

Grenfell Tower – fire safety investigation:

The fire protection measures in place on the night of the fire, and conclusions as to:

**The extent to which they failed to control the spread of fire and smoke;
The extent to which they contributed to the speed at which the fire spread.**

Interim Recommendations

SUMMARY REPORT OF

Dr Barbara Lane FREng FRSE CEng

Fire Safety Engineering

3rd April 2019

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| Specialist Field | : | Fire Safety Engineering |
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| On behalf of | : | Grenfell Tower Inquiry |
| On instructions of | : | Cathy Kennedy, Solicitor, Grenfell Tower Inquiry |
| Subject Matter | : | To examine the circumstances surrounding the fire at Grenfell Tower on 14 th June 2017 |

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1 Interim recommendations

1.1 Definitions

1.1.1 The Chairman has been giving thought to the nature of the recommendations that he could make. With regards to **interim recommendations** which could be made now or following completion of his Phase 1 report, I am advised they may fall into one or other of the following two categories:

1. Recommendations that are so urgent that they should be made now and prior to the completion of the Chairman's Phase 1 report.

To fall into this category, the recommendation must be one which is:

- A. obvious in the light of the evidence which has been heard at Phase 1; and
 - B. so urgent on grounds of public safety that it should not be deferred until either the publication of his Phase 1 report or left to be addressed as a final recommendation at the end of Phase 2.
2. Recommendations which are based on the Chairman's findings and analysis in his Phase 1 report that should not be left to be addressed as final recommendations at the end of Phase 2.

1.1.2 My specific instructions are:

The Inquiry would like you to focus on whether there are any recommendations (urgent or Phase 1 recommendations) which you would wish the Inquiry to consider in terms of building regulation, building safety and fire risk assessment.

1.1.3 I note I have not carried out my analysis of the fire risk assessment activity associated with Grenfell Tower, as part of Phase 1. And this topic is excluded from my interim recommendations as a result; except where I address the risk to life in the buildings identified by the Ministry of Housing Communities and Local Government (MHCLG) as being clad on their external walls "with unsafe ACM cladding".

1.1.4 I intend to complete my work regarding the compliance status of Grenfell Tower, with the Building Regulations, and other fire safety related legislation, in Phase 2.

1.1.5 Once this is completed I will also make a separate detailed report on recommendations which could contribute to a sustainable and long-term change regarding building fire safety.

1.1.6 This Summary Report of Interim Recommendations, should interpreted in that context i.e. I intend to report separately at the end of Phase 2 on the sustainable, long-term changes I think are necessary to regarding building safety.

- 1.1.7 However, I have made clear in my Phase 1 report dated 24th October 2018, and I re-state those here in this Summary Report, where I already consider recommendations to be “obvious in the light of the evidence which has been heard at Phase 1”.
- 1.1.8 I have particularly focused on the evidence presented in my own Phase 1 report.
- 1.1.9 This evidence is supplemented, in the context of this Summary Report, by my longstanding experience in the design and construction industry, which includes my involvement with the detailed design and construction of external walls, in multiple forms of material type; and my professional experience of fire tests and certificates for use as a design practitioner (active and passive fire protection measures).
- 1.1.10 Therefore, I have made clear where I consider a matter to be one of public safety, and why, [See Table 1] and therefore I have recommended it should not be deferred to a final recommendation at the end of Phase 2. But instead it is my opinion they should be considered as part of Phase 1, where possible.
- 1.1.11 Additionally, I note that the Inquiry is particularly keen to understand whether there are any public safety concerns I have, regarding high-rise or other high-risk buildings at the present time. That includes consideration of whether any interim arrangements that are in place for existing buildings are robust and whether I consider there are any further steps that should be taken to mitigate the risks e.g. which are posed by the presence of combustible cladding or other external wall materials or arrangements for those buildings.
- 1.1.12 In this context, the Inquiry has been informed by the Ministry of Housing Communities and Local Government (MHCLG) in their Position Statement (CLG00019099) that the Department has identified 457 high rise buildings “with unsafe ACM cladding”. The most recent Building Safety Programme Monthly Data Release produced by MHCLG provides a revised figure as of 28 February 2019 of 433 buildings in total identified in England with unsafe ACM cladding and 8 private sector buildings where the cladding status is still to be confirmed. It states cladding remedial works have been completed for 79 of those identified buildings.
- 1.1.13 No explanation is provided by MHCLG in the February 2019 data release for the change in total number of identified buildings with ‘unsafe ACM cladding’. New figures are released monthly by MHCLG; for this Summary Report I shall refer to the identified buildings as the ‘433 buildings identified with unsafe ACM cladding’ which is the current total figure for public and residential (social and private sector) buildings.
- 1.1.14 The Ministry has stated that it “*has provided clear, evidence-led information and advice to building owners on the steps they should take to make their buildings safe*” (see paragraph 3 of its Position Statement). The Inquiry has advised me they are interested to know whether I have any recommendations

about further steps that ought to be being taken in respect of these buildings in the interests of public safety.

