

Road lighting

Part 9. Code of practice for lighting for urban centres and public amenity areas

Eclairage routier
Partie 9. Code de bonne pratique pour
l'éclairage des centres urbains et des zones
d'aménagement public

Strassenbeleuchtung
Teil 9. Beleuchtung von städtischen Zentren
und öffentlichen Freizeitflächen

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Electrical Illumination Standards Policy Committee (LGL/-) to Technical Committee LGL/23, upon which the following bodies were represented:

Automobile Association
British Lighting Association for the Preparation of Standards (Britlaps)
British Precast Concrete Federation Ltd.
Chartered Institution of Building Services Engineers
Council for the Protection of Rural England
County Surveyors' Society
Department of Transport
Institution of Civil Engineering Surveyors
Institution of Civil Engineers
Institution of Electrical Engineers
Institution of Lighting Engineers
Institution of Mechanical Engineers
Lighting Industry Federation Ltd.
Royal Fine Art Commission
Scottish Office (Building Directorate)

This British Standard, having been prepared under the direction of the Electrical Illumination Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on
15 August 1992

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First published January 1969
Second edition September 1990
Third edition August 1992

The following BSI references relate to the work on this standard:
Committee reference LGL/23
Draft announced in *BSI News*
March 1992

ISBN 0 580 20899 0

Amendments issued since publication

Amd. No.	Date	Text affected

Contents

	Page
Committees responsible	Inside front cover
Foreword	3
Code of practice	
Section 1. General	
0 Introduction	4
1 Scope	4
2 Definitions	4
Section 2. Lighting objectives: general	
3 Objectives	5
4 Traffic	5
5 Security and safety	6
6 Trade and commerce	6
7 Visual appreciation	6
Section 3. Lighting objectives: specific	
8 General traffic	7
9 Arcaded and canopied areas	7
10 Subways, footbridges, stairways and ramps	7
11 Car parks	9
12 Service areas	10
13 Conservation areas	11
14 Parks and landscaped areas	11
15 Lighting of landmarks	12
16 Decorative and festive lighting	13
17 Fountain lighting	13
Section 4. Installation design: general	
18 General considerations	14
19 Site appraisal	14
20 Consultation and planning	14
21 Installation works	14
Section 5. Installation design: specific	
22 Light sources and luminaires	15
23 Location and mounting heights	15
24 Multifunctional lighting systems	16
25 Maintenance and vandalism	16
Section 6. Installation design: process	
26 General	17
27 Gathering preliminary data	17
28 Determination of lighting needs	17
29 Choice of equipment and installation	17
30 The calculation of design geometry	18
31 Plotting of luminaire positions	18
32 Finalization of installation specification	18

	Page
Appendices	
A Calculation of semi-cylindrical illuminance	19
B Design methods for floodlighting landmarks	19
C Work sheet for 'Installation design: process'	20
Tables	
1 Lighting requirements for general traffic situations	8
2 Lighting requirements for arcaded and canopied areas	8
3 Lighting requirements for subways, footbridges, stairways and ramps	9
4 Lighting requirements for car parks	10
5 Lighting requirements for service areas	10
6 Lighting requirements for footpaths and cyclepaths	11
7 Lighting requirements for floodlighting of structures	12
8 Luminous intensity for water effects	13
9 Luminaire maintenance factors	16
Figures	
1 Concept of semi-cylindrical illuminance	19
2 Luminous intensity diagram	19
3 Example of floodlighting a monument	20
4 Work sheet for 'Installation design: process'	21

Foreword

This Part of BS 5489 has been prepared under the direction of the Electrical Illumination Standards Policy Committee and is a new edition of BS 5489 : Part 9 : 1990 which is withdrawn.

The 1990 edition of this Part of BS 5489 extended the code of practice on road lighting to those areas within villages, towns and cities which have an importance for social or other reasons, and for which lighting conditions different from those described in other Parts were considered desirable or appropriate.

