

**ODPM Buildings Division  
Project Report :**

Forward Look

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Fire Safety Framework

**Forwards Look**

**CI/71/5/11 BD2469**

**Forwards Look Report**

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## **Executive Summary**

This report has been produced by BRE as part of a contract placed by the Office of the Deputy Prime Minister. Any views expressed in it are not necessarily those of the Office.

A review of Part B of the Building Regulations, for England and Wales, formally commenced at the beginning of 2004. As a part of this review BRE was commissioned by ODPM to carry out a forward look exercise to gauge the views of the relevant stakeholders and to identify issues that they consider may be important to include in the revision of Part B.

Three regional workshops designed to encourage constructive debate on the provisions of Part B were staged during April and May 2004. Delegates for the workshops were, as far as possible, selected to ensure an even distribution of views from the different stakeholder groups.

In conjunction with the workshops an electronic questionnaire was produced, placed on the internet and promoted via a series of paper and electronic mail shots. The questionnaire provided the opportunity for stakeholders to give general comments about Part B of the Building Regulations as well as answering specific questions.

Fire safety is a very broad subject and this was reflected in the wide variety of issues addressed and comments made. However, some strong common themes did emerge:

### **Fire Safety Management**

The vast majority of delegates strongly thought this issue needed to be addressed. Views about what should be done in Part B varied widely but there was a common theme that information about the fire safety design of the building must be passed on to the person responsible for its management. This was felt to be essential given the move to a risk assessment based regime for fire precautions in buildings in use.

### **Residential Sprinklers**

This was clearly a very topical subject; many delegates were disappointed that recent research indicated that their widespread use would not be cost effective. Their potential use as a compensatory feature was raised with delegates but there was no clear consensus as to what design freedoms would be acceptable. Many delegates felt that open plan layouts were popular with designers but there was concern that sprinklers would not prevent escape routes becoming smoke logged.

### **Means of Escape for Disabled People**

It was clear from the comments made that current guidance on this issue was inadequate and is an issue that should be addressed. One of the main difficulties concerns how people are assisted from refuges to a final exit. This is generally regarded as a management procedure but there may be built-in solutions that could facilitate this process and guidance was required. The use of lifts was thought to be the ideal option but the potential costs may be prohibitive.

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## 1 Introduction

This report has been produced by BRE as part of a contract placed by the Office of the Deputy Prime Minister. Any views expressed in it are not necessarily those of the Office.

The current version of Part B of the Building Regulations 2000 (England and Wales) and the current edition of Approved Document B (AD B) (Fire safety) has been in force since 1 July 2000. In December 2002 an amendment was published and subsequently came into effect on 1 March 2003. The purpose of this amendment document was to provide visible recognition to the new European technical specifications and supporting fire test methods, which had been produced in support of the Construction Products Directive.

The 2002 amendments did not, however, affect any of the specific technical guidance in the existing AD B edition and a commitment to carry out a review of the wider technical aspects of the Part B requirements and AD B was set out in the Government's White Paper "Our Fire and Rescue Service" published in 2003. The review formally commenced at the beginning of 2004. As part of this review of Part B, BRE was commissioned by ODPM to carry out a Forward Look exercise to gauge the views of the relevant stakeholders and to identify issues that they consider may be important to include in the revision of Part B.

To this end three regional workshops designed to encourage constructive debate on the provisions of Part B, were staged in Watford, Manchester and Cardiff during April and May 2004. The workshops consisted of presentations followed up with a series of themed break-out sessions. The delegates for the workshops were, as far as possible, selected to ensure an even distribution of views from the different stakeholder groups. An additional workshop was also organised by the Construction Products Association and comments from this workshop have been included within the appendix of this report.

In conjunction with the workshops an electronic questionnaire was produced, placed on the internet and promoted via a series of paper and electronic mail shots. The questionnaire provided the opportunity to provide general comments about Part B of the Building Regulations and supporting guidance as well as answering specific questions.

The results of the Forward Look exercise are set out in this report.

## 2 Workshops

### 2.1 Method

The aim of the Forward Look was to capture the views of stakeholders with regard to the revision of AD B. The intention of the workshops was to promote constructive debate on how the existing AD B could be improved and capture any suggestions, which arose.

Three regional workshops were staged in Watford (17<sup>th</sup> May 2004), Manchester (26<sup>th</sup> May 2004) and Cardiff (9<sup>th</sup> June 2004, providing 200 delegates places). The workshops consisted of short presentations followed up with a series of themed break-out sessions. The delegates were, as far as possible, selected to ensure an even distribution of views from the different stakeholder groups.

Following the presentations the delegates were split into break-out groups of between fifteen to twenty delegates per group.

To try and allow a reasonable time to debate each topic a limit of 15 minutes per topic was allowed. Each workshop was structured to provide two break-out sessions (one morning and one afternoon).

The morning break-out session began with each group being given three topics to discuss. For each group two of the topics were chosen from either means of escape for disabled people, warehouses, residential sprinklers or phased evacuation and then a third topic was given to each group chosen from either; fire safety engineering, arson, structure of guidance, self closing devices, fire fighter safety or domestic smoke alarms. The final part of the morning session was to brainstorm in order to produce a list of further topics which the delegates felt warranted review, these suggestions are listed in the Chosen Topics section of this report.

The afternoon session started with each group voting on which topics they would like to debate and thereby democratically choosing the three topics which were then debated in the afternoon.

The views of all the groups on all the topics discussed are set out in the workshop views section of this report.

## 2.2 Chosen Topics

### Group 1 (Watford) chose to discuss

Means of escape for disabled people  
Phased evacuation  
Fire fighter Safety  
Management / maintenance  
Fire safety engineering  
Quality and competency

### Group 2 (Watford) chose to discuss

Warehouses  
Phased evacuation  
Structure of guidance  
Means of escape for disabled people  
Means of escape vs security  
3<sup>rd</sup> party accreditation

### Group 3 (Watford) chose to discuss

Means of escape for disabled people  
Residential sprinklers  
Fire safety engineering  
Quality and competency  
Management / maintenance  
Downlighters, false ceilings and fire resistant construction.

### Group 4 (Watford) chose to discuss

Warehouses  
Phased evacuation  
Domestic smoke alarms  
Fire safety engineering  
Structure of guidance  
Quality and competency

### Group 5 (Watford) chose to discuss

Warehouses  
Residential sprinklers  
Arson  
Fire safety engineering  
Management / maintenance  
Means of escape for disabled people

### Group 6 (Watford) chose to discuss

Means of escape for disabled people  
Residential sprinklers  
Self closing devices  
Quality and competency  
3<sup>rd</sup> party accreditation  
Structure of guidance

### Group 7 (Manchester) chose to discuss

3<sup>rd</sup> party accreditation  
Means of escape for disabled people  
Warehouses  
Management / maintenance  
Residential sprinklers  
Arson

### Group 8 (Manchester) chose to discuss

Phased evacuation  
Fire fighter safety  
Domestic smoke alarms  
Local acts  
Schools  
Protected shafts  
Approved inspectors  
Travel distance  
Security  
Residential sprinklers

### Group 9 (Cardiff) chose to discuss

Means of escape for disabled people  
Residential sprinklers  
Self closing devices  
Approved inspectors  
Warehouses  
Smoke ventilation in apartment buildings  
Insurance issues



### 2.3 The total list of topics suggested, were as follows:

- Means of escape for disabled people
- Warehouses
- Residential sprinklers
- Phased evacuation
- Fire safety engineering
- Arson
- Structure of guidance
- Self closing devices
- Fire fighter safety
- Domestic smoke alarms
- Management / maintenance
- Inspection by building control officers
- 3<sup>rd</sup> party accreditation
- Quality and competency
- Means of escape vs. security
- Occupancy : risk
- Speculative buildings
- Links with Regulatory Reform Order (RRO)
- Access B5 (Access to site, Cannot get to site, Communication with emergency services)
- Local acts
- Role of fire brigade
- Horizontal evacuation considering building compartmentation
- Terminology
- Approved inspectors
- Communication across disciplines (training, who is qualified to do what)
- Self storage warehouses
- External storage
- Recessed down lighters
- Consistency of approach across the Approved documents
- Downlighters, false ceilings and fire resistant construction
- Workmanship issues and post-construction testing
- Management control – need for an additional functional requirement
- Competency and accreditation of fire engineers, installers and producers. Inspection and fire stopping of HVAC
- Inclusion of optional functional objectives to build in flexibility for subsequent change of use.
- Hot smoke testing for complex buildings
- Sprinklers as a trade off with passive fire protection
- Complexity of modern forms of construction does not fit in with simplistic geometric representation in AD B
- Intumescent paint
- Insulation – issues around polymeric insulation materials and their behaviour in fire
- Means of escape
- Control for fire doors for commercial and domestic
- Surface finishes over the life of the building need to control surface spread of flame
- Asset protection
- Sustainability
- Refurbishment of existing housing stock
- Standards
- Insurance issues
- Compulsory sprinklers for all schools
- Means of escape vs security
- Fire loads in warehouses
- Mezzanine = floor or balcony
- Commissioning of fire safety engineering solutions
- Location of exit signs (“sign blindness”)
- Smoke control systems (unable to achieve 10 a/c per hour)

- Domestic smoke control
- Blue flashing alarms to stimulate egress
- Low level lights / way-guiding
- Competent person for Fire Safety Engineering (FSE) design / 3<sup>rd</sup> party peer review
- Building Log Books (1)
- Schools
- Protected Shafts
- Extinguishers
- Smoke ventilation in apartment buildings
- Travel Distance
- Cross referencing
- Entertainment
- Security

## 2.4 Workshop Views

### 2.4.1 Warehouses

There have been concerns expressed by fire fighters that warehouse buildings are becoming progressively larger and larger. There are currently no limitations on compartment size for these buildings and no provisions for fire suppression.

There are a number of Local Acts, which are concerned with this area and these include provisions for fire suppression and for limiting compartment size. These Acts are often criticised by developers who see no justification for regional variation in technical standards. There was general agreement that it would be a good thing to have provisions within the AD B to deal with these concerns at a national level and avoid the confusion caused by having different guidance in different geographical areas. It would also stop contractors simply building in areas of the country with less onerous requirements.

