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The professional voice of the
UK Fire & Rescue Service

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Response to *'Fire Safety: Risk Prioritisation in Existing Buildings – A Call for Evidence'*
Building Safety Programme
Ministry of Housing, Communities and Local Government
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United Kingdom

Sent via email to: ADBconsultation@communities.gov.uk

26 February 2020

To the Ministry of Housing, Communities and Local Government,

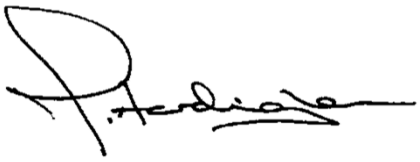
**Response to *'Fire Safety: Risk Prioritisation in Existing Buildings – A Call for Evidence'***

Please find attached the National Fire Chiefs Council (NFCC) response to *'Fire Safety: Risk Prioritisation in Existing Buildings – A Call for Evidence'.* The NFCC is the professional voice of the UK fire and rescue services and is comprised of a council of UK Chief Fire Officers. This submission was put together through the NFCC's Protection and Business Safety Committee, which I Chair. The Committee is comprised of protection and fire safety specialists from across the UK.

NFCC is supportive of the need for further research in how to better classify the risk of existing buildings within our communities. Our responses to recent consultations in the area of building safety have outlined our belief that risk cannot be quantified solely by the use of arbitrary measurements such as building height. Building risk is dependent upon many aspects of both the building itself, and of those using it. Prioritisation of risk in buildings should take into account a number of factors, including the characteristics and vulnerabilities of occupants, the use of the buildings along with aspects of their design and construction.

Our response below provides an outline of existing methodologies FRS have used which could warrant further research and review and help form the basis of any future systems.

Yours Sincerely,



Mark Hardingham
**NFCC Protection and Business Safety Committee Chair**

**Fire Safety: Risk Prioritisation in Existing Buildings**

**A Call for Evidence**

| **Question 1** | **Respondent details** |
|---|---|
| Name | Mark Hardingham |
| Position (if applicable) | Protection and Business Safety Committee Chair |
| Organisation (if applicable) | National Fire Chiefs Council |
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| Please state whether you are responding on behalf of yourself or the organisation stated above | Responding on behalf of the National Fire Chiefs Council (NFCC) |

| **Question 2** | **Select one** |
|---|---|
| Please indicate whether you are applying to this consultation as: | |
| Fire and Rescue Authority representative | X |

**Question 3**

**Do you agree that a case by case risk-based approach should be taken for existing buildings?**

Yes.

NFCC agrees that any risk-based approach should take account of the individual buildings on a case-by-case basis. However, due to the large number of existing buildings, it may be necessary for any retrospective application to apply cascading criteria that could be used to incrementally triage the existing built environment as the sector prepares for the new building safety regime.

NFCC outlined in our response to the Building a Safer Future Consultation questions about height thresholds, that height does not equal risk. Our previous submission suggested that consideration of building risk should incorporate other available types of risk information, such as the Government's Fire Service Emergency Cover (FSEC) Toolkit, produced to support Risk Based Inspection Programmes[1]. This approach incorporated census Output Areas, local historical incident data and socio-demographic factors, and multivariate analysis to enable geographic targeting of Community Fire Safety. It also considered historical incident data, plus the intervention activities, to establish the total dwelling fire risk level after intervention has been considered.

[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/7636/940448. pdf

The Toolkit calculates a risk level for each output area, which is directly comparable between FRSs and consistent across Great Britain. NFCC notes that within FSEC, buildings such as Hospitals and Care Homes score much more highly than purpose-built blocks of flats, as shown below in Table 1.

**Table 1: FSEC Societal Life Risk Fire Frequencies and Relative Risk Scores– June 2008, Department for Communities and Local Government**