- 1.1.15** I note that I have not been provided with any definition of the “evidence-led information”, upon which the Ministry relies, nor do I understand what that may comprise. I have therefore reviewed all the documents published in respect of the *Building Safety Programme*, as recorded at <https://www.gov.uk/guidance/building-safety-programme>.

1.2 Content of this report

- 1.2.1** Section 2 of this report reconfirms the recommendations I have already made in my Phase 1 report dated 24th October 2018. However, I have specifically emphasised in this Summary Report, those issues I consider have an immediate public safety relevance, and which are obvious in light of the evidence I have presented in Phase 1.
- 1.2.2** Section 3 of this report discusses my understanding of the current life safety state of the 433 buildings classed as having “unsafe ACM cladding” by the MHCLG, and how the guidance published by MHCLG under the *Building Safety Programme* can assist Responsible Persons (as defined by the Regulatory Reform (Fire Safety) Order 2005) of those buildings to provide adequate mitigation measures for all residents of those buildings.
- 1.2.3** Table 1 then collates and summarises all my current recommendations from my Phase 1 report dated 24th October 2018.
- 1.2.4** Table 1 identifies specifically whether any of my recommendations have already been addressed by the changes in the 2018 amendment to the Building Regulations 2010 or the guidance currently published by the National Fire Chief’s Council and/or MHCLG as part of the *Building Safety Programme*.
- 1.2.5** Table 1 provides commentary on which of my recommendations in my Phase 1 report I consider can increase the fire safety standards for residents currently housed in one of the 433 buildings in England classed as having “unsafe ACM cladding” by MHCLG.
- 1.2.6** That Table also identifies whether each of my recommendations should, in my opinion be:
- a. Considered by the Chairman as part of his work for his Phase 1 Report – there are 18 such recommendations;
 - b. Considered later, as part of the Chairman’s Phase 2 Report – there are 2 such recommendations.
- 1.2.7** I will also make a separate detailed report at the end of Phase 2, regarding recommendations which could contribute to a sustainable and long-term change regarding building fire safety.

2 Phase 1 recommendations

2.1 Conclusions already presented in my Phase 1 report

2.1.1 In Section 2 of my Phase 1 Expert report dated 24th October 2018, I set out my conclusions from my Phase 1 work. Specifically, these are presented in Section 2.9 – Section 2.25 of my main report.

2.1.2 I have not reproduced these again here.

2.1.3 However, I hope they will all be considered by the Chairman, as part of his own Phase 1 report analysis.

2.1.4 Changing the current reliance on Stay Put

2.1.5 I do want to emphasise the issue of Stay Put, which I think merits consideration at this stage of the Inquiry's work, so that changes in the Regulatory regime can commence before the end of Phase 2. I have written about Stay Put in my Phase 1 report, and I have also set out how in this country it is the single safety condition designed for. I note the following key points here.

2.1.6 Any change in Stay Put during a fire is not easily dealt with in the UK, where there is no statutory requirement to provide an automatic detection and alarm system in high-rise residential buildings for the purposes of warning all occupants that an all building evacuation is required.

2.1.7 There is no fire alarm panel provided with controls for the fire and rescue services, or responsible persons, to raise an all-out alarm should it become required. In Section 18 of my Phase 1 report I have identified the current forms of communication available for residents and firefighters when (a) there is no automatic communication provision in a building and (b) the operational guidance to Stay Put needs to change.

2.1.8 The limitations on communication caused difficulty on 14th June 2017, and this was particularly the case after the Stay Put guidance to 999/FSG (Fire Survival Guidance) callers was changed.

2.1.9 I have also explained the additional difficulties for persons requiring assistance, and the severe consequences for such persons when rescue becomes impossible. Therefore, when self-evacuation is not possible, this imposes a very high burden on any fire and rescue service to carry out rescue.

2.1.10 All these difficulties remain now, for any existing building. They also arise in respect of any new building with a Stay Put evacuation regime.

2.1.11 In my opinion, for an existing building also identified with unsafe ACM cladding, the risk to life in a sole Stay Put regime, cannot be mitigated. And this is particularly so for those who rely entirely on rescue. This places even more burden on the fire and rescue services. Please refer to Section 3 below.