It is often argued that warehouses are sparsely populated and as such do not present a significant life risk. However, there is a growing trend for mail-order / internet distribution centres etc to have larger populations. The workshop groups all indicated that they would like to see a change in classification of these buildings, although opinions varied on whether they should be classed as factories, retail or a new class should be created.

Most groups were of the opinion that means of escape was generally not as big a problem as fire fighter safety. However, increasing use of mezzanine floors within these buildings was seen as a dangerous trend when considering means of escape and some groups suggested that in these cases the building should be treated as having multiple floors.

The issues surrounding change of use of these buildings were also seen as very problematical. For example, in buildings of this size a fish processing plant would present a very different risk to a storage depot for fireworks and yet the building itself may remain exactly the same. This issue gave rise to suggestions that the type of foreseeable fire / risk should play a large part in deciding the measures that are required to ensure a reasonable level of safety.

Many groups called for sprinklers to be made mandatory in large buildings such as these. The main reasoning for this was for improved firefighter safety, although environmental concerns were also perceived as significant when dealing with both water run-off from fire fighting and fall-out from a fire plume of potentially enormous size and duration.

Property protection was also discussed, both in regard to the warehouse and contents and with respect to fire spread to adjacent buildings. Some of the groups felt that they would like to see Part B extended to cover this whereas other groups felt that property protection was beyond the remit of Part B and was more an issue for insurers.

### 2.4.2 Residential Sprinklers

Following an extensive research project by BRE it has been shown that a provision requiring sprinklers in all new dwellings would not be cost effective.

However it has been suggested that sprinklers could be used as a compensatory feature, or a “trade off”, for an alternative approach to compliance.

Several delegates felt that the cost of these systems was too high and it was suggested that the sprinkler industry is responsible for unnecessarily high costs. Hidden costs associated with these systems, such as water supplies, were also discussed. Other delegates were of the opinion that cost should not be a consideration.

However partial protection, where sprinklers are used as a compensatory feature, was supported. The groups agreed that there is a need to take an integrated approach to passive and active systems when considering trade-offs. Some of the possible trade-offs suggested were in;

- 3 storey conversions of houses
- To extend fire resistance
- Where there is difficulty of access for the fire brigade
- To extend travel distances for means of escape

Many delegates felt that open plan layouts were popular with designers but there was concern that sprinklers would not prevent escape routes becoming smoke-logged. This problem was illustrated in the full-scale experiments that have been carried out by BRE. As such, it was felt that variations should be considered on a case-by-case basis. Many concerns were expressed about the need for maintenance and for a reliable water supply. Other concerns raised were maintenance of any pumps, freezing weather and vandalism (for local authority buildings). Some of the groups suggested that, in order to extend the use of sprinklers, further information on concealed heads would be required as this is what the public would demand for aesthetic reasons.

### 2.4.3 Arson

Around one fifth of fire deaths are listed as non-accidental. The guidance in AD B does not address any special measures to prevent or protect from arson attacks. No clear view was given as to whether Part B should attempt to protect against arson. The main problem being that, as a deliberate action, arson can be impossible to predict in terms of locations where fire might start, growth rate of the fire or even size of fire. The issues needing consideration, as suggested by the delegates are: as follows;

- Is the fire set due to intelligence or ignorance
- Vandalism
- Premeditated
- Type of building
- Security
- Surveillance
- Storage of refuse –schools
- Design against arson

- Management
- Mailbox (fire resistant letter boxes)
- Community fire safety – more smoke alarms – educate child fire setters
- Social issues
- Fireworks
- Sprinklers
- Security vs means of escape
- When building is unoccupied – automatic links to fire alarms (false alarms)
- Sensitivity of smoke alarms – reducing false alarms

#### **2.4.4 Structure and Scope of the Regulations**

The current AD B encompasses guidance for all types of building. Recent amendments to Part L broke guidance down into two parts – dwellings and non-dwellings. This has been well received and it has been suggested that AD B could also be split into two.

It has also been suggested that a new requirement “B6” could be introduced to cover fixed fire-fighting facilities. This could include provisions for sprinklers, hydrants and risers etc under their own heading rather than within the provisions for compartmentation and fire service access.

Most groups agreed that the AD B would be improved by splitting it into two sections. It was felt to be important that the split should mirror the division in other Approved Documents. Some groups felt that the split could go much further with a separate guide for each Purpose Group. It was suggested by one group that a part B0 could contain guidance on general fire safety issues common to all Purpose Groups such as the approaches to compartmentation, limitation of fire spread and means of escape. Specific guidance would then be provided for each specific Purpose Group (something like the US Life Safety Code approach).

Another group suggested that the proposed B0 should include an introduction to design considerations as in Part M. Specific clauses should include a commentary such as, what are the reasons for a particular clause? What experience led to it?

Delegates suggested that the AD B should be web based, automated and interactive with a comprehensive search engine and cross-referencing system. There was some discussion as to who the AD B was for. Although greater accessibility was felt to be an important goal it was agreed that the AD B should remain a professional document for professional people.

In terms of scope, some delegates felt that the inclusion of environmental and sustainability issues and property protection should be included as part of a Regulatory Impact Assessment. However, other delegates felt that this was outside the scope of AD B.

Delegates also suggested guidance should target the common or general case, and then put in caveats for rarer or special exceptions. The reason given was that, as AD B is currently written, it can be difficult to extract the parts related to simple/bulk-standard constructions without wading through a lot of clauses applying only to more unusual exceptions. More examples/worked examples in AD B was also a popular suggestion across many groups.

#### **2.4.5 Phased Evacuation**

Following the World Trade Centre incident there has been considerable debate about the way that large buildings are evacuated. Questions have been asked about the viability of the phased evacuation strategy and the design of stairways & fire alarm systems to facilitate it.

Delegates felt that there is very little guidance on how such an approach should be implemented. Further, it was felt that phased evacuation would be very difficult as individuals would be unlikely to remain in place as instructed during an emergency, due to the consequences of 9/11 and the current climate of terrorist threats. Therefore delegates felt that means of escape would be inadequate for buildings designed for phased evacuation (i.e. with narrow stairs or reduced aggregate stair width provision). The concerns therefore related to human behavioural aspects and stair capacity.

One suggestion was that such issues could be included in the specific risk assessment for the building. Good building management was felt to be the key to successful evacuation procedures. Another suggestion was that a phased evacuation strategy should be operated only if combined with adequate stair provision to enable simultaneous evacuation if required.

Another issue raised was the rationale behind the differing evacuation requirements for private residential and hotels and it was questioned how mixed use buildings (hotel and flats) should be treated.

It was suggested that the scope of AD B should be extended to include life safety/evacuation aspects of terrorism (bombs, chemical, biological, radiological).

The limitations of fire fighter physiology in dealing with fires in high rise buildings was raised.

Also it was pointed out that there might be problems when different companies occupy the same building so that if the zone to be evacuated affected 2 (or more) companies who would co-ordinate?

#### **2.4.6 Means of Escape for Disabled People**

With the requirements of Part M (Access and Use) and the Disability Discrimination Act the design of buildings to cater for people of all abilities has become increasingly significant. There is growing concern that the provisions for unrestricted access are not reflected in the provisions for escape.

The current AD B refers to BS 5588 Part 8, which gives guidance on means of escape for disabled people. As a result most multi-storey buildings are now provided with protected refuges, which allow disabled people to wait in relative safety for assistance.

The issue of refuges was an area of concern, in particular, how many should be provided and where should they be placed (next to the lifts or next to the stairs). The groups all felt that one of the main difficulties is how people are assisted from the refuge to a final exit. This is generally regarded as a management procedure but there may be built-in solutions that could facilitate this process and therefore guidance was required.

It was considered essential to consult access groups at the design stage as training of staff was felt to be vital. Other considerations included whether staff would be required to carry disabled people down stairs or push wheel or escape chairs, and the risks to staff in terms of back strain etc as well as to the disabled occupant.

For hotels, it was suggested that perhaps guests should be asked when registering, whether they would need assistance in the event of evacuation?

Delegates felt it was important to consider a wide range of different abilities in the occupant population, not just wheel-chair users. Stair widths and the conflicts/agreement with requirements of Part M needed attention. Different methods for measuring width, treatment of hand-rails etc can cause further confusion. Some stairs allowable in AD B would be too narrow for a wheel chair.

Lifts were needed for both access and evacuation. Lifts would need to be upgraded (similar to fire fighting lifts) except perhaps in some low-rise buildings.

A number of conflicts exist. However, there were also potential synergies in that people responsible for management of security were also usually responsible for fire safety. Education for the building management would be a key part of any strategy.

In residential care there were problems regarding entry/egress controls. The overall feeling was that products exist which combine good security against illicit entry with ease of escape in an emergency. The problem was cost. It was felt that it would be necessary for the better product types to be suggested in guidance, otherwise cheaper, less suitable methods would always be used.

A suggested solution to aid rescue from a refuge area was communications with Fire Brigade, such as a 'com' system. Sprinklers could be used to give more time for rescue. Another strategy suggested was horizontal escape, such as used in hospitals is another strategy that was suggested. Smoke extract from common areas could give a bigger safety margin. Magnetic hold-open systems were suggested as a method of satisfying both Part M and Part B with regards to the problem of forces required to open doors.

Concerns for the delegates were:

- That existing buildings would be hard to modify.
- The problem of people "collapsing" on stairs, blocking them for others.

- Alarms are currently auditory only (what about the deaf)?
- Without fire marshals, would disabled people get priority in the use of lifts to escape?
- Could refuges be used for obese and “unfit” persons too?
- Are refuges large enough?
- AD “B” needs to spell out responsibilities of management, builder, designer, fire brigade.
- Design and management teams need to work together.
- The numbers and locations of disabled users may change from day to day and/or individuals may suffer from temporary mobility impairment.

#### **2.4.7 Fire Safety Engineering**

AD B has recognised the potential for fire safety engineering to provide solutions for large, complex or unusual buildings for some time. Concerns have been expressed that Building Control Bodies can find it difficult to deal with Fire Safety Engineering designs and that many such designs lack adequate attention to good practice.

Delegates felt that this is a grey area and a question often asked is “who has overall responsibility / co-ordination for the design? Is it the main contractor? Fire engineer?” A further problem can arise when systems are not properly integrated / tested as a whole and later conflict in some way.

