Analysis of responses to the draft

 BB100

*Designing and managing against the risk of fire in schools*

issued for public consultation in 2005

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**Executive Summary**

DCSF consulted on the 2005 draft of Building Bulletin 100 then titled, *Designing and managing against the risk of fire in schools,* between August and November 2005.

BB100 is quoted in Building Regulations, Approved Document B (AD B) on Fire as the normal means of compliance for school buildings with Building Regulation requirements on Design for Fire Safety. It is therefore an important part of the approval process carried out by Building Control Bodies.

There were 64 responses to the public consultation from a wide range of stakeholders.

The majority of respondents felt that life safety issues would have been better addressed if AD B of the Building Regulations remained as the primary source of guidance. Another frequently made comment was that the 2005 draft BB100 was too difficult to follow, due to its poor structuring, and that its format was unsuitable as a design document.

The final version of BB100 therefore incorporates more information from AD B to provide a comprehensive document for designers. However the risk-based approach to design remains. We have also restructured BB100 to make it more accessible to designers and easier to use as a compliance document.

The issue of fitting sprinklers in new or refurbished schools was foremost in many respondents’ concerns. Many felt that sprinklers should be compulsory. In March 2007, DCSF announced the new policy on sprinklers in schools. The provision of sprinklers will be based on a risk assessment and this will result in the provision of sprinkler systems in all but a few very low risk schools.

At the same time, DCSF published a risk analysis tool and a cost benefit analysis tool to be used to determine whether a school should be fitted with a sprinkler system and a report on the costs of sprinkler systems in schools.

The new policy on sprinklers reflects the many consultation responses which argued for more widespread use of sprinkler systems in new schools. Note that the consultation exercise took place in 2005, well before the DCSF announced its policy on sprinklers.

The inclusion of provisions aimed at property protection were generally welcomed, although a number of respondents highlighted the need for these extra requirements to be distinguished from those concerned with life safety. This is because the life safety requirements (compliance with the Building Regulations) are legally binding, whereas property protection is not. The final BB100 achieves this by colour coding the property protection recommendations so that they can be clearly distinguished from the life safety requirements.

A number of questions (eg, the use of robust materials) were uncontroversial, with almost all respondents in favour.

Since the public consultation the Department for Communities and Local Government has published a revised Approved Document Part B that came into effect in April 2007. This was the main reason for the delay in publishing the final version of BB100.

**Introduction**

This report is based on the 64 responses to the consultation document.

As some respondents may have offered a number of options for questions, total percentages listed under any one question may exceed 100%. Throughout the report, percentages are expressed as a measure of those answering each question, not as a measure of all respondents.

The organisational breakdown of respondents was as follows:

|  |  |
| --- | --- |
| Building Control | 2 |
| Designer | 4 |
| Fire & Rescue Service | 11 |
| LEA | 7 |
| Other - consultant | 3 |
| Other - fire engineers | 3 |
| Other - fire protect | 11 |
| Other - health & safety | 3 |
| Other - insurance | 3 |
| Other - miscellaneous | 5 |
| Other - personal opinion | 2 |
| Other - sprinklers | 4 |
| School | 6 |
| TOTAL | 64 |

As is clear from the above list, respondents in the “other” category accounted for over 50% of the total. For this reason, a further breakdown of the “other” category was provided.

The report starts with an executive summary, followed by a summary analysis of each question within the consultation.

Annex A provides a statistical analysis of responses by respondent ‘type’.

Annex B lists suggestions and comments made by respondents in answer to each question. This annex is intended to provide context to the summary and statistics.

Annex C lists all respondents to the consultation document. It also indicates which category each respondent comes under.

Annex D lists respondents who would like to be included in future research or receive further consultation documents.

**Summary of responses to the questionnaire**

**Question 1**

**Do you agree with the proposal that risk assessment should be the basis for designers to make their choices rather than a purely prescriptive approach which may preclude many of those choices?**

The responses to this question were:

46 (72%) Agree

2 (3%) maybe Agree (inferred from comment)

8 (13%) Disagree

3 (5%) Not sure

5 (8%) Nil / other response

A clear majority of the respondents **agreed**, however all the respondents from the sprinkler industry disagreed.

The respondents recognised the flexibility provided by a risk-based approach. However there was concern that the risk assessment should be comprehensive, competently conducted and consistent. The importance of an holistic approach was mentioned by several respondents. It was observed that the risk assessment would be complementary to the requirements of the RR(FS)O.

**Question 2**

**Do you agree with the proposals that both life safety and property protection need to be considered equally during the design process?**

The responses to this question were:

47 (73%) Agree

2 (3%) maybe Agree (inferred from comment)

12 (19%) Disagree

2 (3%) Not sure

1 (2%) Nil / other response

A clear majority of the respondents **agreed**.

Many respondents felt that life safety should be the main consideration but noted that the cost and impact on the community of property loss was also an important factor.

**Question 3**

**Do you agree to the proposal that smoke control measures should be considered and included if indicated by the risk assessment? This is particularly important as school buildings are becoming ever more complex, for example, including associated atria.**

The responses to this question were:

53 (83%) Agree

1 (2%) maybe Agree (inferred from comment)

3 (5%) Disagree

5 (8%) Not sure

2 (3%) Nil / other response

A clear majority of the respondents **agreed**.

Respondents were aware of the dangers of smoke and the importance of maintaining clear escape routes. Some were concerned with the interaction with a sprinkler system. Smoke control should be considered as part of the total design.

**Question 4**

**Do you agree with the proposal that sprinkler systems should be installed if indicated by the risk assessment?**

The responses to this question were:

50 (78%) Agree

1 (2%) maybe Agree (inferred from comment)

7 (11%) Disagree

4 (6%) Not sure

2 (3%) Nil / other response

A clear majority of the respondents **agreed**.

Many respondents felt that sprinklers should be installed in all schools as a matter of course. Some noted that they are part of the fire safety system of passive and active measures.

**Question 5**

**Do you agree that the guidance on fire detection and alarm systems is adequate?**

The responses to this question were:

33 (52%) Agree

0 (0%) maybe Agree (inferred from comment)

18 (28%) Disagree

10 (16%) Not sure

3 (5%) Nil / other response

A clear majority of the respondents **agreed**, however a significant number, representing all groups, disagreed.

Several respondents referred to BS 5839 part 1:2002, others suggested that the Fire and Rescue Services should be consulted. The section (8.1) needed to go beyond automatic detection to include manual systems (type M), delayed alarms, false alarms and alarm signals (eg, to prevent confusion with class change bells). A few respondents stated the guidance was not adequate, while others felt it was sufficient.

**Question 6**

**Do you agree that the guidance on sprinklers is adequate?**

The responses to this question were:

15 (23%) Agree

1 (2%) maybe Agree (inferred from comment)

36 (56%) Disagree

7 (11%) Not sure

5 (8%) Nil / other response

A clear majority of the respondents **disagreed** (including all the respondents from the sprinkler industry and most of those from the fire and rescue services), however a significant number agreed.

This attracted a number of detailed comments from the respondents. Many of the concerns have been addressed by the DCSF policy (announced in March 2007) that the provision of sprinklers would be dependent on a risk assessment. In late 2007, DCSF is also going to publish a document on *Sprinklers in Schools* in the SSLD (Standard specifications, layouts and dimensions) Series of publications. This will provide detailed guidance on the specification of sprinkler systems for schools including for boarding schools.

**Question 7**

**Do you agree with the proposals that there should be a package of measures available to the designer to reduce the effects of vandalism and arson as well as accidental fires? These include smoke tightness, improved security, good housekeeping and effective management, as well as detection and alarm systems and sprinklers.**

The responses to this question were:

58 (91%) Agree

2 (3%) maybe Agree (inferred from comment)

0 (0%) Disagree

2 (3%) Not sure

2 (3%) Nil / other response

A clear majority of the respondents **agreed**.

There was strong agreement, several respondents felt these measures would be a natural outcome of risk assessments and/or a holistic approach to fire safety and security.

**Question 8**

**Do you agree with the proposals to alter the critical angle to 90 degrees from 45 degrees when calculating alternative routes of escape?**

The responses to this question were:

16 (25%) Agree

1 (2%) maybe Agree (inferred from comment)

17 (27%) Disagree

22 (34%) Not sure

8 (13%) Nil / other response

**Undecided**. Most had no opinion and the numbers of those agreeing and disagreeing were very close.

This was seen as a technical question which many respondents did not feel qualified to answer. Those who did respond either supported the increased level of safety or were concerned that it would be restrictive to designers. Consistency with AD-B (which uses 45°) was suggested several times. In the final published BB100 the 45° angle has been retained for consistency with AD B.

**Question 9**

**Do you agree with the proposals for measures to allow designers greater freedom without increasing the risk with respect to fire resistance (Appendix B)? For example an alternative to providing full compliance with the insulation criterion, especially in the design of escape routes.**

The responses to this question were:

39 (61%) Agree

1 (2%) maybe Agree (inferred from comment)

12 (19%) Disagree

8 (13%) Not sure

4 (6%) Nil / other response

A majority of the respondents **agreed**.

Some of the respondents who agreed qualified their response with the proviso that sprinklers should be included. Several strongly disagreed giving detailed technical arguments (see Annex B).

**Question 10**

**Do you agree with the proposals that robust materials will meet fire requirements and withstand abuse will be acceptable?  For example, doors that cannot withstand impacts, glasses that cannot accept scratches and some single-skin lining materials should be restricted in use.**

The responses to this question were:

49 (77%) Agree

1 (2%) maybe Agree (inferred from comment)

4 (6%) Disagree

4 (6%) Not sure

6 (9%) Nil / other response

A clear majority of the respondents **agreed**.

Several respondents noted the flexibility that provision of sprinklers would give to selection of materials. Many of the responses were cautious, saying materials should be fit for purpose, which should include fire safety requirements or that materials meet appropriate standards. Some detailed corrections to the technical data in Appendix C were given.

**Question 11**

**Do you agree that the guidance in BB100 is suitable for it to be used in place of Approved Document B, Fire Safety?**

The responses to this question were:

16 (25%) Agree

1 (2%) maybe Agree (inferred from comment)

30 (47%) Disagree

11 (17%) Not sure

6 (9%) Nil / other response

A majority of the respondents **disagreed**, however a significant number agreed, including all the respondents from the insurance industry.

Many respondents felt the current version of BB100 needed significant further work and several suggested restructuring the document following AD-B. Some suggested that BB100 should “supplement “ AD-B while others considered it should be an alternative. The final BB100 reproduces the relevant parts of BB100 and adds to them to give recommendations on property protection and school specific guidance.

**Question 12**

**Are there additional changes you would wish to propose to the draft guidance as written? For example have you found the guidance clear and easy to follow in this format?**

The responses to this question were:

22 (34%) Agree

4 (6%) maybe Agree (inferred from comment)

17 (27%) Disagree

11 (17%) Not sure

10 (16%) Nil / other response

A small majority of the respondents **agreed**, however many were not sure or made an ‘other’ response. Note that this is in fact two questions, where “agree” could indicate additional changes proposed, or “disagree” meaning the guidance was unclear in its current format.

While some of the respondents were content with the guidance many suggested restructuring the document to make it clearer and easier to use as a design document. Several provided very detailed comments noting omissions and errors (Annex B). These comments have been taken on board in the final revision of BB100 which closely follows the AD B structure.

Annex A

**Responses to the consultation - statistics**

**This Annex provides a breakdown of the responses to each question, by respondent category. Five possible responses are tabulated, as follows:**

A Agree

(A) maybe Agree (inferred from comment)

D Disagree

N Not sure

other Nil / other response

**Question 1**

**Do you agree with the proposal that risk assessment should be the basis for designers to make their choices rather than a purely prescriptive approach which may preclude many of those choices?**

The responses to this question were:



A clear majority of the respondents **agreed**, however all the respondents from the sprinkler industry disagreed.

**Question 2**

**Do you agree with the proposals that both life safety and property protection need to be considered equally during the design process?**

The responses to this question were:



A clear majority of the respondents **agreed**.

**Question 3**

**Do you agree to the proposal that smoke control measures should be considered and included if indicated by the risk assessment? This is particularly important as school buildings are becoming ever more complex, for example, including associated atria.**

The responses to this question were:



A clear majority of the respondents **agreed**.

**Question 4**

**Do you agree with the proposal that sprinkler systems should be installed if indicated by the risk assessment?**

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A clear majority of the respondents **agreed**.

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**Do you agree that the guidance on fire detection and alarm systems is adequate?**

The responses to this question were:



A clear majority of the respondents **agreed**, however a significant number, representing all groups, disagree.

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**Do you agree that the guidance on sprinklers is adequate?**

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The responses to this question were:



A clear majority of the respondents **agreed**.

**Question 8**

**Do you agree with the proposals to alter the critical angle to 90 degrees from 45 degrees when calculating alternative routes of escape?**

The responses to this question were:



**Undecided**. Most had no opinion and the numbers of those agreeing and disagreeing were very close.

**Question 9**

**Do you agree with the proposals for measures to allow designers greater freedom without increasing the risk with respect to fire resistance (Appendix B)? For example an alternative to providing full compliance with the insulation criterion, especially in the design of escape routes.**

The responses to this question were:



A majority of the respondents **agreed**.

**Question 10**

**Do you agree with the proposals that robust materials will meet fire requirements and withstand abuse will be acceptable?  For example, doors that cannot withstand impacts, glasses that cannot accept scratches and some single-skin lining materials should be restricted in use.**

The responses to this question were:



A clear majority of the respondents **agreed**.

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**Do you agree that the guidance in BB100 is suitable for it to be used in place of Approved Document B, Fire Safety?**

The responses to this question were:



A majority of the respondents **disagreed**, however a significant number agreed, including all the respondents from the in insurance industry.

**Question 12**

**Are there additional changes you would wish to propose to the draft guidance as written? For example have you found the guidance clear and easy to follow in this format?**

The responses to this question were:



A small majority of the respondents **agreed**, however many were not sure or made an ‘other’ response.

Annex B

**Responses to the Consultation - Comments**

**Question 1**

**Do you agree with the proposal that risk assessment should be the basis for designers to make their choices rather than a purely prescriptive approach which may preclude many of those choices?**

Risk assessment is a necessary part of creating an adequate fire safety strategy for a school. It should only be undertaken by those competent to do so. However, risk assessment is subjective and so certain minimum measures need to be specified to ensure a consistency of approach. These measures set the baseline for fire safety. In view of the massive number of school fires, the consequent disruption to the education of children in those schools, the loss of community facilities and the economic losses, sprinklers should be a standard part of all fire safety solutions in new and refurbished schools.

[5]

Subject to intelligent acceptance of core requirements. Then the new guide will fall in line with recent codes allowing a more flexible approach.

[6]

A prescriptive approach has been used historically, however the more modern approach is more holistic, and is achieved by means of risk assessment. The risk assessment should be all encompassing taking all factors into consideration, giving a more balanced solution to risk.

[8]

We have assumed that as this question refers to designers it refers primarily to new build schools.

While we would accept that a true fire risk assessment (i.e. one that encompasses both life safety, property protection, the risks to the lives of fire fighters and others and the impact of firefighting activities) would be appropriate we also consider that it would be possible to fudge the issue by using that fact that there have been no deaths in school buildings in the UK since 1990 to suggest that there is no problem.

We believe that some prescriptive approaches must be retained in respect of school design if new schools are to be able to resist the consequences of fires - particularly those caused deliberately.

[10]

We agree that a risk assessment approach rather than a purely prescriptive approach is desirable.

However, as with Approved Document B clear and concise “prescriptive” guidance should be provided with the option to vary the recommendations by means of risk assessment or fire engineering. To provide for a consistency of approach some examples of the risk assessment process would be helpful.

The draft document does not provide clear and concise “prescriptive” guidance and does not provide meaningful guidance on how the need for sprinklers may be determined in the context of cost effective property protection.

[7]

The risk assessment should be a holistic approach which takes into account all relevant factors, such as occupant characteristics, the total package of fire protection measures and soft issues such as management. The approach to the risk assessment should follow that adopted under health and safety risk assessments whereby the objective of the assessment is not limited to merely preventing harm to people once fire has occurred but should begin with endeavours to eliminate or reduce the hazard itself. The risk assessment should not be used to justify a decision regarding fire precautions which has already been made or to justify significant departures from universally recognised good practice. The competence of the fire risk assessor and the ownership of the assessment should also be taken into account.

[14]

Provided risks are properly assessed. Guidance should draw out the following key risk factors:

* The probability of fire, including social and economic factors. For example 45% of school fires occur in seven metropolitan areas;
* the consequences of fire, especially if the school is a community assets and is used for a variety of community uses;
* to where staff and pupils can easily relocate;
* how quickly the Fire and Rescue Service can be expected to respond, bearing in mind the longer response time in rural areas

[15]

We partially agree

Minimum prescriptive solutions for fire protection can be a very useful tool to aid those architects and designers with minimal formal training in fire protection techniques. The protection of property may require higher minimum provisions than those in Approved Document B. Do note that there are minimal inclusions for property protection in the draft Guidance.

The insurers 12 Essential Principles are not even referenced in the draft guidance – despite being based on established actuarial risks.

However, we also recognise that risk assessment and the communication of hazards & associated risks are the basis of the Regulatory Reform (Fire Safety) Order 2005 - due to be enacted in Spring 2006. Therefore we tend to agree, assuming that the process will be wholly transparent.

Any Guidance for Schools should recognise the important details of the proposal to add a new Appendix G into Approved Document B – to communicate hazards and risks to the building user.

[16]

Whilst a risk assessed approach allows flexibility in design it is important to give guidance as to what is a reasonable level of fire safety. The draft at the moment does not do this and as such there is no bench mark to compare differing designs against. This makes evaluating a design and ultimately enforcing a reasonable level of safety almost impossible.

Risk assessment needs to cover the building when it is occupied and ‘loaded’ with combustible materials etc as opposed to a an ADB design for an empty building (i.e. ADB does not deal with contents). Therefore the risk assessment approach would need to be a continuing risk assessment and mesh in with the requirements of the Regulatory Reform Order.

[17]

Subject certain minimum standards as set out in the attachment to this note.

[18]

Where a risk assessed approach is utilised to provide ‘design choice’, it should not be done on a ‘ad-hoc’ approach. It is recommended that reference be made to BS7974 (Application of Fire Safety Engineering Principles to the Design of Buildings) which provides a structured ‘objectives-based’ framework for the application of fire engineering principles for the protection of life and property.

[19]

This method is no different to Approved document B where each section has the functional requirement that must be met and the commentary in ADB is only one method of satisfying the requirements.

BB100 appears to adopt this method and leads designers away from prescriptive measures, however the risk assessment method can be restrictive if the assessment has not been holistic.

[21]

The ASFP believes in a holistic approach to the fire protection of buildings, that is the most appropriate fire protection solution should be used to solve the problem at hand. This solution may involve passive and/or active fire protection systems.

[23]

Whilst risk assessment has its place there should be a standard minimum level of security and fire protection. Risk assessment should be reserved for additional measures to meet special needs, for instance when a school is for young offenders.

[24]

Using a risk assessment based approach allows for much greater freedom in the design and protection of schools. However it is important that recognised standards are used for the design and installation of fire protection equipment to ensure that unproven equipment does not get installed. We would suggest following the Approved Document B requirement that equipment be tested and approved by a third party certification body and that the designers and installers of systems also be certificated.

[26]

A valid risk assessment must be carried out against clear criteria / objectives in terms of both life safety and asset protection.

The option should always exist to be able to use time proven effective means of protection.

We believe that some prescriptive approaches must be retained in respect of school design if new schools are to be able to resist the consequences of fires - particularly those caused deliberately.

[27,28,29]

Agree. As it has been used in Approved Document B for several years, a risk assessment approach is an acceptable option. However, any risk-based approach should be comprehensive enough to consider all aspects of fire safety design and management.

[30]

The development of robust risk assessment techniques is to be welcomed with regard to fire safety in schools. There is a need to ensure designers are adequately trained to understand how to make valid decisions, as well as improved information about actual costs for different types of control. Without this information making quantitative and qualitative judgements will not be possible.

[39]

Agree. As it has been used for several years in Approved Document B (Fire Safety) to the Building Regulations, a risk assessment approach is an acceptable option. However, any risk-based approach should be comprehensive enough to consider all aspects of fire safety design and management.

[91]

Experience has shown that in many buildings a performance based ‘risk’ approach is the most effective way of achieving an adequate level of fire safety in many large and complex buildings. Codes that are purely prescriptive are usually unable to address every situation that can arise during design.

One shortfall in this approach is that of possible differing interpretations and standards of perceived “risk” at the design stage being determined by Building Control and F&R Authorities.

A degree of prescription to meet the basic life safety requirements of Building Regulations B1 to B5 may be required.

[93]

There is a need for risk assessment strategies to be properly understood by designers.

There is a need for ongoing costs to be factored into the design stage to help identify the best practicable risk controls over the life of the building

[95]

This choice is already available within AD B

[96]

Generally yes- but with some minimum requirements specified. Bear in mind that many designs are developed in partnership with Governors: in my experience, there is often a governor who claims to know more than the designer, or who will challenge based on a little knowledge. National specifications and requirements can help.

[rd4]

The "Five Steps" procedure is OK for the management of an existing building, but too basic for a new building, especially considering that it should be the whole basis of the fire strategy. The Employer's Guide is mentioned; other methods should be itemised, eg, HSG 65 and PAS 79. The design risk assessment should be undertaken by fully competent assessors in consultation with the Local Authority Building Control and Fire Service Fire Engineers/Fire Safety Officers

[rd5]

Risk assessment is the correct basis on which to determine fire safety, providing the risk assessment itself is carried out proficiently and takes account of all pertinent risk factors. A sound risk assessment process should examine not only the chances of an incident occurring but also the potential consequences of that incident – likelihood and impact assessed together. Risk as a product of likelihood and impact.

**SEVERITY OF CONSEQUENCES**

**LIKELIHOOD**

**OF ACCIDENT**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **HIGH** | **MEDIUM** | **LOW** |
| **HIGH** | ACTION REQUIREDIMMEDIATELY |  |  |
| **MEDIUM** |  | ACTION REQUIRED WHEN PRACTICABLE |  |
| **LOW** |  |  | ACTION NOT REQUIRED |

The above diagram shows how to prioritise the findings of a risk assessment. This will ensure that critical aspects are given appropriate importance and acted on as a matter of urgency. Risks towards the top right of the scale clearly pose an immediate threat to the school and should be dealt with as a matter of priority. Risks that fall into the bottom left part of the scale do not need to be prioritised but should be reviewed regularly to ensure that the risk has not increased.

