
LABC Guide to safe guarding systems to balconies & open walkways in and around buildings

Introduction

This note offers guidance on acceptable forms of guarding to prevent people from falling in buildings where children under the age of five years could/might be present during normal use. It is not intended to offer advice on specialist systems that may be used in situations other than buildings such as bridges, access walkways. This guidance should be considered relevant for all buildings, both residential and non-residential alike, where children under the age of 5-years might be present - whether this is solely a place of work or not e.g.: an office building or shop/leisure facility.

Requirement K2(a) and (b) of Schedule 1 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 stair, ramp, floor, balcony 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 K, Section 3, para 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

Horizontal railing/wire type barriers are 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, e.g.: 99mm or less. The top balustrade can often be inclined toward the floor/balcony side as a safety measure to prevent a child climbing and falling over the top of the balustrade. Some consider that if the wiring is stretched sufficiently tight 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

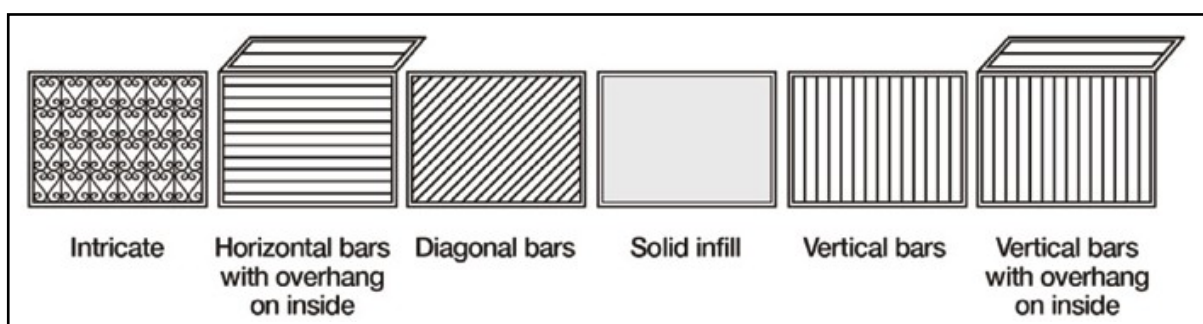
Extensive research has previously been undertaken to establish whether there is a real or merely perceived risk to young children in the use of such systems.

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 BRE paper acknowledged the use of the 100mm sphere maximum spacing principle. A paper produced by the NHBC 'Technical newsletter August 2004, Issue 30', gave additional 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 three infill styles on the left of the diagram were easiest to climb while those on the right were hardest.

There was an appeal to the Secretary of State (Ref. 45/3/140 dated 13/01/2000) against a local authority's refusal to relax or dispense with requirement K2, so as 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.



LABC.TS.Guide-to-safe-guarding-systems-to-balconies-and-open-walkways.V2.WT.17.08.2022

T: 020 8616 8120 E: consult@labc.co.uk
LABC 2a St George Wharf, Vauxhall, London, SW8 2LE

LABC is a trading name of District Surveyors Association Ltd. Company No. 5531889 registered office as shown. District Surveyors Association Ltd. is a company controlled by local authorities. A list of the controlling local authorities is available for inspection at the company's registered office.



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 previously been undertaken with members of the LABC national technical network, with many taking the stance that horizontal cable systems for guarding are inadequate and do not satisfy requirement K2 unless additional design features are included that prevent a small child from climbing them. Features that might assist in improving safety might include inwardly inclined support posts and offset horizontal rails part way up or at full height of the system on the accessible side.

A similar design to the one described above is shown in the image below for illustration purposes only.



Openings and gaps within and around barriers

In Scotland in 2004 a 21-month-old boy died after falling from a height of over 4.5m.

Ben McCreath was with his mother visiting her workplace (a solicitors office) during her day off. Ben had been supervised throughout the visit, but unexpectedly ran from his mother and then tragically fell through a gap (>100mm wide) in a glazed barrier. The barrier was protecting pedestrians from falling over the floor edge into the void beyond and had only been designed with adults in mind.