The general feeling was that Building Control Officers are not “competent” persons when it comes to assessing the suitability of fire safety engineered designs. The delegates were also unsure as to who is considered to be a ‘competent person’ when it comes to drawing up a fire safety engineering design. One solution put forward was to have a list of retained consultants to check design. It was generally agreed that there should be some kind of third party checks on fire safety designs. The view across all the discussion groups was that the regulations have not kept pace with technology or very complex design.

A further concern of Building Control Officers was that they felt there needed to be a more level playing field on commissioning with Approved Inspectors otherwise clients will just take the cheapest option.

On-site testing (e.g. hot smoke tests) could be a requirement.

Issues surrounding the ‘building life’ and use were a strong theme throughout all of the workshops. It was felt that information used for the design needs to be available at later stages in the buildings life and needs to be updated. A popular idea with delegates was some form of “building MOT”, such as a log book, perhaps along similar lines to that specified in Part L.



It was suggested by some groups that this should be the subject of a new requirement B1 (i.e. should be the first item to be considered). Risk assessment should be carried out and the classification/categorisation used should be the same as the level of fire safety management used by the insurance industry and should tie in with the existing system in Part L. A list of key performance indicator's should be included in a new section on fire safety management. There was some discussion about the legal issues that may arise if change of use took place.

Delegates did point out that this would make employers largely responsible and that there would be high levels of ignorance of any new requirement. It was suggested that the employer should be required to liaise with fire brigade. An education campaign might be required by Government.

In order to have accountability some delegates suggested AD B should clearly state that the management responsibilities were legally binding. This would require the management chain and associated responsibilities to be included in the building log book.

#### **2.4.8 Competency/Workmanship Issues**

It was felt that a mandatory requirement for accreditation would be unlikely and, in the current circumstances, may be non-competitive. However, protocols and good practice should be encouraged and referenced in AD B. The Fire Service have the powers to take contractors to court. On-site testing to establish fitness for purpose should be encouraged as long as the responsible person could be clearly identified. The fire service were felt to be the most appropriate body (and to have the necessary powers) to control quality of construction and installation after the works had been completed.

Delegates requested that any changes made to the AD B were enforceable.

Some delegates felt that we have not reached a stage where self-certification could be relied upon. One perceived problem was that trade associations may charge too much for accreditation. Delegates were in favour of audited training leading to a "Certificated Competent Installer". Better education leading to an integrated approach so each trade has an awareness of each others requirements was also seen as key.

Delegates also suggested a requirement in AD B to identify individual to sign off work

#### **2.4.9 Domestic Smoke Alarms**

It has long been recognised that smoke alarms are a highly effective and relatively inexpensive measure in reducing fire casualties.

It has been suggested that the provisions for smoke alarms could be extended so that they are fitted, not only in circulation spaces but also in habitable rooms thus reducing the time taken to raise the alarm.

It has also been suggested that the provision of a back up power supply within a mains-powered smoke alarm, which is currently optional, should become the minimum standard.

Delegates felt that for single owner occupied dwellings the current situation was very effective. This was borne out by the statistics. It may be that there is little room for further progress.

Insurers could provide a benefit for back up systems – this would relate to a categorisation of the fire safety management issues and cuts across all of the topics.

More effort is required in multi-occupancy dwellings. A clearer definition of houses of multiple occupancy would be useful.

Many of the problems encountered with smoke alarms were technical problems to do with the cost of the appliance. Many of the false alarms were do to with the inability to adjust the sensitivity of the detector.

Guidance should not be limited to smoke detectors but should also consider heat detectors and carbon monoxide detectors.

New environmental laws may prevent the distribution of ionisation type smoke alarms.

It was suggested that increasing the coverage of alarms in new homes may not have a significant impact. The real problem was with older homes that had no alarms at all. Further education campaigns may be the answer.

#### **2.4.10 Inspection and Third Party Accreditation/Approval**

Delegates perceived that a big problem with buildings was that there were no Quality Assurance schemes for construction and installation of products and systems in buildings, despite the comprehensive testing and certification requirements for individual construction products and items of equipment. This is a serious issue and delegates felt that poor product selection/installation/maintenance was a problem. Two examples given were application of intumescent paint (often ordinary paint was used) and installation of glazing (often a cheaper product with a lower specification to that stipulated was installed). Other examples were incorrect installation of fire stopping materials and unstopped holes in passive protection made when pipes and cables were installed.

AD B guidance could call up the use of Approved Installer and Competent Person Schemes. A problem with such schemes was to some extent the use of restrictive practices, whereby an installer would need to pay unreasonable registration fees.

AD B should add commentary to cover issues such as these. It could also include or reference best practice guides.

Key Performance Indicators and Commissioning (CDM – Commission, Design, Maintenance) “Building Control now goes on throughout the life of the building”

#### **2.4.11 Fire Fighter Safety**

The purpose of AD B is to secure health and safety of people in and about buildings. This includes the safety of fire fighters engaged in search and rescue. Delegates felt that further guidance is required. In many of the areas where the Fire Brigade have concerns it was suggested that sprinklers may be the answer but delegates were cautious about “putting all eggs in one basket”. Indeed in many cases it was accepted that to retrofit sprinklers would be too expensive. The question was asked whether sprinklers may be justified on sustainability grounds but it was also pointed out that sprinklers are unpopular because water tanks take up rentable space.

Sandwich panels were also raised as causing a problem for the Fire Brigade.

#### **2.4.12 Schools**

Delegates felt that school fires have an impact on the whole community and that arson attacks are becoming more common during daylight hours. Out of hours use of school premises can present different fire risks. The greater use of CCTV for security was suggested as a possible measure which could reduce the arson problem. Some delegates called for all schools to be sprinklered.

#### **2.4.13 Protected shafts**

One delegate felt that service shafts should be fire stopped at floor level.

#### **2.4.14 Approved Inspectors**

There was considerable concern that competition in the building control service was driving down standards, both in terms of the standards applied and the level of on site inspection. Fire authorities felt that they were being ignored during consultation. It was suggested that Building Control Boards should be audited by an independent commission.

#### **2.4.15 Security**

Delegates perceived a conflict with means of escape and fire service access and suggested there is a need for consistency between standards - arson prevention could be included via improved security.

#### **2.4.16 Down Lighters**

Delegates were concerned that these can remove the integrity of a ceiling. The delegates felt that AD B needs to consider these devices, as they can get very hot. Interaction with Part E (Resistance to the passage of sound), Part P (Electrical Safety), Part L (Conservation of fuel and power) are needed.

### 3 Internet Responses

#### 3.1 Method

As part of the data gathering exercise a questionnaire was placed on the FRS web site thus providing a quick and easy conduit for any interested parties to submit views on how AD B could be improved.

In order to promote awareness of the questionnaire and thereby capture views from all arenas where AD B is used, in excess of 1200 flyers advertising the questionnaire were sent out (hard copy) to key stakeholders including: Architects, Building Control Bodies, Fire Brigade, Fire Consultants, Local Authorities, Approved Inspectors and Manufacturers.

Information was also sent out to over 1500 e-mail contacts and the questionnaire was given further exposure on the FRS web site, which receives over 115,000 hits per month.

The questionnaire consisted of nine questions, chosen to canvas opinion on key subject areas of the AD B.

These were:

- 1 Do you agree that Approved Document B should be split into two parts, one dealing with apartment buildings (flats and maisonettes) and houses, and one dealing with other purpose groups?
- 2 Do you agree that Approved Document B is easy to understand?
- 3 Do you agree that Approved Document B provides an adequate level of fire safety for people in and about buildings?
- 4 Do you agree that Approved Document B should provide greater protection to vulnerable groups, such as elderly or socially disadvantaged?
- 5 Do you agree that Approved Document B provides an adequate level of fire safety for fire fighters?
- 6 Do you agree that local acts create unnecessary problems for developers?
- 7 Do you agree that more guidance is needed to address means of escape for disabled people?
- 8 Do you agree that there should be more guidance on dealing with material alterations and historic buildings?

- 9 Do you agree that provisions for fire fighting equipment and automatic fire suppression systems (sprinklers) should be taken from Parts B3 and B5 and placed into a new requirement B6?

Respondents to the questionnaire were asked to rate each question as:

- Strongly agree
- Agree
- Don't know
- Disagree
- Strongly disagree

An overall view was then averaged from the rating given by all individual respondents. The findings are displayed on the graphs below. To try and better understand the sway of opinion for each question the view of each category of occupation is also displayed underneath the overall view. The occupations of respondents were:

- Architects
- Manufacturer
- Health and Safety Officer
- Fire Consultant
- Building Control
- Fire Brigade
- Other (containing any occupations not previously mentioned).

Note that the trade associations that replied were placed in the 'Manufacturers' category.

In addition to the questions, respondents were given the opportunity to submit any comments about the AD B within the questionnaire. These are listed in the appendix of this report.

### 3.2 Graphs

A total of 52 responses to the questionnaire were received. Of these the total for each occupation category was as follows:

Architect = 1

Fire Brigade = 12

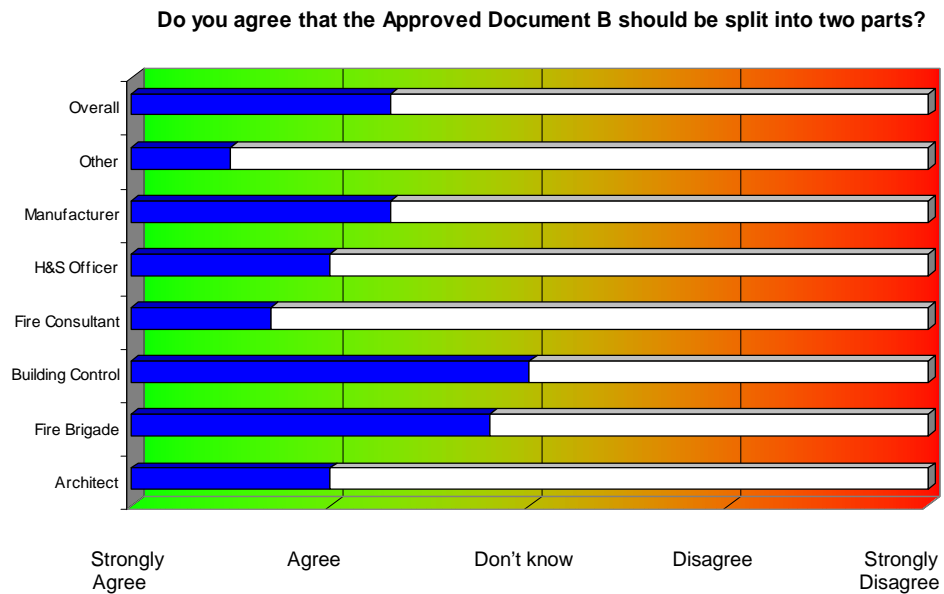
Building Control Officer = 4

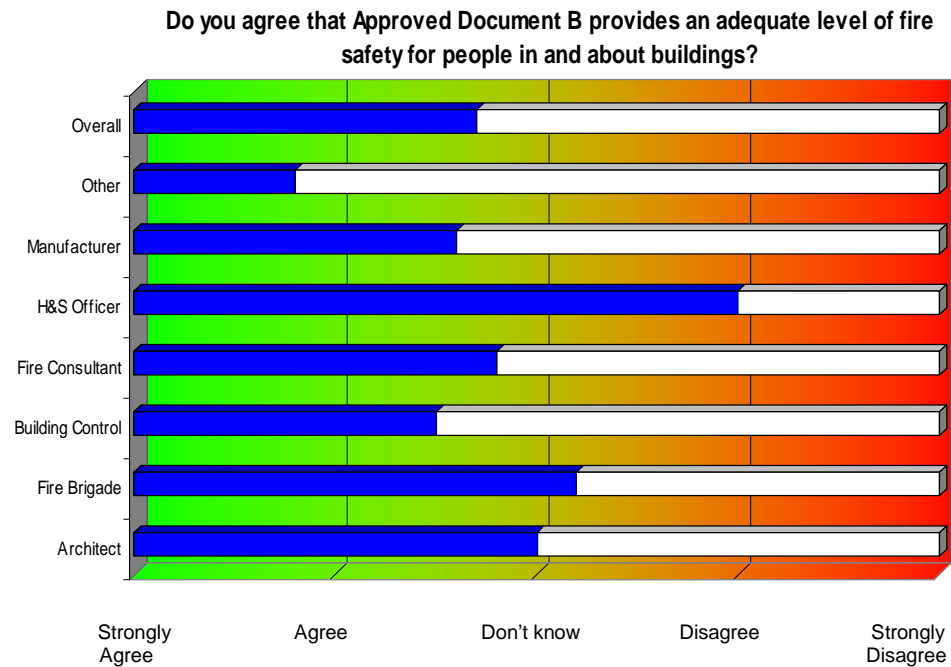
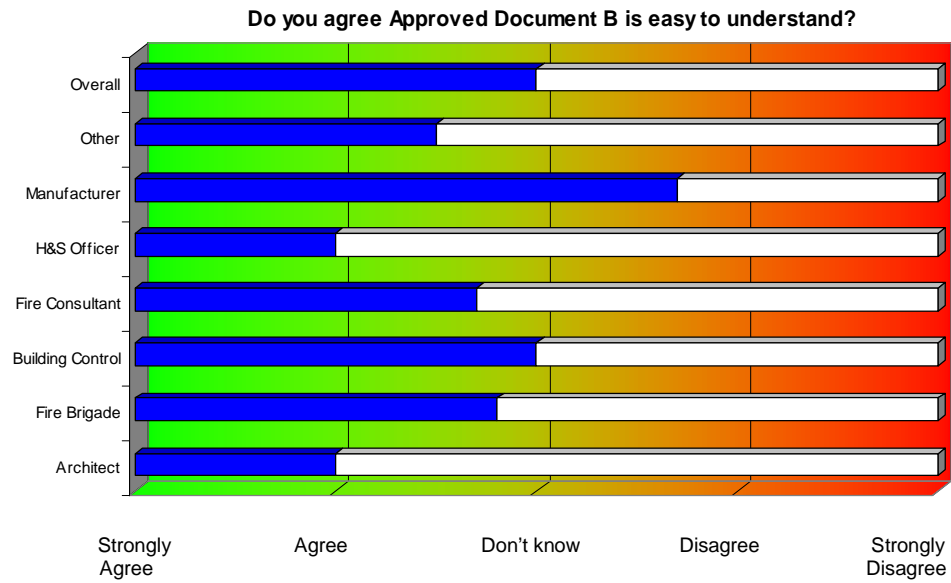
Fire Consultant = 9