| **Occupancy Type** | **Average FSEC Societal life risk fire rate per 1,000,000 Buildings per year** | **Relative Risk Bands** | | | | |
|---|---|---|---|---|---|---|
| | | **Very High** | **High** | **Medium** | **Low** | **Very low** |
| | | **FSEC Life Risk Score** | | | | |
| | | **10+** | **9 to 3** | **+2 to -2** | **-3 to -9** | **-10+** |
| | | **Relative Risk Scores** | | | | |
| **Hospitals and Prisons (A)** *See note 3 below* | 676 | >6.83 | 6.78-6.31 | 6.13-5.53 | 5.35-4.88 | <4.83 |
| **Hostels (E)** | 167 | >6.22 | 6.18-5.70 | 5.52-4.92 | 4.74-4.27 | <4.22 |
| **Care homes (B)** | 128 | >6.11 | 6.06-5.59 | 5.41-4.81 | 4.63-4.15 | <4.11 |
| **HMO's ( C )** | 106 | >6.03 | 5.98-5.50 | 5.33-4.73 | 4.55-4.07 | <4.03 |
| **Houses converted to flats (G)** | 106 | >6.03 | 5.98-5.50 | 5.33-4.73 | 4.55-4.07 | <4.03 |
| **Purpose built Flats (D)** | 106 | >6.03 | 5.98-5.50 | 5.33-4.73 | 4.55-4.07 | <4.03 |
| **Hotels (F)** | 77 | >5.89 | 5.84-5.36 | 5.19-4.59 | 4.41-3.93 | <3.89 |
| **Shops (N)** | 63 | >5.80 | 5.75-5.27 | 5.10-4.49 | 4.32-3.84 | <3.80 |
| **Other sleeping accommodation (H)** *See note 3 below* | 21 | >5.31 | 5.27-4.79 | 4.62-4.01 | 3.84-3.36 | <3.31 |
| **Schools (M)** | 11 | >5.05 | 5.00-4.52 | 4.35-3.74 | 3.57-3.09 | <3.05 |
| **Further Education (J)** | 11 | >5.05 | 5.00-4.52 | 4.35-3.74 | 3.57-3.09 | <3.05 |
| **Public Buildings (K)** | 11 | >5.05 | 5.00-4.52 | 4.35-3.74 | 3.57-3.09 | <3.05 |
| **Other buildings open to the public (P)** | 11 | >5.05 | 5.00-4.52 | 4.35-3.74 | 3.57-3.09 | <3.05 |
| **Licensed Premises (L)** | 10 | >5.02 | 4.97-4.49 | 4.32-3.72 | 3.54-3.06 | <3.02 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Factories/Warehouses (R)** | 4 | >4.62 | 4.57-4.10 | 3.92-3.32 | 3.14-2.67 | <2.62 |
| **Other Workplaces (T)** | 4 | >4.62 | 4.57-4.10 | 3.92-3.32 | 3.14-2.67 | <2.62 |
| **Offices (S)** | 3 | >4.47 | 4.42-3.95 | 3.77-3.17 | 2.99-2.51 | <2.47 |

**Note:** The societal life risk fire rates in this table differ from those used in the FSEC toolkit:

1. In FSEC, the societal life risk fire rates quoted in the risk definitions are rounded values so are slightly different to those above.
2. The societal life risk fire rates quoted in this table for some occupancy types (shops, offices etc) are double those used in FSEC - this is because FSEC divides the fire frequency by 2 for buildings only occupied during the day
3. Prisons were previously included in "Other sleeping accommodation" but are now included in the "Hospitals" category as the fire frequency in prisons is more similar to that of hospitals. The figures for these two categories have therefore changed. Youth Offending Institutes and Immigration Detention Centres should also be included in this category.
4. The gaps in the relative risk scores between risk levels (eg for Hospitals, the relative risk score ranges from 6.78 to 6.31 for high risk and 6.13 to 5.53 in medium risk – there is an apparent gap here with no risk level for relative risk scores between 6.31 and 6.13) is a consequence of the way in which these relative risk scores are calculated and is not an error. Correct calculation of relative risk, with whole (integer) numbers for the FSEC life risk score will not produce results outside of the ranges given above.
5. The societal life risk scores achievable by a property in FSEC ranges from +12 to -34.

Such an approach warrants review to consider if there are new or emerging datasets which could usefully contribute to a more holistic understanding of risk, including the vulnerability of people who live and work in buildings.

For existing buildings, one of the greatest challenges is the availability of accurate records about how buildings have been constructed, and what they are made of, as identified by Dame Judith Hackitt in the Independent Review of Building Regulations and Fire Safety. This applies not only in respect of what was planned to be built, but how actual construction may have changed during build, for instance with particular products being substituted during builds or refurbishments. NFCC would note that there are likely to be a range of ways buildings could be prioritised in theory, but some of these will rely on the availability of some information where there are still significant barriers to gathering it.

## Question 4

**What factors, aside from height, do you think should be considered when classifying building risk? Please provide evidence to support your answer**.

In addition to our answer to Question 3, there is significant scope for 'gaming' hard parameters such as trigger heights, and aspects such as how buildings are measured. Currently, there is an anomaly for protection of buildings between 11m and 18m (at 11m it is assumed that firefighting will need to commence from inside a building, but additional provisions to assist firefighters are not required for buildings under 18m in height).

