BRITISH STANDARD

BS 6399 :
Part 1 : 1996

Loading for buildings

Part 1. Code of practice for dead and imposed loads

ICS 91.040

Committees responsible for this British Standard

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British Iron and Steel Producers Association
British Masonry Society
Concrete Society
Department of the Environment (Building Research Establishment)
Department of the Environment (Property and Buildings Directorate)
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Institution of Structural Engineers
National House-building Council
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Co-opted members

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Contents

Foreword

This Part of BS 6399 has been prepared by Subcommittee B/525/1, Actions (loadings) and basis of design. It supersedes BS 6399 : Part 1 : 1984, which is withdrawn.

This edition of BS 6399 : Part 1, introduces technical changes, but it does not reflect a full revision of the standard which will be undertaken in due course.

The principle change in this edition is the presentation of the imposed floor loads according to the type of activity/occupancy, rather than occupancy class as introduced in the 1984 edition. The weights of movable partitions which were redefined as imposed loads in the 1984 edition, retain their classification. The reductions in floor load with number of storeys and with area have also been clarified.

The clause on dynamic loading has been expanded to give guidance on dynamic loads due to crowds and a clause on accidental load on key or protected elements has been introduced.

The basis of the loadings is historical and they agree, subject to comparatively minor variations, with international consensus of opinion.

The data on wind loads are given in BS 6399 : Part 2 and data on imposed roof loads are given in BS 6399 : Part 3.

In this edition of BS 6399 : Part 1, numerical values have been given in terms of SI units, details of which are to be found in BS 5555. Those concerned with the conversion and renovation of older buildings designed in terms of imperial units may find it useful to note that 1 N = 0.225 lbf and 1 kN/m^2 = 20.89 lbf/ft^2.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Code of practice

1 Scope

1.1 This Part of BS 6399 gives dead and minimum recommended imposed loads for use in designing buildings. It applies to:

a) new buildings and new structures;

b) alterations and additions to existing buildings and existing structures;

c) existing construction on change of use.

It does not apply to the maintenance of, or the replacement of parts of, existing buildings and structures where there is no change of use.

1.2 This code of practice does not cover:

a) loads on road and rail bridges, as these are dealt with in other British Standards, e.g. BS 5400;

b) wind loads (see BS 6399 : Part 2);

c) imposed roof loads (see BS 6399 : Part 3);

d) snow loads (see BS 6399 : Part 3);

e) loads on structures subject to internal pressures from their contents (e.g. bunkers, silos and water tanks), which have to be calculated individually;

f) loads due to machinery vibration and dynamic loads other than due to crowds;

g) loads due to lifts (see BS 2655);

h) loads incidental to construction;

i) test loads;

j) loads for crane gantry girders (see BS 2573).

2 References

2.1 Normative references

This Part of BS 6399 incorporates, by dated or undated reference, provisions from other publications.These normative references are made at the appropriate places in the text and the cited publications are listed on the inside back cover. For dated references, only the edition cited applies; any subsequent amendments to or revisions of the cited publication apply to this Part of BS 6399 only when incorporated in the reference by amendment or revision. For undated references, the latest edition of the cited publication applies, together with any amendments.

2.2 Informative references

This Part of BS 6399 refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on the inside back cover, but reference should be made to the latest editions.

3 Definitions

For the purposes of this code of practice the following definitions apply.

3.1 dead load

The load due to the weight of all walls, permanent partitions, floors, roofs, finishes and all other permanent construction including services of a permanent nature.

3.2 imposed load

The load assumed to be produced by the intended occupancy or use, including the weight of movable partitions, distributed, concentrated, impact and inertia, loads, but excluding wind loads.

3.3 storage height

The height of the space between a floor and a physical constraint to the height of storage formed by a ceiling, soffit of a floor, roof or other obstruction.

3.4 wind load

The load due to the effect of wind pressure or suction.

3.5 accidental load on key or protected element

The ultimate load assumed, during a single accidental loading event to apply to structural elements essential to the residual stability of the building.

4 Dead loads

Dead loads are calculated from the unit weights given in BS 648 or from the actual known weights of the materials used. Where there is doubt as to the permanency of dead loads, such loads should be treated as imposed loads.

Where permanent partitions are indicated, their actual weights are included in the dead load.

