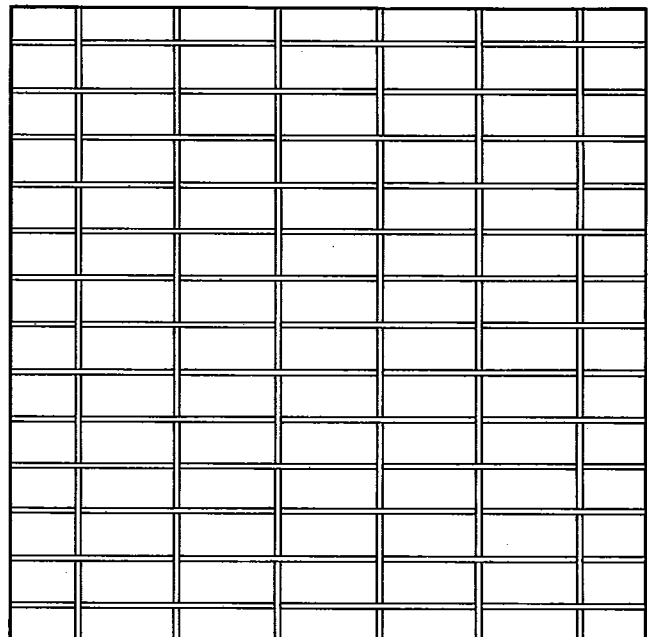
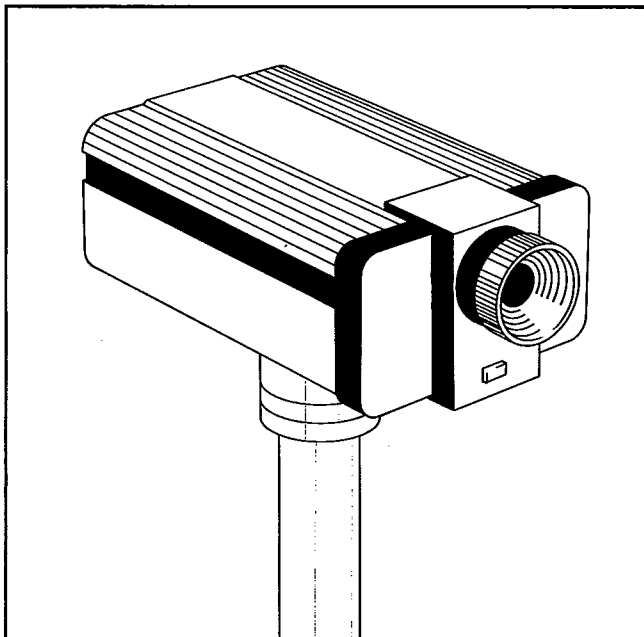
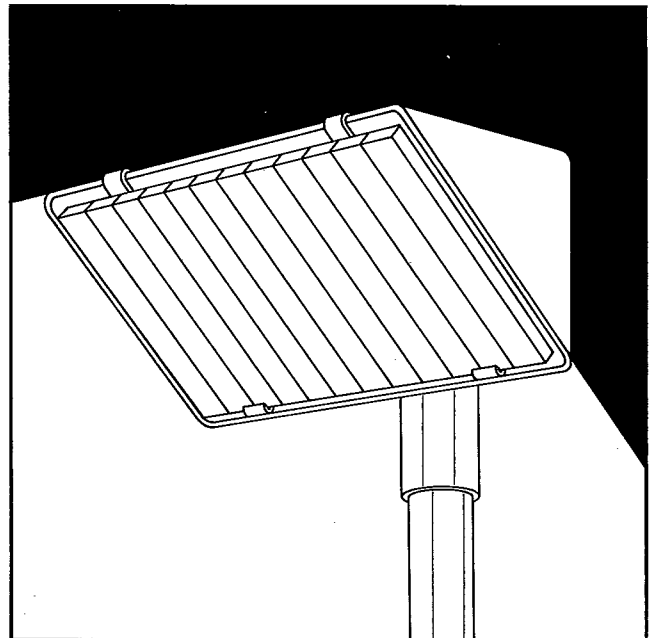
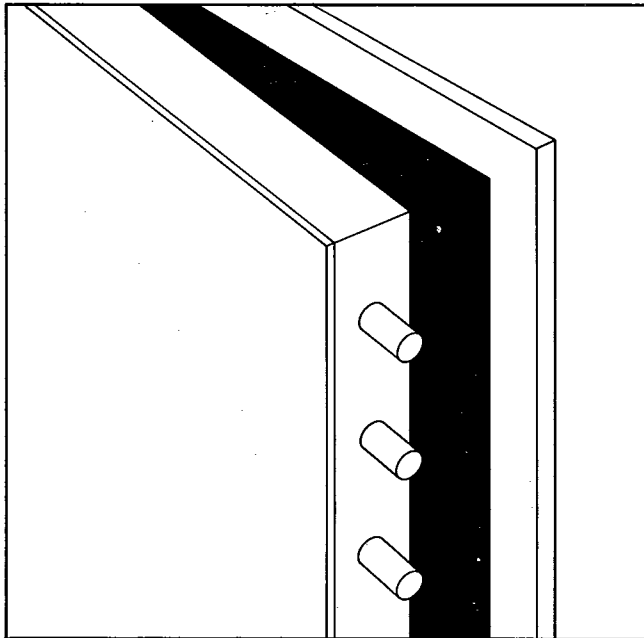




British Standard Guide for

Security of buildings against crime

Part 2. Offices and shops



British Standards Institution

Foreword

This Part of BS 8220, prepared under the direction of the Basic Data and Performance Criteria for Civil Engineering and Building Structures Standards Committee, is concerned with the security of offices and shops. BS 8220 : Part 1 is concerned with dwellings. Further Parts will be issued in due course.

The standard has been prepared so that it can be used by architects, builders, designers, managers, manufacturers, owners, occupiers, and specialists.

The security of both new and existing offices and shops is covered in this Part of BS 8220.