Section 8.5 of the consultation document highlights the need to take account of socio-economic factors in risk assessment. Fire, and in particular arson, is more common in areas of deprivation. 44% of the school arson fires in the UK occur in the 7 Metropolitan Boroughs. There are costs and benefits associated with different school locations. The guidance should recognise that school fires, and school arson in particular, can have a devastating impact on both a school and the community it serves. Schools in Metropolitan areas may benefit from shorter Fire Service response times, and have easier access to neighbouring schools that could accommodate pupils on a temporary basis. This can be contrasted to a school in a rural area that, whilst potentially at lower risk of suffering an arson attack, is likely to be at a greater distance from the local Fire Station (20 minutes response time or more, greater community use of school facilities and a higher proportion of local residents employed at the school).

This means that the impact of an arson attack at a school in a rural location could be higher than an attack on a school in a Metropolitan location, which may have a higher likelihood. Schools will need to consider risk factors specific to their school. For example, an opportunist arsonist will target a school with particularly poor perimeter fencing in place. Alternatively the school may be located near a park or fields with unsupervised youngsters with few engaging distractions. Here, storage of potential fuel or flammable materials must be secured, and robust perimeter fencing put in place.

[rd10]

We agree that risk assessment should be the basis for the design, but it is imperative that the fire safety scheme is fully understood by the management of the school upon handover, in order to ensure the systems and processes are managed effectively

[rd11]

When a designer designs a building they should design fire safety for that building too. [rd12]

My experience is that in order to make a complete risk based assessment of a premises, full account must be taken of the building once it is occupied and functioning. The designer must take into account these factors, along with sound fire engineering principles and practise along with an understanding of the behaviour of materials and persons in fire situations. risk assessment should not be used to reduce fire safety measures but to enhance them, by making full use of the opportunities afforded by such measures as automatic suppression systems.

[rd13]

This Authority believes that Risk Assessments are purely subjective, they are someone’s opinion and as such they can be proved to be wrong. When this happens in a school it can result in a catastrophic loss for the community as a whole. Especially considering the fact that more and more schools are being used as community activity centres, etc. With this in mind it is felt by this Authority that a minimum standard needs to be prescribed to include a sprinkler system. Anything above this minimum standard can be risk assessed to reduce costs, etc

[19]

The assessment of risk should play a dominant role in the design of the building, however this is not currently reflected in the proposed document. Parts 1 to 9 of the proposed document do offer a brief overview of some of the key issues relating to the design of schools, however no clear delineation is offered between the issues discussed in these sections of the document and the prescriptive requirements offered in Appendices A to C. For example: it must be reasonable to extend single direction travel distances in a building provided with an enhanced fire alarm system against one solely provided with a manual system? It is our recommendation that clear instruction is provided that the guidance offered in the appendices is to be followed unless a fire engineering risk based approach is undertaken for all or some of the relevant issues (e.g. travel distance, compartmentation, sprinkler protection etc).

[rd22]

It is critical that the fire safety design, and subsequent management, of a school is based on a risk assessment that recognises the hazards; the chances of a particular or incident occurring; and the potential consequences of any reasonably foreseeable scenario. All too rarely do the designer, the insurer and the person who will be responsible for managing the building sit down together at an early stage to consider the matter, let alone carry out a risk assessment at the design stage. The importance of carrying out such an assessment must be emphasised, since the establishment of appropriate objectives and criteria for the protection of an educational building will enable the achievement of cost effective fire protection of the assets.

[rd24]

There is a risk of varying standards with this approach, so the risk assessment guidance needs to be clear and consistent.

[rd25]

As locations and usage very considerably from site to site, a local risk assessment will be needed for each site design, based on local needs and factors.

[rd26]

Risk Assessment is the logical route to follow, BUT does require that the design team are able to implement it. Unfortunately, it seems that this is not currently the situation for most projects. Perhaps the team MUST include a competent Health and Safety Adviser?

[rd27]

**Question 2**

**Do you agree with the proposals that both life safety and property protection need to be considered equally during the design process?**

The question should clarify that both life safety and property protection should be considered. A school is an important resource for the local community and more should be done to preserve it from fire. The standard installation of fire sprinkler systems will not greatly add to the cost of new construction or major refurbishments and if properly planned from the beginning of the project, could even be cost neutral if architectural freedoms are then allowed. The financial and educational losses caused by school fires justify the fitting of sprinklers.

[5]

Life safety requirements should be of paramount consideration and should take precedence over property protection measures. However the importance of property protection is acknowledged and the greater emphasis on such expressed in the document is welcome. In particular this type of building is prone to high likelihood of Arson incidents consequently measures to reduce risk or limit such, should be incorporated at the design stage rather than a reactive approach which are often difficult to implement and more costly.

[6]

Life safety has always been the priority when implementing fire safety standards, and fire safety legislation has been designed to this effect.

With the introduction of part B of the Building Regulations, and many other British Standards and design documents, property protection has also become a requirement to accompany the life safety standards applied.

In order to achieve a well designed building in terms of fire safety then both aspects need to be incorporated as property protection enhances life safety provisions, and also addresses other factors such as disruption, loss of important documentation, re- building costs, and environmental impact.

[8]

We believe that while considerations of the safety of live must inform all decisions, property protection should be treated as a critical facet. The loss of a school is more than just a property loss as its impact can have far reaching effects on the wider community. Things which must be considered include:

* longer term effects on pupils (emotional, developmental)
* need for temporary accommodation or bussing - sometimes for three years
* loss of course work (could be disastrous for some university aspirants)
* loss of teaching aids - often accumulated over many years
* loss of libraries (when books are already a scarce resource)• loss to the community of an asset for community groups and organisations, leisure facilities etc.
* impact on staff and the LEA in respect of business continuity and the rebuild
* impact on insurability of other LEA assets

[10]

It is important to consider both property protection and life safety in the design process but the recommendations in the draft document do not make it clear which recommendations are for life safety and which are for property protection.

For instance there is no justification for an 800m2 compartment limit for life safety but it could be relevant in terms of property protection.

[7]

Whilst we agree that the protection of property is important we believe that the over arching focus should be on life safety. That said any property protection measures aimed at reducing the spread of fire are likely to have a positive effect on life safety. We therefore fully support the proposals to address property protection.

[14]

This is a qualified agreement.

Preventing deaths and injuries is paramount – especially as reducing deaths by accidental fires in the home by 20% by 31 March 2010 is the one target of the Fire and Rescue Service, which is the subject of a Public Service Agreement, and the FRS’ strategy is geared toward pro-actively saving lives. However, protecting property during the design process in such a way as to prevent fires, to reduce their spread and to mitigate their effects, should add to the protection of life. Moreover, protecting property also protects much else, for example protecting:

* Future public investment in public infrastructure, as Her Majesty’s Government. plans to spend £22bn over the next 10 to 15 years in refurbishing all existing secondary schools and in new school buildings.
* Schools as community assets, as the buildings often have considerable use outside of school hours.
* Lives and persons of those using schools outside of school hours.

• Continuity of education, with minimum disruption and trauma - particularly for young pupils

[15]

We definitely agree.

With 20 serious fires in schools every week, the rate of loss via fire damage is threatening to outstrip the rebuild / replacement process.

We do advocate the protection of property in schools not just for the education process, but also for the provision of sustainable activities for the local community. It is disappointing that there is no reference to the requirements from the insurers ‘Design Guide for the Fire Protection of Buildings’ nor to the fundamental requirements for property protection as listed in insurers 12 ‘Essential Requirements’ which has been completely ignored. Cost effective property protection is best implemented by early inclusion of insurers requirements. In such circumstances additional costs are minimal.

Note that insurers calculate Maximum Estimated Losses by assuming that any sprinklers have failed. Sprinklers are not effective in all circumstances, especially for external fire exposure, fire in roofing systems or fast growing fires.

[16]

Good design should account for both concerns but under what legislation can property protection be made (and enforced) as a mandatory concern? If this is a recommendation for best practice rather than an enforceable matter then the document needs to highlight that.

[17]

It is recognised that both can complement one another, and with the impending Regulatory Reform (Fire Safety) Order, both become intricately linked via the need to protect those in the ‘vicinity’, adding appropriate weight to the need for suppression based fire protection.

[19]

Yes agree totally, however unless property protection becomes a functional requirement it is unlikely that it will be adopted through choice.

Property protection will add a cost to the construction, which will make it prohibitive through choice.

[21]

The ASFP agrees that both life safety and property protection need to be considered equally during the design process. The ASFP believes that for buildings such as schools that are critical to the community that the level of property protection may need to be increased over and above that which would be normally used for life safety alone.

[23]

Both life safety and property protection should be taken into account when designing fire protection measurers, and when assessing cost/benefit. However placing an equal value may not be appropriate.

From an external view, there is no doubt that the losses in school fires over the last 10 years, if properly evaluated, would alone justify the installation of sprinklers in all substantially refurbished, rebuilt or new schools.

From the life safety viewpoint, the increased use of school premises for community purposes outside school hours, and the increased frequency of fires at times when the premises are occupied, also justify sprinkler protection.

[24]

It is important to note that schools generally are susceptible to arson attack and therefore this issue needs to be considered in terms of both life and property protection at the design stage.

[25]

Both life safety and property protection are absolutely critical during the design process. Clearly the concerns over life safety are understood but these must not overshadow the need to adequately protect the structure. Although getting the staff and pupils out safely is the prime concern, if the fire continues to grow and cause significant or total damage then the school can be out of action for several years causing enormous disruption (loss of work and the stress of moving to temporary accommodation) and huge financial implications (although most schools will have insurance, the excess may still be as much as £1m). By taking property protection into account and considering the full impact of a fire, a full risk management approach can be taken.

[26]

We believe that while considerations of the safety of live must inform all decisions, property protection should be treated as a critical facet. The loss of a school is more than just a property loss as its impact can have far reaching effects on the wider community. Things which must be considered include:

* longer term effects on pupils (emotional, developmental)
* need for temporary accommodation or bussing - sometimes for three years
* loss of pupil course/exam work and essential statistics
* loss of teaching aids - often accumulated over many years
* loss of libraries
* loss to the community of an asset for community groups and organisations,
* leisure facilities etc.
* stress on staff and the LEA in respect of business continuity

The establishment and recognition of ‘Life Safety Sprinkler Systems’ should be recognised as it provides both life safety and property protection.

[27,28,29]

Strongly agree. We fully support the guide’s attempt to provide guidance on property protection.

[30]

Life safety remains more important than property protection, due to society’s belief that it is not acceptable for people, especially pupils to die in a fire, but it is alright if a building is destroyed.

On a risk assessment basis, the value of a life is far greater than the value of a building, thus dictating that life safety needs to be considered more than property protection in the design process.

 [39]

Strongly agree. We fully support the guide’s attempt to provide guidance on property protection. Indeed – given the persistent problem of fires, and the disruption and heavy losses incurred to an increasingly ‘community asset’ – the FSDG would emphasise the need to consider protection of property. BB100 should raise the bar still further to highlight the advantage of the FPA 12 ‘essential principles’, which are included in recent proposals for the new approved document B.

[91]

The high occurrence of school fires makes property protection issues highly important in the design process. However, it is important to be able to recognise whether a particular life safety measure is provided for life safety, property protection or both.

The Building Regulations are focused on addressing life safety. At present Approved Document B (ADB) provides a benchmark against which compliance with the Building Regulations can be judged. However, the ODPM is proposing that guidance for schools be removed from ADB and that reference be made to BB100 instead. However, BB100 in its current form does not provide a suitable benchmark for judging compliance with the Building Regulations as it combines life safety and property protection without distinction.

To address this one of the following options would be required:

1) Retain guidance for schools in the revised ADB, so that it may remain as the benchmark for meeting the Building Regulations requirements. In this case careful co-ordination between BB100 and ADB would be required to ensure the recommendations for life safety remain consistent.

2) Remove guidance for schools in the revised ADB. For this to be effective there needs to be clear identification of the life safety recommendations within BB100 for designers and approval authorities. This requires separate life safety and property protection guidance in the BB100 document. [93]

On a risk assessment basis the proposals for life safety outweigh the need for property protection.

[95]

However, as far as the requirements for Building Regulation approval go (at the moment) only life protection is fully considered. We do understand that the issues relating to property protection will pretty-much complement those required for life-safety and therefore can only be a good thing.

[96]

Personal safety must always have priority.

[rd4]

These two areas should never be separated if the Fire Strategy is designed correctly; however, they are not the only areas for consideration; designers should not neglect business continuity or fire-fighter safety.

[rd5]

We strongly agree.

[rd6]

Yes. BB100 correctly emphasises that fires in schools pose a threat not only to safety of life but also protection of property. Since school facilities only exist to enable delivery of education, loss of these buildings results in loss of these services. This approach rightly aligns the aims of BB100 with the aims of the UK Fire & Rescue Service, as outlined in paragraph 1.2 of the National Framework 2005/06 . Paragraph 1.2 of the Framework states that one of the principle aims of the Fire Service is to “reduce the commercial, economic and social impact of fires and other emergency incidents”. By aligning the aims of BB100 with the National Framework, consistent delivery of fire safety measures across both building regulation and Fire Service strategy will be ensured.

The protection of school property is essential as schools are commonly used not only during the day for traditional teaching, but increasingly at night as adult education centres, sports facilities, venues for arts and performance, and similar. Along with housing, hospitals and local services, schools are central to the development of communities that are truly sustainable. The loss of school buildings would not only result in costs to the Local Authority, but more importantly would mean the loss of an important community resource.

Destruction of property results in not only a financial impact on the school and the Local Education Authority, but disruption of education, loss of coursework, loss of teaching aids, disruption of staff jobs and loss of facilities or resources in the community. If pupils need to be accommodated in other nearby schools this will impact on the education of pupils at both schools. Fortunately there have not been any fatal school fires in the UK for a number of years. However Zurich Municipal estimates that school fires disrupt the education of up to 90,000 children per year. This emphasises the importance of protecting against property damage alongside life safety.

[rd10]

We believe that life safety is the ultimate consideration. However we welcome consideration of property protection as the loss of all or part of a school has a much greater impact upon society than just the cost of bricks and mortar. We feel that greater emphasis should be placed upon the provision of sprinklers in order to prevent loss.

[rd11]

Life safety is much more important.

[rd12]

Building design must take into account building sustainability and business continuity. Life safety should however be paramount given the potential for severe loss of life in schools. Having visited a number of schools and spoken to end users, it is clear that some designers have little or no real knowledge of fire behaviour and simple design features, such as providing adequate storage room for equipment and supplies, which lead to open storage with the associated fire risks.

[rd13]

As mentioned above the loss of a school has a major effect on the community as a whole. It is not only the schooling of the pupils that is effected it is the additional pressures put on parents to transport pupils to the temporary school in the next town and the effect this has on their work commitments. It also effects any community activities that are held a these schools as more and more are. Therefore it is felt by this Authority that there needs to be a Holistic approach to fire safety design and management for buildings used as schools with equal focus given to life and property protection.

[rd19]

Predominate emphasis should be on life safety. Schools, while expensive, can be replaced while lives cannot. The document should indicate clearly what is required for life safety and what is required for property protection so that Approving Authorities, the design team and the end-user can see which parts of the document apply to what. Ideally the appendices should be re-organised such that all property protection issues are removed, this then gives the benchmark for life safety. A further section should be added (potentially combined with the issues relating to risk) to cover recommendations for property protection (e.g. limited compartment size where sprinklers are not provided, separation of high value rooms, security measures for arson reduction).

[rd22]

It is critical that both life safety issues and the need to protect the resource and asset represented by a school are considered at the design stage. A fire, even a small fire, in any school can be truly devastating on the individuals directly affected. The effect on the education of students and the work of the staff, plus the impact on the community resource provided by the school, and the financial implications for the bodies or authorities concerned, can be truly catastrophic. The loss of, or damage to, students’ course work, educational resources, other facilities or buildings will not only put the students, their families and staff under considerable stress but also impose large educational, financial and administrative costs on the individual establishment or educational body concerned. When such disruption occurs at a particularly critical time, such as the weeks, months or year leading up to examinations, the impact on students and their future can again be catastrophic. In addition the growing use of these facilities, both during and outside the hours or times of year when they are used for educational purposes, means that a fire in these buildings will have an increased impact on the community as a whole. It is therefore important that the design, construction and management of the school reflect not only the need to provide protection from fire for students, staff and visitors, but also the protection of the premises and its contents as a community resource and asset.

[rd24]

But the word "equally" is worthy of thought. Life is rarely lost in fire, tragic though that is; but property protection helps reduce major financial waste. Both aspects need to be considered thoroughly, with no compromise on life safety : the limited loss of life in fire tragedy is a testament to successful life safety so far.

[rd26]

There seems little point in designing a structure which is intrinsically safe for its occupants, but then is burnt down! Surely the design process is when the safety of the building can be given significant weight. Loss of the building implies loss of pupil's work and teaching materials, possibly administrative material too - often as traumatic for the school as the loss of buildings. This is particularly important when looking at schools in rural areas, where effective fire fighting might easily be even further away than for suburban schools(see p7).

[rd27]

**Question 3**

**Do you agree to the proposal that smoke control measures should be considered and included if indicated by the risk assessment? This is particularly important as school buildings are becoming ever more complex, for example, including associated atria.**

Smoke control should be designed so as not to prevent the efficient working of the sprinkler system.

[5]

Means to restrict smoke travel are critical in a flexible approach to design use of building. Such items should be implemented at this stage as part of package to achieve effective Fire Safety at minimum cost.

[6]

Where fire engineered solutions are used, then their inclusion in the risk assessment is of paramount importance.

The installation of a smoke control system may have a bearing on the means of escape, and other fire safety related issues.

[8]

It is impossible for a 'simple' guide to cover adequately the implications of design and installation of smoke control and smoke movement and we believe it is dangerous for the non specialist to be asked to make decisions in this area

A school building which is to be provided with an atrium should be designed in accordance with strict compliance to fire engineering principles - eg BS 7974 or BS 5588: Part 7.

[10]

Smoke control is provided to assist in means of firefighting and is only one of many means of fire protection.

Rather then refer to smoke control the document should give better guidance on the currently popular design forms.

For instance atria are now commonplace in school designs but no meaningful guidance is given for fire safety in atria. Safe atria can in practice be achieved with or without smoke control depending upon the means of escape provisions and the fire safety strategy adopted.

[7]

Other fire protection systems measures such as smoke control systems are an essential feature for the protection of life in some (usually complex buildings) buildings. They can have an important role to play to the life safety of occupants in certain large or complex buildings. Even when the principle objective of the system is property protection or assistance of the fire and rescue service it would still be appropriate to take note of the system in the overall fire risk assessment. It is important that the assessment does not look at the contribution that these measures make in isolation but should take into account the effect they have on the overall package of fire safety.

[14]

The BCSF has not specifically addressed this issue, but the principles set out in the responses to questions 2 and 4 apply.

[15]

We agree.

We advocate the control of the spread and generation of smoke from construction products as included in EC Interpretative Document 2. Smoke is not only toxic and often very corrosive, but is the conveyor for fire spread throughout a building. Hot smoke is the basis of sudden flashover in rooms.

BS EN 13501-1 classifications for Reaction to Fire of construction products provide a zero cost method of eliminating or minimising smoke hazard from construction products at the design stage. The smoke classification [production rate] is an additional part of the standard classification – e.g. Euro class A2 – s1 do.

[16]

This would need to be considered on a case by case basis. Where circumstances are such that a smoke control system is required, explanation of the reason for it’s use and how it facilitates a solution should be clearly stated.

[17]

Engineered solutions are used throughout Great Britain at the present time.

There is no difference to engineered solutions being adopted in school design, but the building user must be 100% clear of the parameters fire engineering will impose.

This will only be achievable through a clear and concise risk assessment as required under the present Regulations.

[21]

The ASFP agrees with the comment that smoke control measures should be considered and included if indicated by the risk assessment. In addition the ASFP would like to see the risk assessment consider the possible sources of smoke generation within a building and use where possible products that generate little or no smoke.

[23]

Is smoke control of value where sprinklers are installed? If smoke control is installed in sprinklered premises, it should be designed so as not to prevent the efficient working of the sprinkler system.

[24]

Smoke control needs to be considered as part of a flexible approach to design use of building. Cost will be kept at a minimum if included at design stage.

[25]

It is absolutely right that the importance of protection of escape and access ways against smoke penetration should be emphasised, as the single biggest cause of deaths in fire is due to smoke inhalation.

However, having drawn attention to tenability conditions and escape time, there is no indication in BB100 of the exact recommendations on design parameters that should apply concerning limits of tenability and travel time. These parameters should be given to ensure a basic minimum standard safety level and a measure of consistency of design from school to school.

Guidance on recommended tenability conditions and guide design escape times, or speeds of movement, for different occupier groups need to be given, or referenced to an appropriate source, otherwise there is likely to be a lack of consistency in the provisions of fire safety from building to building.

[30]

As smoke is the major killer in fires, to adequately protect life safety it is essential that smoke control measures are considered in the risk assessment. Early detection and adequate compartmentation are essential to ensuring life safety of building occupiers and the emergency services when they arrive on the scene.

[39]

It is absolutely right that the importance of protection of escape and access ways against smoke penetration should be emphasised. Smoke inhalation is the single biggest cause of deaths in fire.

Neither should we forget that hot smoke is also the basis of flashover of fire when the temperature at ceiling level reaches 600C. This is also the underlying principle of European classifications for reaction to fire of lining materials. The draft BB100 appears to have overlooked the point:

European Class Basis of FLASHOVER in classification

when tested in Room Corner Test

A1 No flashover – non-combustible

A2 No flashover – non-combustible

B No flashover, limited combustibility

C Flashover between 10 and 20 minutes

D Flashover between 2 and 10 minutes

E Flashover before 2 minutes

F No data available / Not tested

The FSDG would add that, having drawn attention to tenability conditions and escape time, there is no indication in BB100 of the exact recommendations on design parameters that should apply concerning limits of tenability and travel time. These parameters should be given to ensure a basic minimum standard safety level and a measure of consistency of design from school to school.