- 2.1.12 I note the current advice from the NFCC¹ under the *Building Safety Programme*, is for a *temporary* change to simultaneous evacuation, until failings have been rectified, in respect of purpose-built blocks of flats where a ‘Stay Put’ strategy was part of the original design (but is no longer considered appropriate owing to significant risk issues such as combustible external facades).
- 2.1.13 I do not agree with the NFCCs current position, stated in paragraph 1.4 of their ‘Guidance to support a temporary change to a simultaneous evacuation strategy in purpose-built block of flats’, that a permanent change of this nature is not likely to be appropriate “*particularly in buildings over 18m in height, in which the number of persons who evacuate simultaneously may be considerable*”.
- 2.1.14 In my opinion a permanent change in the regulatory regime is needed to remove the sole reliance on a single evacuation strategy as a basis for design. There are other countries which adopt Stay Put evacuation regimes, but once smoke has spread from the first compartment, a second evacuation strategy is designed in and provided for, and so enables a change in the event of smoke spread. This ability to change provides another reasonable layer of safety and can be enabled with reasonable forms of active measures. This additional layer of safety could also be effective in mitigating other failures in safety layers; it would not be limited to a mitigation of failures in the fire performance of cladding systems only. (Cladding systems are already a focus of recent legislative change).
- 2.1.15 These are safety measures which are needed for all occupants and users of a high-rise building – residents and fire fighters. I have made it clear I do not consider it reasonable to expect any fire and rescue service to mitigate the consequences when building design is based on one safety condition, and one or more failures in that safety condition occur.
- 2.1.16 Proper understanding and analysis of stair widths coupled with fire and rescue service needs is required, to remove sole reliance on Stay Put. This is work that should commence as soon as possible. There is no evidence, for example, that the occupancy of Grenfell Tower was such that, in the event of a simultaneous (“all out”) evacuation, it could cause the single stair case to become impassable to escaping residents or attending fire fighters.
- 2.1.17 Further I do not agree with the NFCC position (stated in para 1.4 of ‘Guidance to support a temporary change to a simultaneous evacuation strategy in purpose-built block of flats’) that a more permanent reliance on simultaneous evacuation would be “*detrimental to the equality of disabled people, who may be unable to evacuate without assistance.*” The current regulatory regime, irrespective of any additional risk now posed by unsafe

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https://www.nationalfirechiefs.org.uk/write/MediaUploads/NFCC%20Guidance%20publications/Protection/01052018NFCC_simultaneous_Evacuation_guidance_final_doc.pdf

cladding, is not fit for purpose. Persons referred to as disabled and unable to evacuate without assistance by the NFCC, should not in general be required to await rescue, and even more so should not be required to await rescue in a building with one safety condition only. The intrinsic risk to their lives, when only rescue is allowed for, as opposed to a designed for safe evacuation method, creates inequality. An ability to evacuate without total reliance on rescue by the fire and rescue services, is a key change needed now, and expert consideration of solutions for this is urgently required and should not in my opinion wait to the end of Phase 2.

2.1.18 In my opinion it is also important to consider moving away from a single safety condition [stay put] for new buildings, not just buildings with unsafe ACM cladding, as currently recommended by the NFCC. The statutory and non-statutory guidance should no longer provide for, or enable, a single safety solution. Simple design requirements can provide the facilities needed to enable a change in evacuation strategy during a fire. This will improve life safety standards for residents and for fire fighters.

2.1.19 Just as new buildings should be designed to accommodate facilities that can enable a simultaneous evacuation to occur when required, clear guidance and expectations must also be set for owners of *existing* buildings. Such guidance must assist responsible persons in identifying existing problems in their overall risk assessment, and address, for example, what exactly an all-out alarm system can be relied upon to mitigate, as well as the practical circumstances where an alarm system can truly reduce the risk to life, and how that is to be achieved. This includes what reliance, if any, should be placed on the fire and rescue services, for either leading an evacuation, or effecting rescue for persons who require assistance, etc.

2.1.20 Any such guidance must also be clear on what the minimum standard of detection and alarm system is required and why; as well as provide clear performance needs, such that adequate all-out evacuation of a building can be controlled and achieved.

2.1.21 The works needed to introduce the necessary Regulatory change about Stay Put, for both new and existing residential buildings, should commence as soon as possible.

2.2 **Next Steps information already presented in my Phase 1 report**

2.2.1 In my Phase 1 Expert report dated 24th October 2018, and particularly in Section 2.27 – Section 2.34 of my main report, I set out *Next Steps*.

2.2.2 These are issues I consider to be of immediate relevance to public safety.

2.2.3 I want to re-emphasise the following issues, for urgent consideration by the Chairman as part of his Phase 1 report recommendations.

2.2.4 Persons requiring assistance during evacuation

2.2.5 I consider that the lack of provision made by statutory and non-statutory design guidance for persons requiring assistance in a high rise residential building is unacceptable and results in a substantial breach of the functional requirement for means of escape under the Building Regulations.

2.2.6 Section 2 *Means of escape from flats* in ADB 2013 makes no provision for occupants that require assistance to escape and should be updated promptly.