The guide is being prepared at the request of the Home Office.

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

Guide de la protection des bâtiments contre les cambriolages
Partie 2. Bureaux et boutiques

Leitfaden zum Schutz von Gebäuden gegen Einbruch
Teil 2. Büros und Geschäftsräume

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0 Introduction

0.1 General

The word 'security' in this guide refers to measures aimed at reducing the opportunity for crime and making crime more difficult to commit.

This Part of BS 8220 is concerned with measures that can be taken to reduce the number of burglaries and other crimes in offices and shops. Such actions should reduce losses and other consequences of crime. The burden on the police and law courts will also be reduced.

Many burglaries and other crimes relating to offices and shops are committed by persons who have been given easy opportunities to commit them. The most basic levels of security can deter such persons and are likely to delay even determined intruders.

Often there will be no single clear cut answer to a security problem, because many of the factors involved in the assessment of the risk are themselves known imprecisely. Constraints on security are discussed in 1.6.

0.2 Expert advice

The guide should not be regarded as a substitute for expert advice. The intention is that it should complement it. In many places in the guide, readers are specifically advised to consult experts.

Every Police force has officers who specialize in crime prevention work and who will advise designers, owners and occupiers. They welcome liaison with architects and planners on the security aspects of building design.

Insurers and security consultants will offer advice concerning the assessment of 'risk' inherent in particular properties. Most insurance companies employ security surveyors to advise their clients or their representatives on crime prevention measures, and will welcome early liaison, preferably at the planning stage.

Manufacturers, locksmiths, hardware suppliers, builders and trade organizations have important contributions to make in their particular fields.

Advice can be obtained from the Fire Prevention Officer of the local Fire Authority when fire protection is involved as well as security.

It needs to be recognized that there may be conflict between the need for buildings to be made secure against intruders and the need for people to have access to public buildings.

Specialist organizations* are available for advice at the design stage on fittings that can be operated by disabled people without undue difficulty.

* Centre on Environment for the Handicapped, 35 Great Smith Street, London SW1P 3BJ. Disabled Living Foundation, 380-384 Harrow Road, London W9 2HU.

Section one. General guidance

1.1 Scope

This Part of BS 8220 contains guidance on security measures aimed at reducing crime, in particular burglary, theft and criminal damage by fire, in offices and shops. It contains guidance for architects, builders, designers, managers, manufacturers, owners, occupiers and specialists.

General guidance, including a recommended strategy for combating burglary, theft and criminal damage by fire, and a consideration of constraints upon security, is given in section one.

Management and general design aspects are covered in sections two and three. Guidance is given on the securing of windows (section four), external doors, doorways and access control (section five), and other potentially vulnerable places and features (section seven) which can be exploited for unauthorized entry to premises. The associated matter of glazing (section six) is also covered.

The use of intruder alarm systems, closed circuit television and security lighting, is covered in sections eight and ten.

High risk areas and activities are dealt with in section nine, which contains guidance concerning cash handling and cash offices, strongrooms, safes and information theft.

Appendices A to L inclusive have been specially written for owners, occupiers and managers, to enable them to appraise quickly whether their existing or proposed security arrangements are satisfactory.

NOTE 1. Because of their special security needs, banks, building societies, jewellery shops, post offices and post office buildings are not covered by this standard.

NOTE 2. The titles of the publications referred to in this standard are listed on the inside back cover.

1.2 Definitions

For the purposes of this Part of BS 8220 the definitions given in BS 6100 apply, together with the following.

final exit. Exit used by the last person to leave a premises and which therefore needs to be locked from the outside.

NOTE. The above definition should not be confused with the meaning of the expression when it is used in connection with means of escape. 'Final exit' is defined in the Home Office/Scottish Home and Health Department *Draft Guide to Fire Precautions in Existing Residential Care Premises*[†] as 'terminal point of an escape route to an open space beyond which persons are no longer in danger from fire and can disperse in safety'.

1.3 Opportunities for burglary, theft and fire raising

1.3.1 Burglary

1.3.1.1 General. Burglars are interested in premises believed to contain valuables that can be quickly disposed of for gain.

Burglary from offices and shops occurs mainly at night and tends to fall into two groups.

- (a) High risk premises are likely to receive the attentions of well organized and determined professional criminals

who undertake premeditated attacks, e.g. stealing in bulk, stealing high value goods or stealing equipment, information or data.

- (b) Lesser value burglaries committed by opportunists who are able to exploit weaknesses in security precautions. Opportunist burglaries occur more frequently than organized burglaries.

1.3.1.2 Entry points. External doors, accessible windows, storage areas, goods reception and despatch areas that are out of sight at the rear of offices and shops are especially vulnerable. Ground floor windows and windows accessible from balconies, walkways and roofs are more vulnerable than upper level windows that are beyond normal reach.

Openable windows and doors are used as entry points.

Burglars endeavour to gain quick entry with the minimum of effort and noise.

Some of the methods used by burglars to enter buildings are:

- (a) through windows or doors that have been left open or unlocked;
- (b) by gaining access to window fastenings and door latches by breaking adjacent glazed panels;
- (c) by forcing doors that are insufficiently strong to resist attack;
- (d) by forcing weak locks;
- (e) by overcoming night latches;
- (f) by levering doors and windows open;
- (g) through roofs.

Weaknesses in display window security can also be used for gaining entry or for smash and grab raids.

Garage areas and vehicle compounds are often subject to vandalism and can provide opportunities for theft of and from cars.

1.3.2 Theft

Thieves take advantage of the display of goods in shops and will often utilize the cover provided by crowds. High value, portable and easily disposable goods can prove particularly attractive when security arrangements are lax.

Theft of the belongings of office and shop staff is more likely to occur when the staff are not provided with facilities for keeping them secure.

1.3.3 Criminal damage by fire

Many major fires are started by intruders. Most frequently these are the result of a deliberate act.

The potential financial and consequential cost of such a fire can be disastrous to a business. In the context of this guide the many different motives of fire raisers are not important. What is important to an intruder is the ease of access and the availability of materials with or in which a fire can be started.