[91]

Yes, if indicated by the risk assessment smoke control should be considered. However, we feel that the smoke control section of BB100 (8.3) could be misleading – for example it could be interpreted that sports halls over 800m² and atria should have smoke control. If the document is to be based on risk assessment, it does not seem appropriate to suggest an 800m² limit. These measures would be in excess of those currently considered necessary for life safety requirements. The smoke control requirements in schools are no different to those in any other building.

In the case of atria – not all require additional smoke control provisions (e.g. if open spatial planning is present). Reference should be made to BS 5588 Part 7 (atria) in this section, but it should be emphasised that compliance with Part 7 is not compulsory and that a fire engineered approach can be adopted.

The recommendations regarding the design provisions of atria and open special planning contained within the consultation document of Approved Document B are sensible and follow established principles and guidelines that are readily understood. We would recommend adopting these.

It should also be noted that BS 5588 Part 4 referenced in section 8.3 has now been superseded by BSEN 12101 Part 6.

[93]

As early detection of smoke is a key part for life safety, all adequate risk assessments will identify those areas that require smoke detection systems, e.g. those due to the nature of use (sciences), lack of occupation ( store cupboards), and primary escape routes, especially corridors that are used for the storage of coats. In theory any new build will identify that it is not adequate for fire safety for coats to be stored in primary escape route corridors.

[95]

Inclusion will depend upon budgetary constraints.

[rd3]

Up to a point. I'm not aware of any school fire where smoke has been a problem, except in specialist teaching areas. Keep things in proportion.

[rd4]

There are several areas of smoke control; for example, smoke control in atria or for pressurised staircases already have detailed guidance available in the BS 5588 series, but there are other methods using sensible precautions of fire-load control, compartmentation, room geometry, sprinklers etc that should be considered in the design stages.

[rd5]

Yes. If a risk assessment has indicated that smoke control measures are necessary then they must be included in the fire safety design of the school building. Smoke spread can 1. hamper evacuation of occupants; 2. endanger firefighters who may be entering the building; and 3. increase damage to property. Smoke may also potentially produce toxic fumes that can be harmful to the environment and people in the locality. ABI welcomes the recognition in section 8.3 of the importance of access for firefighters when considering fire safety. If access for firefighters is addressed in the building design then the Fire Service is more likely to be able to adopt an aggressive firefighting stance, which should reduce the size and impact of the fire. If fires are allowed to develop, containment may be the only viable firefighting option in some circumstances.

Fire spread could be accelerated without effective smoke control measures being in place. Smoke is often the major cause of damage resulting from a fire. Control of smoke is therefore a vital element of fire risk management, limiting the level of property damage (and thus resultant disruption to school life).

[rd10]

We welcome the considerations for smoke control, particularly with regard to firefighting. Simple measures mentioned such as openable windows and rooflights will aid the reduction of damage and the effective use of firefighter’s portable positive pressure ventilation units.

[rd11]

Smoke is very dangerous.

[rd12]

I am in agreement for ALL forms of fire engineered solutions to be considered in schools. I do however have concerns that smoke control should not be used as the primary solution. Any such provision should be based upon Realistic fire sizes, taking into account maintenance and reliability requirements. In my opinion, in order to achieve full protection, steps must be taken to limit fire size through compartmentation or fire suppression.

[rd13]

The dangers from smoke logging are well documented and pose a threat to life as well as the further spread of fire.

[rd18]

We take this to mean not just smoke control doors but to include features such as early warning of fire, means to ventilate atria and quality of construction eg durability and resistance to misuse of materials used.

[rd20]

However I am concerned that fire safety measures in schools that have been designed based on a fire engineered solution need to be regularly maintained which may not be carried out due to lack of money/ funds.

[rd21]

In our experience of Computational Fluid Dynamic smoke modelling in buildings (including very open plan schools and colleges with a number of voids in the floor slab), the movement of smoke does not generally present a risk to life safety, especially given the high number of escape routes and enhanced fire alarm and detection system generally provided. Therefore a risk assessment can quite easily identify if the provision of open lightwells impact on the means of escape.

The movement of smoke can lead to some damage to property. The need for atria is based on the requirements by the end-users (e.g. the Educational Authorities) for light and the desire for a ‘spacious’ feel in new schools and this is predominately due to the lack of this in their existing school stock. The reason for the lack of light in much of the old stock is on the basis of the previous building codes (e.g. BB7) which were detrimental to the provision of lightwells due to the high construction costs (e.g. ventilation, fire rated glazing etc). It should be noted that new schools are built under the guidance of Approved Document B (AD-B) therefore there are very few true atria in schools as the floors are not required to be compartment floors. Because of the reduced cost impact more schools are now built with an open spacious feel.

The end-user needs to be make an informed judgement on whether the property damage risk is offset by the feel of the space for the users. This can be factored into the design using a risk assessment. Any prescriptive requirement for smoke ventilation, especially through the ‘back door’ (e.g. such as the requirement that all floors be provided as compartment floors, which turns all lightwells into atria which require smoke ventilation, and prevents open accommodation staircases) should be avoided.

[rd22]

The provision of systems and facilities for the control of smoke, where they are appropriate, are essential. The provision of this type of system is particularly important when considering designs that include atria, or are based on a fire safety engineering approach. However in these circumstances any authoritive guidance recognises that a smoke control systems needs to be designed on the assumption of a steady state and controlled fire. This will require the provision of a sprinkler system and, probably, an automatic fire detection system.

Following research carried out under the auspices of the Building Disaster Assessment Group of the ODPM the basis of the guidance on the provision of smoke control systems for basement areas has been shown to be seriously flawed. The recent article by Dr Howard Morgan in the Fire Safety, Technology & Management periodical (ISSN: 1477-1209) identifies the issues, the different smoke control systems that can be used and their advantages/ disadvantages. It is strongly recommended that consultation take place with ODPM and BSI to determine future guidance on the issues of the provision of fire fighting shafts, dry & wet risers, and the ventilation of basements. Following work carried out under the auspices of the Building Disaster Assessment Group of the ODPM (post World Trade Centre) it is likely that there will be changes to the guidance in the BS 5588 series and subsequently the revised AD B. With regard to means of escape in atria it is recommended that reference is made to BS 5588: Part 7 – Code of practice for the incorporation of atria in buildings, which gives guidance on the design requirements when considering atria designs.

[rd24]

As smoke, not heat, tends to kill and/or reduce the ease of escape, smoke control is essential.

[rd26]

Smoke control is increasingly necessary, smoke can prevent efficient evacuations, in the worst case it will kill occupants before the fire does.

[rd27]

**Question 4**

**Do you agree with the proposal that sprinkler systems should be installed if indicated by the risk assessment?**

Sprinkler systems should not be subject to a risk assessment. They should be a standard measure in new construction and major refurbishments. The cost is typically 2% of the total cost of a new school and can even be cost neutral if modern, economic architectural designs are then permitted. For existing schools a risk assessment may indicate that a fire sprinkler system should be retrofitted independently of a major refurbishment.

[5]

Such a proposal would allow existing vulnerable premises to be included in such assessment. At present existing approach is too fragmented to be effective.

[6]

The benefits of a sprinkler system in schools can not be emphasised enough. Their installation should be sought in all cases and especially where a risk assessment highlights a need.

Most school fires are caused by arson, and the use of sprinklers would, with other measures, help to combat the huge fire losses sustained throughout this country.

[8]

While we would accept that the outcome of the risk assessment should be the primary factor we do believe that sprinklers should be provided in all new or refurbished schools as a matter of policy. We are particularly concerned that unsprinklered replacement schools are still being constructed as replacements for schools destroyed by fire.

The need to inform the provision of sprinklers in existing schools should follow the need for risk reduction as indicated by a risk assessment.

[10]

Given the number of schools that are lost due to arson attacks we believe that the much wider use of sprinklers may be justified.

However, the document should give much better guidance on the criteria to be adopted in the risk assessment process. A risk assessment in terms of property protection should be based on an assessment of the probability of fire and the cost and potential benefits of sprinkler installation. No information is given in the guide as to how the probability of fire may be assessed in different socioeconomic areas or how the costs should be assessed. In terms of benefits the loss to the community is clearly much greater than the cost of bricks and mortar but no guidance is given on how this may be quantified.

[7]

Taking into account the benefits of water fire suppression systems we see this as a positive step which will reduce the vulnerability of schools in high risk areas.

[14]

For the reasons set out in answer to question 2, sprinklers should be widely installed, as part of a range of measures, which should also include, where appropriate :

• Automatic Fire Detection;

• Structural Fire Protection;

• Fire Suppression Systems, including gaseous fire extinguishing systems;

• Foam Systems;

• Dry Powder Systems;

• Portable Fire Extinguishers;

• Fire Hoses

You may wish to note that ODPM are looking at greater innovation in sprinkler design

Data from the Association of British Insurers, from their widespread experience of insuring schools, shows that pupils do not wantonly set off sprinklers. The data also shows that sprinklers, when set off, do considerably less damage to the fabric of buildings than the quantities of water directed from fire tenders to quell blazes.

Sprinklers and other allied systems should be installed in new and existing schools. If this is not immediately possible for existing buildings, then they should be installed in all key areas:

• laboratories, kitchens and other areas, where fires are likely to start;

• corridors and cloakrooms, which are crucial means of escape, and allow fire fighters protected access to blazes.

Data from Zurich Municipal shows that costs of installing sprinklers and other fire prevention and limitation technology, which is about 3% to 5% of total costs of building new schools pays for itself in 7 to 10 years, and thereafter there is a net public expenditure / investment gain in view of the importance of:

• safeguarding the lives of the occupants of school buildings;

• the role of schools as community assets;

• the large sums of public money invested in them,

Central Government should finance the installation of sprinklers and other related measures, where Local Authorities are not able to do so in the short-term; such finance should be ring-fenced, and front-loaded rather than part of a rolling programme.

[15]

We agree provided that sprinklers are part of a holistic evaluation, and not relied upon in isolation of other inbuilt measures.

We agree that the use of sprinklers can usefully contribute to fire safety. It makes good sense to put out small fires before they develop into a large fire.

However, trading off passive fire protection is not justifiable and should not be allowed. For example, any reduction of passive fire protection if sprinklers are used does not make provision for shortfall / failures of active systems. The cost benefits are minimal.

[16]

This would need to be considered on a case by case basis. Sprinkler systems can clearly offer benefits to design. Where circumstances are such that a sprinkler system is required, explanation of the reason for it’s use and how it facilitates a solution should be clearly stated. This would presumably be primarily for property protection and therefore a best practice issue on most occasions.

[17]

There should be a presupposition that Sprinklers be installed in all new build schools unless a risk assessment finds otherwise.

[18]

It is important to bear in mind that risk can change, and therefore installation should be considered as a matter of course.

[19]

The benefits of fire suppression systems within schools cannot be over emphasised.

The loss of a school and the burden it puts on an LEA financially, the loss of students course work and the impact it has on the community would be considerably reduced.

BB100 does not give any other suitable measures to stop the total loss of a school by an arson attack.

The fitting of fire suppression system compliments Q2 on property protection.

[21]

The ASFP agrees that sprinkler systems should be used where deemed appropriate by the risk assessment. It should be remembered that sprinklers only work efficiently within properly designed and maintained compartments.

[23]

Clearly yes – however sprinkler systems should be standard fire protection (installed to BS 5306 or BS 12845) and not considered as additional protection. Other forms of protection may also be required if indicated by a risk assessment.

[24]

The risk assessment process will undoubtedly highlight the more vulnerable schools and therefore the suggestion to include sprinklers at the design stage is sound and cost effective.

[25]

Whilst we agree with the proposal, we do not feel the benefits are fully realised in the document.

Sprinkler systems have consistently proven themselves to be the most reliable and effective way of protecting buildings and occupants from fire. More than 70 million sprinkler heads are installed each year and in their 140 year history they have maintained a 99% success rate and no one has ever died in a building fully protected by sprinklers.

The cost of a sprinkler installation in a school is typically 1-2% of the construction of a new school.

There are also a number of accepted cost benefits which arise when sprinklers are fitted:

* Design freedoms – such as removal of door closers, extended travel distances.
* Insurance – discounts of up to 75% are available.

More importantly, if a school does suffer a fire, it can typically be back in operation the same day with damage limited to a small area.

[26]

Sprinklers have a well established history as an effective means of providing immediate local fire suppression so, in view of the high fire loss experience in schools, they should always be considered. Non active fire fighting provisions alone can result in significant fire losses and possible loss of life. However, other suppression systems should also be considered where appropriate standards and third party conformity schemes for the design and installation are in place.

Risk assessment should also address the additional hazards such as kitchen appliances and the high value assets in IT departments etc where other methods of fire suppression (e.g. watermist or Gaseous extinguishing systems) have proven effective in protecting these environments.

[27]

We agree, but it should be made clear that this should not be as an alternative or substitute for structural fire protection measures, compartmentation and fire separation. This advice should be included in the guidance.

Active and passive systems are not mutually exclusive but complementary. They are based on different systems, have different objectives and achieve their objectives in different ways. Both the active and passive sectors of the fire protection industry agree, and have a signed memorandum of understanding, that both types should be used together within and integrated and balanced fire protection strategy.

[30]

Until detailed costings, including capital and ongoing revenue costs, for the different control measures are identified, it is difficult to identify if sprinkler systems should be installed.

[39]

We agree, but with the proviso that sprinklers should not be regarded as an alternative – or substitute – for structural fire protection measures. The reduction allowances in Table B1 should be withdrawn. This is because compartmentation and fire separation remain the foundation stone of any fire safety strategy.

Sprinklers can be added to these measures to mitigate risk still further. Given the target for fire that schools have become, combined with their increasing function in ‘wraparound’ / out-of-hours care, BB100 should include guidance to this effect.

The need for active and passive systems working together, and the caution not to view sprinklers alone as a panacea in fire protection, is reflected in the limitations of suppression systems, such as:

• Doubts over controlling fast or ultra fast growing fires.

• Limitations on use arising from locations in high rooms.

• Sprinklers in ceilings will do little to limit fire spread on roofs and roof spaces or external walls and concealed spaces.

• Effectiveness may depend on water supplies at adequate pressure.

Active and passive systems are not mutually exclusive but complementary. They are based on different systems, have different objectives and achieve their objectives in different ways. An over-reliance on one system or another is therefore misguided.

Both the active and passive sectors of the fire protection industry agree, and have a signed memorandum of understanding, that both types should be used together within and integrated and balanced fire protection strategy.

[91]

Sprinklers are an invaluable defence against arson. Where enlarged compartments are proposed they would also be seen as a benefit.

Sprinklers have a very good track record and are very effective at preventing large fire developing. It should be emphasised that the provision of sprinklers in schools is led by property protection considerations, and that they are not a required to comply with building regulations – refer answer to question 2.

It may be of benefit to reference in this section the BASA/Zurich draft document Joint code of practice for sprinklers in schools, which contains practical design advice.

BASA are currently redrafting their “benefits of sprinklers” document which includes a valuable section on education premises. It may be worthwhile referencing this.

We would suggest that if sprinklers are provided (to life safety standard), that certain trade-off be permitted in the design to reflect the reduced risk category. E.g. permitted travel distances for places of special fire hazard such as teaching laboratories /technology rooms be increased – this is in line with the guidance of DD9999:2005 – clause 8.5.3. Additionally we would suggest a reduction in the standard of fire resisting construction for certain hazard rooms protected by sprinklers (an approach adopted by the Firecode guidance for hospitals.

[93]

As the key is life safety, the risk assessment will need to justify that sprinkler systems are necessary, for this. The lack of staff training in the use of fire fighting equipment is an area that requires consideration when designing in a sprinkler system, as staff.

[95]

Some guidance on cost/benefit analysis should be included.

[rd2]

Installation will be dependent upon budgetary constraints.

[rd3]

Again, beware the law of unintended outcomes. There seems to be a view that sprinkler systems are the answer to everything. They are not. I've often been under pressure to include sprinklers where the cost outweighs the benefits. The question is, whose risk assessment? Govs always seem to want them, even though the benefits may be very small. I would urge a presumption against sprinklers, except in residential accommodation. [rd4]

Sprinklers should be seriously considered, but before the risk assessment, not after. If it is decided that sprinklers are not to be fitted, there should be very good reasons for it. The draft document does not go nearly far enough to sell the concept of sprinklers.

[rd5]

The guidance on this issue is extremely helpful.

[rd6]

Sprinklers should be provided in all cases.

[rd8]

Yes. The decision to install sprinkler systems is one that must be based on a considered and robust cost-benefit analysis for the particular school, both in terms of an assessment of the probability of an incident, and an assessment of the potential impact of a fire. Zurich Municipal estimates that currently only around 150 schools out of 28,000 in the UK are sprinklered, despite 20 schools or colleges suffering an arson attack each week. None of the schools suffering a large fire in 2004 were fitted with a sprinkler system. Insured losses from sprinklered buildings are estimated to be just one tenth of those in unprotected buildings.

Installation of a sprinkler system in an existing school can be expensive and therefore only viable in high-risk situations. However the inclusion of sprinklers in the design of a new or refurbished school substantially reduces costs, representing around 3-5% of total construction cost. In these circumstances, costs could be recovered in 7-10 years through reduced insurance premiums alone. This is particularly true in respect of PFI insurances that are normally arranged, unlike LEAs, with low deductibles.

If it is not considered cost effective to install sprinklers throughout the entire building, then guidance should also be given to schools regarding partial sprinkler installation. There may be certain areas such as school halls or gymnasiums, science labs or escape corridors where sprinklers would be appropriate. The guidance in BB100 should give further information to inform the assessment of the need for sprinklers.

Popular concerns that sprinklers cause significant water damage are unfounded. There may also be a reluctance to install protection over and above that strictly required by the UK Building Regulations.

Key points include:

• When fires occur in a sprinklered building, the vast majority are controlled by activation of only one or two sprinkler heads, using limited quantities of water. Sprinkler systems use less water than a firefighter’s hose.

• Sprinklers can extinguish the fire before the Fire Service arrives, particularly in rural areas, limiting the smoke and fire damage.

• Zurich Municipal report that where sprinklers have been installed in schools, they have not had any reports of sprinklers being activated as a result of vandalism over a 10-year period.

• Sprinklers facilitate innovative designs in schools such as large internal spaces for community learning, where traditional fire protection such as compartmentation cannot be applied.

The cost of fire in schools in 2004 was estimated by Zurich Municipal to be over £73 million. The experience of the USA may be instructive here. Following a number of multi-facility fires in the late 1950s, building codes that required sprinkler installation in the majority of schools were approved. The annual cost of school fires in the USA is now around £50 million, despite having five times more schools than the UK. BB100 should make the above benefits explicit to ensure that any school’s decision is driven by a fully informed risk assessment process.

[rd10]

We believe sprinklers are the most effective method of providing both life and property protection for new-build schools. We feel that the guidance does not give sufficient emphasis to the benefits of sprinklers, such as flexibility and innovation in design, as it guides the designer to use security, detection and passive methods. Additionally it suggests the costs will be around 5%, whereas the latest information indicates this is nearer to 1%.

[rd11]

Fires need to be controlled and schools are not safe places to start with.

[rd12]

Given the evidence indicating the effectiveness of suppression systems (sprinklers)I find it inconceivable that in the 21st century we are building any new schools without sprinklers. My feeling is that risk assessment will be used to find reason not to fit sprinklers when ALL EVIDENCE indicates that they will enhance fire safety at a stroke. Designers should be made fully aware of the benefits that sprinkler provision will produce in enhanced design, greater flexibility, cost savings, building sustainability, business continuity, control of fire size, life protection and damage limitation to property and the environment.

[rd13]

However I would refer you to our comments for question 1.

[rd19]

We agree with the general principle, but the risk assessment must show positive benefits (in terms of life or asset protection where arson is demonstrated to be a high risk.

[rd20]

Greater emphasis should be made on the provision of sprinklers and it should be highlighted that sprinklers systems should be installed in schools unless the risk assessment demonstrates otherwise. By giving greater weight to the provision of sprinklers in schools, it would be possible to relax a number of the other proposed requirements contained in the document (e.g. smoke ventilation, compartmentation, reduced travel distance) which have a much bigger impact both in aesthetics, usability of the space and cost.

[rd22]

Agreement where new buildings are being provided and alternative measures are not considered adequate (via risk assessment). The cost of installing sprinklers does not appear to be recognised within DfES guidelines (M2) and costs £/m2. If promoting the installation of sprinklers recognition to the cost of installation is necessary. Installing sprinklers in existing buildings proves more difficult. Installing sprinklers to an existing building is disruptive and more expensive than providing a top grade fire alarm, for example. Greater clarity would be helpful in guidance around the approach to existing buildings, particularly considering the affordability aspect. When looking at specific projects it can be seen that the scope is often driven by a specific improvement need/purpose and funding is not always awarded/available to upgrade the 'whole' school scene environment.

[rd23]

Yes - Sprinklers are a combined detection and extinguishing system that have a proven track record over many years of controlling fires in all types of commercial buildings, including educational premises. They provide many benefits, even where the likelihood of arson is low, and their inclusion in the design will often mean that additional passive protection, security, and other active systems, are either not necessary or can be reduced in the level of specification, or increases in travel distances are possible. We believe that it is essential that BB 100 (a) identifies the many benefits of sprinkler systems, and (b) dispels the many myths surrounding their use.

The benefits of sprinkler systems include:

• they use very limited quantities of water,

• they attack, control and often extinguish fires before the fire service arrives,

• they facilitate the provision of large open spaces (including atria – see above),

• they are very robust with an exceptionally good record in terms of accidental actuations,

• they have a very good record in schools prone to vandalism (where this is a potential issue the use of sprinkler heads concealed behind open grid ceilings or protective plates minimises their attraction as targets for vandalism by students – as a result we are unaware of any actuations caused by vandalism).

[rd24]

Installation of sprinklers has significant budgetary implications and adoption of a risk assessment approach ensures that this measure is taken where risks are highest - this is a welcome approach.

[rd25]

Yes, BUT there needs to be careful consideration given to the prevention of pupils setting off sprinkler systems at will and therefore ruining school materials, books, coursework etc. [rd26]

Again, it seems foolhardy not to provide as much protection as possible, the consequences of total loss go beyond the issue of personal safety.