Health and Safety Officer = 2

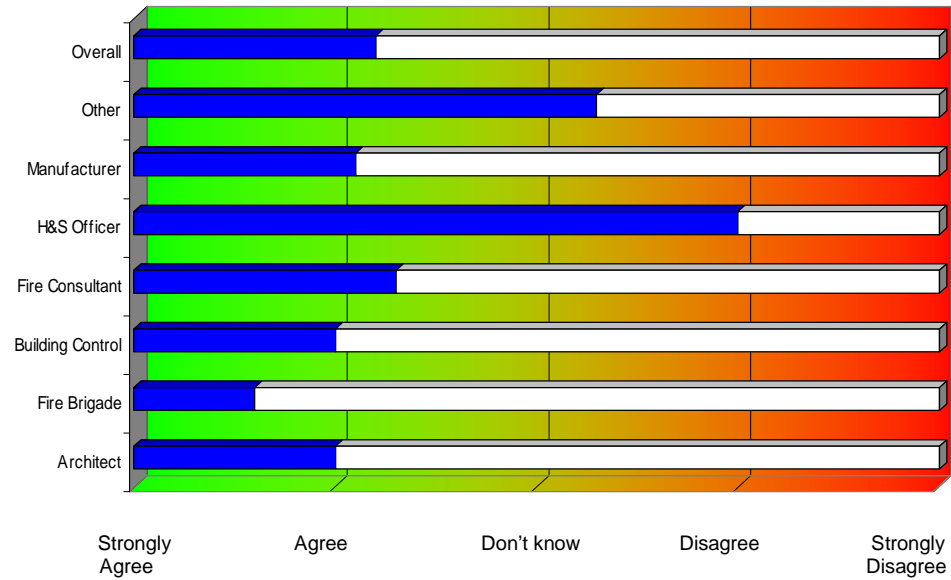
Manufacturer = 18

Other = 6

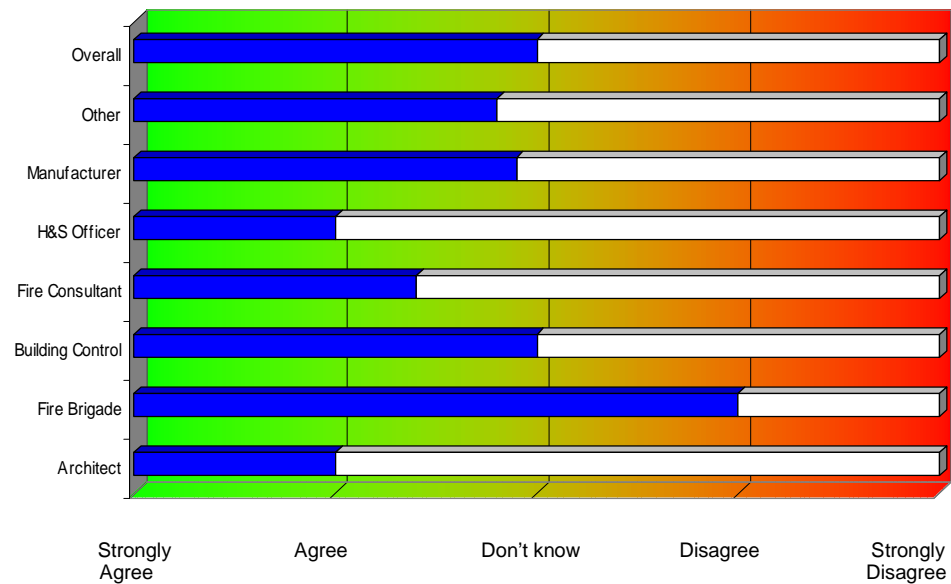




**Do you agree that Approved Document B should provide greater protection to vulnerable groups?**

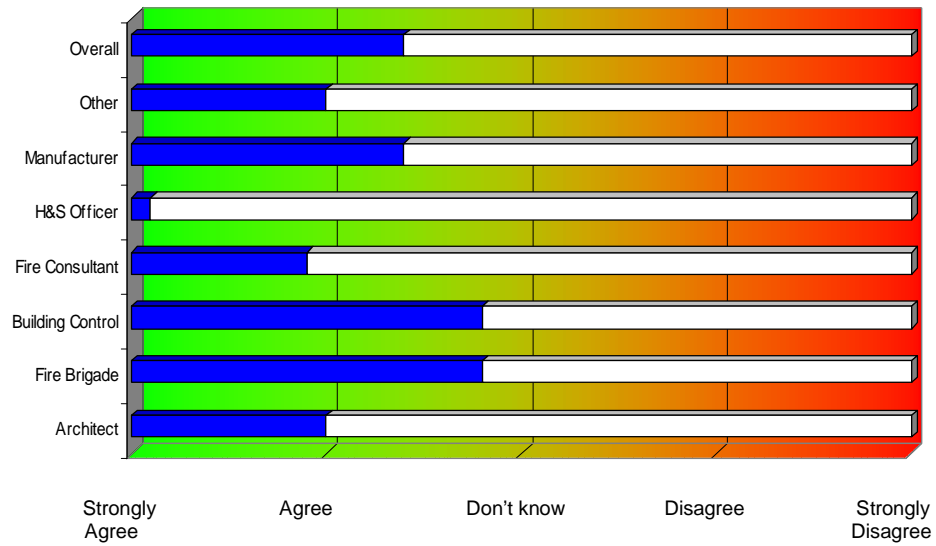


**Do you agree that the Approved Document B provides an adequate level of fire safety for fire fighters?**

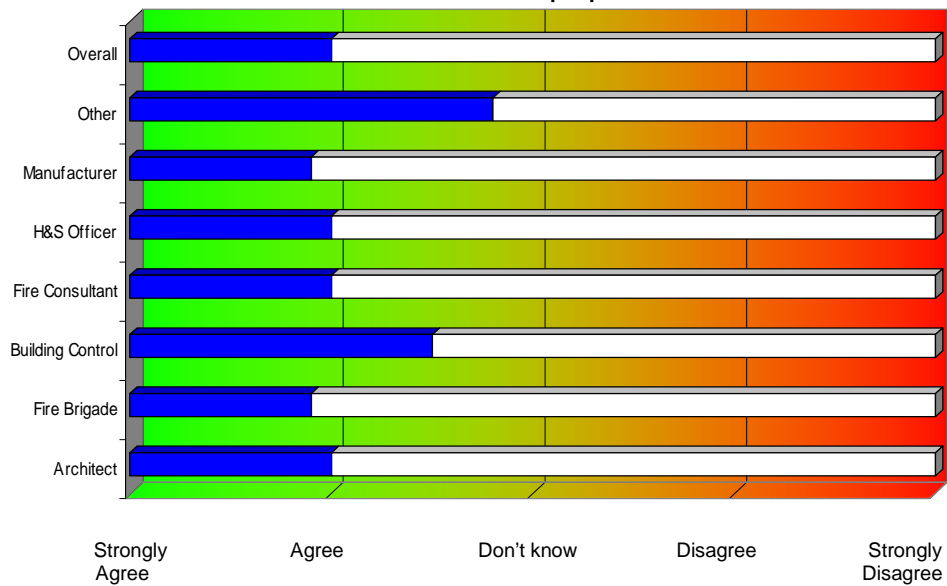




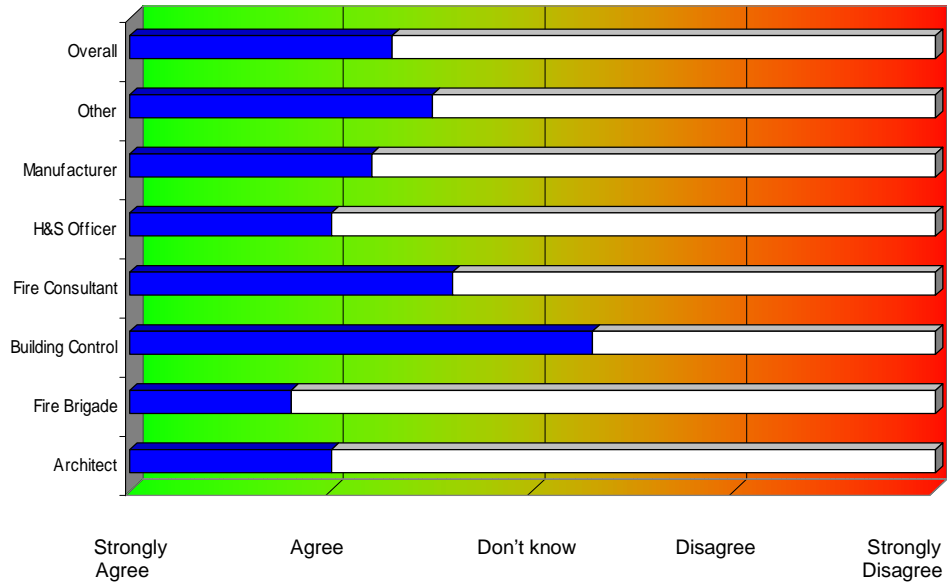
**Do you agree that Local Acts create unnecessary problems for developers?**



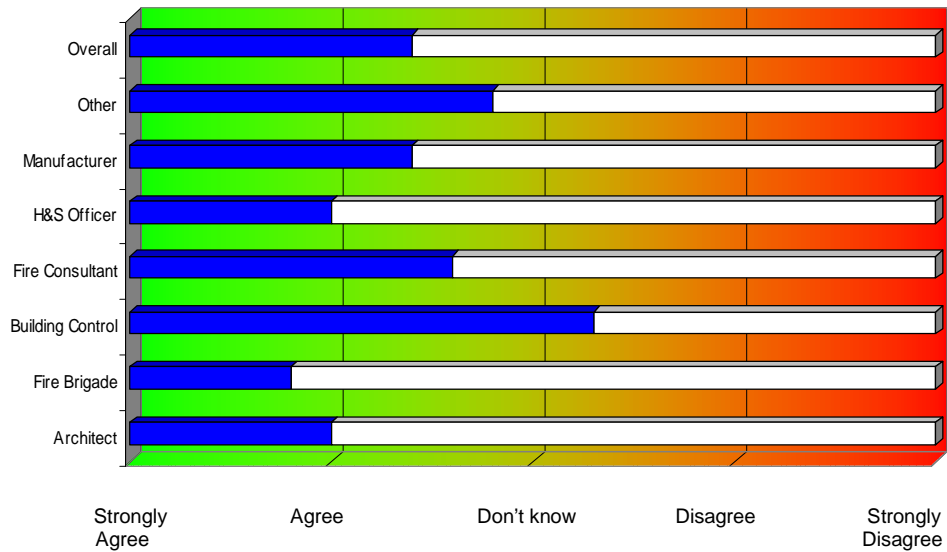
**Do you agree that more guidance is needed to address means of escape for disabled people?**



**Do you agree that there should be more guidance on dealing with material alterations and historic buildings?**



**Do you agree that provisions for fire fighting equipment and automatic fire suppression systems (sprinklers) should be taken from parts B5 & B3 and placed into a new Requirement B6**



## 4 Conclusions

BRE sent out more than 1200 flyers to Architects, Building Control Bodies, Fire Brigades, Fire Consultants, Local Authorities and Manufacturers. There was considerable interest in the workshops from all of these groups and 180 people attended one of the three events. One group that was not as well represented was Fire Consultants however this group formed around 20% of the 52 internet respondents. The total number of people who contributed to this process was greater than the number of responses received to the formal consultation carried out for the previous full review of Part B.

Fire safety is a very broad subject and this was reflected in the wide variety of issues addressed and comments made. However, some strong common themes did emerge:

### **Fire Safety Management**

The vast majority of delegates strongly thought this issue needed to be addressed. Views about what should be done in Part B varied widely but there was a common theme that information about the fire safety design of the building must be passed on to the person responsible for its management. This was felt to be essential given the move to a risk assessment based regime for fire precautions in buildings in use.

### **Residential Sprinklers**

This was clearly a very topical subject; many delegates were disappointed that recent research indicated that their widespread use would not be cost effective. Their potential use as a compensatory feature was raised with delegates but there was no clear consensus as to what design freedoms would be acceptable. Many delegates felt that open plan layouts were popular with designers but there was concern that sprinklers would not prevent escape routes becoming smoke logged.

### **Means of Escape for Disabled People**

It was clear from the comments made that current guidance on this issue was inadequate and is an issue that should be addressed. One of the main difficulties concerns how people are assisted from refuges to a final exit. This is generally regarded as a management procedure but there may be built-in solutions that could facilitate this process and guidance was required. The use of lifts was thought to be the ideal option but the potential costs may be prohibitive.

### **Smoke alarms**

Delegates felt that for single owner occupied dwellings the current situation was very effective. This was borne out by the statistics. It may be that there is little room for further progress. It was suggested that increasing the coverage of alarms in new homes may not have a significant impact. The real problem was with older homes that had no alarms at all. Further education campaigns may be the answer.

### **Internet questionnaire: Set questions**

To try and better understand the sway of opinion for each question the view of each category of occupation was analysed. The respondents were divided into the following categories of occupation. Architects, Manufacturer, Health and Safety Officer, Fire Consultant, Building Control, Fire Brigade, Other (containing any occupations not previously mentioned).

### **Structure of Guidance**

Most of the occupation categories agreed that the AD B would be improved by splitting it into two sections. It was felt to be important that the split should mirror the division in other Approved Documents. Some categories felt that the split could go much further with a separate guide for each Purpose Group. Of the respondents to the Internet questionnaire it is notable that those people who use the AD B on a daily basis (Building Control/Fire Brigade personnel) were less supportive of a split than people who use it less frequently.

### **Clarity of content**

Most categories did not express a strong opinion but did agree that the AD B is easy to understand. The Manufacturers that responded disagreed but not strongly.

### **Levels of fire safety for people in and around buildings**

Most of the respondent categories agreed that the AD B does provide adequate levels of fire safety for people in and around buildings. The Health and Safety category disagreed although there was only one respondent in this category.

### **Increased protection for vulnerable groups**

Overall the view of the respondents was that the AD B should provide greater protection for vulnerable groups. The respondent in the Health and Safety category disagreed.

### **Levels of safety for fire fighters**

The only category of occupation to disagree that the AD B provided an adequate level of fire safety for fire fighters was the Fire Brigade although most categories had no strong opinion.

### **Local Acts**

All categories agreed that Local Acts cause unnecessary problems for developers although the Building Control and Fire Brigade categories did not express a strong view.

### **Further guidance on means of escape for disabled people**

All categories agreed that the AD B should provide more guidance on means of escape for disabled people.

### **Further guidance on material alterations**

All the categories except Building Control agreed that the AD B should provide further guidance on material alterations and historic buildings.

### **Creation of a new requirement for fire fighting equipment and automatic fire suppression systems**

All the categories agreed that the AD B should include a new requirement except Building Control but it was not a strong disagreement.

## **Appendix A – List of comments and suggestions for the review of Approved Document B**

The following comments / suggestions were received from Stakeholders via the questionnaire and workshops. All comments / suggestions have been “cut and paste” directly into this appendix without being edited (other than to expand acronyms) and are the views of stakeholders and not necessarily those of either BRE or ODPM.

### **General comments**

With the developing idea that the designer should create a correct design, AD B should be more generic. If a division is made then the short version could be limited to 1 – family houses, probably the detached house.

The importance of workmanship could be stressed somewhere near to beginning of the document.

The use of Roman numerals for the identification of sub-clauses may be thought a touch out of date.

Water mist in residential applications. Full scale experiments have shown that it will be very dangerous for people to be in the same volume of the building as a small fire and with a water mist system in operation.

Integration of Section 20 London Building Act into the Building Regulations. If there are safety benefits to be gained on large buildings by placing additional controls over fire fighting access, facilities and compartmentation etc, then should not be limited to London

Guidance on sprinklers/fire resistance trade-offs.

Guidance on residential sprinklers/Means of Escape trade-offs (travel distance & protection of routes). Current policy is vague – Building Control Bodies vary in their acceptance of sprinklers as an alternative to protected escape routes.

Around 70% of fire deaths occur in the residential sectors. The success of the smoke detector campaign is there for all to see. We believe that this success could be greatly improved upon if sprinkler systems were introduced into the residential sector, particularly in social housing and the residential care homes areas. It is interesting to note the views of the Scottish Parliament following the recent tragic experience there. Additionally, we would wish to see the provision of sprinklers extend into all new public and private sector housing.

