

Site Security Briefing Note

External security lighting



INTRODUCTION

Security lighting switched on throughout the hours of darkness is an important component of security at many commercial premises but one which, to be truly effective, will usually also embrace use of appropriate physical barriers to unauthorised entry and a degree of site supervision – all as part of a total security package.

This lighting should ideally provide a high level of illumination of the:

- site perimeter
- buildings enclosed within the perimeter
- areas between the perimeter and enclosed buildings

As a general principle, the system should expose the intruder but conceal any observer(s). Its purpose in most cases is chiefly to:

- deter intruders and vandals by making them feel exposed
- aid early detection of intruders and vandals, their identification and subsequent apprehension
- protect security staff from surprise attack
- discourage pilfering by employees
- support any installed CCTV during hours of darkness



Image: Thinkstock

Areas left in shadow will assist criminals

Following a carefully considered risk assessment, an Operational Requirement (OR) should be drawn up that takes account of the identified security issues. Guidance on the preparation of an OR is published by the Centre for the Protection of National Infrastructure (CPNI), and can be found on their website. The advice of a security lighting professional obtained at the outset is likely to improve the chances of a positive and cost-effective outcome.

When planning for security lighting, the potential nuisance to nearby residents and road users must be considered in order to avoid changes, which may become necessary due to inadequate consultation or legislation such as the Clean Neighbourhoods and Environment Act 2005. An expert assessment is often essential.

Incomplete perimeter lighting will result in gaps, providing an opportunity for unauthorised and undetected entry so:

- lights should be correctly positioned and give maximum visibility
- the level of illumination (lighting intensity) should be as uniform as possible, eliminating areas of shadow in which an intruder could take refuge - the evenness of the light is more important than the absolute light level

Note: Coverage from any adjacent street lighting should not be relied upon as part of a security lighting scheme because its operation and maintenance cannot be controlled



Image: Thinkstock

Consider arboreal growth at the planning stage

- light fittings and supports/standards should be vandal resistant, with lighting units (luminaires) mounted as high as practicably possible, preferably five metres or more above ground level, and power lines buried underground where feasible
- consideration should be given to providing standby capacity through the use of multiple fittings or specifying the minimum level of illumination (in lux) for the installation with one lamp failed
- back-up emergency power — generators and batteries — must be considered, particularly for high level security or especially vulnerable premises
- a programme of regular inspection and maintenance, ensuring timely replacement of lamps and cleaning of luminaires, is essential — lamp types vary in their rate of output decline through ageing, soiling etc

Where premises have no site perimeter barriers and are adjacent to the public highway, it may be necessary to illuminate (independent of any street lighting) secluded building exits, such as deep set doorways, which open directly to the thoroughfare.

LOCATIONS OF LIGHTING

Security lighting is used in many locations, the examples below being typical.

Perimeter — flood lamps mounted high up on buildings can illuminate large stretches of the site boundary or can otherwise be used on commercial street standards or lighting columns mounted at intervals throughout the length of a boundary. In doing so consider:

- lamp standards or columns should be positioned at least 2 metres from the perimeter barrier to reduce the risk of their being climbed to overcome the perimeter defences
- if the perimeter barrier is opaque, i.e. is a solid fence or wall, both sides should ideally be illuminated, remembering that high reflectance chain link fencing or similar (although not 'solid') can create a visual barrier through reflectance of light
- low mounted luminaires (between 0.5 m/1.5 m high) facing outwards (glare lighting) can illuminate not only the fence but also the 'surveyed field' beyond with the added benefit of intimidating and dazzling anyone



Perimeter lighting on 8m columns



Glare lighting

Images: Centre for the Protection of National Infrastructure www.cpni.gov.uk

approaching, subject to the potentially serious light pollution issue

- ‘topping up’ lighting refers to the use of additional lamps to cover gaps in perimeter lighting

Security gatehouses and weighbridge offices

These should have ‘low intensity’ interior lighting compared to well lit exteriors, so that the vision of the occupants is well adapted to the brighter conditions outside, whilst their presence and activity cannot easily be observed by potential intruders. The lighting outside the gatehouse should be adequate to strongly illuminate vehicles of all shapes and sizes that could conceivably pass in front of the observers.

Area lighting between a site perimeter and enclosed buildings

— flood lamps mounted overhead between 5m/12m high to uniformly illuminate specific spaces such as service roads, external storage or vehicle parks.