[rd27]

It is NGC's firm belief that sprinkler systems should be included as matter of course in all new builds and major refurbishments. We do not believe that the draft guidance goes far enough on this issue. While there may be additional costs to the build of adding sprinklers, this is surely outweighed by the educational, emotional and financial costs of a major school fire. New sprinkler systems are concealed and almost totally vandal proof. We understand that there have been no reported incidents of sprinkler vandalism in schools. With the extended schools agenda it is more important than ever that schools have the best protection available.

We do not believe these decisions should be left to individual local authorities and providers. The Government should take a firm stance and make the installation of sprinklers in new builds and major refurbishments compulsory.

[rd28]

**Question 5**

**Do you agree that the guidance on fire detection and alarm systems is adequate?**

With proviso that Fire and Rescue Services are involved at an early stage.

[6]

No clear guidance is provided on the standard of fire detection that is recommended. The guidance that is provided is questionable.

[7]

The guidance gives sufficient information to outline the basic requirements of a fire alarm and detection system. Further details can be obtained from B.S. 5839 : Part 1 2002 which is quite comprehensive.

[8]

Provided fire alarm systems and detection systems are installed to conform with appropriate BS/ EN standards i.e. BS 5839: Part 1 2002.

[10]

With the proviso that fire and rescue services are consulted at an early stage.

[14]

Careful consideration needs to be given to updating the guidance. Many schools rely on low-technology break-glass alarms, which require a person to be on site to set them off, which leaves buildings vulnerable for fire outside of school hours, when they are unoccupied. Given that two out of three fires start outside of school hours, and promptly escalate, updated technology, including automatic fire detectors, should be installed. Hence updated guidance will be needed for the updated technology. There also needs to be more on:

• how good management precautions can reduce the risk of fire starting;

• child safety;

* crime issues [15]

We are not experienced in this area.

[16]

There is not enough introductory/background information. Causes of false alarms are not covered. Delayed alarms are not covered. The regulatory need for an alarm system vs. the possible benefits of automatic detection is not mentioned.

[17]

See attached comments.

[18]

The guidance places too much emphasis upon the ‘cost’ of alarm systems rather than their benefits and effectiveness.

[19]

If further guidance is needed BB100 should direct the reader to B.S. 5839:Part 1 2002 which is the appropriate comprehensive guide.

[21]

The ASFP does not feel qualified to comment upon this.

[23]

Fire and Rescue Services should be consulted.

[25]

Not sure. As this is outside our area of expertise, we are unable to comment.

[30]

There is a need for concrete examples to show how the risk assessment approach works.

For lighting, it may not be necessary to provide emergency lighting, rather photo-luminescent signage could be used, due to the normal rapid evacuation of school buildings.

[39]

This question is outside our area of expertise. It would not, therefore, be appropriate for us to answer categorically.

[91]

Raising an alarm of fire is fundamental to means of escape and this does not feature highly enough within the section dealing with means of escape (Section 3).

Section 8.1 deals with automatic detection only – more details on alarm should be provided. In some premises the use of a type M system may be appropriate (based on risk). Further recommendations on location and/or protection of break glass alarms for schools would be useful, to minimise malicious activation.

The choice of and extent of system will be determined by the risk and fire safety objectives (life and/or property protection).

[93]

However the layout in the guidance is unclear, this can be improved through better indexing and … (?)

[95]

It is not necessary to fully describe the details of the various categories of BS 5839, just state the standard. Argument should be given for the value of remote monitoring of automatic detection for when buildings are unoccupied, against the possibility of false alarms, but in general, a manual alarm system should be sufficient for life safety in the majority of school buildings. The value of voice alarms should be stressed, also differentiation of class-change bells.

[rd5]

We are a little puzzled by the general order of contents and why an excellent section on fire protection facilities is at Part 8.

[rd6]

BS 5839 Part 1 applies.

[rd7]

ABI believes it is essential that the benefits of appropriate detection and alarm systems be spelt out to schools in the guidance. The case for installation of systems at the design stage is compelling and should be made explicitly to schools. In particular in section 8.1 one of the things to consider is listed as “Is [the detection system] for life safety and/or property protection?” As the rest of the guidance explicitly makes the point that BB100 is aimed at protection of property alongside life safety, for consistency a clear steer must be given to schools to ensure that a system that can adequately protect life and property is the only appropriate option.

[rd10]

We feel that more guidance should be included on the requirement to avoid unwanted fire signals.

[rd11]

very poor indeed-the school I go to has very little fire detection -no fire exits no signs nothing.

[rd12]

Insufficient attention is drawn to any qualities of a schools' occupants eg disabilities which may have a bearing on the selection of the system. The guidance provided on minimum standards of systems could be better.

[rd20]

Section 8.1 offers a great overview of the different systems for a lay-person, however a minimum requirement should be identified (e.g. an L4 system). This will assist designers with a starting point.

[rd22]

We do not believe that the guidance, from both the point of view of the background material and technical information provided, is adequate. The benefits of providing fire detection and alarm systems, especially as part of a truly integrated package of fire precautions, needs to be clearly spelt out.

[rd24]

It still seems provide excuses for not making the necessary provision, by qualifying the need for specific systems to be in place, eg alarms, emergency lighting, sprinkler systems. Making these obligatory seems unlikely to conflict with the architects freedom to produce a good design!

[rd27]

**Question 6**

**Do you agree that the guidance on sprinklers is adequate?**

The guidance gives the reader the impression that the budget figure for sprinkler systems in both new and refurbished schools should be 5% of the total cost of the project. This is incorrect. Data from sprinkler contractors shows that where sprinklers are included in plans from the start of the project, the true cost in new construction is 1-1.5%. Adding margins for lead contractors and others the final cost is about 2% in a secondary school and 2.5% in a primary school. Retrofitting sprinklers costs up to twice this figure, so it is only for the retrofit of a small school that costs can be as much as 5% of the budget. The guidance needs to reflect the difference in costs between new build and retrofit and between primary and secondary schools.

Furthermore the guidance should remind readers that if sprinklers are included from the start of the project it may also be possible to accept architectural designs that otherwise would not be acceptable from a fire safety point of view. This can lead to the inclusion of sprinklers being cost neutral or better.

[5]

Lack of emphasis and negativity towards sprinklers. In the scope of the document, it cites the need to reduce the risk of a fire spreading. Sprinklers are the most effective way of achieving this. We consider sprinklers should be mandatory in all new build schools, and strongly considered on major refurbishment and retro-fit in certain high risk areas. We feel a whole section should be devoted to sprinklers (in a predominant part of the document).

An excellent example of the content of this section is contained within the document "Guidance on the Provision of Sprinklers in Schools" produced by the National Fire Sprinkler Network and Lancashire Fire and Rescue Service. Sprinklers should be seen as an holistic approach, and in such circumstances they are cost effective. Sprinklers protect life, property, allow innovative design freedoms (often reducing building costs), allow a more inclusive and user-friendly building design (particularly for disabled users) and virtually guarantee the protection of this valuable community resource.

Additional comments on Section 8.5 are:-

• “…property protection aspect is as important to life….”:- Disagree, life safety is always more important than property.

• “5% build costs”: inaccurate;-costs can be as low as 1% of build.

• Sprinklers may in certain circumstances replace or reduce Automatic Fire Detection, thereby allowing massive savings (and AFD maintenance and replacement costs as AFD has a relatively short system life when compared with sprinklers).

• “Existing schools may be more cost effective to upgrade passive fire safety measures…” a negative statement as the same/stronger case can be made for sprinklers.

• “Vulnerability to abuse”: Over emphasis of sprinkler vandalism that is unjustified and negative: Over 200 schools are currently protected by sprinklers (many with ‘challenging’ pupils). There is no evidence of ‘abuse’, suggest you speak with those schools, LEA’s, Zurich etc.

• “Concealed system”: Presume you mean “concealed heads”.

• “Dry/pre-action system”: This would be a deviation from T.B. 221 (Sprinkler protection of schools – The Technical Bulletin that accompanies BS EN 12845:2004) May still be an option though, but wording should reflect this deviation from standard.

• “There is a good chance that a fire will be controlled by a sprinkler system”. Suggest a reword: A correctly designed, installed and maintained sprinkler system will control (and often extinguish) a fire. Much evidence to support this.

• “Mechanism for calling the brigade”: Flow switch on sprinkler system does this. (Do not need the costly expense of a fully automated zoned Automatic Fire Detection system as suggested). See T.B. 221 Clause 11.1.

[6]

I feel that the advantages of sprinklers are understated. As arson is the main cause of fires in schools, it mentions measures to be taken to reduce the risk. These measures however do not negate the fact that suppression systems cannot be bettered in protecting the building.

With regards to actual activation of sprinklers, no mention was made as to the limitation of water damage, and that only the sprinkler heads actually involved in the fire zone activate.

Sprinklers are the most effective way of reducing risk of fire spread as such we consider sprinklers should be mandatory in all new build schools, and strongly considered on major refurbishment and retro-fit in certain high risk areas.

[8]

It is not clear how the suggestion that sprinklers are likely to cost 5% of build-costs has been arrived at. is this 5% of total costs (ie including site acquisition, civil costs, design, fees ) or is 5% of the total cost of providing the school (ie including fitting out and provision of all school equipment)?

It is clear to us that some of costs of sprinklers being mooted is unrealistic as they appear includes significant uplifts in the total price charged to include a mark up for the main contractor and professional fees. We are aware of one particular quotation where the cost of sprinklers was increased by 65% by the time it reached the client.

 A more realistic estimate would be 3.5% of civil costs and even this figure could be reduced if sprinklers are included in the first stage design so that water supply matters and the provision of major civil works for the sprinklers (eg pump house, tank) are not a late addition to the project.

The publication implies that the threat of arson only applies to inner city schools. This is incorrect as current ODPM statistics (UK Fire Statistics 2003) suggests that schools in shire counties are equally at risk.

The publication is also incorrect by implying that the majority of school fires occur during the night, recent evidence collated by West Midlands Fire & Rescue service indicates that the greater number of fires occurs during the working day with a peak between 11:00 and 14:00 hours.

School fires 1.7.00 to 30.6.05

|  |  |
| --- | --- |
| **Hour of Fire Call** | **No of Fires** |
| 00 | 7 |
| 01 | 3 |
| 02 | 6 |
| 03 | 3 |
| 04 | 2 |
| 05 | 2 |
| 06 | 2 |
| 07 | 12 |
| 08 | 20 |
| 09 | 17 |
| 10 | 39 |
| 11 | 38 |
| 12 | 30 |
| 13 | 32 |
| 14 | 28 |
| 15 | 25 |
| 16 | 13 |
| 17 | 17 |
| 18 | 20 |
| 19 | 13 |
| 20 | 22 |
| 21 | 8 |
| 22 | 10 |
| 23 | 9 |
| **Total** | **378** |

Source: West Midlands Fire and Rescue Service September 2005.

The publication also suggest that sprinklers installed in schools may be at risk from vandalism. While it is accepted that this is a possibility it should be made clear in the guide that there is no evidence of such vandalism. We believe that there are now more than 300 schools in the UK which are now protected by sprinkler systems and there has, to date, been no evidence to suggest that these are being vandalised. To put the matter into context there are thought to be more than 40,000 sprinkler systems installed in the UK. In 2003 one sprinkler head was deliberately activated by malice.

On the other hand, there is ample evidence to show that other fire equipment (alarm call points and portable extinguishers to name but two) is the object of vandalism.

In addition, a simplistic fixation on the original cost of a fire suppression systems obscures the wider benefits of sprinklers. These include:

1. Very low whole life costs: Sprinklers have a probably service life of at least 30 years without major overhaul or refurbishments. (There are 80 year old sprinkler system still in service in the UK.

2. The cost of maintaining sprinklers is very low, especially when compared with electronic protection systems. The average sprinkler system in a primary school will cost around £350 - £500 per year and in an comprehensive £500 - £1000 per year.

3. Design flexibility - larger compartments which allow more flexible use of space and reduced travel distances to escape routes.

4. Sprinkler systems also act as fire detection systems and as all rooms and compartments will be provided with their own heat detector it may be possible to install a lower specification of electronic fire detection and alarm system.

5. It may also be possible to design a building with less need for fire compartmentation, including fire barriers and smoke stop doors.

Experience has shown that a significant proportion of the cost of a sprinkler system can often be 'traded off' in respect of savings made elsewhere in respect of other fire precautions which are no longer necessary when sprinkler protection is present.

6. Insurance premium discounts and lower deductibles/excesses.

7. In existing schools, the installation of sprinklers will compensate for unsatisfactory structural features such as a lack of compartmentation in ceilings or roof voids.

[10]

The guidance on sprinklers is inadequate to enable a decision to be made as to whether sprinklers are justified or not. A proper case study would be of assistance in this regard. [7]

Water fire suppression systems protect life, property, allow innovative design freedoms (potentially with reduced building costs), allow a more inclusive and friendly design and virtually guarantee the protection of valuable community resources such as schools. Based upon these facts we feel that the benefits of water fire suppression systems are under emphasised in the document. Some of the figures quoted are also we believe questionable and we would like to see more research in this area. We feel strongly that water fire suppression systems should be mandatory in all new build schools and strongly considered in major refurbishments etc, especially in high-risk areas.

[14]

There is no collective BCSF view, as members come from different backgrounds, and are therefore likely to have differing and possibly conflicting experiences and views.

[15]

We disagree. Many designers will not be aware of the limitations that may apply.

We do not see any guidance to indicate the limitations of sprinklers, such as

•Inability to control fast growing fires

•Limitation of use in high rooms

•Ineffectiveness for fires on roofs or external fires.

• Ineffectiveness against fires above ceilings, or in concealed spaces and attics.

• Effectiveness depends on water supply pressures & primed sprinkler heads.

[16]

It is important to differentiate between enforceable issues and best practice. Further clarification would be useful. There is not enough introductory/background information about the uses and benefits of sprinklers. Myths about sprinkler systems should also be spelt out and dispelled. More should be said about water mist and other types of suppression systems.

[17]

See attached comments.

[18]

The benefits are not emphasised strongly enough. e.g. the text states that a benefit is “buying time before the arrival of the fire service”.

When a fire occurs in an unsprinklered school, its effects can be devastating. The fire will develop and spread undetected. In 2002, the cost of the repair and rebuilding of schools damaged by fire was £83 million. Additionally, children’s education is disrupted through loss of schoolwork and relocation, causing stress and impacting upon future opportunities. There are also likely to be impacts upon the community as activities normally held in the school become affected, and local jobs (e.g. catering, cleaning, maintenance) may be lost.

The cost of such systems quoted are inaccurate and provide a negative inference. Costs are more realistically only 1-2% of build cost and up to 5% for systems fitted retrospectively.

[19]

Wholly inadequate.

The commentary states the findings of the recent BRE project report on RESIDENTIAL sprinklers in section 2.5 of the document.

This gives a very negative view of sprinklers to the reader from the onset of the document.

No mention is given to facts on sprinkler operation at fires i.e. Only one head operated, the fire was completely extinguished etc.

If the BRE report must be referred to, then other reports supporting sprinklers must also be referred to, this would give the reader a clear and un-biased choice of bibliography so as to come to there own reasoned decision.

In part 6.6 last paragraph it refers the reader to see part 8.5 on reaching part 8.5 there is two lines which state that a suppression system would give the added bonus of giving heat detection throughout the school which may lead to an overall saving.

[21]

The ASFP does not feel qualified to comment upon this.

[23]

The guidance gives little indication of the amazing difference in fire control that sprinklers bring over any other means of fire protection.

Where sprinklers are installed, fire/water damage would be most likely limited to an area not greater than the coverage of four sprinklers at most, and smoke production and spread significantly limited.

The school fitted with sprinklers can be back in operation in less than 24 hours after a fire.

The installation costs gives are overestimated, and the scope for improved overall building design where sprinkler are fitted is not taken into account.

As a result the net cost benefit of sprinkler protection is significantly understated.

[24]

Despite current thinking and the extensive work of such groups as the National Fire Sprinkler Network (NFSN) there continues to be a negative view on sprinkler installation. The guidance points the reader towards reducing fire spread and it follows that automatic sprinklers are the most effective way of achieving this. The view of my own Service is that sprinklers should be mandatory in all new build schools, and strongly considered on major refurbishment and retro-fit in certain high risk areas based on risk assessment.

In view of the increase in school fires and in particular the number of fires occurring in the school day it seems appropriate that much more of the documents should address the use of sprinklers to reduce the risk and aid in a more flexible approach to design.

The latest document from the NFSNA i.e. "Guidance on the Provision of Sprinklers in Schools" recommends that sprinklers should be seen as an holistic approach, and in such circumstances are cost effective. Sprinklers protect life, property, allow innovative design freedoms (often reducing building costs), allow a more inclusive and user-friendly building design (particularly for disabled users) and virtually guarantee the protection of this valuable community resource..

Additional comments on Section 8.5 are:-

• “…property protection aspect is as important to life….”:- Disagree, life safety is always more important than property.

• “5% build costs”: inaccurate;-costs can be as low as 1% of build

• Sprinklers may in certain circumstances replace or reduce Automatic Fire Detection, thereby allowing massive savings (and AFD maintenance and replacement costs as AFD has a relatively short system life when compared with sprinklers).

• “Existing schools may be more cost effective to upgrade passive fire safety measures…” a negative statement as the same/stronger case can be made for sprinklers.

• “Vulnerability to abuse”: Over emphasis of sprinkler vandalism that is unjustified and negative: Over 200 schools are currently protected by sprinklers (many with ‘challenging’ pupils). There is no evidence of ‘abuse’, suggest you speak with those schools, LEA’s, Zurich etc.

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• “Dry/pre-action system”: This would be a deviation from T.B. 221 (Sprinkler protection of schools – The Technical Bulletin that accompanies BS EN 12845:2004) May still be an option though, but wording should reflect this deviation from standard.

• “There is a good chance that a fire will be controlled by a sprinkler system”. Suggest a reword: A correctly designed, installed and maintained sprinkler system will control (and often extinguish) a fire. Much evidence to support this.

• “Mechanism for calling the brigade”: Flow switch on sprinkler system does this. (Do not need the costly expense of a fully automated zoned Automatic Fire Detection system as suggested). See T.B. 221 Clause 11.1.

[25]

Whilst we agree that the technical information about sprinkler systems should remain in referenced documents rather than in BB100 itself we feel that the document does no provide enough background and information to enable the design team and school representatives to make balanced judgements.

For example, there are many myths surrounding sprinkler protection (such as they all activate in the event of a fire) which could be explained away in BB100 allowing decisions to be made in full view of the facts.

This document is also an ideal place to fully explain the design freedoms which can be put in place if active fire protection is put in place. Examples include reducing fire resistance of the structure, relaxation of fire detection requirements, removal of door closers, extension of travel distances etc. The fire brigade are currently drafting their own guidance on this subject and should be consulted.

We and our trade association colleagues would be more than happy to present draft text for this section for you to review.

[26]

The features, benefits and capabilities of sprinkler systems as missing. This is a serious omission and prevents adequate consideration to sprinklers being given. Other fire safety sections give basic guidance re performance expectations which is noticeable by its absence from section 8.5.

1-2 sprinklers control 50% of fires; sprinklers have a 99% success rate. Life safety sprinkler systems should be recognised.

Direct linking of sprinkler alarms to the Fire Service should be mentioned.

 Reductions in the fire rating of passive protection can be made where sprinklers are fitted –per Appendix B - with resultant cost mitigation .

[27]

Please refer to our comments on 4.

[30]

Please refer to our comments to question 4.

[91]

See comments in 4.

Reference should be made to BASA/Zurich document Joint code of practice for sprinklers in schools.

[93]

See previous response. A section on cost/benefit analysis, to inform the decision process would be helpful.

[rd2]

This document could be a very valuable vehicle for encouraging the greater uptake of sprinklers in schools. Indeed, the existing guidance documents (ADB etc) are sufficient for fire safety design in buildings, including schools, therefore this document would be better for the management of the additional fire risks specific to schools, which in most cases can be solved with sprinklers.

[rd5]

See our response to Question 4.

[rd6]

Further definitive guidance required for school situations. These will fall somewhere between Residential and Commercial systems.

[rd7]

The guidance on sprinklers in section 8.5 does not make the case explicitly for installation of sprinklers in schools. Whilst the guidance rightly points out that installation at the initial stage can cost up to 5% of the total cost (although often much lower), ABI consider this to be a small investment given the long-term benefits that sprinklers have.

An initial investment can minimise disruption and save costs in the long-term. In the event of a fire, insured losses in sprinklered buildings are one tenth of those in unprotected buildings. The Arson Prevention Bureau estimates that schools will recover the cost of initial installation of sprinklers within 7-10 years in installation through reduced damage, lower insurance premiums and offsetting other building costs.

Sprinkler installation also gives greater flexibility of design. The guidance does not outline adequately the life protection function of sprinklers. Throughout BB100 the guidance emphasises the need for means of escape to take account of the range of occupants that a school building may house, including pupils of all ages and abilities, disabled people and non-English speakers. Sprinklers give occupants more time to evacuate the building as well as checking the progress of the fire.

Sprinkler systems give the Fire Service the chance to fight the fire more aggressively and control the spread of fire. The guidance needs to take account of firefighting techniques and developments, and to reflect the life safety needs of those entering a burning building as well as those vacating it. The installation of a sprinkler system gives greater design flexibility and facilitates more innovative school buildings. Where there is a requirement for larger learning areas, improved acoustics in classrooms and school halls or more natural light throughout the building, sprinkler systems provide robust protection of the learning resources whilst allowing architects to be more innovative.

Section 8.5 rightly points out the need for schools to undertake a robust risk assessment and take account of “the existence of certain processes or other socio-economic factors” when considering fitting fire suppression systems. It is reasonable to assume that in some cases the person responsible for these decisions will not be a fire risk professional and therefore this guidance may constitute the totality of their knowledge about risk assessment. It is therefore important that the guidance is clear, easy to understand, concise and complete. At present it is neither concise nor complete.

The processes and socio-economic factors that may be risk indicators should also be included, such as: • Kitchen areas, science laboratories or technology areas may be particular high-risk areas; Socio-economic factors to take into account include:

* Location in a Metropolitan area.
* A history of small fires within the school.
* Fires in neighbouring schools.