2.2.7 The LGA guidance should also be updated to adequately deal with persons requiring assistance, from “general needs” blocks. The LGA guidance defines a ‘general needs block’ as “*a block of flats intended for occupation by members of the public and not those of a specific demographic or vulnerability*”.

2.2.8 Additionally, the current lack of such design guidance has serious implications for persons requiring assistance, particularly residents in high rise buildings currently classified by MHCLG as having “unsafe ACM cladding”.

2.2.9 Immediate moratorium on the use of test data from BS8414

2.2.10 In my opinion, full scale testing of rainscreen cladding systems ought to be carried out. However, such testing must now include window openings and other relevant fixtures and fittings, rather than the current arrangements in BS8414 Parts 1 and 2. Until these matters are resolved, I recommend an immediate moratorium on the use of any new test data based on BS8414, whilst a robust test method is urgently established.

2.2.11 A more robust testing framework, reflecting real building design and construction detailing, would also assist in establishing whether materials of “limited combustibility” (Class A2) are suitable for use, especially in buildings taller than 18m and/or with substantial sleeping accommodation. Such a framework would also allow a more credible view on the fire performance of individual materials when used in typical construction forms.

2.2.12 Current products relying on test data from BS8414 should be required to publish very detailed information regarding the system as tested and contain clear guidance on the limits of applicability of the same. See Section 2.2.15 of this report below.

2.2.13 The urgent need for a body of relevant fire test data

2.2.14 Based on the current submissions to the Public Inquiry, there is an absence of a body of relevant fire test evidence for rainscreen cladding systems and the components of rainscreen cladding systems, including insulation and cavity barriers. This shows a serious failing in the current testing and classification regime. A body of publicly available and relevant fire test evidence is urgently required to support common construction forms.

- 2.2.15** **An immediate change to the required published content of current and new test certificates and supporting fire test reports**
- 2.2.16** I recommend an urgent regime change regarding the process of carrying out fire tests, including the need to (a) communicate their results in a transparent manner; and (b) communicate how those results apply in a transparent manner. In my opinion, there is an urgent need for a more formal intervention to change the current status quo.
- 2.2.17** My extensive review of the BBA certificate for Reynobond Architectural Wall Panels, and the relevant fire test data upon which it relies, has shown what I consider to be a startling series of omissions in the communication of tested fire performances over the 9 years this certificate was in circulation. There are also considerable limits of applicability in the reviewed test data which were not conveyed/stated in the BBA certificate such as method of panel fixing (riveted versus cassette fixing). These tested fire performances are highly pertinent to designers when selecting materials and assemblies for use in buildings.
- 2.2.18** Therefore, I recommend that third party certificates and fire performance classification certificates should no longer be published without all the relevant test data upon which they rely – pass *and* fail data – being made fully available.
- 2.2.19** I have another serious concern to note. The BS 8414-2 test report and associated BR135 classification report for RS5000 insulated system with a ventilated Eternit rainscreen failed to accurately describe the specific construction and materials installed in the test sample. Such omissions make it impossible for a designer or contractor to provide a design or construction that is compliant with relevant test evidence when using those products.
- 2.2.20** Therefore, I recommend that assembly construction for testing, becomes the responsibility of the test house to inspect and verify, not the current status quo where this assurance is provided by the test sponsor. It should be the responsibility of the test house to reject assemblies that cannot be produced in real construction projects. Alternatively, an independent 3rd party should be employed to provide this level of transparency and assurance. This information must be provided with any certificate that references this assembly, or the individual products used in the assembly. I expect this matter to be investigated in some considerable detail in Phase 2.
- 2.2.21** The evidence provided to the Inquiry by Celotex also raises concerns about the variability in reaction to fire performance test results for the different compositions of insulation material – for example, Line 1 and Line 2 material composition, which are sold under the same product name (RS5000 or FR5000). A similar issue arises in the evidence submitted by Arconic regarding the varying fire performance of different core colours (black or translucent) where both types are sold under the same name Reynobond Architectural Wall Panels. These variations are typically not communicated

in relevant fire certificates for products yet appear to be capable of substantially altering material performance in fire.