Security against entry to buildings may not wholly eliminate the risk of fire raising. Access to the perimeter may permit the starting of fires by the introduction of

[†] Available from HMSO.

means of ignition through openings such as broken windows and letter boxes, whilst fires started externally may also penetrate a building.

All offices and shops are potentially at risk to the fire raiser. As with other property, those at greatest risk are isolated or often unattended premises or those with little or no physical security.

Gaps beneath doors either should be as small as possible or should be sealed where practicable. Letter boxes should be provided with sheet metal receptacles on the inside.

Hazardous goods such as flammable liquids and gas cylinders should be kept to the minimum necessary, e.g. for sales display in shops. Further stocks of such materials should be locked in special stores, particularly outside working hours. A high standard of housekeeping can frustrate a fire raiser's attempts to cause a rapidly developing fire and can restrict fire spread and consequent damage.

The risk of an external fire, (involving, for example, combustible waste) spreading into the building should not be overlooked.

1.3.4 Existing security measures

A detailed assessment of existing premises may reveal that existing physical security measures are adequate but that they are not being used or are being used incorrectly.

1.4 Strategy

The overall strategy for combating burglary, theft and fire raising in offices and shops should cover situations which obtain when premises are open for business and when they are closed. The basic strategy should encompass the following:

- (a) limiting as far as practicable the number of external doors, accessible windows and other possible points of entry;
- (b) ensuring, where possible, that potential intruders cannot gain entry to premises unseen;
- (c) providing lighting, to make it difficult for intruders to operate unobserved;
- (d) providing and maintaining adequate security devices on external doors, windows and other possible points of entry;
- (e) controlling access to offices and parts of shops not intended to be used by customers during business hours;
- (f) planning the interior layout of offices and shops so as to minimize losses due to theft;
- (g) being on the alert for customer and staff theft;
- (h) employing security staff, when appropriate;
- (i) keeping records and marking goods with company/shop identity, to help the police identify valuable items should they be stolen;
- (j) reducing the possibility of fire being introduced;
- (k) denying the potential fire raiser fuel.

1.5 Assessment of security needs in relation to potential risk

The degree of security needed for a particular office or shop will depend on the potential risk.

In arriving at an assessment the following matters will need to be considered:

- (a) type of business;
- (b) attractiveness to both professional and opportunist criminals of goods, cash and possibly confidential documents kept on the premises (valuable and portable items, and items that can be easily disposed of are particularly attractive);
- (c) potential routes for removal of stolen goods (these may not be the same as the possible entry route(s));
- (d) ease of access from streets, open areas, adjacent roofs, floors above and below the premises concerned if under separate occupancy, and from adjoining premises;
- (e) degree of inherent security of the premises in relation to its construction;
- (f) vulnerability relative to local trends in crime;
- (g) surveillance provided either by normal public activity and routine Police patrolling of the area or by security patrolling of the premises or its surroundings.

1.6 Fire/emergency and other constraints on security

1.6.1 General

An assessment of security risk will rely heavily upon practical experience and should not jeopardize the functional occupation of the premises. It should also take account of the need to ensure that security arrangements do not negate any facilities, or procedures, associated with fire and emergency precautions, particularly means of escape in case of fire. Such facilities and procedures may be required under a number of statutory provisions, such as those covering fire precautions, town and country planning, building regulations, petroleum licensing, and storage of liquefied petroleum gas.

Particular care may need to be taken to ensure that any fire precautionary requirements in respect of basement car parks, service areas, loading bays and refuse holding facilities are not prejudiced.

It should be remembered that Section 2 of the Health and Safety at Work (Etc) Act 1974 places a general duty on every employer to ensure the health, safety and welfare at work of all employees.

Steps should be taken to ensure that all relevant enforcing authorities are consulted before any alterations are made to the structure or layout of the premises or to procedural arrangements. In considering the effect on fire precautions, reliance upon practical experience alone is unlikely to

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Section one

be satisfactory and it is important to consult the local Fire Authority. Generally acceptable standards of fire precautions may be found in BS 5588 : Parts 2 and 3 and in the Home Office *Guide to the Fire Precautions Act 1971 No 3 – Offices and Shops**, but the interpretation and specific application should be confirmed before proceeding with additional security arrangements.

1.6.2 Constraints related to fire

Within office and shop premises it is generally not acceptable for doors that afford a means of escape in case of fire to be locked, or fastened, in such a manner that occupants will need to use keys to open them. Any exception to this general principle needs to be approved by the local Fire Authority. Failure to do so can result in prosecution. There may also be instances when similar approval should be sought from the Health and Safety Executive, the local authority, or the licensing justices.

When assessing security provisions it is advisable to consider fastenings that do not need keys when the premises will be occupied. It may however be acceptable to the appropriate authority for these fastenings to be supplemented by key operated locks for additional security during periods of non-occupation, but there should be a reliable procedure

for ensuring that such locks are inoperative during hours of occupation, including those of cleaners, security staff and maintenance staff.

Security fastenings and hardware can also raise a problem when used in conjunction with fire resisting doors. Any devices that necessitate the cutting away of any part of a door may reduce the fire resistance to an unacceptable extent. Detailed advice on this matter is available from the Fire Prevention Officer of the local Fire Authority. It should be noted that there may be constraints derived from conditions of planning consent and also that there are requirements relating to fire doors, to satisfy the Building Regulations. None of these conditions should be breached without prior approval of the local authority concerned. Requirements relating to fire are also contained within other statutes and it may be necessary to consult other enforcing authorities before commencing any alterations to fire exit routes or fire protecting structures, including doors.

It should also be borne in mind that security measures which restrict access to the Fire Brigade are likely, in the event of fire, to result in greater fire damage to a building and its contents by delaying the fire fighting attack at its most crucial stage.

* Available from HMSO.

Section two. Management aspects of security

2.1 General

The responsibility for the security of office or shop premises against crime, of necessity involves senior management. Only at that level is it possible to deal adequately with the size and complexity of the problem and to cater for the possible involvement of virtually every employee or caller.