This would ensure that BB100 truly remains a one-stop shop for fire safety guidance for schools. Section 8.5 should also reflect best practice in risk assessment in considering whether a fire suppression system is appropriate.

The probability and potential consequences of an event are the fundamental considerations of any risk assessment procedure. Every other factor listed should contribute to these: location, accessibility, and public access will inform either the probability of an event of the potential consequences of it. This should be made explicit. [rd10]

The document introduces the idea that sprinklers may be considered in the design of the school ‘where arson is a regular occurrence.’ We believe sprinklers should be considered for all new-build schools. We feel that the societal effects and on-costs, such as hiring temporary accommodation, loss of community facilities, uninsured contents, stress for staff and pupils, and school reputation, are extremely important. We believe the document does not emphasise the benefits of sprinklers and effectively undermines the case for the fitting of sprinklers, as it defers to other methods to reduce risk, such as increased compartmentation, fire resistance, and detection.

[rd11]

very poor

[rd12]

The guidance section on sprinklers is woefully inadequate and falls well short of ODPM proposals that are 'minded' in the revision of Approved Document B. There should be a full section which EXPLAINS where sprinklers can be a benefit, including detailed information on design allowances, full cost benefit analysis, case studies, Insurance Company advice. Most of this information is available and would allow and encourage reasoned decisions to be made regarding sprinklers.

My opinion is that the section fudges the issue. As a piece of guidance it will be obsolete with regard to sprinklers before it is published, as many education 'authorities' and PFI Companies are already convinced that sprinklers are a reasonable and sensible fire safety precaution in new and refurbished schools.

What is really needed is clear direction from DFES and an acknowledgement from the Government that sprinklers are a prudent way forward. We are wasting a great opportunity, especially in light of the Building schools for the Future programme.

[rd13]

However, there can be issues around the water supply for sprinklers, either tanked or directly fed. Checks with water authorities must be made to ensure adequacy of supply. [rd18]

This Authority feels that the guidance is far too vague. In our opinion a sprinkler system is a necessity and only if your risk assessment indicates that you don't need one, should you even consider not having one. This document seems to suggest that a sprinkler system shouldn't be considered unless it is absolutely necessary. A subtle difference which if left as it is, will mean that every school will do it's utmost to justify not having a sprinkler system installed.

[rd19]

BB100 section 8.5 deals with all types of automatic fire suppression systems, not just sprinklers. Although the case study example is simple to understand, the example given is not typical of many school situations and does little to help the process of deciding whether there is a need or not for sprinklers in more common situations.

[rd20]

Section 8.1 offers a great overview of the different systems for a lay-person, however a minimum requirement should be identified (e.g. an L4 system). This will assist designers with a starting point.

[rd22]

As with fire detection and alarm systems we do not believe that the guidance, from both the point of view of the background material and technical information provided, is adequate. In addition guidance contains somewhat mixed messages. The first paragraph of section 8.5 starts by stating that it is important to protect the property as well as the lives of the people – then it states that under the Education (School Premises) regulation 1999 only life safety is a regulatory requirement – it then goes on to say that in this type of building property protection is as important as life!

The provision of sprinkler systems will provide greater flexibility to the designer, and often be essential to allow for large open spaces or atria. They will also be of considerable benefit in fighting the fire, especially in assisting the fire service. They are also likely to be cost effective by allowing reductions in insurance premiums, reducing damage and interruption in the event of a fire, and facilitating reductions in the costs of other building systems that would otherwise required.

Current estimates are that it will take only 7 – 10 years to recover initial costs, which in themselves are estimated to be no more than 3% - 5% of total build costs. The benefits of providing sprinkler systems, especially as part of a truly integrated package of fire precautions, needs to be clearly spelt out (see question 4).

[rd24]

YES

[rd26]

There seems no logical reason why sprinkler systems are not made compulsory.

[rd27]

See comments in response to Q4.

[rd28]

**Question 7**

**Do you agree with the proposals that there should be a package of measures available to the designer to reduce the effects of vandalism and arson as well as accidental fires? These include smoke tightness, improved security, good housekeeping and effective management, as well as detection and alarm systems and sprinklers.**

Including sprinklers as a standard measure will dramatically reduce the damage caused by most arson attacks. A package of additional measures should be available to the designer further to reduce the effects of vandalism and fire. Arson is the leading cause of fire in schools and school fires are in turn the leading category of major loss fires in the UK.

[5]

School Management should accept greater responsibility for Fire Safety in premises: Part 9 is welcome and it is satisfying to note that Fire Safety Managers should be of senior level, Head or Deputy.

Expansion of school management is viewed as critical in reduction of Arson.

[6]

We agree in principle but question the adequacy of the guidance given.

[7]

Section 8.8 Security and Prevention of Arson deals with the issues adequately.

[8]

While the fire safety of all buildings should include an appropriate blend of fire prevention, fire safety management, compartmentation, detection and security against intrusion, it is difficult to accept the arguments that all these systems have been successful when it is clear from the 1500 - 2000 fires in schools each year prove the contrary. The author of this submission is also a security specialist and is able to confirm from his own experience and published research that the introduction of security equipment into schools has not been successful in preventing arson attacks.

As long as there are arson attacks on schools only sprinklers (or the rapid intervention of the fire and rescue services have any hope of saving individual properties.

In addition, it is clear from discussions carried out between this association and a number of LEAs that the costs (including financial costs) of providing and maintaining passive fire safety measures such as smoke stop doors is proving a real burden with little return on the investment.

[10]

We feel that the document deals with these issues adequately.

[14]

Qualified agreement.

Should consult:

• The local Fire and Rescue Service, in particular their Integrated Risk Management Plan;

• Local knowledge;

• Those who (will) occupy and manage school buildings

before embarking on a series of measures.

[15]

We agree

Control of smoke generation should be highlighted as a tool for designers within this package of measures (see Q3).

[16]

It would be useful to have far greater guidance within the document. Effective management (or good housekeeping) can be shown as one of the most important factors in a safe building and without it, even the most robust design will fail.

Arson is very much part of the risk assessment process as described in the Regulatory Reform Order. It is the main source of fires in schools and should be covered both at the design stage and also as part of the RRO risk assessment.

[17]

Including sprinklers as a standard measure will dramatically reduce the damage caused by arson attacks. Sprinklers will deal with more than a single seat of fire.

With regard to vandalism, speed of response is an important factor. Mobile teams in high vandalism areas, responding to intruder alarm calls would greatly increase the rate of apprehension of the vandals.

[24]

This is the first document to inform readers that School Management should Fire Safety Managers should be of senior level i.e. Head or Deputy. The whole concept of improved of school management is necessary to combat the rise in arson related incidents.

[25]

It should be emphasised that it should be part of a holistic fire safety strategy. We would also include advice on the provision on burglar-resistant glazing for key access points and higher risk rooms, such as computer laboratories.

[30]

A holistic approach should be taken when considering any health and safety issue, including fire safety. Providing information on vandalism, housekeeping, storage - especially of outdoor wear, will enable the designer to ensure the risk assessment is suitable and sufficient as required by the legislation.

[39]

It should be emphasised that it should be part of a holistic fire safety strategy.

We would also include advice on the provision on burglar-resistant glazing for key access points and higher risk rooms, such as computer laboratories.

Control of smoke generation (not just smoke spread) should be highlighted as a tool for designers within this package of measures (please refer to our answer to question 3, above).

[91]

There should be a package of measures available to designers however the layout of the document does not lend itself readily to enable designers to make informed judgements simply. Therefore its use in practice may be reduced. The appropriateness and benefits of the various “packages” needs to be simply explained for designers.

[93]

From a Building Control perspective, it would be advantageous to be involved at an early stage (risk assessment) in order to fully appreciate how well the proposed management and other provisions impacted on fire safety.

[96]

This is a "motherhood and apple pie" question. Who is going to say no?

[rd4]

The police should be consulted about external security as a method of arson prevention, but sprinklers are a very effective control measure for fires started deliberately. Fire detection will not prevent fires growing, neither will compartmentation when fires are started in several places.

[rd5]

We strongly agree. Perhaps this guidance does not stress the arson issue as directly as it could.

[rd6]

The ABI strongly supports the inclusion of arson as an equal consideration in the risk assessment process in schools. 44.8% of all school fires to which the Fire Service are called in the UK are deliberately started. This equates to 20 schools and colleges a week suffering an arson attack in the UK, a third of which occur during school hours. The level of arson in schools has remained worryingly constant over the past 10 years. Indeed, in the last official UK Fire Statistics published , the number of schools suffering an arson attack in the UK had actually increased. Arson accounts for a disproportionate number of large fires in schools. Zurich Municipal, the main insurer of schools, estimates that up to 90% of major school fires are as a result of arson. Costs incurred as a result of school fires have increased by more than 170% in the last 10 years. It is therefore essential that the guidance stresses in the strongest way possible the importance of taking steps to reduce the risk of an arson attack and the potential impacts of such an attack.

Section 8.8 of BB100 states that arson should be preventable. This statement should be qualified – total prevention of arson is beyond the scope of this document. The incidence of arson cannot solely be prevented through building design. Design is just one of a range of methods of tackling arson. Fire safety management and behavioural adjustment also have a vital role to play in arson prevention. The guidance should therefore make clear that, while building design can achieve a great deal, it does not replace other work such as the need for effective, on-going fire safety management. It can however make a significant contribution to reducing the cost of arson.

BB100 mentions the Arson Prevention Bureau publication ‘How to Combat Arson in Schools’. The latest version of this document was published in 2003, rather than 1998 as BB100 states. The Arson Prevention Bureau also has this document available in a short leaflet-style format giving some advice on low-cost housekeeping techniques that schools can implement to help reduce the probability of an arson attack. Both of these documents are available free from the website www.arsonpreventionbureau.org.uk. We would be happy for this information to be included in the BB100 guidance.

The ABI welcomes the recognition in the guidance that the Fire Service and the police can provide information on arson reduction techniques. The ABI and the Arson Prevention Bureau promote the use of the Fire Service as a source of information. It should be highlighted in the guidance that the first call a school makes to the Fire Service should not be a 999 call. There are a number of local agencies in place across the country that schools can draw upon. Numerous Fire Authorities have a dedicated Arson Task Force available, each local area will have a Crime & Disorder Reduction Partnership, and local initiatives such as New Deal for Communities, Neighbourhood Renewal Units and the Local Authority will all have information that the school can draw on when looking to manage their risks. The local Fire Authority Integrated Risk Management Plan should provide useful contextual information. These agencies should be publicised and promoted as a source of information and advice.

[rd10]

Without prejudice to our comments relating to sprinklers, we support the aspects relating to the measures mentioned.

[rd11]

strongly agree

[rd12]

We already know that schools are the No1 local authority arson target as well as for general vandalism. My concern is that many issues do not come to light until after the building is occupied. designers should be encouraged to be fully aware of how their designs can help or hinder such things as good housekeeping and building management along with how the maintenance of safety measures is vital to the continued safety of the premises and its occupants.

[rd13]

This is fundamental.

[rd18]

Measures to prevent arson should be seen in the wide context of the check list in section 8.8 (most schools should already be aware of these through various arson prevention initiatives).

[rd20]

The requirements for reducing vandalism as well the risk of an arson fire are worth considering, specifically considering the large number of fires in schools which are the result of arson. However all issues relating to property protection should be clearly highlighted and kept separate from the minimum life safety requirements. This enables the team to clearly identify what is a definite requirement and what is an option subject to a risk assessment.

[rd22]

Since the late 1960s fires in educational establishments, particularly fires caused by arson, have become a serious problem, not only for educational bodies but also for society in general. Figures from the Office of the Deputy Prime Minister record that in 2004 there were 2,053 fires in educational establishments, of which 50% were deliberate in origin. In addition, and contrary to popular belief, 50% of all fires in such premises, both accidental and malicious, occurred at the times of maximum occupancy, between the hours of 9am and 4pm. Indeed Zurich Municipal estimates up to 90% of major school fires are as a result of arson, with the costs of school fires having nearly doubled in the last ten years. The number of occasions when students and staff are being directly put at risk (where the students and staff have had to escape “through the smoke”) is increasing. We believe that it is only a matter of time before there is a significant loss of life (both pupils and staff) in a fire, probably caused by arson. Whilst the potential for arson to occur can be significantly reduced it cannot be entirely designed out. It is therefore essential that the guidance highlights this potential threat, its potential impact, the options for reducing the risk, and the role of fire safety management. The Arson Prevention Bureau has a number of publications that address the issue of arson. These are available from the website www.arsonpreventionbureau.org.uk.

[rd24]

The issue of school security is bound up with the issue of fire/arson safety and indeed theft/vandalism. There should be a coordinated approach to making school sites secure : to prevent intrusion / damage. The British Security Industry Association is a highly professional source of advice.

[rd26]

Not sure of the meaning of this question! Yes, architects should have the best advice available to them , to ensure inherent safety. They should also be able to provide advice to the users of the buildings on its management, both day to day and in emergency situations.

[rd27]

**Question 8**

**Do you agree with the proposals to alter the critical angle to 90 degrees from 45 degrees when calculating alternative routes of escape?**

Proposal will allow greater time available for evacuation of pupils that need supervision. This we feel is a progressive step.

[6]

We are not aware of any evidence to suggest that the 45° separation of exits has given rise to problems with escape from schools or other building types. If there is evidence to this effect it should be published and be subjected to proper scrutiny before any change is made.

[7]

Figure 5 Alternative escape routes.

The critical angle in the Approved Document B (and in the proposed new edition) is maintained at 45 degrees so why is it altered in B B100 whereby schools do not present any greater risk than those properties covered by A.D.B.

Figure A6 Travel distance in one direction only from classroom ‘dead end condition’

The rule of the angle being 90 degrees plus adding 1m for every 2.5 degrees has been removed in the proposed A.D.B, again showing inconsistencies.

[8]

We do not feel that is a wise move as the provision is well understand and does not appear to be unduly burdensome.

[10]

Whilst we agree with the proposal in principle, on the basis that it will allow greater evacuation time for pupils who require supervision, it goes against the risk based approach of the document and contradicts the guidance contained in the vast majority of fire safety publications.

[14]

 The BCSF will cover this in their collective response to the revised Approved Document B. [15]

We tend to agree

The proposals appear to be realistic for small rooms but may be unnecessary for larger rooms in buildings, such as sports halls or assembly spaces.

[16]

What is the evidence that would support this proposal – any such evidence should be referenced to establish its credibility.

[17]

Outside our normal remit for property protection but the reasoning seems sound. [18]

The requirement is more onerous than ADB so adds an additional safety factor, although it would be preferred to have consistency. ADB also proposes to remove the 2.50 rule that is retained within BB100.

[19]

 Why has BB100 deviated from ADB ?

What makes schools so different to deviate from ADB ?

Where is the consistencies with national recognised standards ?

[21]

Sprinkler protection would justifiably allow increased travel distances.

[24]

This should assist in additional time being made available to evacuate.

[25]

We can find no explanation as to why the critical angle is recommended as 90 rather than 45 degrees. What evidence is there that this change is required? School evacuation is practiced and generally very effective.

[39]

 The adoption of the 45° + 2 ½ degrees in the ADB caused enough confusion. From our experience the simple 45° option is the most effective and its well understood.

The provision of alternative escape routes is solely a life safety (Building Regulations) issue and we are not aware of any evidence or research that suggests the current 45 degree rule is inadequate. It should not be changed without substantiation. The impact of 45° is minor in real design terms.

It should also be noted that the ODPM is proposing that the 45 degree rule be simplified in the revised ADB (to eliminate the +2.5 degree part). The BB100 should follow this model.

[93]

What justification is there for this change (even though this is a more onerous standard). [96]

Too technical a question for me!

[rd2]

The reasons for changing the 45 degree rule to a 90 degree rule are not explained. I can see no necessity for this but can see serious design constraints because of it.

[rd5]

We have had no feedback on this issue.

[rd6]

Introduces unnecessary restrictions to design.

[rd7]

These appear to be reasonable proposals to the ABI and Arson Prevention Bureau. These proposals would facilitate both the speedy evacuation of occupants and fuller access for firefighters when attending an incident.

[rd10]

We believe this an improvement in means of escape and it is welcomed.

[rd11]

This will depend on the design of the individual buildings. Generally speaking I believe that anyone should be afforded an opportunity to turn their back on a fire. how this works out in practise is often clouded by the positioning of furniture, taking doors out of use and other maintenance problems. In theory this proposal should enhance escape, but should not be used to reduce the number of alternative means of escape.

[rd13]

This proposal gives us concern as it is in conflict with existing published guidance eg App Doc B (including proposed amendments)and DD9999. It is likely to result in unwelcomed disagreement designers and occupants as to whether alternative escape routes are needed or were provided for in designs.

[rd20]

Where does this 90 degree recommendation come from? All buildings in the U.K. (as well as many other countries) are based on a 45 degree requirement. Has there been any recorded cases in the U.K. of children / adults being trapped by fire in a school building with two or more exits provided, which therefore justifies an increased separation angle?It is our view that the 90 degree separation requirement is very onerous and could have a major impact on the design of some smaller and / or more unusually shaped schools. It is doubly onerous when it seems to be provided based on the whim of a committee rather than be based on established principles for the design and construction of buildings in the U.K.

[rd22]

Not able to comment.

 [rd26]

This sort of advice surely relies on substantial research on behaviour in emergency situations as well as the practicality in the design brief. Since many sites are limited, it might be difficult to return people using the alternative route to a place of safety.

[rd27]

**Question 9**

**Do you agree with the proposals for measures to allow designers greater freedom without increasing the risk with respect to fire resistance (Appendix B)? For example an alternative to providing full compliance with the insulation criterion, especially in the design of escape routes**.

Yes as long as sprinklers are included as a standard minimum measure.

[5]

Prescriptive approach could be viewed as a handicap in Design approaches.

[6]

Any change in the use of materials still have to comply with a compatible fire resistance criteria and so does not in any way increase the risk factor.

[8]

One of the greatest single additional benefits of the provision of sprinkler systems is the design freedom afforded in respect of issues such as compartment size, travel distance to escapes and alternative compliances with Approved Document B of the Building Regulations. This facility alone should ensure that sprinklers are provided in all new schools.

[10]

A prescriptive approach may be seen as a handicap to innovative design. Providing the materials used are fit for purpose we could not see any objection to allowing more design freedom.

[14]

Qualified agreement, dependent upon designers:

• building in appropriate counter-balancing safety features;

• providing appropriate guidance to managers;

• consulting and involving building managers and staff;

taking account of the age of pupils in each school, as the logistics of evacuating and ensuring the safety of infants or children with special educational needs are quite different from those in secondary schools, who are approaching adulthood. [15]

We disagree with the suggestion in the Question that reduced fire resistance does not increase risks. However, we see no relevant text in Appendix B.

Any relaxation to the requirement to fully comply with integrity and insulation criteria represents a potential increase in risk with respect to fire resistance. This specific ‘downward pressure’ on fire safety appears at odds with the stated aim of the document to increase fire safety to protect both life and property.

The ‘insulation requirement’ protects against ignition from radiated heat off a hot surface even when fire has not physically broken through. It is particularly important for walls /partitions / cavity barriers bounding any spaces that may be innocently used for storage purposes.

[16]

This is dangerous ground and there should be underpinning safeguards. Society will expect schools to be conservatively safe not designed down to the limit of marginality.

[17]

This criterion should mirror of that proposed in the new ADB.

[21]

The question is unclear, e.g. surely the risk with regard to fire resistance must be increased if the insulation criterion is not met and other measures are not put in place to compensate for this downgrading of the building’s fire protection systems?

[23]

Yes as long as sprinklers are included as a standard minimum measure.

[24]

a time when all fire regulation are being covered under Regulatory Reform the risk assessment approach is a better alternative to the outdated prescriptive approach.

[25]

One of the greatest single additional benefits of the provision of sprinkler systems is the design freedom afforded in respect of issues such as compartment size, travel distance to escapes and alternative compliances with Approved Document B of the Building Regulations. This facility alone should ensure that sprinklers are provided in all new schools.

[27]

This allows designers to take into account active systems working in conjunction with fire resistive elements.

[29]

Strongly disagree on technical grounds. Test information, technical principles, references and the technology of fire-resistant glass products all show that there is no alternative to the insulation criterion.

Insulation performance as defined by national and international test standards (that is measured surface temperatures no more than 140°C average with no individual point greater than 180°C) gives low measured radiant heat values at 1m distance less than 2 kW/m2 (i.e. broadly equivalent to solar intensities experienced in southern Europe in summer). At this level, the risk of experiencing unbearable pain and blistering of exposed skin is eight times lower than the threshold radiant heat value.

A radiant heat value of 15 kW/m2 at a 1m distance, however, gives only 6.5 seconds before this threshold limit for unbearable pain and skin blistering is exceeded. Travel in the distance within 1 m of the glazing – which is entirely possible under conditions of crowded escape in schools – gives even higher radiant heat exposure intensities and even less safe travel time. Touching such a glazing will give serious contact burns.

Clearly the two cannot be equated in life safety terms, as determined by radiant heat levels, and must not be seen as alternatives. The two levels of protection are entirely different. This can be substantiated by reference to test and technical data.

Allowing designers greater freedom by ‘relaxing’ the insulation criterion would increase the risk with respect to fire resistance and lead to compromised fire safety in a building where the occupier group could be particularly vulnerable.

[30]

Providing clients and designers understand the need to employ staff/contractors with fire safety design competence. Failure to ensure this could then lead to poor fire safety design and an unacceptable risk.

[39]

Strongly disagree on technical grounds. This, in fact, highlights the shortcoming of the draft document, BB100. The FSDG does not agree that any relaxation in fire resistance should be permitted whilst document claims to have property protection fully considered.

Test information, technical principles, references and the technology of fire-resistant glass products, for instance, all show that there is no alternative to the insulation criterion.

Allowing designers greater freedom by ‘relaxing’ the insulation criterion would increase the risk with respect to fire resistance. This in turn would compromise fire safety in a type of building where the occupier group could be especially vulnerable, i.e. young children.

[91]

Why has a requirement for all floors to be compartment floors been added? Is this purely a property protection item? – if so this should be stated. This recommendations will conflict with many modern school designs where there are atria/voids/streets connecting levels. If the concern is with the size of a fire that could develop (for property protection) in a single compartment then a volume limit would be more appropriate rather than suggesting that every floor should be a compartment floor. The principles adopted in the AD B are that each floor within the compartment should not exceed the 800m² (or 2000m²) and does not rely on horizontal compartmentation if these floor areas are not exceeded.