LABC.TS.Guide-to-safe-guarding-systems-to-balconies-and-open-walkways.V2.WT.17.08.2022

T: 020 8616 8120 E: consult@labc.co.uk
LABC 2a St George Wharf, Vauxhall, London, SW8 2LE

LABC is a trading name of District Surveyors Association Ltd. Company No. 5531889 registered office as shown. District Surveyors Association Ltd. is a company controlled by local authorities. A list of the controlling local authorities is available for inspection at the company's registered office.



This case is a sobering reminder to building owners, designers, installers and regulators alike to be fully appreciative of the way buildings might be used, and by whom, and to be mindful of the potential risks and foreseeable harm arising from design choices (low risk but high consequence).

In the concluding remarks to the inquiry into Bens' death, Sheriff Stephen said: *"Although the risk of injury to children in offices is reported to be very small indeed the unchallenged research evidence showed that the application of the 100 mm rule would protect the entire population including small children from the risk of injury or death where there was a change of level protected by pedestrian protective barriers."*

A Local Authority Building Control member has reported that he was involved in a case where a small child slipped through a narrow gap, between a staircase and a wall in a museum building.

The staircase was an accommodation stair and was constructed from stainless-steel circular supports and handrails, with safety glass infill panels. The architectural appearance of the staircase was open plan and gave the illusion that it was unsupported – as there was no sideways connections. Support was achieved by top and bottom landing fixity.

The wall-side of the stairs had a handrail but was designed to be otherwise unguarded and the gap between the stair stringer and wall was approx. 75mm (less than the 100mm tolerance stipulated in Approved Document K).

Whilst the building was in normal use a small child became separated from its parents and managed to slip through the gap between the wall and stair, becoming trapped at their waist and suspended in the air above the ground floor over 3m below. The child was safely extracted from the gap, but both parents and child were traumatised by the experience. The gap was subsequently sealed up with a timber batten, which was painted the same colour as the staircase to sympathetically blend in.

Key points to consider

- The use of horizontal cable systems in 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(1) 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 600mm in/around a dwelling, or 380mm in/around any other type of building.

LABC.TS.Guide-to-safe-guarding-systems-to-balconies-and-open-walkways.V2.WT.17.08.2022

T: 020 8616 8120 E: consult@labc.co.uk
LABC 2a St George Wharf, Vauxhall, London, SW8 2LE

LABC is a trading name of District Surveyors Association Ltd. Company No. 5531889 registered office as shown. District Surveyors Association Ltd. is a company controlled by local authorities. A list of the controlling local authorities is available for inspection at the company's registered office.



- Any openings in and around the guarding should not permit a 100mm sphere to pass through e.g.: 99mm or less and in some cases gaps should be sufficiently small to protect small children from slipping and becoming trapped, as this can cause both immediate physical and mental trauma
- Designers should have regard to the use of climbable rails/wires and wide gaps in all buildings, and particularly those in which small children could be present during normal use. Such buildings might include (the list is not exhaustive):
 - Schools
 - Shops and shopping centres
 - Workplaces where parents could take their children.
 - Health care premises
 - Leisure facilities
 - Places of sport
 - Theatres and cinemas
 - Transport hubs/terminals
 - Car parks

Further Guidance

NHBC 'Technical newsletter August 2004 Issue 30 – item 2'

Building Regulation Approved Document K 2013 edition

<https://www.gov.uk/government/publications/protection-from-falling-collision-and-impact-approved-document-k>

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

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/3030/Building_regulations_appeal_45-3-140.pdf

[Inquiry under the fatal accidents and inquiries \(Scotland\) act 1976 into the sudden death of Harry Robert McCreath – May 2010](#)

LABC.TS.Guide-to-safe-guarding-systems-to-balconies-and-open-walkways.V2.WT.17.08.2022

T: 020 8616 8120 E: consult@labc.co.uk
LABC 2a St George Wharf, Vauxhall, London, SW8 2LE

LABC is a trading name of District Surveyors Association Ltd. Company No. 5531889 registered office as shown. District Surveyors Association Ltd. is a company controlled by local authorities. A list of the controlling local authorities is available for inspection at the company's registered office.