- 2.2.22** Therefore, I recommend that product certificates, or supporting fire test reports or classification reports, should no longer be published without all relevant material composition data to support the certificated fire performance.
- 2.2.23** I want to be clear why I think it is important enough to emphasise again, as part of my Interim Recommendations.
- 2.2.24** In general, I have identified that none of the fire test evidence provided to the Public Inquiry was relevant test evidence for Grenfell Tower. By this I mean that none of the fire test evidence demonstrates that the relevant material or product installed at Grenfell Tower is in accordance with a specification or design which has been shown by test to can meet the required performance. This remains the case having reviewed all the information provided to me to December 2018.
- 2.2.25** This is particularly true for the rainscreen cladding system, various insulation products, and for the cavity barriers, as installed at Grenfell Tower, but also regarding the fire doors. Please refer to Appendix E of my Phase 1 report.
- 2.2.26** I consider this to be of considerable importance for the Chairman as he produces his Phase 1 report. This is because the absence of relevant test evidence means that a design or installation is non-compliant with the provisions made in Appendix A of the statutory guidance document, ADB 2013, as follows.
- 2.2.27** In terms of the tests referred to specifically in Section 12.5 of ADB 2013 by means of BRE Report *Fire performance of external thermal insulation for walls of multi storey buildings* (BR 135) *for cladding systems using full scale test data* from BS 8414-1:2002 or BS 8414-2:2005, it is relevant to note that the following is stated:
- “The classification applies only to the system as tested and detailed in the classification report. The classification report can only cover the details of the system as tested.”*
- 2.2.28** Additionally, as per Appendix B of ADB 2013, any test evidence used to substantiate the fire resistance rating of a door should, as stated in Appendix B of ADB 2013, *“be carefully checked to ensure that it adequately demonstrates compliance and is applicable to the adequately complete installed assembly”*.
- 2.2.29** Further, ADB 2013 states, *“Small differences in detail (such as glazing apertures, intumescent strips, door frames and ironmongery etc) may significantly affect the rating.”*
- 2.2.30** As a result, I have concluded that no relevant test evidence has been provided at this stage for the installed rainscreen system at Grenfell Tower, nor its component parts.

- 2.2.31** I have found that the flat entrance fire doors installed were not in compliance with the relevant test evidence provided.
- 2.2.32** Additionally, regarding the new dampers installed as part of the smoke control system, the literature submitted to the Inquiry (PSB00000201) states that this product was “*fully tested to the requirements of EN1366 pt 2 for 1 hour.*” This literature is dated October 2011. However, no formal classification is provided in accordance with BS EN 13501-3 based on testing against BS EN 1366-2.
- 2.2.33** This “1 hour” performance statement appears to have been rescinded by the manufacturer in April 2017. It is possible that this was because the relevant fire test report dated October 2011 did not in fact demonstrate that a test to the full requirements of the test standard had been carried out (please refer to Appendix J of my report).
- 2.2.34** Given the matters set out above, I have found no evidence that these discrepancies between the specific details of the tested systems and how they were installed in Grenfell Tower were understood by relevant professionals prior to handover of the fire safety system, nor was it understood by the fire safety management regime.
- 2.2.35** In my view, it is essential that there is renewed and proper understanding of relevant test evidence, and how it relates to performance, as already emphasised in ADB 2013.
- 2.2.36** This is a critical change and it is needed throughout the industry.
- 2.2.37** **Immediate change to BBA certificate 08/4510**
- 2.2.38** I recommend that the first page and title of the 2017 2nd issue amended BBA certificate 08/4510, which is the currently available version for Reynobond Architecture Wall Panels, be immediately changed to state that the certificate is only valid for Reynobond 55 FR panels with a fire retardant core, in a riveted form, and when installed within the field of application stated in the BS EN 13501-1 classification report RA06-0372 (BBA00000054).

3 Buildings with “unsafe ACM cladding”

- 3.1.1** On the matter of the existing building stock in the UK with the “unsafe ACM cladding”, I have considered my recommendations from Section 2.27 to 2.34 of my Phase 1 report further, and in the following context:
- a) Has the recent change to the Building Regulations now addressed the issue? (Noting these are not retrospective changes, the consequences of which I strongly advise the Chairman to consider in the context of the existing high-rise buildings identified with unsafe ACM cladding).
 - b) Is the issue now addressed in the guidance issued by the National Fire Chiefs Council (NFCC) for existing high-rise buildings with unsafe ACM cladding?
 - c) Is the issue now addressed in the guidance issued through the MHCLG Advice notes relating to existing high-rise buildings with unsafe ACM cladding?
 - d) Could my original recommendation (Phase 1 report dated 5th November 2018), if applied to existing high-rise buildings with unsafe ACM cladding, reduce the current risk to life?
 - e) And so, in the context of these 4 points above, is it my opinion that the Chairman should consider those recommendations as relevant to any interim guidance for Phase 1, and so given before the end of Phase 2?
- 3.1.2** Regarding interim recommendations relating to the existing building stock, the critical issue is the residual risk to life intrinsic to the 433 buildings identified by the MCHLG as having unsafe ACM cladding.
- 3.1.3** I can provide a separate review on the guidance given to owners and occupiers of these buildings, and the resulting omissions and concerns I have as a result, if the Chairman would find this useful or relevant at this stage.
- 3.1.4** For now, though, I want to communicate some urgent issues for his consideration.
- 3.1.5** Is it for the Inquiry to advise the Government on how to deal with a portfolio of buildings that pose a risk to life? If so, I recommend that:
- 3.1.6** A standardised method should be published which allows parties to calculate the intrinsic risk to life in each of these buildings, so that this risk is considered uniformly and not on an ad hoc basis for each building; the Housing Health and Safety Rating System, remains unclear and I cannot currently envisage it will achieve a consistent ranking of risk across all 400+ buildings;
- 3.1.7** A clear set of criteria regarding the necessary competence of the persons carrying out the standardised fire risk assessment method; and