Appendix B – does not appear to provide any guidance on what constitutes an “element of structure”. The appendix makes reference to elements of structure but no explanation or definition could be found.

It is not made clear what the fire resistance periods are for single storey buildings.

The insulation criteria are referenced in Appendix C. However rather than allowing greater design freedom the recommendations are more onerous than the current ADB provisions contained in table A4 of ADB which allow uninsulated glazing for protected corridors and enclosures to protected corridors and protected stairs. There are also references to section 4.2.5 and Tables 3 which do not exist in the document. The Appendix C insulation criteria also conflicts with the section on glazed construction in C6.

The addition of intumescent seals to doors on escape routes also seems overly onerous, particularly given that many schools are likely to be provided with an L2 alarm system which will serve to reduce evacuation times.

The recommendations for high hazard rooms to be enclosed in 60 minutes construction also seem overly onerous for sprinklered schools. We would expect a trade off for such measures based on risk.

It should be made clear that the recommendation for sub-compartmentation is a property protection consideration only (not life safety).

[93]

However, the section on evacuation lifts is not persuasive. With the every increasing complex use of school buildings with all sections of the society then the installation of evacuation lifts, as a key component of life safety, is essential. This will also aid compliance with the Manual Handling Operations Regulations 1992. They have elimination of manual handling tasks as the top control in the hierarchy of control measures. At present Fire Brigades are not willing to be considered as part of the school risk assessment procedures. This along with the identification and training of staff to lift or carry an individual to a place of safety down stairs is unacceptable.

[95]

There is insufficient guidance to agree this proposal…

Consideration is needed for places like dormitories (now covered by BB100)

- Only 30min FR for up to 5m tall?

- Is this adequate for firefighting?

- Will reductions in insulation values lead to increased radiant heat damage and spread of fire?

[96]

This is not something I would feel happy seeing compromised.

[rd4]

Do you mean Appendix C? If so I can see design benefits in the greater use of glazed screens, but a reduced insulation requirement should be balanced with reduced fire loading in the vicinity, or sprinklers.

 [rd5]

This seems a sensible proposal.

[rd6]

ABI does not believe that there is currently an adequate substitute for full compliance with the built-in safety measures required by the Building Regulations particularly where the design phase does not involve those managing and occupying the school. It is therefore essential that any flexibility genuinely results in equivalent in-built risk levels, rather than relying on fire safety management to overcome deficiencies in design. There is a continuing problem of designers and architects failing to build schools with built-in protection, both active and passive. Although Building Regulations impose various requirements, for example relating to compartmentation, the trend is for designers to incorporate these initially but then omit them from the final design. Fire engineered solutions (requiring the employment of a fire engineering consultant) are favoured as these allow the use of designs that please aesthetically without limiting options to traditional approaches to built-in fire protection.

[rd10]

We welcome these proposals.

[rd11]

I am in favour of greater design flexibility, BUT it should not be at the expense of safety. This is where I believe fire suppression systems can greatly enhance flexibility if considered at the design stage. In too many cases they are an 'Add on' which does not release the full potential of the designer.

[rd13]

If this can be proven with scientifically proven methods and evidence not to increase the risk then this Authority would approve the proposals. However if the measures are based on nothing but a subjective Risk Assessment then we as an Authority would not be comfortable reducing standards. The only way we would be comfortable reducing standards in one area is on the condition that by introducing an additional measure such as sprinklers the overall safety of the building is as good if not better than it was originally. In other words a trade up/off approach is adopted.

[rd19]

This is a complex issue, and is a matter for experienced architects/fire engineers to resolve on an individual basis.

[rd20]

We are not sure on what basis it is claimed that the proposals would not increase the risk. Why should schools not be subject to the same levels of fire resistance, etc, than that recommended in for other uses falling into the same Purpose Group within Approved Document B (Assembly and Recreation)? Taking into account the nature of the occupancy, and the increasing risk caused by arson, we believe that any reduction in the recommendations for fire resistance should only be allowed as part a “trade off” involving the provision of appropriate additional passive or active systems.

[rd24]

It is important that insurance cover is not compromised here.

[rd25]

Fire resistance must not be compromised but will have a different perspective when designed into different features i.e., main circulating areas compared to external escape routes.

[rd26]

**Question 10**

**Do you agree with the proposals that robust materials will meet fire requirements and withstand abuse will be acceptable? For example, doors that cannot withstand impacts, glasses that cannot accept scratches and some single-skin lining materials should be restricted in use.**

This is sensible and common sense. Products that cannot withstand the environment of a school are not fit for purpose.

Sprinklers are a robust technology. Many systems are decades old and still work when called upon. Over 300 schools in the UK have been fitted with sprinklers. Where there has been a concern that children could try to tamper with the sprinklers they have been concealed and children have left them alone. Current UK experience has proven that sprinkler systems are fit for purpose in the challenging environment of a school.

[5]

Sensible proposal in view of use of building and is welcome. Sprinklers should be mentioned as they compliment this area by allowing design freedoms which may result in less fire doors/compartmentation. Use of sprinklers not only greatly reduces the overall maintenance costs for doors but also protects property, life and allows a more innovative and user friendly building design (especially for those who find excessive numbers of doors a burden, i.e. disabled/wheelchair users).

[6]

We agree strongly but would suggest that all partitions and doors in schools should be suitably robust whether or not they fulfil a fire safety role. Would this information be better placed in a more general design guidance document with appropriate cross references.

[7]

Materials that fulfil a fire requirement must be fit for purpose.

Therefore when selecting a material or element with fire safety requirements, consideration as to its use and abuse likely to be sustained must be considered.

I.e. items should be robust enough not to compromise the fire safety requirements caused by anticipated use.

[8]

Our experience is that it is impossible to specify materials for use in schools which are over-robust. We are particularly concerned that the use of certain types of 'sandwich panels' are very prone to casual damage - if the outer skin is picked away, fires can spread via the insulating material.

[10]

Given the nature of the occupants of school buildings it would seem sensible to use more robust 'products'.

The materials selected must be robust enough to fulfil their fire safety function in normal use.

[14]

In addition to the reasons in answers to questions 2, schools’ infrastructure suffers considerable levels of abuse, which is not always fully repaired because of pressure on budgets, thus making the occupants and building more vulnerable to the outbreak and impact of fire. Hence, thoughtful, pro-active infrastructure design would increase the fire safety of both occupants and buildings, rather than leaving the maintenance of the fabric at the mercy of budget cuts.

[15]

We agree in principle, but offer comment as below.

We point out that Table C4 is ‘partially borrowed’ from the Insurers Design Guide, Appendix 3B ‘Robust Materials’. However, the transposition is incomplete and should include –

‘Steel faced mineral wool sandwich panels. The density of mineral wool is to be not less than 100 kg/m3 and a minimum thickness of 100mm. The thickness of the steel facing is not to be less than 0.7mm’.

The inherently fire safe nature of non-combustible insulation materials should also be highlighted with respect to materials used as a thermal or acoustic infill components within the fabric of the building. Some insulation materials are recognised as fuels. Clarity would help designers, local authorities and head teachers.

[16]

 This should all be part of the risk assessment (particularly the RRO risk assessment) and cost benefit analysis.

Additionally the section on security is generally based upon documents that do not take into account changes in security best practices such as performance standards and initiatives. The Crime and Disorder Act has a section that requires consideration of crime during planning and for liaison with Police advisors before implementation. Making reference to Insurer requirements such as those provided by Zurich Municipal would also be useful. DfES provide a publication “Key Design Guidance for Schools” from the DfES Schools Building and Design Unit (2004 edition). It is not referred to in BB100 yet it contains the latest DfES thinking on security.

Section 5.5 of the current DfES publication from the Schools Building and Design Unit “Key design guidance for schools” April 2003 (updated 2004) refers to “Secured By Design” (SBD) an ACPO (Association of Chief Police Officers) scheme and in particular to the Secured By Design – Schools publication.

This was created to encourage better safer more secure schools. Section 5.5 also refers to Building Bulletin 95: Schools for the future, Appendix A Checklist 3. This publication provides 11 good sense bullet points but no information on how to achieve the security required. This can be addressed by simple reference to standards for effective security such as those recognised by SBD and the Association of British Insurers (ABI).

Examples include:

LPS1175 – Doors, windows, shutters other façade elements and enclosures. This standard rates resistance to unauthorised entry, and is also being developed to cover fences and gates. An example of the application of LPS1175 in schools is the Fawood children’s centre in Harlesden London; this was one of the six nominees for this year's RIBA Stirling Awards. Its facade was approved to LPS1175, preventing unauthorised entry into the school 24/7.

LPS1214 – IT theft (e.g. laptop and projectors). This standard should help to prevent the huge IT losses currently being suffered, e.g. £2M of equipment (in one year) stolen from Manchester schools and £400K from Redbridge. It should also help with deterring entry by those who target schools to steal IT equipment and then set fire to the school to destroy evidence.

LPS1602/1603 – Intruder Detection and Alarm systems. These standards ensure that an intruder system is compliant with current legislation and is aimed at reducing false alarms.

The standards referred to are intended to help with reducing arson attacks by keeping out and/or detecting an intruder and by making it very difficult to gain entry to rooms or to steal equipment if already within the school.

[17]

Appropriate materials must be to a relevant standard, rather than described as ‘robust’.

[19]

In general the ASFP agrees with this statement however each particular situation should be considered on its merits and the best overall holistic solution chosen to solve the problem at hand.

[23]

This is a reasonable measure where sprinklers are installed. A small flow of water over a surface dramatically increases the fire resistance of that building component.

[24]

It is worth considering sprinklers within this remit as they compliment this area by allowing design freedoms which may result in less fire doors/compartmentation. Use of sprinklers not only greatly reduces the overall maintenance costs for doors but also protects property, life and allows a more innovative and user friendly building design (especially for those who find excessive numbers of doors a burden, i.e. disabled/wheelchair users.

[25]

However, this is an unsafe assumption. Materials for the building fabric must be suitably fire resistance tested and approved. Some exceptions may be made where sprinklers are fitted throughout.

[27,28,29]

We agree with the principle, but ‘robustness’ needs to be suitably defined, for example, in accordance with appropriate British or European Standards.

In table C4, the reference to fire-resisting glazing is seriously misleading. It seems to suggest that 6mm wired glass, 12mm laminated glass and 10mm solid monolithic glass offer the same level of ‘robustness’ (which itself is not defined). Obviously, this is absolute nonsense.

The thickness of a glass for any particular application will depend upon a number of factors, including pane size, aspect ratio, edge support conditions, size, type and location of applied loads, etc.

It is sufficient for the glass to be in accordance with BS 6262-4 and, if appropriate BS 6180 or BS 5234.

As implied in the question, for some glass – toughened glass, for example – scratches may have a significantly detrimental affect on its fire resistance and impact safety performance. This is well-known within the industry, although the effect is difficult to quantify once installed.

“Glasses that cannot accept scratches” as written in BB100 needs to be precisely defined, as many specifiers will not have the necessary knowledge to understand this statement. We would suggest that the following is inserted: “Glasses that cannot accept scratches, for example, standard toughened glass and modified toughened fire-resistant glass.”

[30]

We agree with the principle, but there are some problems of definition and shortcomings with regard to the scope of references. For instance:

• ‘Robustness’ needs to be suitably defined, for example, in accordance with appropriate British or European Standards.

• In table C4, the reference to fire-resisting glazing is seriously misleading. It seems to suggest that 6mm wired glass, 12mm laminated glass and 10mm solid monolithic glass offer the same level of ‘robustness’ (which itself is not defined). This is simply wrong.

• Table C4 should also include defined mineral wool solution, such as durable, metal-faced insulated sandwich panels with mineral wool cores. Please refer to the LPC design guide for suitable reference. The advantages of non-combustible insulation material should also be cited, for fire safety purposes as well as thermal and acoustic infill.

• The thickness of a glass for any particular application will depend upon a number of factors, including pane size, aspect ratio, edge support conditions, size, type and location of applied loads, etc.

• As implied in the question, for some glass – toughened glass, for example – scratches may have a significantly detrimental affect on its fire resistance and impact safety performance. This is well known within the industry, although the effect is difficult to quantify once installed.

These issues should be addressed before the document proceeds to official guidance status.

[91]

The guidance on selection and specification of appropriate materials is seen as welcomed in light of the current educational building procurement methods.

In section C10 (Linings) it states that designated escape routes should have a surface spread of flame of 1. Shouldn’t this be Class O?

[93]

The main reason that less robust materials have a tendency to be used is because they are cheaper than their robust equivalents. This needs to be accepted and reflected within LEA budgets to enable the more robust materials to be used on projects.

[RD3]

 It is often found that damage encourages damage. Robust materials are one answer, but prompt repair and maintenance will help deter progressive deteriation and hopefully instil pride in the building.

[RD5]

This is another sensible proposal and there is a helpful account of the relevant factors to consider in the guidance.

[RD6]

 If the proposals do ensure that robust materials will meet fire safety requirements and withstand the abuse that is likely to occur in school buildings throughout the whole-life of the building then this is acceptable to ABI. Solutions need to be pragmatic, acknowledging the realities of occupation and use.

[RD10]

We welcome these proposals.

[RD11]

Great care must be taken to ensure that the 'robustness' of materials does not compromise fire safety, for instance where damage resistant materials may be used whose performance in fire is inadequate, such as in some man made building materials. I have heard of schools where composite materials have been used in construction (i.e. Cladding to first floor) which would enhance fire growth if involved.

[RD13]

This question is not clear! Any material in a school and especially anything for fire safety MUST be able to take the wear and tear that they will be subjected and still able to perform its function.

[RD18]

This is an issue of cost effectiveness over the building life time for the quality of construction materials use. Provided robust materials meet fire resistance standards, then there is no disagreement with this principle.

[RD20]

 Fire resisting materials should also be robust. Damage to materials will reduce the effectiveness of the materials and frequent replacement may lead to ad hoc repairs with unsuitable materials.

[RD22]

 The basis of the proposal appears to be eminently sensible. However what is the criterion that determines a “robust” material? Far more guidance, and in particular definitive guidance, needs to be provided if these proposals are to be of benefit.

[RD24]

 NAHT does not have the technical knowledge to comment fully here. We make the observation however that pupils en masse give any school structure a "hard time". Pupils and children do exercise heavy wear and tear upon the school fabric, so robust materials are needed.

[RD26]

**Question 11**

**Do you agree that the guidance in BB100 is suitable for it to be used in place of Approved Document B, Fire Safety?**

The structure of this document is very different from Approved Document B and therefore may be difficult for practitioners to use. Approved Document B contains standard guidance for designers. If this guidance is followed the design will be deemed to have met the functional requirements of the fire safety building code and it is very likely to be approved. Many designers find the existence of this option very helpful. BB100 does not include this standard guidance. Aside from this it seems inefficient to have more than one set of civil servants tasked with accumulating expertise in fire safety.

[5]

We agree with the principle of BB100 being used in place of ADB, providing guidance within document is suitable.

Document needs more research in this area. Presentation is poor. More diagrams are needed and of a better quality and greater use of colour. Diagrams in BB7 are a good example.

Table A1 is confusing. Existing explanation of 2/3rd rule in ADB is better option.

[6]

 The guidance in Approved Document B is clearly presented, well understood by designers and allows for alternative solutions. The draft BB100 is unclear and makes no clear distinction between life safety (statutory requirements) and recommendations for property protection.

We are very strongly of the view that recommendations regarding compliance with Building Regulations should remain in Approved Document B, (i.e. it is important that approvals bodies know what criteria they are approving against [statutory only] and what measures are foe property protection. This may be particularly relevant to schools falling outside of the state system).

General background information and guidance on measures for property protection should be provided in BB100 together with much better guidance on the property risk assessment process (i.e. how to establish whether sprinklers are cost effective or not).

[7]

I Feel that BB 100 should be used as the primary document; however reference could be made to A.D.B. where appropriate where further clarification is required.

[8]

We believe that it is wrong in principle and practice to promote a situation where the national building regulations do not apply to a major class of buildings which are particularly at risk from fire and which include occupants who have been identified as forming a vulnerable group.

BB 100 should restrict itself to the provision of much-needed guidance on the management of fire risks in schools.

[10]

Providing that the guidance within the document is suitable we agree that it could be used in place of the approved document. However the document as it stands is not suitable and needs more research.

[14]

We understand BB100 as an attachment to complement rather than replace Approved Document B (ADB). Given that as from 1 April 2006, the Regulatory Reform (Fire Safety) Order will also apply to educational establishments, we see the three documents dovetailing with, and informing each other, rather than as alternatives. Indeed, BB100’s comprehensive list for risk assessment purposes makes it suitable complement to the ADB.

Given that seven knowledgeable and experienced building designers rather than hundreds or thousands of unknown designers are to be used for the £22bn plan of refurbishing existing schools and building new ones, BB100 can be used alongside the revised ADB and relevant RRO to help the many head teachers and building managers nationwide to master and meet fire safety requirements.

The issue of management responsibility should be highlighted somewhere in BB100 in the same way as in Approved Document B, given the same prominence.

[15]

Unfortunately, we must disagree at this stage.

In its present state of drafting, BB100 is not sufficiently developed to replace ADB, as indicated in our ‘additional comments’.

[16]

The guide will need considerable work before it is suitable for this purpose. If this is the intention then the guide may benefit from a more structured format following the sections in Part B (B1 –B5). In it’s current format it would be very difficult to use.

BB100 ‘Designing and managing against the risk of fire in schools’ is a wide ranging and discursive document. It is very much risk orientated and probably does not define an acceptable level of safety. BB100 does not say who it is intended to be used by. Most of the factual information is contained in the Annexes and does not form part of the main text.

[17]

School design in respect of means for giving warning and escape, internal and external fire spread and access and facilities for the fire service should remain under the auspices of ADB.

BB100, dealing with school-specific matters, would provide a very useful management tool supporting the principles within ADB.

BB100 makes reference to criteria within ADB, but which is being taken out of the revised version of ADB e.g. “120 pupils in single staircase situation” – it will be important to maintain the origins of criteria applied.

[19]

The document appears to be part ADB format functional requirements and then guidance to risk assesses measures to be taken.

The document does not give a clear path to follow as in ADB or BS 5588 series.

[21]

Yes the ASFP welcomes this move as property protection is considered in BB100 and we believe that this is very important for buildings that are crucial to the community

[23]

Obviously this has to be very carefully thought out and may be an approach worth investigating. However, on reflection, we believe that basic building standards for all building types – especially fire protection - should originate from one single department and one source document; the ADB.

Additional requirements for schools could still be added by the DFES, but fire protection is clearly not their greatest area of expertise.

[24]

It is possible to use BB100 in place of ADB, however this Service feel that more work needs to be done on the current document in terms of content and presentation. Presentation is poor for example Table A1 is confusing. The existing explanation of 2/3rd rule in ADB is better option.

[25]

We believe that the guidance on the fire protection design of buildings, including schools, should rest within ADB. Having said that there is certainly a place for BB100 to go further and provide more specific guidance for the fire protection of schools such as design freedoms and how better to protect against arson attacks.

[26]

We believe that it is wrong in principle and practice to set up a situation where the national building regulations do not apply to a major class of buildings which are particularly at risk from fire and which include occupants who are identified as being a vulnerable group.

BB 100 should restrict itself to the provision of much-needed guidance on the management of fire risks in schools.

The present document provides insufficient information and guidance for risk assessors and decision makers.

[27,28,29]

Agreed, but only on the condition that the document is restructured. We suggest that the document could be restructured along the lines of Approved Document B, i.e. B1 to B5, but with an additional part (B6?) for property protection, so that there can be more ready cross referencing between the documents and a consistent approach across documents based on similar fire protection principles.

Other improvements could be to shorten text and remove descriptive statements. Make each section punchier and more direct. Use bullet points to emphasise key points. Remove arbitrary statements and general ‘rules of thumb’, which can only lead to a variability and lack of consistency in design.

Once these improvements have been made, we believe that the document is appropriate enough for the DfES to make compliance with it as a condition of securing funding for new schools.

[30]

As it is related specifically to schools this additional guidance could help designers in their decision-making. However the need to employ competent staff/contractors at an early stage needs to be made more explicit.

There is also a need to create a section on client duties, as this will help ensure compliance with fire safety legislation and the Construction (Design and Management) Regulations 1994. There is a need for the design team to be adequately briefed if problems are to be designed out at an early stage.

[39]

The FSDG would like to support the general concept behind the document, namely to respond to the alarming rate of fire damage in school buildings and the rising prospect of personal injury. But we are cautious to commit to BB100 while it remains in its current form – we believe considerable editing and greater detail are required before the guidance matches that found in approved document B.

The FSDG would also recommend that BB100 be restructured along the lines of Approved Document B (i.e. B1 to B5), ideally with an additional section specifically for property protection. This would facilitate cross-referencing between the documents, and a consistent approach for practitioners to use, based on similar fire protection principles.

With these improvements applied, and redoubled focus on the benefits of a holistic approach to fire safety in buildings that are community assets, we would feel much more comfortable lending our full support to BB100 for use by architects, contractors, enforcement authorities and occupier.

[91]

In its current form No.

See comments in for question 2.

To be a guidance document for compliance with Building Regulations measures to protect property should be distinguishable from measures to protect life.

[93]

BB100 should be an addition to Approved Document B, rather than a replacement for it. Approved Document B has been through due process and is a national standard, which should continue to be the basis for all judgements made.

[95]

It is difficult to comment fully without having used the guidance.

[96]

Not sure

[RD1]

There is much to commend the existing document. I am not in favour of too much easing up in this area..

[RD4]

The whole document should be slimmed down to target only those additional considerations of fire safety in schools, highlighting areas of greater risk as well as pointing towards possible relaxations and freedoms. Approved Document B should continue to lead. Additional guidance can come from BS 5588, 9999, 7974 etc. These documents should be consulted directly instead of using extracts in another new document.

[RD5]

We have had no feedback on this issue.

[RD6]

There are some areas which conflict with and are more excessive than App Doc B. e.g. 60 minutes fire resistance for boiler rooms, kitchens, ICT suites etc. 60 minute doors in some situations e.g. ICT suites may prove difficult for children on a day to day use.