Factories and warehouses is an area that has given further rise for concern. You will recall that the 2000 revision included changes to the provision for sprinklers in single storey retail premises following a number of high profile fires, some of which resulted in the deaths of fire fighters. We see no distinction between the risks posed by similar buildings in the storage and industrial purpose groups. Indeed, there have been fire fighter deaths in fires in these groups in fairly recent times. We see this as an opportunity to introduce the provision of sprinklers into these areas both as a risk to fire fighters and to reduce the costs of fire overall.

Fire damage in schools in 2003 is estimated at £93m and continues to rise. This does not include the cost of relocation, transport etc. The losses to the pupils and teachers' work are immeasurable. I am working on behalf of the Chief Fire Officer at the moment on an initiative to persuade all our Local Education Authorities to include sprinklers in all new, and major refurbishments of, schools. This is meeting with considerable success. We would wish to see this reflected in the revised Part B.

The provision of sprinklers to extend to far greater range of building types than present. In particular, the Fire Service would wish to see this provision extend to warehouses, factories and schools. Sprinklers offer a degree of control and help to provide for health and safety of persons in and around buildings and thus offer greater protection to fire fighters as well as providing the additional benefits of reducing environmental damage and contributing to the sustainability of buildings.

Further and stronger emphasis of the need for the additional elements of life safety provisions for sprinkler systems. This element is frequently ignored by developers and certain Building Control bodies. It is an essential addition that ensures system availability. This could be achieved by moving the requirement into B1 rather than B5.

Sprinklers to be provided for all new housing both in the private and public sectors. Sprinklers to be provided in all new social housing. Sprinklers to be provided in all new residential care premises and retro fitted in certain cases. Sprinklers to be provided in Houses in Multiple Occupation as it here that around 70% of fire deaths occur.

With the use of Building Bulletin 98 and acoustic designs for schools, and the likely less open plan classrooms, can a degree of fire resistance be built in to give further protection both on acoustic front and also for damage limitation

The issue of 'risk' needs much more detailed guidance - especially when 'fire engineered solutions' are not used to assess the adequacy of means of escape. This will be particularly important with the repeal of the Fire Precautions Act 1971 and the uncertain future (or potential for confusion if they remain) of the associated Fire Precautions Act guidance documents

In the light of the events of 11 September 2001 close consideration needs to be given to;

- i) the validity of placing all means of escape routes within the centre-core of tall buildings and whether in future such designs might be prescribed by the height of the building, and

- ii) current assumptions in Approved Document B relating to height specifications for the provision of fire fighting shafts and lifts for use by the fire service, and
- iii) current assumptions in Approved Document B relating to height specifications for the provision of compartment floors for office buildings, and
- iv) the provision of fire service access to and within tall buildings, and
- v) the provision of fixed fire-fighting and fire suppression systems in tall buildings, and
- vi) acceptable methods of providing durable fire resistance to structural steelwork, and
- vii) phased evacuation of tall buildings.

We have noted that the Buildings Division have let a three-month contract to establish a scoping study to assess the current work on the safety of tall buildings and to identify specific issues on which research was needed. We hope that this work will be available for consideration by the BRAC Part B Working Party. We believe that this is an extremely important issue and we would wish to see it fully debated and developed within the BRAC Part B Working Party

In the light of increasing pressures upon building designers and developers to take building security into account, plus given the progress of the Sustainable and Secure Buildings Bill which appears to be well on its way to becoming an Act and which will place an emphasis into the Building Act 1984 on the security of buildings we believe this issue must be discussed by the BRAC Part B Working Party. Increasingly fire fighters are attending incidents in buildings which have been secured at the end of the working day or week and which they then have to force an entry into often causing a considerable time delay between their arrival on site and the time that they can commence to tackle the fire.

Many single storey industrial type buildings are now being built with no fenestrations at all in the outer façade or roof, other than the fire exit doors at ground level which in turn are often secured internally by security shutters to prevent burglaries through them when the building is unoccupied. Where buildings cannot be entered easily or where there are no openings by which the fire service can ventilate the building then we have a situation where fire fighters are placed at considerable risk of either a flashover or backdraught occurring when they finally break into the building. As a result and in the case of high security buildings we believe the BRAC Part B Working Party will have to contemplate other methods of controlling the growth of a fire while fire fighters effect an entry to the building.



We would strongly recommend that Approved Document B once reviewed recognises and states quite clearly and unequivocally that the safety of fire-fighters both when carrying out rescues and fire-fighting is a legitimate and statutory concern that should be given full and proper consideration by all those who design and construct buildings

We would recommend that Approved Document B be extended to include a section of recommendations on fixed fire fighting systems. By that we mean non automatic fire fighting systems intended for use either by properly trained occupants of the building or fire fighters and includes;

- hose reel systems, and
- foam injection or foam pourer systems, and
- dry or wet risers (and their storage tanks and supply systems in the case of wet systems), and
- non automatic water or foam drencher systems, and
- all inlet ports, gates or valves associated with such systems.

We make this recommendation on the basis that these are fixed fire-fighting systems, i.e. non portable, which often form part of the structure of a building and it thus makes good sense to include them into a design and construction programme rather than attempt to install them after the event.

We believe, as we said above in paragraph 2.10.1, that the Approved Document could usefully be extended to contain recommendations relating to the provision of fixed fire fighting systems (e.g. hose reels, foam pourers, drencher systems) that are manually operated (i.e. by suitably trained staff or fire fighters). Equally, such a provision could be applied to automatic fire suppression systems (sprinklers, gaseous, foam and dry powder systems) which are currently linked to compartmentation. Both types of systems are best inserted during the building programme for premises rather than after they are fitted out.

We have also considered how this requirement might be included in a revised Approved Document if the BRAC Part B Working Party were minded to agree with it and it seems that there are two possible options. As fire fighting and fire suppression systems are really there to restrict the growth of the fire by active intervention and assist the fire service in doing so by providing a means of delivering a fire extinguishing medium to the fire area from a safe location than you could perhaps, extend B5 to capture them.

However, a more pragmatic approach might be to create a sixth functional requirement to deal with restricting fire growth through the use of fixed fire fighting and fire suppression equipment. We understand that some may well argue that Requirements B2, B3 and B4 do this by dealing with the potential for spread of fire, but we would argue that fire growth is a different matter to fire spread although the two are clearly interrelated. For instance compartmentation is provided to restrict fire spread to a predicted area, but cannot restrict fire growth within that given area which is supposed to be of a size that the fire service can realistically deal with a fire in

An issue which will come to the for more and more in the future with a greater reliance on a move to risk assessment of fire safety measures by building occupiers and an integrated risk management approach to fire cover by fire authorities is the need for the fire authority, the building control body and the building occupier all to be completely aware of all the fire safety measures that have been placed into a building and the need to manage them and maintain them at peak operating efficiency.

To this end it will become increasing important that the building designer and developer hands over a comprehensive and detailed fire safety completion document or manual for a building when completed to those bodies or individuals. This should include accurate details of all fire safety measures installed, their location and their maintenance and testing schedules, plus any fire safety product, or installation, certificates issued by contractors. This is a matter that we believe the BRAC Part B Working Party should address and we recommend that they give consideration to it

Hospitals; If it was intended that HTM 81 satisfies only B1 and that AD B should be used in relation to B2 – B5, this needs to be made clearer.

Similar requirements to those contained in AD L of the Building Regulations should be included for fire safety matters in AD B with “A Competent Person” being defined as installers in UKAS accredited schemes that include random inspections of work and that valid Certificates of Conformity be required by the regulatory authorities to clearly define the standards provided in the building.

We recommend that CE marking be made mandatory for fire protection materials and products.

## **GENERAL INTRODUCTION**

0.10 There are definitions throughout the text, and in an appendix. Could these all be collected instead of a few in the introduction and others elsewhere.

0.11 Should Fire Engineering be given a higher status?

0.14f The adequacy of a structure to resist the effects of a fire should include adequacy to protect against associated or subsequent events such as progressive collapse.

0.14m The importance of changes in management might be emphasised

## **B1 MEANS OF WARNING AND ESCAPE**

### **B1 Introduction**

B1.iii The statements here seem somewhat vague and clearer guidance might be preferable

B1.ix Multiple fires may start as a result of terrorist attack

B1.xii The matter of using lifts for general evacuation

B1.xv The possibility of progressive collapse might have to be considered in relation to protected stairways

B1.xvi More co-ordination is needed with Part M

Review interface between Approved Doc M and Part B

B1 xvii My understanding is that it was the intent of the last paragraph of this clause to apply to dwelling houses and flats and maisonettes (not the common escape doors only the doors to the units). Because of the wording in the last paragraph, Building Control Bodies want confirmation that the locks to the front doors of flats and maisonettes are not to be controlled.

Table 1 The storey and exit and stair widths determine the capacity of a storey as within reason the applicant can decide on the occupancy factor; is it the role of Building Regs to deal with overcrowding. For assembly buildings I can see an overlap with entertainments licensing and comfort for occupants but for commercial buildings I have my doubts.

Why are shops in converted shopping complexes excluded? Remove reference to malls?

## **B1 Section 1**

1.4 Why are smoke alarms to be mains operated with battery back-up as an option. Should this not be compulsory

1.11 The required coverage of smoke alarms (or Carbon Monoxide alarms) is very poor at present. Coverage should be influenced by type of house and the type of occupant(s).

audibility and provision of alarms in flats/corridors

1.25 The meaning of this paragraph is not clear

1.32 The concept of the building log book could be introduced here

## **B1 Section 2**

2.9 Refers to sleeping galleries: several Building Control Bodies believe that this allows galleries that are later used for sleeping to slip through.

Refers only to galleries in houses and that the gallery should not be more than 4.5m above ground level; I understood that the principle was to apply to houses and flats at any height – I do not believe that persons would be at risk.

2.11 Guidance is required regarding provision above first floor level - to provide or not to provide, that is the question - whether it is safe to do so .....

Locks on escape windows - I have been told ( only hearsay) that one major Building Control Boards Body is requiring window locks to be filled with glue so that they cannot be used

Restrictors on egress windows – inconsistency of interpretation for first floor windows.

