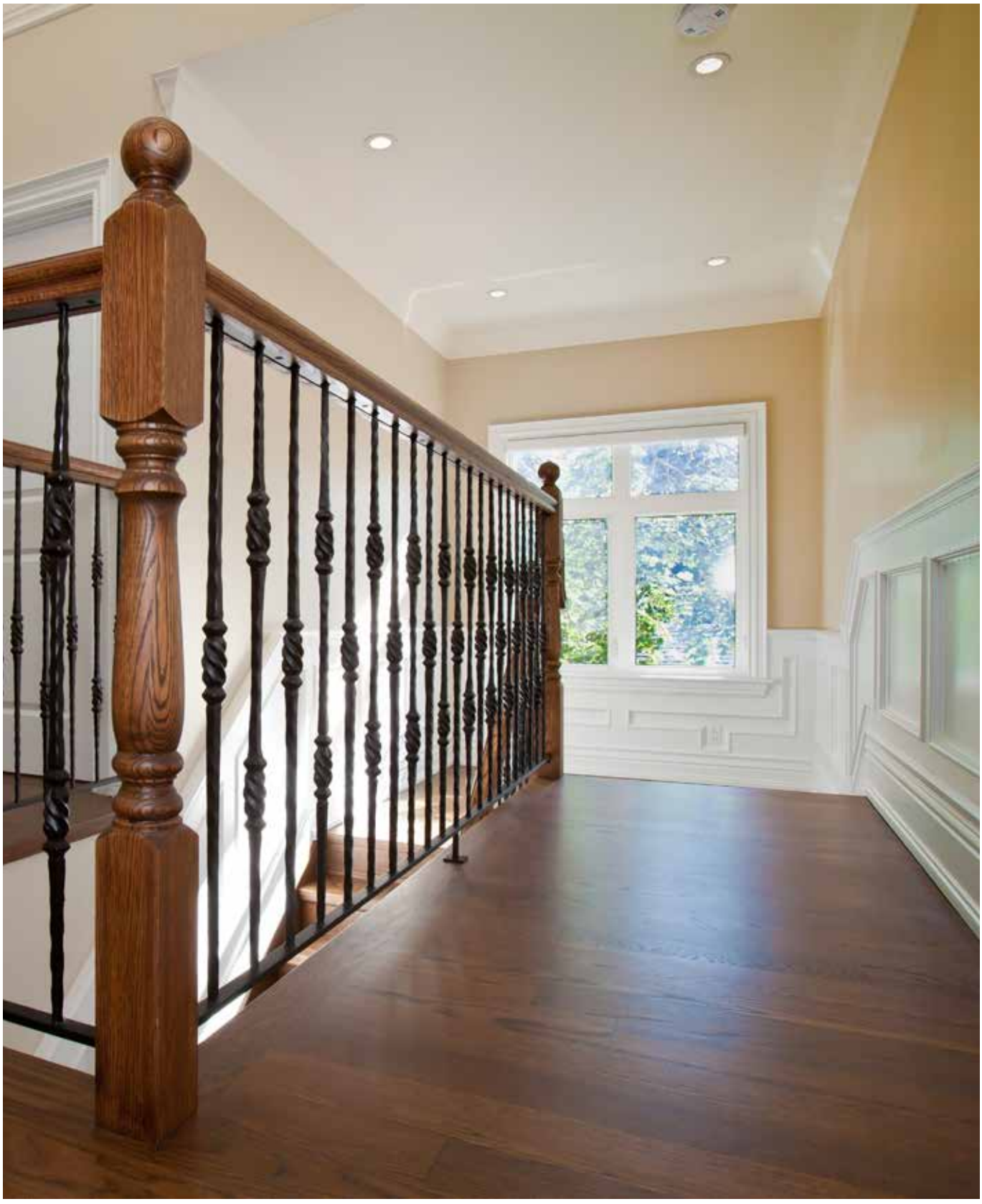
Guide to safe guarding systems to balconies and open walkways in residential buildings

Technical guidance for building control surveyors, designers and installers

LABC
Delivering building control through local authorities



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Introduction

This note offers guidance on acceptable forms of guarding to prevent people from falling in residential buildings that are likely to be used by children under the age of five years. It is not intended to offer advice on specialist systems that may be used in situations other than domestic buildings such as bridges, access walkways and commercial buildings.

Regulation K2 (a) (b) prescribes various situations where guarding should be provided to areas where people have access: this can include both internal and external areas. It states that any stairs, ramps, floors and balconies and any roof to which people have access shall be provided with barriers where it is necessary to protect people in or about the building from falling.

Approved Document K2 (3.3) is quite specific in commenting that horizontal rails for guarding should be avoided and any construction should be such that a 100mm sphere cannot pass through any opening in the guarding. It does not however comment on other construction methods that may include diagonal or intricate construction styles. Many people are concerned about the use of guarding systems that may well meet height requirements and the 100mm sphere rule but do not meet the non-climbable requirement as a result of using horizontal railing or wires.

Design considerations

This type of railing is favoured where views would tend to be spoilt or obscured by the use of vertical wooden or metal spindles. Developers and architects tend to favour horizontal steel stretched wires that are spaced to prevent a 100mm sphere passing through. The top balustrade is often canted inward as a safety measure to prevent a child climbing and falling over the top of the balustrade. They consider that if the wiring is stretched sufficiently taught it will prevent a child's head from passing between the wires (100mm sphere rule), and by offsetting the top balustrade rail inwardly a child will not be able to reach the top.