Most often there is no single and easy answer to the management aspects of security, although almost invariably it will be possible to determine basic principles with which managers, supervisors and employees should conform. Full use should be made of advice from security consultants.

Security arrangements will be affected during business hours by the parts of the building that are intended to be open to callers or shoppers and by those parts to which it is necessary to have limited and regulated access.

2.2 Using the guide to improve security

Appendices A to L pose a number of questions that will enable managers to appraise quickly whether existing or proposed security arrangements are satisfactory.

The actions, if any, needed after reading these appendices will mostly either:

- (a) be self evident; and/or
- (b) be clear after reading other appropriate Section(s) of the guide; and/or
- (c) need consideration with experts such as the Crime Prevention Officer of the local Police, the Fire Prevention Officer of the local Fire Authority, insurers, security consultants, architects, builders, manufacturers and suppliers. Consultation with other occupiers or occupiers of adjacent buildings may also be desirable and/or necessary, e.g. consideration may need to be given in shopping centres and office complexes to a precinct security service.

Section three. Design

3.1 General

3.1.1 Application of security principles at design stage

It is essential that the application of security principles should be considered at the building design stage, as the subsequent alteration of any building to improve security could not only prove more expensive but could also disrupt the primary function of the premises concerned.

A clear and uncluttered design for both the exterior and interior of a building site can assist security surveillance, especially when coupled with good natural and artificial lighting.

3.1.2 Building function

The functions of buildings can vary, both in size and use, and the security threat assessment should be carefully balanced with these factors. Advice on these matters is readily available from the Crime Prevention Officer of the local Police.

3.1.3 Environment

The specific location and the general environment will provide vital details for the base plan, which should also include changing environmental factors, e.g. local sporting fixtures and the potential for inner city violence.

3.1.4 Perimeter of premises

Good physical security to the outer perimeter of building sites is important, using natural physical assets wherever possible.

The security of doors, windows and other service openings in the perimeter and roof areas of buildings is also of vital importance.

The physical security of entrances and exits and other facilities within the building itself will obviously be influenced by the main function of the premises, but ideally they should reflect and complement the outer security system.

3.1.5 Use of proven security materials and equipment

The use of proven security materials and equipment should always be considered and should complement a basic security plan.

3.1.6 Vulnerable areas of buildings

The more vulnerable areas of buildings, such as strongrooms, stock rooms, cash offices, computer suites and record stores, will need special consideration, and ideally should be positioned inside the protection of inner and outer security zones. They may need more sophisticated protection materials and equipment and these special features should be integrated in the overall security plan.

3.1.7 Detailed design factors for different types of premises

It is not possible in this guide to give detailed custom design factors for each kind of premises but the guidelines, in check-point and listed form, in 3.2, 3.3 and 3.4, should form a foundation on which security can be built into the

design of offices and shops (which can include kiosks, corner and terrace shops, semi-detached and detached shops, supermarkets, department stores and the relatively new development of shops forming parts of purpose designed shopping precincts). Obviously allowance will have to be made for the specific trade of a shop and the methods of trading, and for the nature of business carried out in an office.

3.2 Pre-design

Consideration should be given to:

- (a) the extent to which the selection of the location of premises will be pre-determined by other considerations, and the extent to which the selection of a site can be influenced by security factors;
- (b) the extent to which security provisions will be influenced by a proposed location, taking account of:
 - (1) isolation of the premises if rural;
 - (2) kinds of crime that may occur if the premises will be in inner city areas;
 - (3) any special considerations, e.g. if the premises will be in a suburban area;
- (c) existing or potential levels of crime locally, e.g. burglary, theft, rowdyism, vandalism, extensive graffiti and other criminal damage;
- (d) proximity to areas of public gathering, e.g. football grounds, licensed premises, dance halls, playgrounds and housing estates;
- (e) the extent to which security problems may be influenced by the weather, the season or seasonal factors such as an influx of tourists;
- (f) the possibility of gaining additional security by natural features provided, for example, by rivers, streams and broken ground;
- (g) advantages that can be obtained from proximity of constantly manned premises, such as police, fire and ambulance stations or from existing security perimeters of well maintained premises with high walls or fences;
- (h) benefits that can be obtained from existing street lighting;
- (i) levels of security that owners and occupiers of other premises in the district apply to their properties;
- (j) surveillance factors, e.g. the extent to which a property can be seen from other properties.

Advice and assistance on these matters are available from a number of sources: the Crime Prevention Officer of the local Police (some areas also have Police Architect Liaison Officers), Chambers of Commerce, Local Planning Authorities, local professional bodies, trade organizations and insurers. All such bodies can help to supplement personal observations.

3.3 Design: external and structural features

3.3.1 General

The perimeter of all building types should be secure and robust, and due regard should be given to the standard of security, use and structure of adjoining buildings and of any shared facilities.

Particular attention should be paid to the security of exposed entrances, exits and roofs.

3.3.2 Shopping complexes

In deciding the level of security of an individual unit within a shopping complex, it should be considered whether the complex will be closed to the public outside normal working hours. Generally speaking a complex which is closed will be more secure and will need a lower level of security than would otherwise be necessary.

3.3.3 Approach/entrance

The location and type of entrance should be balanced between customer and staff convenience and the need for good security. Clear directional signing, well maintained control facilities (manual, mechanical or electronic), efficient lighting and unobstructed sight lines will assist, where appropriate.

3.3.4 Shared facility

The security of premises needs to take account of the security on any shared entrance or exit. Mutually agreed security arrangements for common roads and common services should be made where appropriate.

3.3.5 Service roads

Good lighting, provision of surveillance facilities where required, clear road marking and other informative signs, will improve supervision of traffic.

Whenever possible it is advantageous for goods vehicles to use roads separate from those used by private cars.

3.3.6 Bus stops and waiting areas

The proximity of bus stops and waiting areas near perimeter walls or entrances or exits may result in a need for additional security measures.

3.3.7 Car parks

Car parking facilities are now an essential part of office and shop developments.