Egress windows – a note suggesting that it is imprudent to use them above 2 storeys

Any window provided for emergency egress purposes and any external door provided for escape purposes should comply with the following conditions: The window should have an unobstructed openable area that is at least 0.33m<sup>2</sup> and at least 450mm high and 450mm wide (the route through the window may be at an angle rather than straight through). The bottom should be not more than 1100mm above the floor.

2.12 was the title meant to include **Additional**.

Confirmation that egress windows can be omitted when a protected route is provided

2.13 Rising butts are referred to in relation to houses only. Rising butt hinges are referred to in Section 2 for Dwelling houses specifically. There is no specific reference in Section 3 Flats and Maisonettes. The definition of an “automatic self closing device” “allows” rising butts to and within dwellings which I take as to and within flats as a “dwelling” by definition does not exclude flats and maisonettes. A “dwelling-house excludes flats and maisonettes.

The use of rising butt hinges in dwellings conflicts with the necessity for automatic closing devices to positively close the door past the latch

2.14 Single stairs and 4 storey dwellings – current Associated Corporation of Approved Inspectors District Surveyors' Association ACAI / DSA agreed policy regarding additional features to obviate an alternative escape

### **B1 Section 3**

3.11 What is the escape route in an open plan flat – this arose when a massive beam in a flat resulted in headroom of 1.6m (5ft 4ins). I think “buyers beware” but head height is queried on occasions

3.23 Guidance on the use of smoke shafts as a solution to corridor / lobby venting.

Clear guidance on controls for open able vents (position of controls and height of windows)

Stairwell ventilation – situated at storey level or at top?

3.47 Live/work units – guidance on means of escape needed.

#### **B1 Section 4**

4.6 45 degrees + 2.5. Personally, I have never known it to be enforced

Compensation for dead end fire resistance can be achieved with Automatic Fire Detection (AFD) on both sides of doors and assist in design freedoms approach.

4.12 Allowance of two doors is not permitted due to pathway route and the likely event to make the self closing devices in effective. However, when exit route is via an upper direction of one level this should also be not permitted as it is not good design.

Table 3 Travel distances to be re-considered as a measurement of time as opposed to a distance ready for the guidance being prepared for new Regulatory Reform Order (RRO) legislation

Table3 limitations on travel distance:- Note 6 should contain a reference to the guidance contained in 'Fire Precautions in Warehouses and Distribution Buildings' published by the Fire Protection Association. It should also remind the reader that in order to determine the level of risk within premises, the 'Guide to fire precautions in existing places of work that require a fire certificate factories offices and shops' issued by the Home Office/Scottish Office, should be referred to. This guidance suggests that for buildings where a very rapid spread of fire can be expected would tend to fall outside the description of 'normal risk'. Therefore care should be exercised in determining 'risk' when the use of high-rack storage systems in non-compartmented buildings is proposed (see Warehouse Guide paragraph 1.5) and AD B should emphasise this. Furthermore, the issue of risk should be further emphasised in view of the changing nature of the contents of storage and distribution buildings. This may well affect the risk in case of fire to persons in such buildings, much more so than many others; however, such changes may not always require Building Regulations approval.

#### **B1 Section 5**

5.14 Calculation of uneven floors. Commentary/example required regarding uneven numbers within middle of building

Table 7 Does this need to be reviewed for buildings with more than 10 storeys

5.17 The influence of goings and risers is, I think, being reviewed by someone

5.18 Does phased evacuation need to be re-considered

Worked examples These are very useful and might be of benefit elsewhere although the document does not want to be much longer.

#### **B1 Section 6**

6.14 Should not all doorways and exits open outwards?

6.19 Mixed use buildings – use of common staircases and lobby/venting provisions

6.25 External escape stairs. Do we need fire resisting glazing when a building is highly compartmented, e.g. flats, and where there are two or more stairs

Diagram 22 1.8m provision for openings within escape routes – does this apply at ground floor level – clarify.

6.39 The matter of using lifts for general evacuation was, I think, mentioned as a possible topic for consideration

## **B2 INTERNAL FIRE SPREAD (LININGS)**

### **B2 Guidance**

We believe that these factors should now become a series of recommendations in the Approved Document. They were omitted from the amendments to AD(B) to bring it in line with the European Fire Standards which we accepted at the time. However, we now believe that this is the opportunity to deal with these issues once and for all. We are aware of fire safety products that when exposed to heat or flame pass the prescribed fire test to which they are being subjected, but produce copious amounts of toxic smoke or drip flaming droplets neither of which are commented upon in the test report as it does not form part of the fire test. We believe that all building products used as wall or ceiling linings should be subjected to both the smoke and flaming droplets tests and their results displayed. The Approved Document should then set acceptable levels of safety for the use of these products, particularly in circulation areas and escape routes

B2.iv Are there any specific references to furniture and fittings that might be given

## **B3 INTERNAL FIRE SPREAD (STRUCTURE)**

### **B3 Guidance**

a Is there any evidence as to whether the periods given for the integrity of load bearing structures are appropriate

### **B3 Section 8**

Concerns have been expressed about the very high level of fires in educational premises, particularly the high incidence of those caused by arson. School fires caused by arson are continuing to increase and also the time frames for such fires appear to be shifting from outside of normal school hours when buildings were unoccupied to times when both students and staff are still on site. Thus the life threat of such fires is increasing.

This problem was demonstrated recently in a fire in a school in South Wales where a teacher had to be rescued by fire fighters from a flat roof of one of the school building where they had become trapped by the fire.

Currently, the Approved Document recommends that new school buildings be separated into fire compartments every 800m<sup>2</sup> but, unusually, there is no allowance to double that size by the fitting of an automatic fire suppression system. As a result we believe that there is an urgent need for the consideration of a combination of active fire suppression systems linked to improved passive fire suppression systems to be introduced into the Approved Document based around the existing compartment size to deal with the level of such fires.

It is understood that the Department for Education and Skills (DfES) is currently employing fire safety consultants to draw up a replacement fire safety guidance document along the lines of their previous guidance document for Local Education Authorities, Building Bulletin No. 7 - Fire and the Design of Schools.

It may be that once finalised this guidance document could be called up as approved guidance in the revised Approved Document. If that is the intent, then we believe that the DfES must put their proposed guidance document out for public consultation and scrutiny and act upon any comments that they may receive before it achieves such status in the Approved Document.

We have concerns regarding the ability of portal framed buildings to resist fires before collapsing inwards. We also accept entirely they are a very popular and commonly used building method and form a large part of the new build commercial and industrialised building stock.

However, when unprotected from fire they are prone to rapid collapse which tends to bring the roof of a building down upon the fire thus proving extremely dangerous for fire-fighters and upon collapse often causing them extreme difficulties in reaching the seat of a fire to extinguish it.

Fires in such buildings in the past have often meant that fire service resources are retained on site for days whilst heavy lifting gear is brought in to raise the collapsed roof sections off the fire.

We recommend that the BRAC Part B – Working Party should consider this situation in the light of the problems that we have outlined with a view to increasing the degree of structural fire protection recommended for the elements of structure forming part of portal frame type building systems

8.5 Use of Euro Code 1 ; a brief description for information ;clarification in its use , e.g. is venting via windows and or non-fire resisting construction, impact of obstruction/sealing windows and the like; need to pass on information to subsequent owners/occupiers

8.8 AFD allows up to 20m travel distance. Taking account of 8.8 what happens over this size? Larger area still needs early warning of fire

### B3 Section 9

Our concerns revolve primarily around the lack of a predicted compartment size for single storey storage buildings in Approved Document B. This lack of constraint upon floor area compartment sizes and indeed a height limit enables the construction of extremely large and tall storage buildings which are only restrained in their horizontal dimensions by the travel distances imposed for means of escape in case of fire purposes.

This lack of control has produced some gigantic storage and distribution buildings, particularly in areas where there are no local acts controlling the size of such developments.

It is strongly felt that in the event of a fire affecting such a large building it would pose major fire fighting difficulties for the fire service and substantial hazards both to the local area and to the safety of firefighters who entered such a building to carry out rescues if persons are unaccounted for or to attempt to fight the fire.

There is also a very real danger of damage and disruption to, adjacent buildings and communities, local transport infrastructures in the vicinity and to the environment, by such a fire.

We also note with concern that access to such buildings for the fire service may not be to 100% of the perimeter despite their huge floor areas. There are also issues of concern surrounding the mezzanine floors which are often found in these buildings both in terms of means of escape and when these floors are become floors for the purposes of the Approved Document and thus make the building a multi storey building.

It is strongly recommended that;

- i) a fire compartment size based upon **cubic capacity** should be reinstated for single storey storage buildings within the Approved Document, and
- ii) such a compartment size should also be based upon the ability of fire fighters to actually control a fire in such a building, and
- iii) for this, evidence will need to be taken from the recent Building Disaster Assessment Group (BDAG) trials of physiological testing of fire fighters.

Doubling of compartment sizes in such buildings should only be permitted with the agreement of the fire authority and subject to the fitting of automatic fire suppression systems. Our view is that until this matter is addressed those local acts which currently control the size of such buildings should not be removed.

Suggestion for fire damper section for inclusion in Approved Document B: Any openings in a compartment wall or floor or cavity barrier that are used for air transfer whether ducted or un-ducted must be fitted with a suitably mounted automatic fire damper.



Automatic refers to the provision of a fusible link as a minimum, with consideration given to electrical release/actuation for fast response to smoke in the early development stage of the fire.

Any fire dampers selected shall be tested to, or be assessed in accordance with, BS EN 1366-2:1999, *Fire resistance test for service installations- part2: Fire dampers*. Any classifications for fire dampers shall be to BS EN 13501-2: XXXX, *Fire classification of construction products and building elements, Part3 – Classification using data from fire resistance tests on components of normal building service installations (other than smoke control systems)*.

Fire resistance periods for dampers must meet (as a minimum) those for the compartment wall, floor or barrier into which the units are to be installed (see tables A1 and A2).

Fire dampers shall be installed in accordance with the manufacturers' recommendations, which shall reflect their tested or assessed method. Classification should be E for standard dampers and ES when a low leakage version is required.

There is no requirement for an Insulation (I) classification. Depending on the class of ductwork into which the fire damper is fitted it may be necessary to evaluate its structural stability and performance to the requirements of BS EN 1751:1999, *Ventilation for buildings-Air terminal devices- Aerodynamic testing of dampers and valves*.