The weights of tanks and other receptacles, and of their contents, are considered as dead loads. These loads should be calculated for the cases when a tank or receptacle is full and when it is empty.

5 Imposed floor and ceiling loads

5.1 Floors

5.1.1 *General*

The loads appropriate to the type of activity/occupancy for which the floor area will be used in service are given in table 1. The loads in table 1 should be treated as the unfactored or characteristic loads for design purposes.

They should be considered as the minimum values to be adopted.

Where higher values are considered more appropriate, based on a knowledge of the proposed use of the structure or proposed installation of equipment, machinery, stacking systems, etc., they should be used instead.

Table 1. Minimum imposed floor loads

Type of activity/occupancy for part of the building or structure	Examples of specific use		Uniformity distributed load kN/m^2	Concentrated load kN
A Domestic and residential activities (Also see category C)	All usages within self-contained dwelling units Communal areas (including kitchens) in blocks of flats with limited use (See note 1) (For communal areas in other blocks of flats, see C3 and below)		1.5	1.4
	Bedrooms and dormitories except those in hotels and motels		1.5	1.8
	Bedrooms in hotels and motels Hospital wards Toilet areas		2.0	1.8
	Billiard rooms		2.0	2.7
	Communal kitchens except in flats covered by note 1		3.0	4.5
	Balconies	Single dwelling units and communal areas in blocks of flats with limited use (See note 1)	1.5	1.4
		Guest houses, residential clubs and communal areas in blocks of flats except as covered by note 1	Same as rooms to which they give access but with a minimum of 3.0	1.5/m run concentrated at the outer edge
		Hotels and motels	Same as rooms to which they give access but with a minimum of 4.0	1.5/m run concentrated at the outer edge
B Offices and work areas not covered elsewhere	Operating theatres, X-ray rooms, utility rooms		2.0	4.5
	Work rooms (light industrial) without storage		2.5	1.8
	Offices for general use		2.5	2.7
	Banking halls		3.0	2.7
	Kitchens, laundries, laboratories		3.0	4.5
	Rooms with mainframe computers or similar equipment		3.5	4.5
	Machinery halls, circulation spaces therein		4.0	4.5
	Projection rooms		5.0	To be determined for specific use
	Factories, workshops and similar buildings (general industrial)		5.0	4.5
	Foundries		20.0	To be determined for specific use
	Catwalks		—	1.0 at 1 m centres
	Balconies		Same as rooms to which they give access but with a minimum of 4.0	1.5/m run concentrated at the outer edge
	Fly galleries		4.5 kN/m run distributed uniformly over width	—
	Ladders		—	1.5 rung load

Table 1. Minimum imposed floor loads *(continued)*

Type of activity/occupancy for part of the building or structure	Examples of specific use		Uniformity distributed load kN/m^2	Concentrated load kN
C Areas where people may congregate	Public, institutional and communal dining rooms and lounges, cafes and restaurants (See note 2)		2.0	2.7
C1 Areas with tables	Reading rooms with no book storage		2.5	4.5
	Classrooms		3.0	2.7
C2 Areas with fixed seats	Assembly areas with fixed seating (See note 3)		4.0	3.6
	Places of worship		3.0	2.7
C3 Areas without obstacles for moving people	Corridors, hallways, aisles, stairs, landings etc. in institutional type buildings (not subject to crowds or wheeled vehicles), hostels, guest houses, residential clubs, and communal areas in blocks of flats not covered by note 1. (For communal areas in blocks of flats covered by note 1, see A)	Corridors, hallways, aisles etc. (foot traffic only)	3.0	4.5
		Stairs and landings (foot traffic only)	3.0	4.0
	Corridors, hallways, aisles, stairs, landings, etc. in all other buildings including hotels and motels and institutional buildings	Corridors, hallways, aisles, etc. (foot traffic only)	4.0	4.5
		Corridors, hallways, aisles, etc., subject to wheeled vehicles, trolleys etc.	5.0	4.5
		Stairs and landings (foot traffic only)	4.0	4.0
	Industrial walkways (light duty)		3.0	4.5
	Industrial walkways (general duty)		5.0	4.5
	Industrial walkways (heavy duty)		7.5	4.5
	Museum floors and art galleries for exhibition purposes		4.0	4.5
	Balconies (except as specified in A)		Same as rooms to which they give access but with a minimum of 4.0	1.5/m run concentrated at the outer edge
	Fly galleries		4.5 kN/m run distributed uniformly over width	—
C4 Areas with possible physical activities (See clause **9**)	Dance halls and studios, gymnasia, stages		5.0	3.6
	Drill halls and drill rooms		5.0	9.0
C5 Areas susceptible to overcrowding (See clause **9**)	Assembly areas without fixed seating, concert halls, bars, places of worship and grandstands		5.0	3.6
	Stages in public assembly areas		7.5	4.5
D Shopping areas	Shop floors for the sale and display of merchandise		4.0	3.6