Each type of car park (ground level, multi-storey or basement) presents particular problems of security which can be minimized by good access control and supervision. The aim should be for efficient exterior (vandal resistant) lighting, clear and well sited directional and 'conditions of use' signs with designated areas for private, service and goods vehicles, and clear access for emergency facilities. Where appropriate, zones should be allocated for cycles, perambulators, trolleys, etc.

Surveillance can be improved by closed circuit television (CCTV, see section eight).

Surveillance can also be provided by allowing an accredited company, e.g. a 24 hour taxi service, to make use of the car park.

See also appendix F.

3.3.8 Admission and despatch of goods

Areas for admission and despatch of goods can be especially vulnerable if not designed with security in mind. This subject is dealt with in detail in 5.2.5.

3.3.9 Essential service facilities (see also section seven)

Designers should consider the potential for unauthorized entry using facilities for essential services, e.g. goods lifts, fuel delivery points, ventilation ducts and conveyor openings. Where possible such services should be concealed and/or be located in locked compartments.

Provision should be made for the security of exposed mains and emergency utilities, e.g. generators and telephone ducting.

3.3.10 Construction and fabric of building

The use of robust construction and materials, e.g. those resistant to manual attack and damage, is essential to the initial provision of security.

Many such materials are resistant to the activities of vandals.

3.3.11 Basic design features

A clear unobstructed building line and facings have obvious security advantages. Unnecessary ledges, parapets, indentations, protrusions and sills can provide means of unlawful access.

External pipes should be flush or concealed.

3.3.12 Roofs

Proper planning of roof areas can contribute greatly to security. Sound construction and good materials are essential.

Particular care needs to be given to skylights, access windows and doors, especially when they are out of sight. Strategic exterior lighting coupled with CCTV, and good physical security of roof approaches including adjoining roofs and ceiling voids, should be considered.

The subject of access through roofs is covered in 7.1.

3.3.13 Accessible windows

As far as other considerations will allow, the number of windows that are accessible to intruders should be kept to a minimum.

Matters that need to be considered from a security stand point are:

- (a) size and shape;
- (b) choice of frames;
- (c) method of opening;
- (d) types of locks and fastenings for openable windows;
- (e) advantages that can be obtained from the use of fixed windows where other considerations allow;
- (f) additional security provided by bars and grilles, especially for display windows.

Windows are dealt with in detail in section four.

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3.3.14 External doors

External doors are often the focus of criminal attention.

Points that need to be considered are:

- (a) siting;
- (b) keeping the number of entrances/exits to a minimum;
- (c) design and strength of doors and frames;
- (d) choice of glazed panels;
- (e) type of wood, glass or metal;
- (f) mandatory requirements regarding fire exits;
- (g) type of final exit door;
- (h) strengthening obtainable with metal cladding;
- (i) restrictions on fastening emergency exit doors.

Doors are dealt with in detail in section five.

3.3.15 Glass and glazing

Factors affecting security are:

- (a) type;
- (b) thickness;
- (c) strength;
- (d) fixing to frame;
- (e) double glazing;

Glass and glazing are dealt with in detail in section six.

3.3.16 Locks and other security hardware

It is essential that locks are properly selected so that they play their full part in combating security risks.

Locks for windows are dealt with in 4.4. Locks for external doors are dealt with in 5.5, 5.7 and 5.8. These clauses contain extensive details on types, designs and recommended use of locks and other security hardware.

3.4 Internal design

3.4.1 Reception areas

Whilst there may be commercial reasons to make the reception areas of shops and offices open and inviting, it is in such areas that a clear message can be given to customers and/or visitors that a controlled system of security exists.

Reception desks should be well sited to provide the best vision for staff.

Controlled access can be provided by revolving doors or metal swing barriers, necessitating consultation with and the approval of the local Fire Authority. Entrance alarms ranging from simple door activation to sophisticated CCTV monitoring should complement good administrative procedures of security.

Good lighting and clear security notices are also advisable.

Access control for reception areas is dealt with in 5.1.4.

3.4.2 Display area

In this area there is often a conflict between good security and commercial considerations. Designers and planners can assist in reducing security problems by providing good lighting, clear sight lines between displays and by avoiding blind corners. Security surveillance is essential and this can

range from simple two-way mirrors to extensive CCTV cover.

Proper securing facilities should be provided for the more valuable goods and office equipment, either by wall or floor attachments, or security cabinets.

3.4.3 Counter, till, checkout areas

Design should provide for good control of checkout/payment areas of shops. Provision should be made for the security of tills and takings by providing floor safes, cash chutes and till guards.

Additional security can be provided, where needed, by CCTV surveillance and emergency signalling systems.

3.4.4 Cash offices and strongrooms

The provision of an inner security area for cash and other valuables can be a vital necessity.

Design considerations should include such matters as:

- (a) assessing the threat;
- (b) deciding the ideal site within the building;
- (c) use of the best construction and materials for walls, floors and roofs;
- (d) providing adequate resistance to water and fire damage;
- (e) need for ventilation and emergency exits;
- (f) restricting unnecessary opening of doors, e.g. the provision of cash transfer units in walls or doors, and provision for external communication;
- (g) good two-way visibility;
- (h) provision of CCTV and alarm protection;
- (i) provision of protected internal lobby;
- (j) heavy duty doors and locks (manual or electronic);
- (k) suitable safes and fittings;
- (l) fire resistant cabinets;
- (m) security cupboards;
- (n) key control;
- (o) good staff procedures to ensure security vigilance, e.g. one person only to enter under supervision.

Cash offices are considered in 9.1. Strongrooms are considered in 9.2.

3.4.5 Inner stores for valuable items of stock or goods

Provision should be made where necessary for the safe storage of items of valuable stock or goods.

If a well ventilated secure room or inner warehouse is not available, consideration should be given to a wire mesh construction with a roof, or extending to the ceiling, protected by a lockable door. Metal or plastics seals are often used as an additional protection to such doors as well as good control of access to and issue of keys.