### Compartmentation and evacuation strategies

Most buildings are reliant upon fire resisting compartmentation in order to ensure that escape routes are safe for use in the event of a fire. Buildings which utilise strategies which rely upon a delay in evacuating the whole building, such as 'stay-put' or 'Progressive Horizontal Evacuation' (PHE) are highly reliant upon the compartmentation of the premises.

The compartmentation of buildings which do not conform to modern regulations and/or do not support the intended evacuation strategy significantly increases the risk associated with the building.

### Occupancy – numbers & type such as disabled, very young, elderly etc.

The occupancy of a premises can have an effect on the risk within. The risk of similar building layouts can be greatly increased depending upon the use and the ability of occupants to evacuate safely. Factors that can influence the risk include:

- Persons with restricted mobility – buildings in which occupants may require assistance to evacuate (utilising Personal or General Emergency Evacuation Plans). Premises where this may be an issue include residential care premises; blocks of flats; premises not designed with evacuation facilities such as evacuation lifts; and premises with large numbers of the general public present.

  In general needs blocks of flats, it is possible for there to be occupants present who are unable to evacuate the building by themselves. The presence of such persons will increase the risk to life in these premises due to their need for assistance to evacuate in the event of a fire

- Young Persons – premises with large numbers of young persons may be more reliant upon a managed evacuation.

- Persons with cognitive disabilities – premises with this occupancy are also largely reliant upon staff assisting with the evacuation.

- Buildings where there are large populations or dense crowds – buildings such as licensed premises, theatres, sports grounds and public assembly buildings can present an increased risk to occupants due to large numbers of persons with a lack of familiarity with escape routes, possibly affects of alcohol usage and increased potential for falls and crush injuries.

Fire and rescue service (FRS) experience is that there is very little understanding amongst managers of buildings about what a suitable and sufficient evacuation plan should look like for premises utilising a stay-put or PHE strategy. The safety of occupants in these premises is highly reliant upon management intervention and assistance. However, it is the experience of FRSs that the Fire Risk Assessments (FRA) for these premises rarely refer to the suitability of the evacuation strategy or the ability of the staff present to implement the strategy.

Many risk assessments state that the FRS will carry out evacuation of occupants and for this reason staff are to evacuate themselves and leave occupants in place; NFCC do not support this strategy.

**Use of the building – sleeping, care, prisons etc.**

The use of the building can be a significant factor affecting its risk. A common issue is where the use of the building has changed from that which it was originally intended. The introduction of sleeping risk into a building is becoming more common and increases the risk significantly.

Examples that have been found recently, in relation to change of use, include:

- Warehousing used for goods processing
- Offices converted into flats
- Churches being used as homeless shelters
- Houses converted into care homes
- The emergence of escape rooms
- Warehouse converted for robotic use (dark warehouses)
- Air B&B type properties

These premises can pose significant issues with regard to the lack of knowledge of crews attending a fire at a building that has undergone significant changes and may be unsuitable for that new use in terms of fire safety provisions, means of escape, access and water supplies.

**Complex and/or fire engineered buildings**

Buildings that have been designed to incorporate features that are not in accordance with prescriptive guidance such as Approved Document B are often referred to as Complex Premises. These premises could involve the use of BS 9999: *'Fire safety in the design, management and use of buildings – Code of practice'*, or BS 9991 *'Fire Safety in the Design Management and Use of Residential Buildings'.* These buildings allow a more transparent and flexible approach to fire safety design through use of a structured approach to risk-based design where designers can take account of varying physical and human factors.

Fire engineered buildings utilise fire safety engineering principles in whole or part of their design. Some fire engineered premises may be large and complex or contain different uses. Fire engineered premises may be high risk due to fire engineered solutions where an understanding, management and maintenance of the fire safety systems is essential to the safety of the premises.

Buildings which include a high degree of complexity and/or a fire engineered approach to design often incorporate fire safety features that require knowledge, understanding, maintenance and testing to ensure that the design performs as required. NFCC would classify these buildings as having a higher risk due to the possibility that risk can be increased should there be a failure in either systems maintenance or premises management. FRSs have often found, during fire safety audits, that fire safety provisions installed at the build stage have been removed or become unserviceable later in the life of the building. Fire engineered buildings can also include features such as large compartment sizes, atria, increased travel distances, increased hose laying distances which can pose increased difficulty for firefighters should they have to rescue building occupants.

**Construction method & type**

The use of modern methods of construction have contributed significantly to several serious fires nationally in recent years.