Lighting is a fundamental part of the creation of the night-time urban scene. Apart from the benefits of improved road safety and crime reduction, the creation of an attractive and pleasing night-time environment can bring a sense of order to a space where it is lacking and enhance those buildings of significant architectural merit. This is a community benefit which can be realized in pleasure, social and commercial terms.

This new edition introduces a revised definition of maintenance factor, and incorporates editorial improvements but it does not reflect a full review or revision of the standard, which will be undertaken in due course.

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

Section 1. General

0 Introduction

The general principles of road lighting are given in Part 1 of this code of practice. In urban and amenity areas, people should be attracted by a pleasant visual scene. During the hours of darkness, the surrounding environment and people need to be easily recognized. While business and commercial concerns are open, a relatively high level of lighting is required which can usually result from a combination of public and private lighting.

In view of the diverse nature of each particular site being considered no uniform method of lighting provision is suggested and it is most important to recognize that an individualized approach has to be made. For this reason this Part of the code of practice makes basic recommendations only in regard to the overall lighting provisions, related to each area.

In most of these areas, lighting is required on surfaces other than the horizontal. Light in many instances is particularly required on the faces of pedestrians to ease identification.

During the day it is important to ensure that all lighting equipment complements rather than detracts from the appearance of the area. As will be detailed later, all the physical and psychological criteria such as height of columns and size, design and light distribution of luminaires should be in accord. The general lighting should define the area rather than the traffic route. During the early evening when all shop window lights and signs are illuminated this should all be considered as a part of the lit environment. However it is important to be remember that during the late evening and during the night when shops are closed and the commercial light is reduced or extinguished, the public lighting should aid the security of shops and pedestrians' safety as well as the safe passage of any vehicular traffic. For an attractive and dynamic side to the general lighting installation, this can in many cases be left to the supplementary commercial lighting referred to above which if carefully controlled can introduce useful variations in overall lighting effects.

1 Scope

This Part of BS 5489 deals with the lighting of urban centres and public amenity areas for all road users. Vehicular and pedestrian traffic is involved and, therefore, all exterior public areas alongside, under or over roads are included. As visual orientation and location are important to both drivers and pedestrians within urban centres, the highlighting of landmarks at night is also discussed.

2 Definitions

For the purposes of this Part of BS 5489 the definitions given in BS 5225 : Part 1, BS 5489 : Parts 1 and 7 and BS 6100 : Subsection 2.4.1 apply, together with the following.

2.1 background luminance

The average luminance of the immediate surround of the object being viewed.

2.2 conservation area

A statutory, designated area of architectural merit requiring special attention to preserve its character.

2.3 cyclepath

A means of passage designed for cyclists.

2.4 footpath

A means of passage for pedestrians.

NOTE. Footpaths may be across open spaces or between buildings.

2.5 horizontal illuminance

The illuminance on a horizontal surface of the area being considered (in lx).

NOTE. In the text it is denoted by the symbol E_H .

2.6 luminaire

Apparatus which controls the distribution of light given by a lamp or lamps and which includes all the components necessary for fixing and protecting the lamps and for connecting them to the supply circuit.

2.7 maintained illuminance

The average or minimum illuminance on the reference surfaces ensured by appropriate lamp renewals and maintenance.

2.8 reflectance

The ratio of the light flux reflected from a surface to the light flux incident on it.

2.9 sparkle

The subjective contribution to the enhancement of the visual scene without causing visual discomfort or disabling glare.

2.10 floodlighting

Lighting, by projection, of a scene or object in order to increase considerably the illuminance relative to the surroundings.

2.11 isolux curve

Locus of points on a surface where the illuminance has the same value.

2.12 candela

The luminous intensity in a given direction of a source which emits monochromatic radiation of frequency 540×10^{12} Hz and of which the radiant intensity in that direction is 1/683 W/sr.

Section 2. Lighting objectives: general

3 Objectives

This Part differs from most other Parts of this British Standard in that the efficient lighting of the road surface for traffic movement is not the only or main consideration. A balance with many other aspects has to be achieved.