Fire dampers shall be installed and shall be given adequate access to allow full proper inspection of the unit and shall be properly maintained following the recommendations stated in BS5588-9:1999, *Fire precautions in the design, construction and use of buildings – Part 9: Code of practice for ventilation and air conditioning ductwork and Part 4: Code of practice for smoke control using pressure differentials*.

Note: references in BS5588-9:1999, *Fire precautions in the design, construction and use of buildings – Part 9: Code of practice for ventilation and air conditioning ductwork* to fire dampers in respect of BS476 part 20 should be ignored, as this has only been an ad hoc procedure without specific reference to fire dampers, now that the relevant European standards specifically for fire dampers have been published. References to BS ISO 10294 are still relevant as they are published British Standards that are almost identical to the European ones, providing that furnace control test data reflects the use of the plate thermometer.

9.8 Review definition for atria, and remove “where breaches compartmentation floors”. Apply BS 5588 part 7 to all such areas

9.12 Places of special fire hazard – can be misleading as other codes/guides recommend a much higher standard depending on the installation; suggest a note to highlight this is added

9.15 The omission of the fire resisting property in flat doors could be reduced if residential sprinklers are installed. This omission could apply especially to the 60 minute doors needed as front doors!

Diagram 26 The shading should be defined and in the sketch of a two storey basement the intermediate floor may be a structural support for the retaining walls and is hence as important as the ground level floor

Table 12 Why are there no compartments on the floors of multi-story buildings

From table 12 compartmentation is 800m<sup>2</sup>. What about new school sports halls

In view of the requirements in many 'local acts' such as s53 of the Leicestershire Act, the dimensions in table 12 is not consistent and should be reviewed. The ability to build very tall single storey buildings (e.g. 30 metres high) should be acknowledged in the review of AD B; as the 'fire cube' can now be significantly different in modern single storey warehouses and distribution centres than was previously experienced. Is the 'no limit' still acceptable for single storey storage buildings particularly in view of some buildings now being built well in excess of 100,000m<sup>2</sup>?

More guidance is required on the subject of mezzanine floors and storage platforms e.g. when a mezzanine is classes as a floor, and can therefore bring such a building outside the description of 'single storey'. This is also particularly relevant to the issue of fire-fighter access.

For single storey building there is currently no limit to the compartment size with specific groups. Access and fire loading can make this intolerable risk for fire fighting

9.28 Separation of roof voids over flats and the use of compartment floors in these cases

Diagram 27 Greater clarity and better drafting are needed here

Diagram 28 The phrase '...may be needed to delay distortion....' is too vague

9.43 The external wall of a protected shaft may provide stability for the other walls and hence may need fire resistance

Diagram 31 Greater clarity and better drafting are needed here

Diagram 32 Greater clarity and better drafting are needed here

Diagram 34 The required properties of a sub-division are not immediately apparent

10.9a If a building has been constructed to comply with Parts A and C of the regulations there should be no movement due to subsidence or movement due to wind

10.11d There is reference in Part C to the importance of venting all voids below ground to prevent the build up of ground gases

### **B3 Section 10**

Diagram 33 Top storey ceilings on 3 + storey dwellings – their use in lieu of protected shaft

### **B3 Section 12**

12.2 Reference could be made to a recent publication from the Institution of Structural Engineers on the design of multi-storey car parks

## **B4 EXTERNAL FIRE SPREAD**

### **B4 Section 14**

14.2 Recommend space separation between all buildings on a site irrespective of their ownership and use – this is what the current Regulation requires

14.9 The text was discussed at a recent seminar – it causes confusion: can the Class O be on combustible material

## **B5 ACCESS AND FACILITIES FOR THE FIRE SERVICE**

### **B5 Guidance**

B5.iib The reader should be reminded that where a ‘fire engineered solution’ has been adopted for compliance with means of escape requirements, then this would tend be considered as outside the realms of ‘normal means of escape’. In such circumstances therefore, extra facilities may need to be considered in consultation with the fire authority such as: smoke ventilation, sprinklers, other facilities etc or combinations of such systems

In view of Northamptonshire’s recent experience in the design and construction of a very large ‘cold store’ facility for a large supermarket chain and the fact that this building is increasingly not unique, the ability for fire service personnel to enter cold storage facilities or other special/specific risks needs to be given greater consideration and therefore mentioned in the AD B (note also oxygen depleted atmosphere techniques).

In view of the need for managers of all buildings to establish an ‘emergency plan’ the task of managing an incident at a very large building is increasingly important and extremely difficult. Hitherto there has been lots of experience of design and construction of ‘control rooms’ and similar facilities in shopping centres and other large and complex buildings - this should become more important in premises such as warehouses that spread over a considerable area and, in the event of a fire, pose significant risks to the environment and local communities. Is the AD B and Building Regulations the place to consider/address the important issue of ‘fire water run-off’ and problems of pollution? (I’m not sure that the ‘health and safety’ of the wider community is within the ambit of building Regulations)

### **B5 Section 16**

16.1 Provision of hydrant at the project expense should be applied to new schemes when dry risers are fitted to new or altered buildings. This to be within 18 m of the access point / inlet for dry riser

### **B5 Section 17**

17.1 For clarification of what constitutes the site boundaries see the latest revisions Part C

Access to the open water and the provision of hard standing where open water is used for water supplies to satisfy fire strategies. Hard standing to be large enough to satisfy two pumping appliances, indicated as such and the access kept clear and available.

Access for fire appliances in relation to roads. By the time Building Control get to look at a layout, planning permission is normally granted and the highways authority consulted. To avoid costly and unnecessary re-design, a consultation with the fire authority at the planning stage would be helpful

Where high reach appliances are not satisfied for access in calculation of the perimeter, the provision of sprinkler systems to be mandatory. This being to limit any possible fire size (reduce risk) thus less likely requiring high reach appliance. This being that the building is provided with sufficient internal fire mains and other facilities to assist fire-fighters in their tasks as detailed in the Secretary of States comments in the start of B5

Table 20 The requirement for less than 100% perimeter access to buildings between the range of floor areas of 8,000m<sup>2</sup> and 24,000m<sup>2</sup> should be reviewed in light of the increasing height of such buildings and anecdotal evidence from fire services

17.2 AD B refers to diagram 48 - but there is no cross reference to the clause; and the link is not apparent to me

17.3 Fire service hose coverage – should be to all parts of flats and maisonettes – not the front door

Diagram 49 Account for practical operation of appliances and hence measurements e.g. widths of jacks, and that jacks are not supported by pavements

### **B5 Section 18**

18.1 With technology changing for lifts and that there is sometimes no lift motor rooms installed, it is therefore very critical where lift control panels are now sited, and especially for the fire fighting lifts. This to be addressed with suitable fire protection

Diagram 52 The fire main should be shown in the fire fighting lobby

### **B5 Section 19**

19.1 would it be possible to note a reference to BS 7346-7

## **APPENDIX A**

We observed through an article published in the September 2002 issue of *Fire Prevention and Fire Engineers' Journal* that a vehicle fire had occurred in an open-deck car park in New South Wales, Australia. The fire had spread to a number of adjacent vehicles and due to radiated heat from the fire had also threatened an attached residential building. We also noted that the car park was atypical in that it appeared to be sub-divided into small wire mesh cage garages which were also used for the storage of tyres and other car parts by the vehicles owners and that under the legislation of applicable in New South Wales the car park was too small for fire sprinklers to be required. Nevertheless, this fire has tested the UK assumption that a fire involving a car in a car park would not result in fire-spread to adjacent vehicles and that under normal circumstances, due to the size of the openings in car park walls, the threat to adjacent buildings from radiated heat energy would be substantially reduced. We have passed copies of the test reports carried out following the fire by colleagues in New South Wales to colleagues in the Buildings Division of the ODPM. We recommend that the BRAC Part B Working Party consider, in the light of this fire and also changes in motor vehicle construction which involves greater use of plastic body components and seating, whether they should reconsider the fire protection recommendations contained in AD (B) for open sided car parks and in the case of enclosed and underground car parks a requirement for the fitting of sprinkler systems.

## **APPENDIX B**

I propose that the restriction to only 25% of a compartment wall being uninsulated be removed where the building is sprinklered and where the fail safe position of the replacement wall/door is closed by gravity or by means which do not rely on a secondary power source

## **APPENDIX C**

Currently plant rooms solely on top floors allow the height of the building to be measured from the floor below. This should be removed on the basis that fire fighting is still required at this height for the plant rooms. As part of this height, dry risers would assist in this function. If not included, as part of the height of building and or not continued up to plant level, means greater difficulty to fire fighters in and around the building. Therefore on health and safety grounds feel that height of building now includes any plant and machinery, where a roof is provided over plant etc making it additional one or two floors on the height of a building

## **APPENDIX D**

Purpose Groups – coach parks. Are they outside the scope of the table; or are they storage and other non-residential? Although they might not be quite the problem I had previously thought, so very little information exists on them I question the adequacy of the AD B recommendations (as a whole) at this time

Student accommodation to be redefined when considering generically as a risk group. Only considered for one purpose group

## **APPENDIX E**

Guidance on when an entrance hall is considered a “room”/habitable space.

Mezzanine floors not covered in document, only as raised storage areas. Definition could be taken straight from out of BS5588 part 11

Gallery floors; open and closed aspects to be qualified for gallery floors definition in Appendix E

## **APPENDIX F**

We still have very strong concerns about the continuing lack of any real control over the use of large insulated sandwich panels (LISPS) in building construction. Whilst we appreciate that AD (B) calls up in Appendix F the guidance document produced by the International Association Cold Storage Contractors (IACSC) European Division) entitled “Design, construction, specification and fire management of insulated envelopes for temperature controlled environments” there is no recommendation in AD (B) which in effect makes the application of this document a recommendation to be complied with. There is also a genuine concern that designers see the IACSC document as applicable only to refrigerated storage buildings although a recent High Court case may have concentrated their minds upon the issue of sandwich panels. We are also concerned that the panel marking scheme proposed by the IACSC and designed to protect fire fighters by at least telling them which type of panel they are up against does not seem to have gained universal acceptance of the panel manufacturing industry. We would like to see far tougher controls over the testing (full scale tests would be preferable) marking and use of these panels through either the Approved Document or the Building Act