Table 1. Minimum imposed floor loads *(continued)*

Type of activity/occupancy for part of the building or structure	Examples of specific use	Uniformity distributed load kN/m^2	Concentrated load kN
E Warehousing and storage areas. Areas subject to accumulation of goods. Areas for equipment and plant.	General areas for static equipment not specified elsewhere (institutional and public buildings)	2.0	1.8
	Reading rooms with book storage, e.g. libraries	4.0	4.5
	General storage other than those specified	2.4 for each metre of storage height	7.0
	File rooms, filing and storage space (offices)	5.0	4.5
	Stack rooms (books)	2.4 for each metre in storage height but with a minimum of 6.5	7.0
	Paper storage for printing plants and stationery stores	4.0 for each metre of storage height	9.0
	Dense mobile stacking (books) on mobile trolleys, in public and institutional buildings	4.8 for each metre of storage height but with a minimum of 9.6	7.0
	Dense mobile stacking (books) on mobile trucks, in warehouses	4.8 for each metre of storage height but with a minimum of 15.0	7.0
	Cold storage	5.0 for each metre of storage height but with a minimum of 15.0	9.0
	Plant rooms, boiler rooms, fan rooms, etc., including weight of machinery	7.5	4.5
	Ladders	—	1.5 rung load
F	Parking for cars, light vans, etc. not exceeding 2500 kg gross mass, including garages, driveways and ramps	2.5	9.0
G	Vehicles exceeding 2500 kg. Driveways, ramps, repair workshops, footpaths with vehicle access, and car parking	To be determined for specific use	

NOTE 1. Communal areas in blocks of flats with limited use refers to blocks of flats not more than three storeys in height and with not more than four self-contained dwelling units per floor accessible from one staircase.
NOTE 2. Where these same areas may be subjected to loads due to physical activities or overcrowding, e.g. a hotel dining room used as a dance floor, imposed loads should be based on occupancy C4 or C5 as appropriate. Reference should also be made to clause **9**.
NOTE 3. Fixed seating is seating where its removal and the use of the space for other purposes is improbable.

All floors should be designed to carry the uniformly distributed or concentrated load, whichever produces the greatest stresses (or where critical, deflection) in the part of the floor under consideration.

The categories adopted for types of activity/occupancy are:

A Domestic and residential activities

B Office and work areas not covered elsewhere

C Areas where people may congregate

D Shopping areas

E Areas susceptible to the accumulation of goods

F/G Vehicle and traffic areas

5.1.2 *Uniformly distributed loads*

The uniformly distributed loads given in table 1 are the uniformly distributed static loads per square metre of plan area and provide for the effects of normal use.

5.1.3 *Concentrated loads*

Concentrated loads should be assumed to act at points on the member to give the greatest moment, shear (or where critical, deflection). Concentrated loads should be applied to individual members and assumed to act on them unless there is evidence that adequate interaction exists to ensure that the load can be shared or spread.

When used for the calculation of local effects such as crushing and punching, the concentrated loads should be assumed to act at a position and over an area of application appropriate to their cause. Where this cannot be foreseen, a square contact area with a 50 mm side should be assumed.

5.1.4 *Partitions*

When permanent partitions are indicated, their weight should be included in the dead load, acting at the given partition location.

In buildings where the use of other partitions is envisaged, an additional imposed load should be specified for the floor area. This may be taken as a uniformly distributed load of not less than one third of the load per metre run of the finished partitions. For floors or offices, this additional uniformly distributed partition load should not be less than 1.0 kN/m^2.

5.2 Ceiling supports and similar structures

The following loads are appropriate for the design of frames and covering of access hatches (other than glazing), supports of ceilings and similar structures:

a) without access: no imposed load; or

b) with access: 0.25 kN/m^2 uniformly distributed over the whole area and a concentrated load of 0.9 kN so placed as to produce the maximum effect in the supporting members.

