Appendix: Management of fire safety

This appendix refers equally to all forms of roof and wall cladding and not specifically to insulated panels. It covers the management of fire safety both during construction and maintenance operations and as part of the day-to-day operation of the building.

Statistics suggest that 70% of all major fires occur as a result of poor management and maintenance rather than as a result of inadequate design or the nature of the processes carried out within buildings.

Risk assessments may have been made at the planning stages of a building and if so will have covered its operation and use and also any foreseen maintenance activities relating to the equipment or fabric of the building. Against this background, this appendix highlights specific maintenance and construction issues that are known to have been the cause of a number of significant fires.

The subjects detailed in this section are part of a wider inspection programme recommended by the insurance companies and which is set out in full on the 'Self Inspection forms for Commercial / Industrial Premises' available from those companies.

Generally the nature of the external cladding, including insulated panels with the most commonly used polyurethane and mineral fibre cores, will not have a significant effect on the likelihood of a fire starting. However, the specific procedures highlighted in this section are advisable where combustible insulation is utilised.

The role of fire safety management

It is essential that any person who is responsible for the operation of a building should implement procedures to prevent a fire occurring and minimise its effects in the event that these procedures are not successful. Ideally such procedures, and details of the buildings construction and fire safety systems should be documented in a fire safety manual. This manual might typically include the following items:

a) fire safety policy statement;

b) safety management structure and responsibilities;

c) details of building construction relevant to fire safety;

e) actions to be taken in a fire emergency;

f) fire drills and staff training;

g) housekeeping (e.g. removal of combustible waste);

h) planned maintenance of fire safety measures;

i) safety procedures for hot works and other maintenance;

j) security (to combat arson);

k) contingency plans for salvage and damage control;

l) record keeping;

m) procedures for updating manual and auditing its implementation.

Good fire safety management can be a key factor in minimising the risk of fire in buildings. Detailed guidance on management procedures for fire safety will be given in a forthcoming part of BS 5588 [20], which is currently in the course of preparation.

Hot works

Hot work is work that involves open flames or sparks or any other activity that generates heat. Fires involving hot work have led to multi-million pound losses. Most frequently the cause is carelessness and ineffective supervision while hot work operations are being carried out.

The sources of heat most commonly involved which may be used in conjunction with or in close proximity to roof and wall cladding systems include:

– gas and electric welding and cutting equipment

– blowlamps and blowtorches

– grinding wheels and cutting discs

Hot working should be avoided whenever possible, but when making structural changes to a steel framed building or when installing or modifying steel pipe work, cutting, grinding and welding appropriate precautions should be taken.

During hot works and cutting operations it is recommended that any exposed combustible cores are protected by temporary coverings.

Appendix: Management of fire safety

Such coverings and screens need to be manufactured from non-combustible or non-flammable materials. Welding blankets are the preferred solution for protecting all exposed surfaces, including ends or edges of panels. Preferably no hot work should be carried out in the immediate vicinity of any exposed insulant of whatever type. Low flame spread plastic coverings, which are intended to prevent damage to finished items during construction do not provide the required levels of protection to resist welding or cutting sparks or splatter.

All works should be properly supervised and a full inspection carried out on completion. Personnel engaged to carry out this work should be competent and fire extinguishers should be on hand at all times.

Experience has shown that a satisfactory standard of care is far more likely to be achieved where a formalised permit to work – a 'Hot Works Permit' – is in force, issued under the supervision of an experienced person who has the authority to ensure compliance with the procedures.

A typical Hot Works Permit:

- specifies the particular job to be carried out
- lists any special conditions
- specifies the area where the work is to be done
- is issued for a set time period.

Follow-up checking:

A fire watch should continue for at least one hour after work is completed, to detect and extinguish any incipient burning in the work area and in all adjoining areas to which sparks and heat may spread. These could include floors above and below and areas on the other side of walls to where the work is being carried out.

Cutting panels

Neither hot cutting techniques nor grinding wheels should be used to cut any type of insulated panels and in particular panels incorporating combustible cores.

Panels should be cut with a powered reciprocating saw and all exposed site cut panels should be protected with a suitable edge protection lacquer.

Holes and apertures are frequently cut to take cabling and wiring through panels, particularly in the food processing and cold store industries, where polystyrene has been the common core insulation. It is essential that full inspection is carried out to ensure that:

- the work has been properly carried out and that the cabling / wiring is fully protected against chaffing and abrasion
- any holes or apertures are properly closed off according to the manufacturers instructions, including where necessary the use of fire stopping materials.

Exposed cores

Any core material of an insulated panel or any insulated cladding system that becomes exposed as a result of cutting penetrations, maintenance work or impact damage should always be protected with metal closure flashings, as soon as practical, following the panel manufacturers recommended procedures.

Rubbish/waste management

A common source of extensive fire damage is fires started, deliberately or accidentally, in skips and rubbish containers located adjacent to the external wall of a building.