[RD7]

 ABI believes that there should be separate guidance specifically for schools, however the guidance contained in BB100 should be improved in the ways outlined above. Schools are a distinct category of building and have unique characteristics both in terms of the type of facility in the building (science laboratories, kitchens, gyms) and also the type of occupant (large numbers of young people, familiar with the layout of the building, potential fire-setters). It is therefore entirely appropriate that school buildings have guidance specific to the risks that they face. The BB100 guidance specifically addresses the risks that schools face and is therefore suitable to be used as a strengthening of Approved Document B, which is too generic to be applied specifically to school buildings.

[RD10]

 The document is a welcome alternative to Approved Document B, Fire Safety, offering the potential for greater flexibility in design.

[RD11]

what is bb100?

[RD12]

 I feel that by producing guidance other than the B Doc will lead to conflict and the potential for confusion and misuse. I have experienced this with regard to HTM codes where guidance is inconsistent between government documents.

[RD13]

This Authority is of the opinion that as more and more schools are being used as community activity centres the building needs to be designed to take into account the different uses it will be put to. The only document that covers all these uses currently is AD B. Also as schools contain some of our most vulnerable members of society they should be protected using the most stringent guidance available. With this in mind we cannot see why schools need to be removed from AD B in the first instance and secondly why the standards in the BB 100 seem to be less than those in AD B.

[RD19]

 With the current uncertainties over the content of the fire RRO and guidance, it is not possible to answer with confidence. However, we feel that BB100 should not be used in place of App Doc B but both should be identical to ensure there is no ambiguity between them.

[RD20]

 I think Approved Document Part B should be used in the first instance and for the more specialized requirements for schools BB100 should be referred to.

[RD21]

 In the current form, the document does not clearly differentiate between life safety (which forms the basis of the Approved Document) and property protection. Without clear clarification on what is a property protection requirement and what is not, there may be some confusion.

[RD22]

Even if the issues that we have identified in the above comments are addressed we do not believe that the guidance as currently drafted is appropriate in style, format or content for use as a replacement for AD B. Our suggestion is that in outline the document is re-structured as follows:

General Introduction. This will give background information on the premises to be covered, the fire safety legislation that applies, and the interaction between the legislation. The Issue. This will give detail on both the general and specific fire safety issues and problems peculiar to schools, such as: the increasing communal use of schools; and the increasing risk from arson, including the loss of the community and educational resource, and the potential loss of life. This will also provide the background commentary on the range of different uses and specific activity areas in schools; fire and its development; plus the range of fire precaution systems available and how they may be used.

Design Guidance. This will be the technical guidance on the fire precautions that are recommended. It is suggested that this should follow a format similar to AD B, in order that designers and approving bodies are able to assure themselves that they have addressed the regulatory requirements. This will also provide guidance on relevant standards or guidance that can be used, or are necessary, to support the guidance in this document. Management. This will provide guidance on the management issues that will need to be considered, when determining the appropriate provision of fire precautions at design stage. In making the above recommendations we are very concerned that there should be a co-ordinated approach within HMG on the production of fire safety guidance for schools. See the answer to question 12.

[RD24]

 BB100 guidance is appropriate but I am unable to comment on its suitability compared with the Approved Document B.

[RD25]

NAHT would presume so.

[RD26]

 What will be the relationship between this document and the guidance likely to be issued under the RRO? It is certainly too lengthy for most schools to read and properly implement. There may be an issue about the suggestion that the school appoint a teacher to be the Fire Safety Manager, there is a possible conflict under TLA. As with most existing guidance, there is little advice on how to designate the ultimate place of safety, or how to manage site traffic, which means that much planning stops at the fire exit doors.

[RD27]

**Question 12**

**Are there additional changes you would wish to propose to the draft guidance as written? For example have you found the guidance clear and easy to follow in this format?**

The document needs to be updated in terms of the number of arson fires which occur during the day. Research by West Midlands Fire Service shows that over half of fires now start during the school day and that the peak hours are 11.00 to 14.00. In section 8.5 BB 100 suggests that sprinkler systems are vulnerable to abuse. TB221 of the FPA sprinkler rules clarifies that either concealed sprinklers or protective guards can be used to prevent damage or tampering. Experience from more than 300 British schools fitted with a sprinkler system has proven that children do not tamper with sprinkler systems if the sprinklers are concealed or protected by a guard. Double knock pre-action sprinkler systems are expensive, require high maintenance and are not suitable for this application.

[5]

Document would be better given more research and time to develop. Document when finalized may be in place for considerable period of time, hence the need for greater detail at this time.

Document would benefit by provision of a glossary of terminology/definitions in line with ADB aimed towards Head Teachers who will need to have some idea of what is being talked about.

References to sprinklers are lacking, insufficient in detail and on the whole negative. (We do not understand the reason for this, given the undisputed track record for sprinklers, the numerous benefits, and the excessive losses of schools to fire).

[6]

The document is not clearly written and is not easy to follow by a designer. There are numerous changes we would like to see made to the format of the document prior to its publication. We have also identified numerous technical statements that are of questionable veracity.

Statutory life safety requirements should be provided in Approved Document B. (These could be included in an appendix to BB100 if desired but difficulties will arise if updating of the documents is not synchronised).

The provision of background information is very useful but needs to be presented more clearly and very closely checked for the veracity of the technical statements.

Much clearer guidance on the property protection matters should be given. In particular the procedures for making a cost benefit assessment of sprinklers.

Guidance on current design approaches (e.g. atria) should be provided with much less emphasis on one particular solution (e.g. smoke control).

We would be happy to provide detailed comments on the text if requested.

[7]

The only changes I would like to be made would be to expand the section on automatic Fire Suppression systems in order to support wider usage. Further information should be incorporated as to their operation and advantages.

[8]

We do not believe that BB100 is 'reader friendly' and based on significant experience of undertaking management fire safety training and writing guidance documents and manuals we do not believe it will achieve its declared objectives. We would be willing to provide a wider critique of the guide but in the interests of time will restrict ourselves here to two main areas of contention:

1. We have particular issues with Section 2,1 which we found confusing and contradictory. The very first sentence is questionable - the risk of fires in buildings used for public assembly is not low. The rest of the section mixes advice on choice of furnishings with advice on arson prevention and it is suggested that this will confuse the non-specialist.

2. The statement in 2.3, that 'constructions capable of resisting fires and restricting the spread of smoke are used throughout schools' is at odds with reality - both in respect of many older consortium-type buildings and even some new designs. The advice, also in 2.3 in respect of wheelchair users and refuges is inconsistent with current thinking and declared fire and rescue service practice which regards the evacuation of premises a matter for the employer or owner.

We also believe that designers and LEA property specialists would benefit from the text of the guide being more closely aligned with Approved Document B.

[10]

As suggested above, we feel that the guide needs considerable restructuring. We will endeavour to help in this process where we can to ensure that a mutually acceptable document is produced.

Once issued the document is likely to remain in place for a considerable period of time. This fact along with the potential vulnerability of the occupants of this type of building means that the document must be fit for purpose. We feel that the publication is not suitable in its existing format and requires more research and time to develop. Taking into account the risk based nature of the document we feel that in its existing format it might be seen to be overly prescriptive. It may be beneficial to refer to a number of functional outcomes which need to be achieved. Because of the need to comply with the building regulations these could be closely aligned with the existing building regulations with additional outcomes for issues not covered such as arson, property protection, management etc.

We also feel that the document would benefit from a “definitions” section which would help those individuals who have responsibilities and are unfamiliar with fire safety nomenclature.

[14]

There is no collective Business and Community Safety view. The constituent bodies of the BCSF may respond individually.

[15]

Yes, we propose additional changes as in our ‘additional comments’.

The document is relatively ‘readable’. It has the style of a ‘commentary’ rather than an organised fire design guide.

The document requires reorganisation and editing. It also requires some elements to be added – especially on the external fabric of buildings. The document has not provided referenced guidance on property protection principles, nor due reference to insurers documents, particularly the 8 page ‘Essential Principles’ document.

Some improvement to the document navigating / referencing system is needed.

It is extremely welcome that C8.2 requires services passing through fire separating elements to fully comply with the integrity /insulation criteria of fire resistance testing. This requirement closes a loophole in ADB that permits unproven provisions for fire-stopping openings – arguably the most critical part of a fire resisting division. However the limited reference to BS 476 Part 20 only perpetuates the uncertainties of ‘ad hoc’ testing in the absence of a purposeful BS test method. We do hope that the redraft will include proper reference to European tests EN 1366 Parts 3 and 4.

It is equally important that ducts passing through fire rated divisions (C9) are required to fully comply with integrity and insulation criteria, whether fire resisting ducts or dampers are used. To quote a requirement of BS5588-9; “The fire resistance of the ductwork, when tested from either side, should be not less than the fire resistance required for the elements of construction in the area through which it passes”.

Unless proven by test, it is not acceptable to attempt to ‘make good’ integrity-only dampers by insulating the duct for a distance of 0.5m with a “suitable fire protection board if there is any possibility of combustible materials coming into contact with the duct in this zone” because of possible dislodgement of the board in a real fire. It is likely that any heat bridges will result in ‘insulation’ failure of the system.

Finally, the fire resistance requirements of ducts should not be uniquely dependent upon subjective assessment of whether there is a possibility of combustible materials coming into contact with the duct. This is especially true of ducts, in hidden voids, that may accumulate combustible dust.

[16]

 Guidance is required on means of escape for disabled people, cladding and facades, cavity barriers. The management section would benefit from considerable expansion.

[17]

See attachment.

[18]

Appended below in the form of a spreadsheet are further comments/observations relating to BB100.

[19]

The guidance is not clear in this format, for example fire suppression systems are referred to in different sections instead of one section dedicated to good clear guidance.

As the guidance document for schools in the RRO Fire Safety has not been produced yet, it begs the question will the RRO school guidance compliment BB100 ?

[21]

The guidance is clear and easy to follow.

An impartial view of the history of school fires over the past 30 years clearly shows that sprinkler protection has been grossly under valued by the Department of Education.

This document begins to get protection measures into better balance, but as our comments above show, we believe that sprinkler protection should be the norm in all new schools, and should be part of the standard refurbishment of existing Schools. Where existing schools are at particularly high-risk (such as from arson) sprinkler protection should be installed as a matter of urgency – possibly in the next school holidays.

[24]

Document would need to be improved. A glossary of terminology/definitions in line with ADB aimed towards Head Teachers would be a welcomed inclusion. There is not enough emphasis on the inclusion of automatic sprinklers despite the historical evidence on school fires.

[25]

There is no doubt that this document serves a useful purpose but it is somewhat unclear if it is a guide on risk assessment, fire protection measures or both. The document starts out with good guidance on risk assessment but in parts goes into too much detail. As mentioned above we feel that rather than fill this document with detailed requirements for design of fire protection measures, BB100 should specify acceptable design standards. For example a great deal of the document provides very specific criteria for the passive fire protection measures which can be found in accepted design standards and it would be better to make reference to these instead.

BB100 represents a great opportunity for DfES and the fire protection industry to provide up to date guidance to designers and user of schools and we would welcome the opportunity of helping redraft any sections on active fire protection if this is of interest.

[26]

For technical comments see the accompanying spreadsheet.

General comments

The document fails to mention the use of competent persons and third party certification schemes for fire protection products and the design installation and maintenance of the systems. This is a serious omission and means that BB100 is out of step with ADB and the guidance to support the Regulatory Reform (Fire Safety) Order. We suggest that similar text to that in ADB be added to the document.

The text fails to advise on the potential reductions in fire ratings of doors etc (ref Appendix B) which mitigate the cost of sprinklers.

Sprinklers will remove the dependence on rapid Fire Service attendance in order to save lives and prevent substantial asset loss.

We also believe that designers and LEA property specialists would benefit from the text of the guide being more closely aligned with Approved Document B

The publication implies that the threat of arson only applies to inner city schools. This is incorrect as current ODPM statistics (UK Fire Statistics 2003) suggests that schools in shire counties are equally at risk.

[27,28,29]

Our detailed comments on BB100 can be found in the following two documents (separately attached):

• FGMA comments on BB100 Part 1 to 10 (7/10/05)

• FGMA comments on BB100 Appendices A, B & C (7/10/05)

For convenience, we have highlighted several important comments below.

General

We recognise the importance of this document, particularly in the light of its recognition in the consultation document to the proposed revision to Approved Document B. It lays down a good basis for fire protection design in schools. However, the ‘novelistic’ and descriptive style could result in a number of key points being overlooked which in turn will lead to a lack of consistency. We recommend that the text is shortened and, where appropriate, bullet points used to highlight key design points which would otherwise be missed. Arbitrary statements, opinions and general ‘rules of thumb’ should be removed and factual statements used instead. This would result in a more practical, user-friendly document. The document needs to be re-structured for easier use and better reference.

We trust that the consultation process will be consistent with that undertaken for the revision of ADB, i.e. transparent and open to all stakeholders. Furthermore, we expect all responses to be made publicly available, unless otherwise requested by the respondee. An opportunity to reply to specific points raised during the consultation would also be beneficial to all involved in the process.

Section 2.1/Para 6

Carbon-rich materials generate a number of different compounds under conditions of incomplete combustion. In addition to fine carbon particles, various chemical components will be present, for example, carbon monoxide, acids (e.g. hydrogen chloride, sulphur dioxide and phenols), and potent poisons such as hydrogen cyanide and polycyclic aromatic hydrocarbons (e.g. acrolein).

The effects of smoke are therefore much more than just irritant.

Section 4.1/Para 2

The term “suitably qualified” fire safety engineers has not been defined. We are not convinced that the responsible person (e.g. head teacher) would be able to assess this. Furthermore, we recommend that assessments or extended applications on the performance of products in relation to British or European Standards should only be undertaken by an appropriate Notified Body.

Section C2/Para 4

With reference to the following statement:

“An alternative to the element providing a 15 minute integrity rating is that at 15 minutes the heat flux measured at a distance of 1m shall not exceed [15] kW/m2.” Sub note B refers to 15 minutes insulation in the line above.

1) 15 minute integrity is a typographical error – should be 15 minute insulation presumably

2) Insulation for 15 minute is not in any way equivalent to a radiant heat value measured at 1m of 15 kW/m2. The effects on exposed skin are dramatically different (also see 9 above).

Delete the paragraph starting with “An alternative …”

Retain :

R Loadbearing capacity 30 minutes

E Integrity 30 minutes

But make the following change:

I Insulation 30 minutes minimum

The same observations occur on following pages.

For more details of the above, along with additional comments, please refer to the two attached documents from the FGMA.

[30]

The document has a too simplistic section on risk assessment with inadequate worked examples to help designers understand the concept of what a suitable and sufficient assessment of the risks is.

There is also a concern that designers may consider themselves competent by reading this advice into designing in fire safety, without a true understanding of the problems and practicable solutions. There is a need at a very early stage to have advice from those with practical experience of schools and of fire safety requirements within them.

The guidance document has not been easy to read and comment on, due to its fragmented nature - there are eight separate references to coats and cloakrooms.

[39]

Please refer to our comments under question 11 for our overall view of the document and the structural development required before it is adopted as guidance.

The following points relay specific concerns identified by out membership comprising the leading passive fire protection manufacturers in the UK:

Section C8.2

It is extremely welcome that C8.2 services passing through fire separating elements to comply fully with the integrity and insulation criteria of BS476-20. This requirement closes a loophole in ADB that allows wholly unproven and unsatisfactory provision for fire-stopping openings – arguably the most critical part of a fire resisting division.

Section C9: Fire-rated divisions

It is equally important that ducts passing through fire rated divisions (C9) are similarly required to fully comply with integrity and insulation criteria, whether fire resisting ducts or dampers are used. To quote a requirement of BS5588-9 “The fire resistance of the duct work, when tested from either side, should be not less than the fire resistance required for the elements of construction in the area through which it passes”.

Unless proven by test, it is not acceptable to attempt to ‘make good’ integrity only dampers by insulating the duct for a distance of 0.5m with a “suitable fire protection board if there is any possibility of combustible materials coming into contact with the duct in this zone”.

Movement or collapse of the largely unprotected duct may cause gaps between the damper and the protective board, resulting in the exposure of part of the duct or even complete dislodgement of the board. Additionally, a direct, relatively short heat bridge exists between the sections of duct that are left unprotected on each side of the barrier. It is likely that this heat bridge would result in failure of the insulation criteria of the system.

Further information on ducts

Fire resistance requirements of ducts should not be uniquely dependent upon subjective assessment of whether there is a possibility of combustible materials coming into contact with the duct. Ducts run in hidden voids where they pose a particular risk to safety if not properly fire protected (and accumulate combustible dust).

Thank you for the opportunity to comment on your proposals.

[91]

We would recommend that the document lists the specific recommendations aimed at life safety to assist with the statutory approval process under the Building Regulations.

There would appear to be no justification for increasing the life safety provisions for educational establishments beyond those contained within the current AD B (apart from increased compartment sizes for sprinklered premises). These provisions should be in line with those in the ADB. Areas include:

• Fire door performance

• Atria guidance

• Compartmentation recommendations

• Determining alternative exits (45 degree rule)

Increased provisions may be necessary for property protection and business continuity (such as smoke sealing etc) but needs to be defined as such.

Improved guidance on alarm systems would be beneficial.

We feel that some improvements can be made to make the document more user friendly and easier to reference. Some important points appear to get lost in the text and so greater use of bullet points could be useful.

[93]

Providing a lot of the extraneous material is taken out, e.g. section 1.5 the note on insurance

[95]

Further guidance is necessary for sleeping risk and dormitories (t.d. within rooms and also escape corridors.

The layout provides a great deal of qualitative information about how fires develop and how strategies need to evolve to encompass these issues but could probably benefit from more guidance on ‘concrete’ items. DD 9999 seems to provide a lot of information regarding risk assessment and possible compensations for these risks. Could BB 100 contain a section similar to DD 9999? Or should DD 9999 be referred to from the BB?

[96]

As Chair of Governors of a Primary School I am particularly interested in the requirements relating to Fire Safety Management. Mention is made that: “As the owner of the building(s) the local authority will usually delegate the running of the school to the Governing Body with the day to day management of the school in the hands of the Head Teacher.” See Section 9 Para 9.1. However, many schools are now operated within under PFI arrangements and neither the school or LEA have effective control of the building or responsibility therefore. I believe that even taking in to account the contractual relationships that may exist between the parties this situation should be specifically recognised and responsibility passported or at the very least shared with the SPV responsible for the school buildings. To imply that the Head Teacher is totally responsible is not equitable and must be recognised.

[RD1]

I have ticked no comment as there are two questions that beg different answers. The flow of text is in some places not helpful. By trying to meet the needs of different audiences at all times, the guidance fluctuates between the self-evident and the technically oblique. As an exemplar of difficult technical concepts, BB93 handles explanation much better. The free guidance sheets from Lawrence Webster Fire are a clearer and a more accessible set of guidance and a good model format.

[RD2]

The Guidance is certainly clear, and generally helpful. Beware of being too liberal, or introducing changes too quickly.

[RD4]

The format is difficult to index and the content is not concise or sufficiently technical.

[RD5]

 Content is excellent. This is an issue where detailed text is fully justified bearing in mind in particular the diversity of the intended audience. We have experienced some difficulty in navigating the text and we have some suggestions:- 1. An executive summary, or key point summary, in each part. 2. An investigation into the possibility of an index. 3. More pictures. These will break up the text. The photographs which are included graphically illustrate the destructive power of fire and they also clearly show good practice and bad practice in fire prevention. 4. Some case studies, e.g. of schools carrying out risk assessments, using the holistic approach to fire protection facilities etc. We would finally comment on the accessibility of this document in terms of publicity, cost and availability on the website.

[RD6]

 It is satisfying to know that Bournemouth Borough Council has already adopted the majority of the guidance already and where practicable included it in existing schools..

[RD7]

However Sprinklers should be provided in all cases.

[RD8]

There should be more emphasis on the enforcement of safety in all schools with regards to fire detection and prevention. Risk management must be carried out on a regular basis to identity any new fire hazards that might have been created since the last risk assessment.

[RD9]

Section 1.3 makes reference to the Schools Guide under the Regulatory Reform Order 2002. That guidance is currently in development by the Building Research Establishment (BRE). There must be consistency between BB100 and the Schools Guide. As these documents will form the basis of a risk assessment process in a large number of schools it is essential that they are consistent in both their message and approach, and mutually reinforcing.

Section 1.4 should use the most up to date statistics available. Currently the guidance uses a 5-year period to 2001, yet UK Fire Statistics are available to 2003. Between 1999-2003 there were on average 2,080 serious fires per year in schools in the UK, not 1,564 per year as set out in BB100. There were on average 936 arson attacks on schools per year recorded in the same period.

Section 1.4 also quotes “recent research” by the ABI and LFEPA that indicates that as many as one is eight schools nationally suffer some form of arson attack each year. This statistic is based on a combination of arson attacks reported to the Fire Service, and rates of under-reporting of small arson fires. BB100 should make it explicit that this statistic includes very minor fires, which may not have an impact but are an indicator of risk.

Section 2.5 makes reference to the BRE report on Effectiveness of Sprinklers in Residential Premises and draws the conclusion that residential sprinklers are not cost-effective for life safety. Whilst this is indeed the conclusion of the BRE report, it is not clear how this relates to school buildings. These have different characteristics such as no sleeping risk (except for a boarding school), a far larger number of occupants, easier access to site for potential arsonists, and so forth.

Section 6.6 of BB100 also makes reference to the BRE report, however as this section deals with school residential accommodation, the BRE reference adds value at this point. Section 8.1 makes reference to “overall savings” that may result from the installation of suppression systems and heat detectors. These savings should be qualified as far as possible to ensure schools are fully informed about the benefits of suppression systems. Savings could be financial over either the short-term or long-term, or could be non-financial, such as better protection of life, less disruption to education leading to better exam performance, better protection of the jobs of staff, or better reputation for the school which may lead to increased admission applications.

Section 8.8 makes reference to an LEA briefing document, however is not clear what document this is. More generally, the guidance appears clear and easy to follow in this format, which is consistent with risk assessment guidance.