6 Reduction in total imposed floor loads

6.1 The following do not qualify for reduction:

a) loads that have been specifically determined from a knowledge of the proposed use of the structure;

b) loads due to plant or machinery;

c) loads due to storage.

Otherwise, floors designed for activities described in categories A to D inclusive in table 1 may qualify for the reductions specified in this clause to be applied to the uniformly distributed floor loads given in table 1.

6.2 Reduction in loading on columns

The reductions given in table 2 (based on the number of floors qualifying for load reduction carried by the member under consideration) may be applied to the total imposed floor load in the design of columns, piers, walls and their supports and foundations, except as provided in **6.1**. The percentage reductions given apply to the total distributed imposed load (including the additional uniformly distributed imposed partition load, see **5.1.4**) on all floors qualifying for reduction carried by the member under consideration.

Alternatively, the reductions based on area in **6.3** may be applied but the reductions given in table 2 cannot be used in combination with those in table 3.

NOTE. The moments on a column should be determined from the load used to design the beams at the appropriate level and not reduced on the same basis as the axial load.

Table 2. Reduction in total distributed imposed floor loads with number of storeys

Number of floors with loads qualifying for reduction carried by member under consideration	Reduction in total distributed imposed load on all floors carried by the member under consideration %
1	0
2	10
3	20
4	30
5 to 10	40
over 10	50 max.

6.3 Reduction in loading on beams

The loading on beams (including the additional uniformly distributed imposed partition load, see **5.1.4**), may be reduced according to area supported by the percentage given in table 3, except as provided in **6.1**.

NOTE. Beams supporting columns should be designed for the same load as that in the column being supported (being applied as appropriate), together with all other loads applied directly to the beam.

Table 3. Reduction in total distributed imposed floor loads on a supporting beam or girder with floor area

Area supported (see note) m^2	Reduction in total distributed imposed load %
0	0
50	5
100	10
150	15
200	20
above 250	25 max

NOTE. Reductions for intermediate areas may be calculated by linear interpolation.

7 Imposed roof loads

For imposed roof loads refer to Part 3 of this standard.

8 Crane gantry girders

For loads due to cranes, see BS 2573.

9 Dynamic loading (excluding wind)

9.1 General

The imposed loads given in clause **5** allow for small dynamic effects and should be sufficient for most structures without the need for further dynamic checks. However they do not cover the special type of loading conditions such as caused by the rhythmical and synchronized movement of crowds or the operation of some types of machinery.

The use of a factored imposed load to represent significant dynamic effects may prove inadequate in these cases. The dynamic response of the structural system depends on the load and several inter-related structural parameters such as natural frequency, mass, damping, and mode shape.

9.2 Synchronized dynamic crowd loads

9.2.1 *General*

Dynamic loads will only be significant when any crowd movement (dancing, jumping, rhythmic stamping, aerobics, etc.) is synchronized. In practice, this only occurs in conjunction with a strong musical beat such as occurs at lively pop concerts or aerobics. The dynamic loading is thus related to the dance frequency or the beat frequency of the music and is periodical. Such crowd movement can generate both horizontal and vertical loads. If the synchronized movement excites a natural frequency of the affected part of the structure, resonance will occur which can greatly amplify its response.

Where significant dynamic loads are to be expected, the structure should be designed either:

a) to withstand the anticipated dynamic loads (see **9.2.2**); or

b) by avoiding significant resonance effects (see **9.2.3**).

Dynamic loads or resonance effects in the vertical and also two orthogonal horizontal directions should be considered.

9.2.2 *Design for dynamic loads*

For the calculation of dynamic response a range of load frequencies and types should be considered. Some limited guidance for jumping loads is given in annex A. As the chances of obtaining a resonant situation in combination with the imposed loads given in table 1 are small, actual static loads appropriate to the activity should be used in the determination of dynamic loads. For these conditions a partial factor for loads of 1.0 is appropriate.

9.2.3 *Design to avoid resonance*

Alternatively to avoid resonance effects the vertical frequency should be greater than 8.4 Hz and the horizontal frequencies greater than 4.0 Hz; the frequencies being evaluated for the appropriate mode of vibration of an empty structure.

9.3 Other dynamic loads

As there is a wide range of loads from different types of machinery no specific guidance can be given, however potential resonant excitation of the structure should be considered. Where necessary the designer should seek specialist advice.