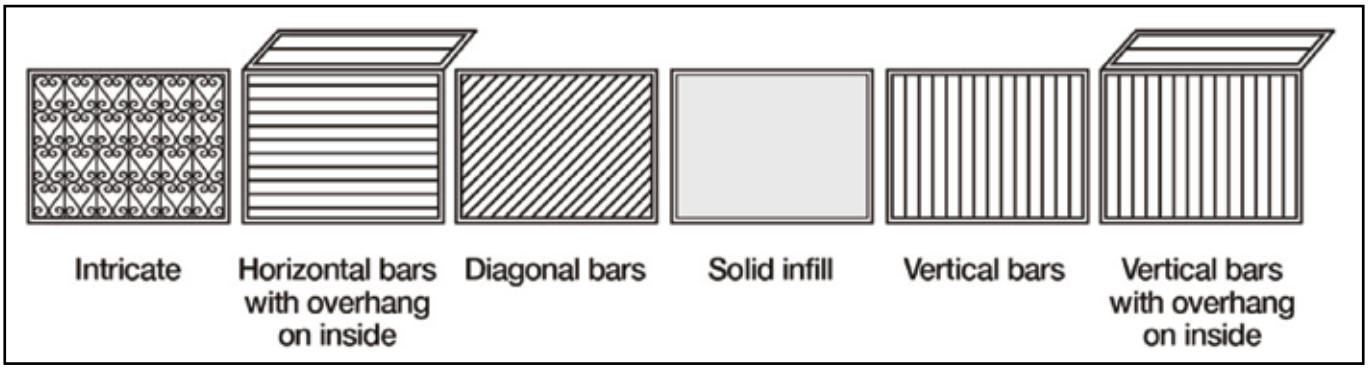
Research/Evidence

Extensive research has been undertaken to establish whether there is a real or merely perceived risk to young children in the use of such systems.

A BRE information paper produced circa. 1986 examined statistics about falls from buildings and balconies provided by the Home Accident Surveillance System administered by the Department of Trade and Industry on accidents that required hospital treatment. All falls were from buildings containing flats. It was recommended that the infill of any guarding should be such that climbing it was difficult for children and that although criteria had not at that time been developed the guarding should be solid and without recesses for hand or footholds. This paper did acknowledge the use of the 100mm sphere maximum spacing principle.

A paper produced by the NHBC 'Technical newsletter August 2004, Issue 30, gave advice on the safety of various types of guarding systems with information based on BRE research where children between the ages four and six were asked to climb a variety of barriers. **All six-year olds were able to climb the intricate, diagonal and horizontal designs shown in the detail below**, with no four-year olds being able to climb the solid infill or vertical bars. The research concluded that the designs on the left of the diagram were easiest to climb while those on the right were hardest.

There was an appeal to the DETR (Ref. 45/3/140 dated 13/01/2000) against a local authority's refusal to relax or dispense with the requirements of K2 to permit the use of horizontal stretched cables with a top handrail cranked inwards by 200mm and situated 1100mm above the floor level to external



walkways and balconies. The application was for the conversion of a redundant hydro- electric power station into 11 apartments where horizontal wired guarding was provided to balconies. The Secretary of State took the view that although the scheme was put forward as a sensitive solution to a listed building, the safety of users was paramount and so dismissed the appeal to dispense with or relax the requirements of the regulations.

Further anecdotal evidence has cited the increased use of children's indoor play activity centres where climbing nets, poles and other similar activities encourage young children to experiment with climbing unusual and challenging scenarios. This is thought to be instrumental in increasing the risk of children attempting to scale what are potentially climbable barriers.

Extensive consultation has been undertaken with members of the LABC national technical network, with many taking the stance that horizontal cable systems for guarding were inadequate and did not meet the requirements of K2 unless additional design features were included that prevented children from climbing them. Features felt to improve safety included inwardly inclined support posts and offset horizontal rails part way up or at full height of the system on the accessible side. The photographs in this paper illustrate some possible scenarios that may be considered acceptable. A solution that incorporates a substantial top rail and inwardly sloping support posts has been put forward as complying with the regulations. The approving council was of the view that in this case the balustrade and guarding would prevent a child from climbing to the top and also offer minimal opportunity for a child's hand to grip the top rail. A similar design to the one described above is shown in the image below for illustration purposes only.

Inwardly inclined support posts and offset horizontal rails improve safety

Key points to consider

- The use of horizontal cable systems in residential buildings which are likely to have children under five years old present should not in general be permitted unless the designer can satisfy the building control body it is safe in use
- The type and gauge of wire and tensioning system may have a significant bearing on the long term suitability of the adopted approach. Consideration under Building Regulation 7 should focus on whether the design and materials are fit for purpose.
- Diagonal railing and intricately designed guarding where children could gain a hand or foothold should also be resisted unless suitable proof can be given to prove the adequacy of the guarding system.
- Guarding should be provided to areas where people have access, this can include both internal and external areas if they can fall more than 600mmm
- Any openings in the guarding should not permit a 100mm sphere to pass through
- Features that may improve safety include inwardly inclined support posts and offset horizontal rails part way up or at full height of the system

Further guidance and useful links

NHBC 'Technical newsletter August 2004 Issue 30 – item 2';
http://www.nhbc.co.uk/NHBCPublications/LiteratureLibrary/Technical/StandardsExtra/filedownload,9935,en.pdf

Building Regulation Approved Document K 2013 edition
http://www.planningportal.gov.uk/uploads/br/BR_PDF_AD_K_2013.pdf

Appeal to the DETR (Ref. 45/3/140 dated 13th January 2000)

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