[RD10]

We feel the guidance is well presented. We welcome in particular the emphasis on management and the requirement for a Fire Safety Manager at Head or Deputy level. The guidance for disabled means of escape is scant and should be enhanced. We feel mention should be made of the Fire Authorities enforcement role and potential sanctions for failure in fire safety..

[RD11]

Fire and safety guidance and fire and safety features in schools are poor.

[RD12]

 I believe that the format existing in ADB (Approved Document B) is all that is required as it has stood the test of time and is understood by all in the various fire safety and building camps..

[RD13]

The guidance appears to be in the main for designers etc. If this is the case there are parts that are not needed i.e. triangle of fire, how fire extinguishers work etc. This guidance try to cover to many people i.e. Designers and Headteachers/schools. There is a need for school managements to take fire safety seriously one look at this guidance will be enough to prevent them looking any further as it is to detailed. There should be two documents one for designers and one for school management. This document with minor modifications will be suitable for designers. The one for schools should have information on school responsibilities, fire risk assessment, training of staff and pupils, type and use of fire fighting equipment and dealing with the emergency services.

[RD18]

This Authority believes that the document, as it is written at the moment, is too lenient. It needs to be far more prescriptive in certain areas such as sprinklers, to insure a minimum standard for all schools. The changes to the licensing regime needs to be reflected accurately within the document.

[RD19]

We wish to note that we find BB100 lacking in diagrams to explain design principles better than text e.g. appendix A. (In this context old BB7 made better use of diagrams).

[RD20]

1)I think page numbering would be good. 2)With amendments possible as is the case of most documents and guides a clip in type format would be a good idea. Any amendments could that be posted on the web site and copied quickly to the guide. 3)I am concerned that not enough detailed guidance has been given to requirements for nurseries that may have children of 2 years and younger. I am concerned additional requirements should be given stating that nurseries should not be located on any floor other than the ground floor as the very young children need to be possibly carried out of the building in the event of a fire. I do not think it is acceptable to locate nurseries on the upper floors of schools or within basements.

[RD21]

 I would recommend that the document is re-organised. The Appendices should be provided at the front as the requirements and the main informative text provided as relevant appendices. It was very difficult to ascertain why some requirements were made in the appendices and where they came from. Explanatory text should be provided explaining the benefits / reasoning for the requirements. The current appendices should also clearly define life safety and property protection requirements to prevent confusion.

[RD22]

 We do not believe that the guidance is either clear or easy to follow (see 11 above). There will be three new guidance documents on fire safety in educational buildings issued for England and Wales, by HMG, in 2006. We believe that it is essential that any, and all, guidance that purports to cover the same types of buildings, and that is issued by government departments, should as far as possible be compatible. Logic and good government suggest that this guidance should be compatible, or at least not contradictory, with that contained in both AD B and that to be issued by ODPM in support of the Regulatory Reform (Fire Safety) Order 2005.

Other specific points on the guidance as written are:

1.3 Para’ 3 The fire safety strategy of the building must also include the level of management needed. All reputable guides or standards make it clear that fire safety management is an integral part of both the implementation and the planning of a fire safety strategy.

1.4 Para’ 3 “In certain cases sprinkler systems may be installed”. Is this sentence implying that sprinklers may need to be installed in order to compensate for poor firefighting water supplies? If so, this is a good idea, but it should be made more explicit in the text. 2 Para’ 2 It is not true to say that insurers don’t “alter premiums to reflect installations such as sprinklers”. Whilst his will depend on the insurer and the circumstances insurers will normally provide discounts to reflect the benefits arising from a properly specified and installed sprinkler system.

2.2 Para’ 4 The damage caused to “sensitive ICT equipment” by smoke can indeed be reduced by suitable smoke containment measures. However it should be made clear that this is effectively counselling against ‘open plan’ teaching spaces – even if they are sprinkler protected.

2.6 Para’ 1 The draft document states elsewhere how big a problem is posed by arson. In this paragraph it states that staff need to be trained in ‘what to do in the event of fire’. It would make sense for staff to also be given training in ‘how to prevent fire starting in the first place’. – This should be taken into consideration when the findings of the fire risk assessment are passed on to staff, but it would be good to state it clearly in this document.

3 Para’ 4 This paragraph seems totally unnecessary since the Fire Precautions Act will be withdrawn in Spring 2006. Leaving the paragraph in will make the document out of date almost as soon as it is published (if not sooner).

5 Para’s 1 & 2 Unfortunately, whilst we believe that we understand the point that the author is trying to get across, we believe that these paragraphs are rather confusing and misleading. All the elements of “prescriptive” guidance are intended to culminate in ensuring the “health, safety & welfare of people in and around buildings” and in doing so ensure the provision of adequate means of escape. Whilst Fire Safety Engineering (FSE) may be used to address the specific issue of means of escape, the reality is that in doing so it has to address all the issues, including “…structural fire resistance, compartmentation, specification of materials for their fire performance, measures to avoid the spread of fire within and between buildings and to provide suitable access for the fire service”.

5.1 Para’ 1 The statement that there should be a “two-way process of understanding” does not state strongly enough that if fire engineering is being used in a school building, then the QDR cannot be said to have been carried out properly unless there has been input from those who have knowledge of the practical day-to-day use and management of the building. It is common (bad) practice for fire engineers to work with architects and developers in the production of their solutions without consulting end users.

5.1 Para’ 3 In the brief explanation of the application of fire engineering to schools presented here, the “fire safety objectives” are lost in the list of what should go on in a QDR. All to often, life safety objectives are the only ones considered. In a school, there are many wider objectives that must be taken into account (which is acknowledged elsewhere in the document), and they justify being described (in this document) in their own right. They would include: o Life safety o Property protection (cost of repairing/replacing school buildings) o Minimizing damage to contents (loss of school work can damage the life chances of children) o Community sustainability (schools are often focal points for many community activities, and the loss of buildings has a much wider impact than on the school itself) o Environmental considerations 5.2 Para’ 2 BS 7974 is less consistent in its use of terms than was its predecessor DD 240, however the overriding thrust of BS 7974 is that ‘worst likely case fire scenarios’ should be modelled, not “worst case fire scenarios”.

5.3 Para’ 3 “There is an onus on the fire safety engineer to show that the proposed solution will at least be as effective as the conventional approach”. In theory this is true, but in practice it only applies when a comparative approach is used.

5.3 Para’ 4 “In a deterministic study all those present in the building should leave it without assistance”. This is true whatever type of study is used. 5.3 Quote Para’ 3 The last part of this paragraph is opinionated and wrong. It suggests that sub-optimal fire engineering should be selected by the architect if “the best result in the fire safety engineer’s eyes” will adversely affect the appearance of the building. What gives architects either the ability or the right to put appearance above safety?

6.5 Para’ 3 The statement that “hard-wired detection may be a useful investment” in a school kitchen somewhat understates the case. Hard-wired detection, in a kitchen or in most other cases within a school, is essential! 6.9 Refers to the Licensing Justices in respect to functions where alcohol is sold. This section needs to be brought up-to-date with current licensing law.

7.1 Para’ 3 Voids above false ceilings are not mentioned in this document. They are at least as important as the ceilings themselves. Design Guide recommendations are generally for voids of maximum 20m dimension behind false ceilings. ADB allows many reductions below this level. What is the specific advice for schools?

7.3 Para’ 3 “In some cases fire alarm systems must be linked to extract fans to shut doors in the even of fire”. We assume that there has been “an editorial hitch” here!

7.4 Para 1 Although it is true that most schools will not require a firefighting shaft under Approved Document B because they have no storey above 18m in height, BS 5588 Part 5 suggest that buildings with a height of 11m or more, but less than 18m, are recommended to be provided with an escape stair, and an unvented fire-fighting lobby provided with a fire main.

8.2 Para’ 2 The LED light on an emergency lighting luminare does not indicate that it will come on in the event of an emergency; it simply indicates that the charger for the dry cell battery is working. There are many reasons why a luminare may not come on despite the LED being illuminated (failure of the bulb being quite common).

8.3 Para’ 11 It is stated that advice on buildings containing atria is contained in BS 5588 part 7. But BS 5588 part 7 states that it does not apply to: “Teaching areas of schools and colleges containing a two storey atrium, with one of the two storeys being at ground level, which are designed for simultaneous evacuation with storey exits remote from the atrium”. The implication is that such small atria in these types of buildings do not require any special provision.

8.4 Para’ 4 This note suggests that the cost of first aid firefighting equipment should be balanced against the cost of a sprinkler system to determine which is the “more attractive option”. Fire extinguishers and sprinkler systems do completely different jobs, and are not mutually exclusive.

8.5 Para’ 6 This paragraph discusses the fact that an automatic fire alarm system may not always automatically call the fire service under the current reduction in false alarms regime. It should be pointed out that because of the small number of false alarms caused by sprinkler systems, it should be possible to negotiate with the local fire authority for automatic mobilisation to calls originating from a sprinkler system.

8.6 Para’ 1 The paragraph says that hydrants should be not more than 70m from the site entrance, and not more than 150m apart. BS 5588 Part 5 2004 states that hydrants should be not more than 60m from the site entrance, and not more than 120m apart. What is the reason for this discrepancy? It is recommended that BB 100 simply refer to BS 5588 Part 5, as this guidance may be amended in light of the research referred to in the response to question 3 in the main questionnaire. Part 9 It is stated that the head or deputy head should be the fire safety manager. This is followed by a list of “main duties of the fire safety manager”. One would expect responsibility to lie with the head or deputy head, but the person who actually carries out the “main duties” should be a person with sufficient skills, training, or other experience appointed by them.

9.2 Para’ 3 Firstly specialist consultants cannot be held responsible for the outcomes of their fire risk assessments. Responsibility lies with the employer at all times. Secondly, although a consultant may carry out a fire risk assessment, there is a need to continuously audit the premises to ensure that the outcomes of the assessment are being maintained, and to identify when the assessment requires updating. Staff who occupy the building on a day-to-day basis must carry out this audit role. The approach of this paragraph is to suggest that the fire risk assessment can be completely offloaded to a consultant. This is not the case. Part 10 BS 5588 Part 5 1991 has been withdrawn and replaced by BS 5588 Part 5 2004 Fire precautions in the design construction and use of buildings – Access and facilities for firefighting Appendix A.

In figure A4 A, it should be highlighted that in an inner room situation, Automatic Fire Detection should be fitted in the access room. The paragraph may be read to suggest that it could be fitted in the inner room.

Appendix A Figure A5 describes the "45 degree plus 2.5 degree for each meter travelled" rule. Note that it is proposed to remove the plus 2.5 degree for each meter travelled part of this rule from the next edition of Approved Document B. Should it be included here? Appendix A “Travel time is affected by…….” This is wrong. Travel time is affected by things like mobility, and width of escape routes. What is described in this box is the ‘required safe escape time’.

[RD24]

The guidance is clear although our insurance and risk manager feels that some of the more obvious, and perhaps trivial, aspects of fire safety management are missing.

[RD25]

The guidance seems very thorough.

[RD26]

The concern I have about this draft is the lack of clarity regarding its audience. There appear to be a number of separate groups who really need guidance tailored for them, and may not feel the need (or have the competence) to deal with the other sections. For example, whilst most Heads will be happy with the general management of their premises, they will probably not be able to make any sense of the technical appendices. (see above query re RRO guidance).

[RD27]

: We think that two separate guidance documents, one containing the more technical specifications and the other the day to day management issues would be more effective. The draft contains some highly technical information necessary for architects, builders and those in local authorities with an overall health and safety remit. This information is of less relevance to governing bodies, headteachers and school staff managing the day to day running of the school. There is, however, some very relevant and useful information about day to day management issues and it seems a shame that this could be missed because it sits with the technical information. Even if BB100 has to contain all relevant information, we think it would be extremely helpful if the day to day management guidance could be extrapolated and placed in a separate document.

[RD28]

Annex C

**List of Respondents to the Consultation**

|  |  |  |
| --- | --- | --- |
| **Organisation (contact name)** | **Type** | **Ref no** |
| Highfield Consultancy Services (Norman England) | Other - consultant | 1 |
| Fire Engineering Solutions (Phillip Horton) | Other - consultant | 2 |
| Association of British Insurers (abiadmin@abi.org.uk) | Other - insurance | 3 |
| Association of British Insurers (Nick Bason) | Other - insurance | 4 |
| European Fire Sprinkler Network (Alan Brinson) | Other - sprinklers | 5 |
| Hertfordshire Fire and Rescue Service (Mr. Paul Hardy) | F&RS | 6 |
| Tenos Fire Safety Engineering (John Barnfield) | Designer | 7 |
| West Midlands Fire Service (Tony Ward) | F&RS | 8 |
| Eurisol - Mineral Wool Association (Crispin Dunn-Meynell) | Other - fire protect | 9 |
| British Automatic Sprinkler Association Ltd (Stewart Kidd) | Other - sprinklers | 10 |
| Croft Consultants (David Croft) |  | 11 |
| IFSA / c/o Fire Engineering Solutions (Phillip Horton) | Other - fire protect | 13 |
| Chief Fire Officers' Association National Fire Safety Committee (Mark Pinnell) | F&RS | 14 |
| ODPM Business Community and Safety Forum (Nicholas Couchman) | F&RS | 15 |
| Rockwool Limited (Bill Parlor) | Other - fire protect | 16 |
| Building Research Establishment (Sam Greenwood) | Other - consultant | 17 |
| Zurich Municipal Insurance (Larry Stokes) | Other - insurance | 18 |
| Mid & West Wales Fire & Rescue Service (K M Wall) | F&RS | 19 |
| Merseyside Fire and Rescue Service (John Sparke) | F&RS | 20 |
| Surrey Fire & Rescue Service (M.G. CREW) | F&RS | 21 |
| CHAIR, ARSON CONTROL FORUM (ANDRE BAKER QPM, LLB (HONS) AKC) | Other - miscellaneous | 22 |
| Association for Specialist Fire Protection (Graham Ellicott) | Other - fire protect | 23 |
| Fire Sprinkler Association (Sir George Pigot) | Other - sprinklers | 24 |
| Staffordshire Fire and Rescue Service (Mr. John O'Leary) | F&RS | 25 |
| Viking Corporation (Chris Gill (cgill@vikingcorp.com)) | Other - fire protect | 26 |
| British Fire Protection Systems Association (Robert Thilthorpe) | Other - fire protect | 27 |
| Fire Extinguishing Trades Association (Robert Thilthorpe) | Other - fire protect | 28 |
| Fire Industry Confederation (Robert Thilthorpe) | Other - fire protect | 29 |
| Flat Glass Manufacturers Association (Phil Brown/Mike Wood) | Other - fire protect | 30 |
| NASUWT (Jon Robinson) | Other - trade union | 31 |
| National Fire Sprinkler Network (Les Fielding) | Other - sprinklers | 32 |
| Staffordshire County Council (Phil Yeomans) | LEA | 33 |
| Tyco Fire & Integrated Solutions (R A Whiteley) | Other - fire engineers | 34 |
| Association of Building Engineers (Gavin Dunn) | Other - miscellaneous | 35 |
| Building Design Partnership (T C Shinn) | Designer | 36 |
| Essex County Council (Ray Hurst) | LEA | 37 |
| Cheshire Fire and Rescue Service (Philip Hales) | F&RS | 38 |
| IOSH (Murray Clark, Researcher) | Other - health & safety | 39 |
| Gifford Primary School (Barry Lister) | School | RD1 |
| EFM Ltd (Stephen Clyne) | Other - miscellaneous | RD2 |
| The Building Design Group (Rhian Roberts) | Designer | RD3 |
| Education development Centre (Adrian Williams) | LEA | RD4 |
| North Tyneside Fire Safety, (Paul Murley) | F&RS | RD5 |
| PAT (David Brierley) | Other - trade union | RD6 |
| Bournemouth Borough Council (Peter Tilling) | LEA | RD7 |
| County Durham & Darlington Fire & Rescue Service (Stephen Chicken) | F&RS | RD8 |
| Bushfield Road Infants School (Richard Fordham) | School | RD9 |
| Lancashire Fire Authority (Richard Stott) | F&RS | RD11 |
|  (no details supplied) | Other - personal opinion | RD12 |
|  (Steven Mills) | Other - personal opinion | RD13 |
| Frome Community College (Andy Dorgan) | School | RD17 |
| Birmingham Education Safety Services (Frank Sparkes) | LEA | RD18 |
| East Sussex Fire & Rescue (George O'Reilly) | F&RS | RD19 |
| County Health and Safety unit (David Goodwin) | LEA | RD20 |
| The Royal Borough of kensington and Chelsea (David Gammon) | Building Control | RD21 |
| Royal Exchange (Gary Daniels) | Other - fire engineers | RD22 |
| Nottingham City Council (Julie Smith) | LEA | RD23 |
| The Fire Protection Association (David Sibert) | Other - fire protect | RD24 |
| Kent County Council (John Lattimore) | LEA | RD25 |
| NAHT (Michael Lloyd) | Other - trade union | RD26 |
| County Hall (Martin Morley) | Other - health & safety | RD27 |
| National Governors' Council (Gillian Windass) | Other - miscellaneous | RD28 |
| Portakabin Ltd (Glyn Boddy) | Designer | new |
| Fire Safety Development Group (Ian Targett) | Other - fire protect | 91 |
|  (no details supplied) | Other - fire protect | 92 |
| Arup Fire (Andrew Hedges/ Nick Troth) | Other - fire engineering | 93 |
| Cadline Design Ltd. (Hugh Grehan) | Other - consultant | 94 |
|  (Dave Garioch) | Other - health & safety | 95 |
| Shrewsbury & Atcham Borough Council (Morgan Saunders) | Building Control | 96 |

Note: four organisations asked for their responses to remain confidential. Their comments do not appear in Annex B, and they are not included in the list above, although the questionnaire agree / disagree, etc, answers have been included in the statistical analysis, since the organisations cannot be identified.

Annex D

**Respondents who would like to be included in further research or receive further consultation documents**

|  |  |
| --- | --- |
| **Respondent** | **Ref no** |
| Highfield Consultancy Services (Norman England) | 1 |
| Fire Engineering Solutions (Phillip Horton) | 2 |
| Association of British Insurers (abiadmin@abi.org.uk) | 3 |
| Association of British Insurers (Nick Bason) | 4 |
| European Fire Sprinkler Network (Alan Brinson) | 5 |
| Hertfordshire Fire and Rescue Service (Mr. Paul Hardy) | 6 |
| Tenos Fire Safety Engineering (John Barnfield) | 7 |
| West Midlands Fire Service (Tony Ward) | 8 |
| Eurisol - Mineral Wool Association (Crispin Dunn-Meynell) | 9 |
| British Automatic Sprinkler Association Ltd (Stewart Kidd) | 10 |
| Croft Consultants (David Croft) | 11 |
| IFSA / c/o Fire Engineering Solutions (Phillip Horton) | 13 |
| Chief Fire Officers' Association National Fire Safety Committee (Mark Pinnell) | 14 |
| ODPM Business Community and Safety Forum (Nicholas Couchman) | 15 |
| Rockwool Limited (Bill Parlor) | 16 |
| Building Research Establishment (Sam Greenwood) | 17 |
| Zurich Municipal Insurance (Larry Stokes) | 18 |
| Mid & West Wales Fire & Rescue Service (K M Wall) | 19 |
| Merseyside Fire and Rescue Service (John Sparke) | 20 |
| Surrey Fire & Rescue Service (M.G. CREW) | 21 |
| Chair, Arson Control Forum (Andre Baker) | 22 |
| Association for Specialist Fire Protection (Graham Ellicott) | 23 |
| Fire Sprinkler Association (Sir George Pigot) | 24 |
| Staffordshire Fire and Rescue Service (Mr. John O'Leary) | 25 |
| Viking Corporation (Chris Gill (cgill@vikingcorp.com)) | 26 |
| British Fire Protection Systems Association (Robert Thilthorpe) | 27 |
| Fire Extinguishing Trades Association (Robert Thilthorpe) | 28 |
| Fire Industry Confederation (Robert Thilthorpe) | 29 |
| Flat Glass Manufacturers Association (Phil Brown/Mike Wood) | 30 |
| NASUWT (Jon Robinson) | 31 |
| National Fire Sprinkler Network (Les Fielding) | 32 |
| Staffordshire County Council (Phil Yeomans) | 33 |
| Tyco Fire & Integrated Solutions (R A Whiteley) | 34 |
| Association of Building Engineers (Gavin Dunn) | 35 |
| Building Design Partnership (T C Shinn) | 36 |
| Essex County Council (Ray Hurst) | 37 |
| Cheshire Fire and Rescue Service (Philip Hales) | 38 |
| IOSH (Murray Clark, Researcher) | 39 |
| Gifford Primary School (Barry Lister) | RD1 |
| EFM Ltd (Stephen Clyne) | RD2 |
| North Tyneside Fire Safety, (Paul Murley) | RD5 |
| Bournemouth Borough Council (Peter Tilling) | RD7 |
| Bushfield Road Infants School (Richard Fordham) | RD9 |
| Lancashire Fire Authority (Richard Stott) | RD11 |
| Frome Community College (Andy Dorgan) | RD17 |
| Birmingham Education Safety Services (Frank Sparkes) | RD18 |
| East Sussex Fire & Rescue (George O'Reilly) | RD19 |
| County Health and Safety unit (David Goodwin) | RD20 |
| The Royal Borough of kensington and Chelsea (David Gammon) | RD21 |
| Royal Exchange (Gary Daniels) | RD22 |
| Nottingham City Council (Julie Smith) | RD23 |
| The Fire Protection Association (David Sibert) | RD24 |
| Kent County Council (John Lattimore) | RD25 |
| NAHT (Michael Lloyd) | RD26 |
| County Hall (Martin Morley) | RD27 |
| National Governors' Council (Gillian Windass) | RD28 |
| Portakabin Ltd (Glyn Boddy) | new |
| Fire Safety Development Group (Ian Targett) | 91 |
|  (no details supplied) | 92 |
| Arup Fire (Andrew Hedges/ Nick Troth) | 93 |
| Cadline Design Ltd. (Hugh Grehan) | 94 |
|  (Dave Garioch) | 95 |
| Shrewsbury & Atcham Borough Council (Morgan Saunders) | 96 |

Note: not all respondents were explicit in their wishes, particularly if they did not reply in the standard format. Only those whose responses were confidential and those who specifically requested no further contact have been removed from the list above.