10 Parapets, barriers and balustrades

Table 4 specifies minimum horizontal imposed loads appropriate to the design of parapets, barriers, balustrades and other elements of a structure intended to retain, stop or guide people. The loads given in table 4 should be treated as the unfactored or characteristic loads for design purposes. The uniformly distributed line load and the uniformly distributed and concentrated loads applicable to the infill are not additive and should be considered as three separate load cases. In design, the horizontal uniformly distributed line load should be considered to act at a height of 1.1 m above datum level, irrespective of the actual height of the element. For this purpose, the datum level should be taken as the finished level of the access platform, or the pitch line drawn through the nosings of the stair treads.

11 Vehicle barriers for car parks

11.1 The horizontal force F (in kN), normal to and uniformly distributed over any length of 1.5 m of a barrier for a car park, required to withstand the impact of a vehicle is given by:

$$F = \frac{0.5mv^2}{\delta_c + \delta_b}$$

where

m is the gross mass of the vehicle (in kg);

v is the velocity of the vehicle (in m/s) normal to the barrier;

δ_c is the deformation of the vehicle (in mm);

δ_b is the deflection of the barrier (in mm).

11.2 Where the car park has been designed on the basis that the gross mass of the vehicles using it will not exceed 2500 kg the following values are used to determine the force F:

m = 1500 kg[1)];

v = 4.5 m/s;

δ_c = 100 mm unless better evidence is available.

For a rigid barrier, for which δ_b may be taken as zero, the force F appropriate to vehicles up to 2500 kg gross mass is taken as 150 kN.

[1)] The mass of 1500 kg is taken as being more representative of the vehicle population than the extreme value of 2500 kg.

11.3 Where the car park has been designed for vehicles whose gross mass exceeds 2500 kg the following values are used to determine the force F:

m = the actual mass of the vehicle for which the car park is designed (in kg);

v = 4.5 m/s;

δ_c = 100 mm unless better evidence is available.

11.4 The force determined as in **11.2** or **11.3** may be considered to act at bumper height. In the case of car parks intended for motor cars whose gross mass does not exceed 2500 kg this height may be taken as 375 mm above the floor level.

11.5 Barriers to access ramps of car parks have to withstand one half of the force determined in **11.2** or **11.3** acting at a height of 610 mm above the ramp.

Opposite the ends of straight ramps intended for downward travel which exceed 20 m in length the barrier has to withstand twice the force determined in **11.2** or **11.3** acting at a height of 610 mm above the ramp.

12 Accidental load on key or protected elements

When an accidental load is required for a key or protected element approach to design,[2)] that load shall be taken as 34 kN/m^2.

[2)] See appropriate material design code.

Table 4. Minimum horizontal imposed loads for parapets, barriers and balustrades, etc.

Type of occupancy for part of the building or structure	Examples of specific use	Horizontal uniformly distributed line load (kN/m)	A uniformly distributed load applied to the infill (kN/m^2)	A point load applied to part of the infill (kN)
A Domestic and residential activities	(i) All areas within or serving exclusively one dwelling including stairs, landings, etc. but excluding external balconies and edges of roofs (see C3 ix)	0.36	0.5	0.25
	(ii) Other residential, (but also see C)	0.74	1.0	0.5
B and E Offices and work areas not included elsewhere including storage areas	(iii) Light access stairs and gangways not more than 600 mm wide	0.22	N/A	N/A
	(iv) Light pedestrian traffic routes in industrial and storage buildings except designated escape routes	0.36	0.5	0.25
	(v) Areas not susceptible to overcrowding in office and institutional buildings also industrial and storage buildings except as given above	0.74	1.0	0.5
C Areas where people may congregate	(vi) Areas having fixed seating within 530 mm of the barrier, balustrade or parapet	1.5	1.5	1.5
C1/C2 Areas with tables or fixed seating	(vii) Restaurants and bars	1.5	1.5	1.5
C3 Areas without obstacles for moving people and not susceptible to overcrowding	(viii) Stairs, landings, corridors, ramps	0.74	1.0	0.5
	(ix) External balconies and edges of roofs. Footways and pavements within building curtilage adjacent to basement/sunken areas	0.74	1.0	0.5
C5 Areas susceptible to overcrowding	(x) Footways or pavements less than 3 m wide adjacent to sunken areas	1.5	1.5	1.5
	(xi) Theatres, cinemas, discotheques, bars, auditoria, shopping malls, assembly areas, studio. Footways or pavements greater than 3 m wide adjacent to sunken areas	3.0	1.5	1.5
	(xii) Designated stadia (see note 1)	See requirements of the appropriate certifying authority		
D Retail areas	(xiii) All retail areas including public areas of banks/building societies or betting shops. For areas where overcrowding may occur, see C5	1.5	1.5	1.5
F/G Vehicular	(xiv) Pedestrian areas in car parks including stairs, landings, ramps, edges or internal floors, footways, edges of roofs	1.5	1.5	1.5
	(xv) Horizontal loads imposed by vehicles	See clause **11**		