Main buildings enclosed within a site perimeter

— the sides, windows and all doorways should be illuminated by the perimeter or area lighting, or by a combination of both. Lighting thrown onto the surface of buildings from fittings at low level can elongate the shadows of anyone approaching, increasing detectability, especially if the buildings have a light finish. Similarly, large shadows can be cast across the ground from low level lighting at the perimeter. Supplementary lights, e.g. mounted over doorways, may be necessary.

LAMPS

In an average year in the UK, there are some 4000 hours of darkness, during which security lights will need to be switched on. To account for changes in the weather, which may affect the level of daylight, as well as the expected day to day seasonal changes, a photo electric cell control switch is recommended, providing dusk to dawn lighting.

Note: Time switches can be used but need seasonal adjustment, and their settings can be altered by interruptions in mains power supply during daylight hours - which may go unnoticed.

The ideal security lamp should:

- provide rapid illumination when switched on and have a short ‘restrike’ and ‘run up’ time (time taken to return to full operation after a power outage)
- have a ‘burn’ life of at least 10,000 hours with low levels of output depreciation over its expected life
- be efficient and economical in energy consumption
- be available in a wide range of sizes to meet user requirements
- offer a high standard of colour rendering, i.e. results as close as possible to the true colours of daylight (a critical factor where colour CCTV cameras are used)

Lamps are available to meet the majority, if not all of these criteria, so for most users it is energy consumption that is a key factor when choosing a lamp type.

The following are the lamp type technologies most often selected for area lighting in security applications. The running and ongoing maintenance costs of these High Intensity Discharge (HID) and LED lamps is superior to previous technologies, with further improvements expected:

High pressure sodium (SON)

The popular choice until a few years ago, as they have a short restrike time (within one minute), are economical and have a long life. ‘White’ SON types exhibit good colour rendering, but other types are poor (light can have an orange tinge).

Metal halide (MBI)

Economical, good colour rendering and long life, may have a restrike time of 4/5 minutes, and if so, this needs to be taken into account e.g. when used with CCTV.

Note: High Intensity Discharge (HID) lamps, e.g. SON and MBI, operate at high internal temperature (up to 1300°C) and pressure (up to 6 bar) and the consequences of a catastrophic failure can be serious, particularly should hot fragments of a failed bulb/fitting fall on personnel or combustible property. The precautions outlined in RISC Authority document RC37 should be taken into account.

Light emitting diode (LED)

The current state of the art technology of choice, with very good longevity (e.g. at least 25,000 hours), low power, instant start and potentially good colour rendering (check suitability for CCTV). Likely to take the form of a dedicated LED luminaire where the light source is non-replaceable.

The following are also used for security lighting, but are not recommended for the reasons given:

Low pressure sodium (SOX)

This is the type with the most favourable running costs, widely used before being overtaken by the superior discharge lamps of the present day. It suffers from easily the worst colour rendering, bathing everything in an unpleasant orange light, creating scene recognition difficulties for the human eye and colour CCTV camera alike.

Incandescent filament lamps

With the phasing out of conventional incandescent light bulbs, these effectively now consist of tungsten halogen lamps. Although superior to the familiar light bulb, with the benefit of instant starting and good colour rendering, they remain expensive to run and maintain, making them unsuitable except in very selective locations, e.g. in the role of the light source for a mass produced PIR sensor-triggered courtesy light - a product of very limited use in a serious commercial security lighting system.

Additional Reading/documentation:

- CPNI: Guide to producing Operational Requirements for Security Measures
- CPNI: Security lighting-Guidance for security managers
- Police Crime Prevention Initiatives Ltd/ Secured by Design: Lighting against crime
- BS 5489-1: Code of practice for the design of road lighting. Lighting of roads and public amenity areas

For more information see RISC Authority guides:

RC37: Recommendations for the control of fire hazards arising from electrical lighting in commercial and industrial premises

BDM10 code of practice for the protection of empty buildings – Fire safety and security

S10 Guidance for the protection of premises against attacks using vehicles (ram raids)

S20 Essential principles for the protection of property

S21 Measures for the control of metal theft

S23 Guidance for specifiers of CCTV in security applications

S29 Guide to electronic access control systems

S30 Terrorism-sources of guidance and support

S31: Unauthorised occupation of non-residential premises – guide to managing the risk

Site Security Briefing Note: fences, walls and gates

Site Security Briefing Note: site layout

Site Security Briefing Note: electronic detection systems

Site Security Briefing Note: manned guarding

Acknowledgements

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Notes

Notes



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