Urban centres will serve many users, each with differing and sometimes conflicting lighting needs. A master plan should be drawn up which contains the various elements in order of their importance and emphasis. These may include many of the following which should, therefore, all be considered:

- (a) lighting design and choice of equipment in relation to the architectural scene and urban landscape;
- (b) lighting to provide safety for pedestrians from moving vehicles and to deter antisocial behaviour;
- (c) lighting commensurate with the character and volume of vehicular traffic (including cyclists);
- (d) control of illuminated advertisements in the interests of amenity;
- (e) control and integration of permanent floodlighting installations into the visual master plan;
- (f) control of temporary special lighting effects, such as floodlighting, festive decorations;
- (g) control of road and direction signs and their relationship with other illuminated material;
- (h) control and blending of lighting from both public and private sources e.g. bus shelters, telephone kiosks;
- (i) protection of residential developments from light pollution;
- (j) protection of installations from accidental or deliberate damage;
- (k) maintenance of installations.

4 Traffic

4.1 Categories

The relative balance of the needs listed in clause 3 will depend on the type of traffic which can be divided into the following categories:

- (a) primarily vehicular;
- (b) mixed vehicular and pedestrian;
- (c) wholly pedestrian.

4.2 Primarily vehicular traffic

The minimum level of provision should be that found in the appropriate category of BS 5489 : Part 2. However, there is a need for the lighting to accentuate the change in area use from that where the motorist has been the prime road user to where

a growing number of pedestrian activities will be occurring. One way to mark this change of use is to alter the appearance of the lighting equipment to a more decorative type and/or change the colour of the light source. Whilst there will still be a need to define a traffic route, normally achieved by direction signs, the lighting should define the area and general street scene. This last point is of special relevance when considering the daytime appearance of the installation.

4.3 Mixed vehicular and pedestrian traffic

The principles of BS 5489 : Parts 2 and 3 should be regarded as minimum requirements. It is important that pedestrians should be able to recognize any potential danger as well as appreciate their surrounding environment.

Where pavements are narrow or subject to very considerable pedestrian traffic then consideration should be given to the removal of the lighting columns, and the use of wall brackets investigated as referred to in BS 5489 : Part 1. To the motorist, road surface luminance will still be important, but of equal importance will be the need to see and clearly define pedestrian movements on the adjacent pavements. For this, illuminance on other planes is of importance. For pedestrians there are more needs: to see the vehicles and to see each other. Luminaire brightness needs to be carefully controlled in order to avoid glare. It should be noted that this does not only apply to the public lighting installation but to the whole urban landscape of commercial signs, shop windows and the like.

At night, modest scale decorative floodlighting can assist traffic movement. A local landmark, known and used during the day as a means of orientation to both motorists and pedestrians, can be totally lost during the hours of darkness. This may be overcome by a purpose-designed floodlighting scheme, a single spotlight attached to an adjacent road lighting column or even by 'spill light' from strategically positioned road lighting luminaires (see clause 15).

4.4 Wholly pedestrian traffic

The objective is that the lighting should promote easy movement of pedestrians and create a feeling of general security and well being. To achieve the latter, recognition of the behaviour and intentions of other pedestrians is important, and for this good colour rendering and good illuminance are very desirable. In commercial and leisure areas the provision of good lighting can add to the general amenity and so encourage people to visit and make use of the facilities.

5 Security and safety

The general lighting needs of traffic referred to in clause 4 will in most cases serve the needs of security and safety. Additionally it will be beneficial to utilize any public lighting installation throughout the hours of darkness rather than simply during times of major traffic movements. If normal lighting levels are very high, such as in some town and city centres, some form of 'multiple lighting' (see clause 24) could be considered to reduce overall running costs. Special care should be taken to ensure that there are no dark corners. In such areas, where necessary, more than one lighting unit should be employed so that a single lamp failure does not leave an area in total darkness. To aid in crime detection, differentiation of colours is useful and this should be taken into account.

To provide a sense of security it should be possible to recognize whether another person is likely to be friendly, indifferent or aggressive, in time to make an appropriate response. To ensure this recognition, the illuminance on the human face should be of an adequate level. In those situations within the scope of this code of practice, this will generally be satisfied by fulfilling the lighting objectives for horizontal illuminance given in tables 1 to 6, together with luminaire mounting heights of between 4 m and 12 m.