3.4.6 Staff room

Except in smaller shops and offices, staff should be provided with a room for their own use. This room should include facilities for lockable lockers for their private property. There should be a record of locker allocation and a system of key control.

3.4.7 Plant and other service areas and rooms

Design should include security aspects to prevent theft or accidental/deliberate damage to equipment, e.g. to freezer cabinets or cold room controls.

The areas should be designed in such a way that they can be kept clear and tidy to ensure good supervision and reduce fire hazard.

3.4.8 Telephones

The provision and siting of telephone facilities is vital to good security and should always be included in security plans.

3.4.9 Intruder alarm systems

Design should allow for the installation of appropriate intruder alarm systems as necessary.

Intruder alarms are dealt with in 8.2.

3.4.10 Fire alarms

Fire alarms have relevance for security as fires can be started with criminal intent.

The incorporation of automatic fire detectors into the fire alarm system will give an early warning of fire. If the alarm is automatically transmitted to the Fire Brigade the early response and fire fighting attack can reduce consequential damage.

3.4.11 Personal attack alarms

There may be a need for the installation of strategically placed personal attack alarms, for protection of staff working in places such as cash offices, or areas where there is cash or valuable stock.

3.4.12 Emergencies

Internal layouts should be such that well practised contingency plans for emergencies, e.g. fire, bomb threat, robbery and personal attack, can be quickly put into effect.

When different emergencies are likely to necessitate different actions by personnel, the means of giving the appropriate warnings or instructions should be sufficiently distinct to avoid confusion (see 8.2.2).

3.4.13 Public address system

In larger premises there may be a need for the installation of public address systems. One of the uses would be to warn people quickly of an emergency.

Section four. Windows

4.1 General

Section four is concerned with securing the three types of accessible windows used in offices and shops:

- (a) openable windows;
- (b) fixed windows;
- (c) display windows.

Security is considered in relation to the use of windows by intruders for entry purposes, mainly by gaining access to locks and fasteners, and also in the case of display windows for smash and grab raids.

Guidance is given in section four on:

- (1) the nature of security risks (see 4.2);
- (2) converting of openable windows to fixed windows (see 4.3);
- (3) window design (see 4.4);
- (4) window bars for openable and fixed windows and limited application display windows (see 4.5);
- (5) grilles and shutters for all types of windows, especially display windows (see 4.6);
- (6) locks and fastenings for openable windows (see 4.7);
- (7) ventilation (see 4.8).

Guidance is given in section six regarding appropriate glazing materials for all types of windows, especially display windows, and in section eight regarding alarm installations for all types of windows.

4.2 Security risks

The security risk to windows varies, depending on the type, use and location of the premises concerned and possibly the value of the merchandise within the premises.

Two types of risk for shops may need to be considered:

- (a) to the merchandise within the shop if entry can be gained through windows at ground level, particularly at the rear, or where there is access from decks or roofs to windows at upper floor levels, or to roof glazing;
- (b) to the merchandise in display windows which may be at risk from smash and grab raids.

Offices range from small low rise buildings to large high rise blocks. Regardless of the size of the building, the security that should be provided by the windows will in some cases be no greater than in domestic buildings (see BS 8220: Part 1). In other cases the risk of burglary may be considerably greater and the recommendations of this Part of BS 8220 should apply.

Air conditioned buildings usually have the advantage that all the windows are fixed lights except perhaps for the few that have to be openable in emergencies.

4.3 Converting openable windows to fixed windows

Areas of openable windows are sometimes larger than are necessary to provide adequate ventilation. In these circumstances some openable windows could be converted to fixed windows unless they are needed for other reasons, e.g. ventilation for comfort, emergency egress or access for external window cleaning.

The normal way of fixing openable windows for security purposes is to use screws through the frames. It may be advisable to obtain specialist advice before doing this, so as to avoid affecting other performance aspects of the window. For example the positioning of screws in thermal barrier aluminium alloy frames and in plastics frames can be critical.

4.4 Guidance on window design

4.4.1 General

Materials used for window frames include wood, steel, aluminium alloy and various forms of plastics*, sometimes in combination. The degree of security afforded by these materials is directly related to the design of a system of glazing and to the strength of the preformed sections.

The design strength of the formed sections for openable windows should be such that lockable security fastenings can be fitted securely.

Windows and their sub-frames should be securely fixed within the surrounding structure.

The use of externally exposed hinge or pivot fixing screws should be avoided. If they are used they should be of the non-removable type.

For window design related to the security of the glazing see 6.5.

4.4.2 Wood frames

The quality of timber used in frames and sub-frames should be in accordance with clauses 9 to 20 of BS 1186: Part 1: 1986. The species should be in accordance with appendix B of BS 1186: Part 1: 1986 (for softwood) or appendix C of BS 1186: Part 1: 1986 (for hardwood).

There are of course factors other than security that have to be taken into account when the species of timber for a window is selected, e.g. suitability for external and internal use, the possible need for the timber to be treated with preservative and its suitability for sills.

The quality of timber workmanship should comply at least with BS 1186: Part 2. The use of external exposed hinge or pivot fixing screws should be avoided.

* A British Standard for plastics windows is in preparation.

4.4.3 Steel windows

Steel windows should comply with BS 6510.

4.4.4 Aluminium alloy windows

Aluminium alloy windows should comply with BS 4873*.

4.4.5 Plastics windows

The problems associated with the use of plastics are no less relevant for window design than those associated with other types of window framing material, and the design of plastics frames for windows should therefore be assessed for security purposes as for any type of framing material.

The security of plastics windows also depends on the reliability of the fixings, e.g. the windows should be secured through at least two walls of the extruded sections.

4.4.6 Use of security glazing

Whether or not windows are openable, consideration should be given to the need for the prevention of entry or theft as a result of breakage of glass. When this is to be achieved by the use of security glazing, the frames should be adequately fixed to the structure, should be of adequate strength and should have glazing rebates of suitable size as recommended by the supplier or manufacturer of the glazing material. The glazing should be in accordance with BS 5357.