- 3.1.8** The publication of an agreed set of specific minimum mitigation measures required for that risk to life; all whilst,
- 3.1.9** The remedial works are prioritised nationally across the portfolio of buildings.
- 3.1.10** I say this because my primary concern, currently, is that the starting position by MCHLG appears to be that the high-rise buildings with unsafe ACM cladding remain safe to occupy. Not the opposite. I am unclear how this position has been derived and validated by the MCHLG.
- 3.1.11** For example, none of the documents supporting the MCHLG guidance and position addresses:
- a. The issue of *prioritisation* of buildings requiring remedial works, or *how* to prioritise individual remedial works within a single building with multiple failings.
 - b. How the MHCLG has ascertained that the 433 buildings are safe for continued occupation before remedial works can be completed. This responsibility has been delegated to individual local councils to determine, but I can ascertain no minimum safety standard requirement.
 - c. The number of Alteration, Enforcement or Prohibition notices that have been issued to high rise buildings with unsafe ACM cladding under the RR(FS)O. Noting that all notices issued under the RR(FS)O are recorded by the NFCC (<http://www.cfoa.org.uk/11822>). Are the relevant Fire and Rescue Authorities ('FRA') being encouraged to proactively issue notices, having carried out their assessments? What are the terms of reference for the minimum time frames, for the enforcement of such notices, to protect life, in the context of the high-rise buildings with unsafe ACM cladding?
 - d. Whether policies and procedures are now in place, for the Fire and Rescue Services around the UK, that clearly set out how they are to manage the new firefighting techniques and new evacuation protocols that are very clearly needed for high rise buildings with unsafe ACM cladding.
 - e. How these mitigation measures are to be provided by the Fire and Rescue Services and then reliably incorporated into any fire risk assessment. To note, this must include:
 - i. How the Fire and Rescue Services are to lead, trigger, and manage a simultaneous evacuation;
 - ii. What the Fire and Rescue Services are to do in the event the fire is outside the reach of firefighting;
 - iii. Rules for when rescue is to be deemed untenable; and
 - iv. Rules for when firefighting is to be deemed untenable.

- f. The minimum equipment now deemed to be required in a high risk building to enable the evacuation of mobility impaired persons, or in other words, the definition of when a building is unsafe to be occupied by such persons. This should also note:
 - i. Who is responsible for the evacuation;
 - ii. And therefore, what must be provided to a Fire and Rescue Service to aid rescue of mobility impaired persons in such high-risk buildings, for example what measures are required to enable rescue or instead to enable self-evacuation;
 - iii. Then, a common definition of the circumstances under which neither approach is considered a feasible evacuation strategy;
 - iv. And so, a common definition of when a building must be considered as unfeasible for occupation by mobility impaired persons.

- 3.1.12** There are multiple reasons a person may be categorised as mobility impaired in the event of an emergency; how are these issues being defined and considered? How is prioritisation during an emergency, as a function of the level of assistance needed for residents, to be achieved?
- 3.1.13** Clarity on all the issues above would result in a subset of buildings that may in fact be unsafe to occupy at this time by some, or potentially all, types of residents.
- 3.1.14** Overall, my question is who is taking responsibility for the level of prioritisation needed during an emergency, and regarding the works needed to the overall stock of buildings with unsafe cladding?
- 3.1.15** It is my opinion that the works to all 400+ buildings requires prioritisation at a national scale, to manage the supply chain and direct resources to the buildings of highest risk first. Such a major programme of works will take years to plan and deliver.
- 3.1.16** This time frame is very significant. Because it means the risk to life is therefore not short term – how are the current mitigation measures considered fit for purpose in this longer timescale?
- 3.1.17** Again, this will impact what buildings can be categorised as safe to occupy, over this period. I cannot find such clarity in the evidence provided from the MCHLG.
- 3.1.18** In the context of the conclusions in my Phase 1 report only, I provide the points in Table 1 for your consideration.