Examples of such methods that increase risk are:

- Cladding systems;
- Timber frames;
- Use of green walls;
- Use of composite materials on balconies;
- Installation of Photo Voltaic Cells; and
- Use of temporary accommodation i.e. cardboard tents.

With regard to existing buildings, many of these construction methods may be hidden and therefore difficult to assess during any form of fire safety risk assessment or audit. As such, the risk prioritisation process must ensure that any such modern methods are clearly highlighted, and their associated risk quantified.

NFCC would also like to raise concerns regarding the apparent lack of large-scale fire test data for certain modern methods of construction (MMC) methodology e.g. modular builds. This understanding not only feeds directly into the design process but allows greater understanding of building performance in fire such that fire services can develop their operational understanding and response. The lack of fire test data, coupled with construction quality issues, does not provide us with confidence that all these schemes are receiving the appropriate level of scrutiny needed for such new and innovative approaches.

**Buildings where access and/or water supplies are limited**

In the experience of our members, FRS often encounter older buildings, that were not subject to the same scrutiny as they would be today during the design process, or converted buildings that do not have adequate access or water supplies for Fire Service use. We find that these issues have not been considered within the Fire Risk Assessment.

## Property Protection

Whilst NFCC appreciate the current intention of the regime is primarily life safety, further emphasis on environmental impacts and property protection could have significant additional benefits, particularly for communities and the safety of firefighters. We recommend that government consider whether there are opportunities within the review of how high risk is defined within the built environment to improve property protection, particularly for key community assets such as schools and heritage buildings. Some areas where this specifically deviates from current definitions of risk include

- premises such as those involving the processing and storage of waste materials; fires in these areas result in protracted incidents which can cause pollution of air and local watercourses and tie up FRS resources; and
- large warehouse buildings – usually situated adjacent to major transport infrastructure where fire and smoke can cause large-scale disruption to the local area.

## Question 5

**How significant do you consider height to be when classifying building risk? Please provide evidence to support your answer**.

Height will be a significant factor in relation to risk for any building**, however height alone does not equal risk.**

For the occupants of any premises the height of the building should not increase the risk if it is built in accordance with an approved building regulation standard and maintained to that standard. NFCC would like to see consideration given to the vulnerability of building occupants rather than building height. Whilst the 18m threshold stated for building height in current guidance (ADB and British Standards) aligns with an increase in building protection in areas such as firefighting facilities, it is a historical height which does not reflect modern firefighting equipment and practices. 18m could be considered at best out of date, but perhaps more appropriately, an arbitrary threshold.

- In terms of higher risks for buildings, NFCC would state that reference should be made to the height at which firefighting facilities are required, which we suggest should begin at 11m or 3 floors. This is generally the height at which firefighting and building evacuation is reliant on protecting the interior of a building to a degree that allows safe evacuation and safe ingress for firefighters.

- Compartment sizes, access to perimeters, hose length distances, and maximum suppression sizes (particularly for warehouses and factories).

## FRS Speed and Weight of Response

FRS ability to respond to incidents in taller buildings can affect the risk to which the building and its occupants are exposed. Differences in resources between FRS can mean that the response to high rise incidents can take longer in some parts of the country (metropolitan FRS are likely to have resources located more closely together than some more rural FRS, who may not be able to provide the same weight of response). The availability of resources can affect the time it takes for the Fire Service to establish sufficient equipment and personnel at the fire floor before an attack on the fire can be made (examples of response time variations are published in government statistics[2]). The higher the building, the longer it will take to reach this point. This also means that the maintenance of systems that have been designed in order to help tackle the fire and preserve escape routes, such as smoke control systems and dry rising mains becomes more critical.

## Question 6

**Please specify areas the research on the prioritisation of risks in buildings should consider.**

In addition to our answers above, one of the main barriers in classifying risk from the FRS experience is being able to gather consistent, current data about buildings and their occupiers. There are a number of gazetteers that can be interrogated to find out building information but they often do not contain all of the data that would be required in order to compare building risk. Often there is little data or a great degree of uncertainty about the size of a building. Other features that may change the risk of a building, such as building features like the number of floors, the number of staircases, or the presence of sprinklers can usually only be found by visiting a premises. NFCC believe that one of the main focuses of activity focussing on risk prioritisation is the creation of nationally available data that can be accessed by enforcing authorities for use in analysing risk in their area. Without a consistent standard it is difficult for consistent application of risk prioritisation to occur.