4.5 Window bars

4.5.1 General

Although windows are only considered to be means of escape in exceptional circumstances they can be of critical importance if for any reason normal escape routes become impassable.

Security bars protecting window openings present serious obstacles to means of escape. This has been evidenced by incidents in which multiple loss of life has occurred when people have been trapped behind barred windows or, at best, rescues have only been possible after protracted operations to cut bars from the outside.

Enforcement authorities are conscious of these potential problems and in accordance with established practice they may press for the removal of security bars when they are prejudicial to the personal safety of occupants.

Windows can also provide convenient means of access for fire fighting operations and in the context of property protection the relative potential losses from thieves and/or fire damage should be considered. Consultation with the local Fire Authority **before** installing window bars is, therefore, strongly recommended.

4.5.2 Basic recommendations

When window bars are to be used, the following items (a), (b) and (c) of this clause and the recommendations

of 4.5.3 to 4.5.4 should be recognized as the minimum recommendations for the upgrading of the level of security:

- (a) use of a solid high grade steel or of solid low carbon steel (mild steel) bars of nominal size not less than 19 mm diameter or cross-section (square section is stronger) at not more than 125 mm centres;
- (b) provision of nominal size 50 mm × 10 mm mild steel cross ties, at intervals of not more than 450 mm;
- (c) supplementing physical security with intruder alarm protection (see 8.2) which establishes that an attack on the window bars has taken place.

4.5.3 Fixing to the structure

4.5.3.1 Method 1. Where possible, bars should be fitted internally and should be set back not less than 50 mm from the internal surface of the wall. Each window bar should be grouted into the masonry at both ends, to a minimum depth of 75 mm. When bars are longer than 600 mm, cross ties should be provided and should be welded at the intersections or otherwise made immovable.

Alternatively, the cross ties may be fitted separately into the masonry to a depth of at least 75 mm at each end and should be welded at intersections.

4.5.3.2 Method 2. When it is not possible to sink the individual bars into the masonry, they should be threaded through the cross ties. The ragged, or fish-tail ends of the ties should then be fixed into the masonry at each end and the bars should be welded or otherwise secured at the intersections.

4.5.3.3 Method 3. This method involves the manufacture of the bars and cross ties as a complete unit with ends fixed as in method 1. The units should not be secured by screws or bolts into woodwork.

4.5.4 Fixing to wood window frames

When fixing into the masonry is not practical, bars should be welded to a cross member at each end which is drilled between each bar and secured to the woodwork with substantial coach bolts, fitted with nuts and burred over. The external heads of the bolts can be sunk below the surface of the frame and can be covered with filler. The strength of such a unit depends on the fixing of the frame to the structure.

4.5.5 Fixing to metal window frames

When fixing into the masonry is not practical, it is usually possible to secure bars to the window frames, but because of the variety of such frames in use, it is not possible to suggest a standard method of fixing. The strength of such an arrangement depends on the material and strength of the window framing and on the fixing of the window framing to the structure.

* Reference can also be made to the National Association of Shopfitters publication *Security of Aluminium Framed Doors used in Commercial Property*.

4.5.6 Fixing to plastics window frames

Window bars should not be fixed to plastics windows, whether or not they have metal reinforced frames.

4.5.7 Roof glazing

When a security risk is deemed to exist, the provision of roof glazing should be avoided if possible. When roof glazing exists or has to be installed, lantern lights, roof lights and dome lights should, where intruders may gain ready access to them, be fitted with bars in accordance with 4.5.3 so as to obtain a reasonable degree of security. Exterior fittings should be robustly constructed with metal plate coverings, clutch head type screws, or similar fittings.

4.6 Window grilles and shutters

4.6.1 Collapsible or removable grilles

Subject to planning consent, display windows can be protected by grilles of types that include collapsible grilles, expanded metal and welded mesh. The most suitable type of grille will depend on the nature of the premises concerned and on the type and value of the goods on display.

Tubular section bars are less secure than solid bars as they can be cut easily.

Grilles should preferably be fitted internally. When fitted externally care should be taken to ensure that they are adequately secured against easy removal.

Grille aperture sizes will depend, in the case of shops, on the type of goods displayed. The height of the grille should be selected taking into account factors that include the display height, level of external window sill, and steps or half gates at the shop entrance that can be used to reach over the grille.

In some premises it may be necessary to provide protection by removable grilles made from expanded metal or welded mesh of substantial gauge, fixed in a frame to suit the window size. Such grilles should be fitted internally, with washers and wing nuts, over the threaded ends of coach bolts permanently fixed through the window framing or building fabric, with the heads of the bolts sunk below the surface and covered with a filler.

Other fixing methods include the use of good quality close-shackle padlocks fastened through staples over which the grille is fitted, or by hinges on one side of the grille and securing by padlock(s) at the opening edge.

The strength of the framing is important. Grilles will generally be more effective against attack if they are contained in a substantial steel flat frame that protects the ends of the metal. It is not good practice to bend or loop unwelded heavy woven wire meshes in order to secure them to a metal rod frame, as the ends of the mesh can be opened sufficiently to allow access to the window. When metal rod frames are used it is suggested that the ends of the mesh should be spot welded to the frame.

4.6.2 Ornamental grilles

Ornamental grilles made of wrought iron or other metals can offer a measure of protection in addition to being decorative.

However the design of the grilles should not be such as to create possible footholds which would enable them to be used in a manner equivalent to using a vertical ladder.

4.6.3 Shutters

For the protection of display windows and open arcades in large urban areas, especially in city centres, external roller shutters may be considered appropriate.

Wood shutters fixed externally provide a good standard of security. They should be of plywood not less than 9 mm in thickness. Additional strength can be obtained by facing the plywood with sheet metal not less than 1.5 mm in thickness. Shutters should be secured by a cross bar and padlock.

NOTE. 1.5 mm sheet steel will add about 12.5 kg/m² to the weight of a shutter.