Table 1: recommendations from Phase 1 report with specific relevance to buildings with "Unsafe Cladding"

| # | Type | Recommendation presented in B Lane's Expert Report | Section reference | Potential Solutions | Addressed by changes to Building Regulation 2018? | Addressed by NFCC Guidance to support a temporary change to a simultaneous evacuation strategy in purpose-built blocks of flats? | Addressed in any of the MHCLG Advice notes? | Would Phase 1 B Lane recommendation reduce the risk to life in the 433 buildings with 'Unsafe ACM cladding'? | Should the Chairman therefore consider an interim recommendation? |
|---|--------------------|---|-------------------|--|---|--|--|---|---|
| 1 | Existing buildings | Unless it can be proven that an existing fire door in a single stair high rise residential building achieves the current benchmark as defined in the statutory guidance Approved Document Part B vol 2 Performance requirement for fire resistance and smoke leakage (including all seals, glazing, door closers, fixing as installed) it must be removed and replaced with a fire door that does | 2.29.7 | Door replacement or repair, in all buildings | No | No – the NFCC advises to follow the LGA guide which does not require existing fire doors to meet the current benchmark | <p>No – MHCLG guidance (advice note 12 <i>Update on interim mitigation measures required pending remediation of cladding</i>) recommends use of LGA guide to assess existing doors and only recommends replacement for non fire-resisting doors.</p> <p>Note Advice Note 16 <i>Advice for building owners on assurance and replacing of flat entrance fire doors</i> provides contradictory guidance – requiring test evidence for flat entrance doors to demonstrate they meet the fire resistance and smoke control from both sides required by Building Regulations. It is not clear how these documents interface.</p> | <p>Yes</p> <p>(But the issue of door closers and so the risk of doors being left open, especially to any flat of fire origin, remains an item that requires action)</p> | <p>Yes</p> <p>Because the MHCLG advice (in Advice notes 12, 16 and 17) requires doors only to comply with the standard at the time of construction.</p> <p>It does not highlight door fire safety performance as a key interim fire safety measure. The role of fire doors, therefore may not be considered a priority item for building owners as part of an interim fire risk assessment, whilst works are underway, or prior to works being completed on their unsafe cladding.</p> <p>Fire doors - self-closing devices and fire resistance and smoke performance is a particularly important protection to escape routes, including during simultaneous evacuation. This is because the evacuation even when simultaneous, remains time critical in the event of rapid external fire spread.</p> |

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|---|--------------------|--|-------------------|--|--|---|--|--|---|
| 2 | Existing buildings | Relevant parties to communicate with one another now and consider whether 'stay put', coupled with a 'defend in place' internal firefighting strategy, remains viable. [For buildings with unsafe cladding]. | 2.28.2 | Fire brigade to issue enforcement or prohibition notices on buildings where sufficient evidence has not been provided that this process has been undertaken. | No – 'stay put' not addressed, nor any changes to internal or external firefighting policy or procedures | Yes The NFCC guidance is for a temporary change of stay put policy only. No information on supporting firefighting policy and procedures for this scenario. | Yes – Advice Note 12 (<i>Updated interim mitigation measures required pending remediation of cladding</i>); advises assessment to determine if a temporary change to stay put should be adopted. Refers to NFCC guidance. But no guidance is provided regarding firefighting response requirements. | Yes | Yes Whilst the interim risk is considered by the NFCC in principle, with respect to evacuation, there is no publicly available supporting firefighting procedures for consideration. A complete risk assessment cannot be provided without this; nor a consistent standard of when a prohibition or enforcement notice should be applied. Additionally, for persons who cannot self-evacuate, the issue of a total evacuation remains problematic. I have made clear the need for an agreed set of information for the Fire and Rescue Services and building owners, to properly plan and aid those persons. This is information of considerable importance too, for a risk assessment, when determining if the package of measures available in any building, mitigates the risk to life, caused by the unsafe cladding material. Permanent changes to 'stay put' in existing buildings should be considered before Phase 2 ends. |