As above, a review of the Fire Services Emergency Cover toolkit would be beneficial in order to incorporate modern understanding of risk, based on the evidence of the last 15 years since it was reviewed.

Other areas that are currently being researched or would benefit from further research include:

- The application of ‘stay put’ strategies in relation to building design
- Benefits of sprinklers and other suppression systems
- Capabilities of modern fire service equipment

[2] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/857924/response-times-fires-england-1819-hosb0120.pdf

- Further research into the suitability of designing buildings with only a single staircase, especially in buildings with sleeping occupants, such as hotels, or in buildings with a delayed or 'stay put' evacuation strategy. It should be determined if any additional compensations are needed in order to justify the use of only one escape route, or indeed whether the risk of losing a single escape route due to the effects of fire and smoke can be tolerated.

- Further research is needed into the evacuation of vulnerable persons and those requiring assistance in strategies such as Progressive Horizontal Evacuation. These scenarios typically require a great deal of time and additional resources, such as staff members, lifting equipment and evacuation aids. The research should focus on whether additional measures such as automatic fire suppression systems and smoke ventilation are required in order to ensure safety of occupants.

- Modern Methods of Construction (MMC) – NFCC note that the Government has appointed an Independent Champion for MMC; we believe that building and fire safety should be a key priority in this area;

The NFCC is mindful that Government have now commissioned a Stay Put Steering Group to oversee further research into the Stay Put strategy in buildings that fail tests for the presence of combustible cladding.

Consideration of the application of a systems engineering framework to existing buildings – looking at the sensitivity of systems failure in terms of increased risk e.g. the aggregation of smaller failures resulting in greater risk. Examples could include whether there is an increased likelihood of fire spread in older buildings which have had significant modifications throughout their life which may have impacted compartmentation and could potentially allow fire and smoke spread. .

**Question 7**

**Please specify approaches and evidence the research should consider when prioritising action between different buildings.**

Whilst NFCC appreciate the current intention of the regime is primarily life safety, further emphasis on environmental impacts and property protection could have significant additional benefits for communities and the safety of firefighters. We recommend that government consider whether there are opportunities within the examination of high risk buildings to include property protection, particularly for key community assets such as schools and heritage buildings.

Approaches and evidence that should be considered as part of the current exercise include:

- Availability of data, and the relevant powers available to regulators to gather information about the design, build and fabric of buildings.

- Review of fire incidents using national fire statistics to inform research of where fires occur[3]. This can identify post-fire trends, for example, ducting fires in restaurants and takeaways, which may affect residential accommodation above due to compartmentation and means of escape issues.

- Research should look at how data held by different regulators could inform prioritisation of fire risk. Examples of this could include:

    - CQC reports – identifying premises coming off the register to see if they are operating as specialised housing where they should really still be a registered care home.
    - Environment Agency – information is held about poor management in and site risk accordance with the Environmental Permitting Regulations.
    - Food rating index –food ratings of less than 5 could indicate that it is likely that compliance with fire safety law could be below required standards.
    - Licencing teams – local police and Local Authorities identify risk during joint enforcement visits targeting an area of problem premises.
    - OFSTED reporting issues with schools.

- Research into the prioritisation of buildings should look to consider where national trends can inform where FRS should focus their resources. These trends could stem from:

    - Emerging strategic risks, for example targeting care homes following notable fire incidents where issues with residents' evacuation were found.
    - Heritage building trends where issues with poor compartmentation and lack of salvage planning have been found.
    - Enforcement trends – where FRS are carrying out enforcement activity, for example, houses being run as hotels for tourists or poor escape routes from residential premises above shops / takeaways.

- Review of the Fire Risk Assessment guidance documents.

- Development of new guides for further building types.

- A review of how relevant bodies including regulators store data about buildings to ensure consistency. This should consider how data is held throughout the lifespan of buildings and what specific information needs to be held in order to assess and compare risk between premises.

[3] http://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/830400/fire-statistics-data-tables-fire0304-120919.xlsx

**Question 8**

**Please provide innovative ideas and supporting evidence of approaches to assessing risk in existing buildings.**

In conjunction with our responses to the questions in this consultation, the following are links to some of our responses to recent consultations which should be read alongside these answers:

- 'Technical review of Approved Document B of the building regulations: a call for evidence'
- 'Technical review of Building Bulletin 100: Design for fire safety in schools'
- 'Building a safer future: proposals for reform of the building safety regulatory system'.
- 'The Regulatory Reform (Fire Safety) Order 2005 Call for Evidence.'
- 'Sprinklers and other fire safety measures in high-rise blocks of flats'.