Whenever practical skips and other rubbish should be kept well away from the external walls of a building. Waste in the open is particularly attractive to an arsonist and strict controls on the storage and disposal arrangements are essential.

– All waste stored in the open should be at least 10 metres from the building and a minimum of 2 metres from the perimeter fence. If this is not possible, lockable enclosed metal skips or a secure enclosed store or compound should be provided, located as far as practical from door and window openings.
– All waste should be deposited in appropriate containers or designated areas provided. These should be clearly marked and should not be under canopies or trees.
– Aerosol cans, containers of flammable liquids and gas cylinders (even if empty) should be kept separately and disposed of as directed by the local authority. They should not be placed in skips with other waste.

Internal self-inspection Reports

Self-inspection systems are recommended by insurance companies as part of an on-going programme to increase awareness of fire hazards and reduce risks. Internal Fire Inspection Reports are available which illustrate the areas that could be part of a self-inspection system.

The reports cover a much wider inspection programme than is directly relevant to the envelope cladding of a building. Examples from a typical list relating to panels and insulated cladding are:

Electrical equipment

– Is there any temporary wiring/cabling
– Is the wiring/cabling passing through panels correctly installed?

Gas cylinders

– Are gas cylinders stored in a secure fire safe compound outside the building?

Fork lift truck / electric vehicle charging area

– Is the charging area clean and tidy?
– Are the low voltage charging cable connectors undamaged?
– Has storage been allowed in the charging area?

Hot work

Have hot work permits been used as required?

Waste management / rubbish

– Are all idle pallets and waste skips at least 6 metres clear of buildings?

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Fire safety during construction

A large proportion of all fires occur when buildings are being constructed, modified or extended.

The Health and Safety at Work Act 1974 is applicable to all work carried out during the construction phase. Under this act the employer has a duty to keep the workplace in a safe condition without causing risk to health. The Act is enforceable by the Health and Safety Executive.

Guidance in respect of construction, including alterations and extensions is given in:
"Fire Prevention on Construction Sites" published by the Fire Protection Association [21]; and
"Fire Safety in Construction Work" pubished by the Health and Safety Executive [22].

Where temporary buildings are introduced within, or adjacent to the building envelope, only those site buildings that comply with the LPS 1195 standard should be used.

The procedures recommended for hot work above should be implemented.

References

[1] Amendment to Building Regulations – Approved Document L2: 2002 edition.

[2] Approved Document B: Fire Safety. The Building Regulations 2000.
Department of the Environment Transport and Regions. HMSO 2000.

[3] Technical Standards for compliance with the Building Standards (Scotland) Regulations 1990 as amended.
Scottish Executive.

[4] Technical booklet E – Fire Safety. The Building Regulations (Northern Ireland) 1994.
Department of the Environment for Northern Ireland. HMSO 1994.

[5] BS 476: Part 7: 1987: Fire tests on building materials and structures. Method of classification of the surface spread of flame of products.

[6] BS 476: Part 6: 1989: Fire tests on building materials and structures. Method of test for fire propagation for products.

[7] BS 476: Part 22: 1987: Fire tests on building materials and structures. Methods for determining the fire resistance of non-loadbearing elements of construction.

[8] External fire spread: building separation and boundary distances. BRE report BR 187. 1991.

[9] BS 476: Part 3: 1958: Fire tests on building materials and structures. External fire exposure roof tests.

[10] BS 476: Part 4: 1970: Fire tests on building materials and structures. Non-combustibility test for materials.

[11] BS 476: Part 11: 1982: Fire tests on building materials and structures. Method for assessing the heat emission from building materials

[12] Firecode – Fire precautions in new hospitals. Health Technical Memorandum 81. NHS Estates 1997.

[13] The LPC design guide for the fire protection of buildings. Fire Protection Association 1999.

[14] LPS 1181: Requirements and tests for LPCB approval of wall and ceiling lining products and composite cladding products. Loss Prevention Council.

[15] BS 7974 Application of fire safety engineering principles to the design of buildings (to be published 2001).

[16] BS 476: Part 20: 1987: Fire tests on building materials and structures. Methods for determining the fire resistance of elements of construction (general principles).

[17] Design, construction, specification and fire management of insulated envelopes for temperature controlled environments. International Association of Cold Storage Contractors (European Division) 1999.

[18] Performance of external cladding systems in fire. Results of Fire Research 1999
Engineered Panels in Construction [EPIC].

[19] Fire and steel construction: The behaviour of steel portal frames in boundary conditions, 1990.
2nd edition Steel Construction Institute.

[20] BS 5585 Code of practice for fire safety in the design construction and use of buildings.

[21] Fire Prevention on Construction sites: Jan 2000. Fire Protection Association.

[22] Fire safety in construction work. Guidance for clients designers and those managing and carrying out construction work involving significant fire risks. HSG 168. Health and Safety Executive 1997.

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Download EPIC information from the website
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