Balconies

Setting standards in design

Mark Taylor - Allies and Morrison
BS 8579 – Guide to the design of balconies and terraces

(all references courtesy of BSI)
Definitions
Balcony or terrace?
**balcony**
accessible external amenity platform above ground level exterior to and with direct access from a building

**walkway**
Exterior passage affording access to an apartment above ground level

**terrace**
accessible space positioned above internal space above ground level exterior to and with direct access from a building
Enclosure
What is a ‘winter garden’?
**open balcony**
balcony that has guarding but no other form of vertical enclosure and does not provide protection to the occupants from weather.

**enclosed balcony**
balcony that is protected from rain ingress by a roof and weather screen.
open balcony
balcony that has guarding but no other form of vertical enclosure and
does not provide protection to the occupants from weather.

enclosed balcony
balcony that is protected from rain ingress by a roof and weather screen

BUT AT WHAT POINT DOES A BALCONY BECOME ‘ENCLOSED’?
The BS 9991 private balcony enclosure threshold

“An open balcony is one that could reasonably be assumed to not become smoke-logged in a flat fire situation. At least 50% of the vertical section should be open and the area of opening should be uniformly spread around the surface...

Enclosed balconies should be treated as inner rooms”
Enclosure
Enclosure

thermal line
Enclosure

thermal line

fire line

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Enclosure

thermal line

fire lines

ventilation

NOTE: Mechanical ventilation should be ducted prior to entering from interior to outside of the weather screen.
Enclosure

thermal line
fire lines
ventilation
solar control
Inclusivity

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The threshold conundrum...
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"Accessible threshold
A threshold that is level or, if raised, has a total height of not more than 15mm, a minimum number of upstands and slopes and with any upstands higher than 5mm chamfered. Other acceptable solutions are described in Accessible thresholds in new housing – Guidance for house builders and developers, The Stationery Office Ltd. ISBN 0 11
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""
Structure and mechanical
Deflection limit

5 mm under a 2 kN vertical point load spread over a 200 mm square
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5 mm under a 2 kN vertical point load spread over a 200 mm square

Balconies should be designed to have a minimum vertical frequency of 5 Hz
Service life
Components transferring load - equal service life as primary structure
Components transferring load - equal service life primary structure

Decking and balustrade infill - 30 years
Safety
Falls from domestic balconies

G. M. B. Webber, BSc, ARCS, PhD and C. E. A. Alting-Wij, BEng, MSc

This paper summarizes a detailed study of the occurrence of falls from balconies using data from the Home Accident Surveillance System and other supporting notes. It describes the principal findings and their likely implications for designers and occupiers of balconies.

INTRODUCTION
A study by Littlewood and Tinker on the safety of children living in flats between 1973 and 1975, showed that about three fatal accidents a year in England and Wales involved falls from domestic balconies. This paper describes an investigation of the implications of balcony design for the safety of children and other age groups. Like the earlier work, it is based on the Home Accident Surveillance System (HASS) administered by the Department of Trade and Industry (a national database on accidents from 30 hospitals in England and Wales) and information on fatal accidents supplied by the Office of Population Censuses and Surveys and HM Coroners.

NATIONAL INCIDENCE
Descriptive analysis of all home accidents reported to the HASS in the years 1985 and 1986, which had been categorized as "falls from buildings," was obtained. Of the 876 events, which included falls from windows, balconies, roofs, walls and scaffolding, 24% involved falls from balconies. Scaling these reported events to the estimated incidence of all home accidents suggests that about 250 non-fatal falls from domestic balconies are reported to accident and emergency departments in England and Wales each year.

Copies of death certificates relating to fatal falls from buildings for the period 1975 to 1985 in England and Wales were also obtained. Of 489 cases, 79 mentioned falls from balconies, suggesting an average annual incidence of eight fatal accidents each year.

Time trends and age distribution
The incidence of fatal falls from balconies over the period of the study is shown in Figure 1. There was a marked increase in fatalities involving adults aged 15 to 64 years.

Figure 1: Three-year moving average of death rates by falls from domestic balconies

Fatal falls involving victims over the age of 15 years occurred about 6 times more frequently than those involving children (see Table 1). The under-five and 15 to 64 age groups had high numbers of victims of non-fatal accidents.
Guidance on:

Height of guarding and avoidance of steps
Slip resistance
Prevention of items falling from guarding rails and from/through decking
Safety for cleaning and maintenance
Recent balcony influenced fires

• West Hampstead
• Manchester
• Sutton Park
• Clapton
Resistance to fire

Floors (REI)
- Open balconies – No requirement
- Enclosed balconies – treat as a separating floor

Partitions (EI)
- Open balconies – No requirement
- Enclosed balconies – treat as a separating wall
Reaction to fire

Balconies in buildings with a floor over 18m and ALL stacked balconies regardless of height:

Use materials of A1 or A2-s1.d0 except for gaskets, seals, fixings and 
**laminated glass**
Reaction to fire

Laminated glass – is it a risk to the spread of fire over a façade?
Reaction to fire

Laminated glass – is it a risk to the spread of fire over a façade?

<table>
<thead>
<tr>
<th>Glass</th>
<th>Includes heat strengthened, chemically toughened, <strong>laminated</strong> and wired glass</th>
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None of the materials in the table is allowed to contain more than 1,0 % by weight or volume **M1** (whichever is the more onerous) of homogeneously distributed organic material.
Reaction to fire

More research needed
Other measures

Non-combustible tray or soffit required – ie. no drain-through balconies
Other measures

No drain-through balconies, ie non-combustible tray or soffit required

Terrace roofs: 6m adjacent to any facade to be class $B_{ROOF}(t4)$
Fire performance of terrace surfaces
Other measures

Cavity barrier or fire stopping?
Other measures

Cavity barrier or fire stopping?
Weathering and drainage
Current guidance on design for roof drainage
Should a partially sheltered balcony be treated the same as a roof?
For a top level balcony, the area would be found from the summation of:

i) The plan area of the balcony; and

ii) 50% of the exposed wall area above any solid guard railing.

For a lower level balcony (i.e. covered) the area would be found from the summation of:

i) 50% of the unenclosed vertical plane above any solid guard railing on the front edge; and

ii) 50% of the unenclosed vertical plane above any solid guard railing on one of the two projection edges.
Alternative drainage strategies
Deck and drainage surface options
Basic strategy for prevention of leaks
Thermal
Wind effects
Acoustics
Security
BS 8579 public consultation starts in November

PLEASE COMMENT!
Thank you