4.7 Window locks and fastenings for openable windows

4.7.1 General

When the security risk is not considered sufficient to justify the fitting of bars, grilles or shutters, or when these are inappropriate, protection can be provided against entry by breakage of glass to reach handles or other fittings of openable windows, by fitting lockable security fastenings to the opening windows. For these to be effective, the design and construction of the windows should conform with the recommendations of 4.4.

Locks and fastenings for hinged, pivoted and sliding windows will be familiar to all security specialists. Others may wish to refer to the illustrations shown in figures 1 to 7 of BS 8220 : Part 1 : 1986. For convenience the various types of locks and fastenings are listed in 4.7.5 and 4.7.6.

4.7.2 Specification of new or replacement windows

Openable windows for shops and offices are more likely to be purpose made than to be standard products. The number of openable windows should be restricted (see 4.3).

The need for key operated and/or multi-locking fittings should be considered at the constructional design stage or when windows are to be replaced, to reduce the possibility of frames having to be adapted to receive additional security items. The availability of such fittings should be checked with window suppliers.

4.7.3 Locks and fastenings for existing windows

Before considering the fitting of security locks a check should be made regarding the need for all the windows to be openable and whether it is more practical for some of them to be secured permanently shut (see also 4.3).

There is considerable variety of window locking devices available and selection can be difficult. They have to be suitable for the type of opening window and for the construction of the frame, and they can vary according to the frame material used or the design of the window. Locks are generally applied to the frames with wood screws or self tapping screws. In all cases care should be taken to ensure that the ends of screws do not contact glass when they are driven home fully.

As an alternative to fixing locks to supplement existing fittings, it may be more appropriate to replace the original fittings with lockable versions. Whether or not this is practical depends on the availability of suitable replacement types and the method of application of the original fittings, which may have been with screws, bolts and nuts, or rivets.

4.7.4 Common key and differ key locks

Some locks operate with a common key throughout their manufactured ranges, but since there is a variety of patterns of locks an intruder would need to carry many keys to be sure of being able to release a particular lock.

Other locks, which offer a limited number of 'differs' or key variations will present greater problems than common key locks to intruders who break glass to gain access to a lock.

4.7.5 Hinged and pivoted windows

When existing windows have exposed ordinary screws, they should be replaced with non-removable screws, or the heads of the screws should be defaced. External fixing bolts or external pins or bolts of pivots or hinges should be made secure by burring over or by similar means.

There is a variety of locks and fastenings that will add to the security of hinged and pivoted windows. They include:

- (a) *independent locks*:
 - (1) lock with turn button to secure the window with differ key to unlock;
 - (2) lock with push button to secure the window with common key to unlock;
 - (3) lock with common key to secure the window and to unlock;
 - (4) internal casement lock for steel casement window with common key to secure and unlock;
 - (5) multi-point locking handle.
- (b) *devices for use with existing fastenings*:
 - (1) casement stay screw;
 - (2) casement stay stop with common key to secure and unlock;
 - (3) cockspur handle stop;
- (c) *other devices that may be fitted, where practicable, as replacements for the original hardware*:
 - (1) cockspur handle with cylinder lock.

4.7.6 Sliding windows

4.7.6.1 General. The design of sliding windows and their fittings should be such that it is not possible for sashes or glass to be removed externally when the sashes are closed.

4.7.6.2 Vertically sliding sash windows. Typical fastenings and locks for vertically sliding sash windows are:

- (a) locking cam catch (Fitch catch) with cylinder lock;
- (b) window locking stop;
- (c) dual screws for use when the vertical members of upper sliding sashes are too narrow to accommodate locking window stops.

4.7.6.3 Horizontally sliding windows. The advice of the window manufacturer if known, or locksmith, should be sought when locks have to be fixed to horizontally sliding windows, as the designs of such windows vary considerably. Types of lock include the following:

- (a) independent lock with key operated bolt into the outer sash, and a common key to lock and unlock the window;
- (b) locking cam catch.

4.7.7 Louvre windows

Louvre windows are considered to be a high security risk. Louvre windows should not be used in positions accessible from the outside, as entry through them can be made quietly and easily. Ideally, louvre windows should be replaced and some other means of ventilation, if necessary, should be provided (see 4.2) or bars should be fitted (see 4.5).

Some louvre windows are claimed by their manufacturers to be less of a security risk, for example those with horizontal bars parallel to the louvres or those fitted with lockable laminated glass blades.

When existing louvre windows need to be made less of a security risk, consideration should be given to bonding the glass blades to their seatings or clips.

Externally exposed fixing screws should be replaced or defaced as described in 4.7.5.

4.8 Ventilation

4.8.1 General

Some windows have to provide ventilation and security. In these cases bars can be fitted (see 4.5) and ventilation devices can be fixed into the glass or window framing, or security fittings of a type that restricts the extent to which windows will open can be provided. The selection may depend on the ease of application and/or the level of security needed.

4.8.2 Ventilation devices

Ventilation devices can be power operated devices or operate by air pressure. They can be of two types:

- (a) those that are fitted into circular apertures in panes of glass;
- (b) those fitted into timber or metal sheets incorporated into the glazing frame.

The security provided by the design and installation should be taken into account. For example it may be easy for devices of type (a) to be pushed or pulled through the glass aperture thus providing access to window fittings.

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Those of type (b) are usually securely fixed but designs vary and the devices should be examined to check whether there is any possibility of fittings being operated through them, for example by the insertion of a length of wire. If so the window fittings should be lockable if window bars are not fitted.

4.8.3 Openable windows

Windows that are not fitted with bars, or that are not or cannot be fitted with the devices described in 4.8.2, may have to be left open to provide ventilation. When there is a security risk such windows should be fitted with lockable

fittings that restrict their opening to a maximum width of 100 mm but which can, for example for cleaning purposes, be released to allow full opening. Any fittings of adjacent openable windows that could be operated from access provided by the restricted opening should be lockable.

Alternatively, the opening of bottom hung and horizontally pivoted windows can be similarly restricted by fitting cradle bars.

Openable windows with a restricted opening are not considered to provide adequate security when premises are unoccupied.