NOTE. The quantification of light on vertical planes presents a difficulty because of the multiplicity of planes at each measurement point which has to be taken into account. This is, to some extent, overcome by using the average illuminance on an infinitesimal vertical half cylinder situated at average head height (1.5 m). However with this measure, the semi-cylindrical illuminance, it is necessary to take into account at least three orientations of the half cylinder (the curved surfaces facing up, down and across the street). In addition, no simple method has yet been evolved of calculating semi-cylindrical illumination from a complete installation other than by using a computer (see appendix A).

6 Trade and commerce

A function of public lighting in urban centres, in addition to that of general safety and security, is to enhance the night-time environment. The provision of good and attractive lighting is likely to assist in stimulating trade and commerce. Many instances can be cited where the specific attraction of this public lighting is known to attract large numbers of people, to the direct advantage of the local trade and commerce.

7 Visual appreciation

Added interest can be given to areas which people may wish to see by the use of imaginative lighting. These will include conservation areas and other areas of local importance containing buildings and monuments of historical interest.

Imaginative lighting design can also do much to subdue the less visually attractive features within an urban environment by highlighting the more attractive and worthwhile features.

Section 3. Lighting objectives: specific

8 General traffic

The lighting provisions for the general traffic situations within urban centres are given in table 1.

9 Arcaded and canopied areas

The lighting of arcades and canopied areas should be to a relatively high level to match that of the adjacent shop windows etc. Good colour rendering light sources should be used.

The lighting provisions for arcaded and canopied areas are given in table 2.

10 Subways, footbridges, stairways and ramps

Subways, footbridges, stairways and ramps should all be lit to a higher level than their surroundings (see table 3). In subways it is important that vertical surfaces are well illuminated and the lighting engineer should request that all surfaces are as light coloured as is practicable.

The lighting engineer when consulted in the design stages will determine the location of the chosen luminaires relative to their performance to enable the electrical intake cabinets and wiring conduits to be moulded into the construction.

In the event of an already constructed subway the design of the lighting and the type of luminaires and cable conduits should be such as to minimize abuse. Recessed ceiling fittings do not light the ceiling adequately, giving the impression of a reduction in height.

Surface-mounted luminaires are vulnerable to vandalism. Unless used in sufficient numbers, bulkhead fittings produce poor lighting due to the inadequate space to height ratio. Good lighting can be produced using cornice-mounted luminaires in continuous runs with panel infills, behind which all circuit wiring conduits can be fixed. This system gives a high degree of protection to the lighting installation except against abuse to the diffuser.

Lamp colour and colour rendering are both important factors to be considered. In general, tubular fluorescent lamps will fulfil these needs.

On long and complex subways the lighting should be operational over a 24 h period. It is recommended that the installation be designed to give higher levels during daylight hours which can be switched to lower levels of illuminance during the hours of darkness. Switching can be carried out by either time switch or photocell.

During the daytime the brighter surroundings of a subway entrance area, relative to a low level of subway interior lighting, can create a 'black hole' effect. At night a reversal of this effect can be experienced when emerging from the subway into lower levels of exterior lighting. In order to overcome this undesirable situation during the daytime the entry area of the subway should be provided with extra threshold zone lighting (see note 3 to table 3). At night the threshold zone lighting values should be reduced, with exterior approaches to the subway provided with good levels of light.

For footbridges and stairways it is important that the 'risers' are illuminated differently to the 'treads' so as to accentuate the steps even if the difference is highlighted by the use of different materials.

On footbridges care should be taken to install the lighting units in such a manner as to complement the structure but with due consideration given to future maintenance.

Important note

On longer complex subways, emergency lighting, to BS 5266 should be considered, lasting for a minimum duration of 1 h. Self-maintained units are recommended.

If the area forms part of an escape route from a shopping centre, car park or transport interchange it is essential that emergency lighting is installed.