NOTE 1. Designated stadia are those requiring a safety certificate under the Safety of Sports Ground Act 1975.

Annex

Annex A (normative)

Dynamic loads for dancing and jumping

In dynamic analysis it is often convenient to express the applied loading as a fourier series representing the variation of load with time as a series of sine functions. Any periodic loading can be decomposed in to a combination of a constant load and several harmonics.

Synchronized dynamic loading [1] caused by activities such as jumping and dancing are periodic and mainly depend upon:

a) the static weight of the dancer(s) (G);

b) the period of the dancing load(s) (T_p);

c) the contact ratio (α), i.e. the ratio of the duration within each cycle when the load is in contact with the floor and the period of the dancing.

Mathematically the load at any instant (t) may be expressed as

$$F(t) = G\left[1 + \sum_{n=1}^{\infty} r_n \sin\left(\frac{2n\pi}{T_p} t + \varphi_n\right)\right] \quad \text{(Equation 1)}$$

where

n is the number of the harmonic being considered 1, 2, 3, ...;

r_n is the dynamic load factor for the n^{th} harmonic;

φ_n is the phase angle of n^{th} harmonic.

The values of r_n and φ_n are functions of the value of the contact ratio α.

In practice for the evaluation of displacement and stresses, only the first few harmonics need be considered as the structural response at higher values is generally not significant. It is generally sufficient to consider the first three harmonics for vertical loads and the first harmonic for horizontal loads. For the calculation of acceleration, additional harmonics will need consideration.

The table below gives typical values of α for various activities.

Table 5 Typical values of contact ratio for various activities

Activity	Contact ratio α
Pedestrian movement Low impact aerobics	2/3
Rhythmic exercises High impact aerobics	1/2
Normal jumping	1/3
High jumping	1/4

The resultant values of r_n and φ_n for a given period of dancing T_p or a jumping frequency ($1/T_p$) may be obtained from literature (e.g. reference 1). For individual loads the frequency range that should be considered is 1.5 Hz to 3.5 Hz and for larger groups 1.5 Hz to 2.8 Hz as coordinated movement at the higher frequencies is impractical.

For a large group the load $F(t)$ calculated from equation 1 may be multiplied by 0.67 to allow for lack of perfect synchronization.

Vertical jumping also generates a horizontal load which may be critical for some structures, e.g. temporary grandstands. A horizontal load of 10 % of the vertical load should be considered.

List of references (see clause 2)

Normative references

BSI publications

BRITISH STANDARDS INSTITUTION, London

BS 648 : 1964	*Schedule of weights of building materials*
BS 2573 :	*Rules for the design of cranes*
BS 2573 : Part 1 : 1983	*Specification for classification, stress calculations and design criteria for structures*

Informative references

BSI publications

BRITISH STANDARDS INSTITUTION, London

BS 2655 :	*Specification for lifts, escalators, passenger conveyors and paternosters*
BS 2655 : Part 4 : 1969	*General requirements for escalators, and passenger conveyors*
BS 5400 :	*Steel, concrete and composite bridges*
BS 5400 : Part 2 : 1978	*Specification for loads*
BS 5555 : 1993	*Specification for SI units and recommendations for the use of their multiples and of certain other units*
BS 6399 :	*Loading for buildings*
BS 6399 : Part 2 : 1995	*Code of practice for wind loads*
BS 6399 : Part 3 : 1988	*Code of practice for imposed roof loads*

Other references

[1] T. Ji and B. R Ellis. *Floor vibration induced by dance type loads — Theory.* Structural Engineer, vol 72, No. 3, pp37-44. February 1994.

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