| # | Type | Recommendation presented in B Lane's Expert Report | Section reference | Potential Solutions | Addressed by changes to Building Regulation 2018? | Addressed by NFCC Guidance to support a temporary change to a simultaneous evacuation strategy in purpose-built blocks of flats? | Addressed in any of the MHCLG Advice notes? | Would Phase 1 B Lane recommendation reduce the risk to life in the 433 buildings with 'Unsafe ACM cladding'? | Should the Chairman therefore consider an interim recommendation? |
|---|--|--|-------------------|--|---|---|---|--|---|
| 3 | Existing buildings | Robust and resilient processes for confirming the location of a resident requiring assistance, their rescue needs, or self-evacuation abilities; as well as the localised and overall fire conditions. Then using this information to provide tailored advice for the fire brigade and/or the residents, for the evacuation journey. | 2.28.3 - 2.28.4 | Agreed fire service procedures and equipment for obtaining relevant information on resident's mobility, and their exact location and needs for evacuation during a fire. Agreed fire service procedures and equipment to communicate with residents and provide them with tailored advice to enable self-evacuation, or to enable a rescue. For mobility impaired persons, clear guidance on when a building is therefore not fit for occupation because e.g. a minimum standard of warning, communication, and equipment to support assisted evacuation is not possible. | No | Partially Recommends PEEPS for vulnerable persons – no recommendation of how to develop these. Fire Fighters to be advised of vulnerable residents and evacuation needs on arrival by staff – no guidance on pre-planning or minimum safety standards provided. No means of informing FRA of conditions throughout building and so if safe to evacuate such persons. No recommendations for FRA on policy, procedures or operational changes for assisting evacuation. | No – requires survey of residents only for identification of vulnerable persons; refers to NFCC guidance for temporary change to simultaneous evacuation. No guidance given on a suitable form of new evacuation method for persons needing assistance to escape from a high-risk building. | Yes | Yes Specifically, Fire and Rescue Services tactical plans for monitoring, in advance of the fire, who requires specific assistance, the minimum equipment required, and a means of monitoring conditions within the building (stairs, protected lobbies) to inform Fire and Rescue Services as they evacuate vulnerable people. In the event this cannot be pre-planned, occupation of the building for such persons, should be considered too high risk. |
| 4 | Updates to fire and rescue service operation | Fire brigade to be provided with location of occupants in need of assistance to evacuate. | 2.27.7 | As above | No | Yes – to be provided by trained staff on arrival. Unclear how the fire brigade can pre-plan their response at that stage. Same concerns with minimum standard of equipment needed for this form of evacuation. FRA also expected to visit premises and update their tactical plans – unclear what the minimum requirements should be. | No – Advice Note 12 requires building owners to inform the Fire brigade for the purpose of inspection and assessment of interim measures only. | Yes | Yes Making clear the minimum level of equipment and procedures required, before a building can be deemed safe to occupy by persons requiring assistance. |

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|---|--|---|-------------------|---|---|--|--|--|---|
| 5 | Updates to fire and rescue service operation | Communication methods with residents of high rise buildings in the event of fire. | 2.28.3 (b) | Common alarm system (with appropriate alarm for aural and visual impairments) in the event smoke enters the protected lobby outside a flat; all out button for use by the fire brigade when they deem it necessary. | No | Yes. Either through staff knocking on doors (short term only) or common alarm system (mid-term). No explicit requirement for direct means of communication with vulnerable persons. No all-out button called for. | No - Advice Note 12 requires building owners to inform the Fire brigade for the purpose of inspection and assessment of interim measures only. | Yes | Yes Common detection and alarm system with control for the fire brigade – coupled with new policy and procedures to support such decision making by the Fire and Rescue Service. |
| 6 | Updates to fire and rescue service operation | Availability of facilities for fighting external multi-storey fires. | 2.28.3 (c) | External perimeter parking of sufficient width and clearance for high reach appliances. | No | No | Yes – Advice Note 12 requires building owners to check there is sufficient roadway access and hardstanding for fire fighting vehicles to undertake external firefighting. No specific guidance on provisions is presented beyond this. No acknowledgement of areas of the external wall which will always fall outside the reach of any typical fire fighting vehicle. | Yes | Yes Although this is referred to in MHCLG Advice Note 12, no specific guidance is provided. It is recommended that sufficient access for high reach appliance is provided. There is evidence from Grenfell that external firefighting providing some control of external fire spread up to 30m. The risk areas of façade that cannot be mitigated by external firefighting require express consideration when deeming the overall risk to the building occupants. And therefore, if there are any limits on safe occupation imposed by specific forms of evacuation, or of the types of mobility requirements for persons to occupy such high-risk premises. |

| # | Type | Recommendation presented in B Lane's Expert Report | Section reference | Potential Solutions | Addressed by changes to Building Regulation 2018? | Addressed by NFCC Guidance to support a temporary change to a simultaneous evacuation strategy in purpose-built blocks of flats? | Addressed in any of the MHCLG Advice notes? | Would Phase 1 B Lane recommendation reduce the risk to life in the 433 buildings with 'Unsafe ACM cladding'? | Should the Chairman therefore consider an interim recommendation? |
|---|-----------------------------------|--|-------------------|--|---|--|---|--|--|
| 7 | Publication of test evidence | A body of publicly available and relevant fire test evidence is urgently required to support common construction forms. Pass and fail. | 2.28.9 | A body of publicly available and relevant fire test evidence is urgently required to support common construction forms. Pass and fail. | No | No | No | No | Yes As I have found in Appendix O10 and Appendix O11 eight test reports for Reynobond panels, disclosed by Arconic were not subsequently referenced in the publicly available BBA certificate, despite some of the results contradicting the performance stated in the certificate. In my review of disclosed BS8414 test reports (in Section 11.22 and Appendix E4, E6 and E7 of my Phase 1 report) it is clear there was no tested system which supported the external wall construction installed at Grenfell Tower. These test reports are not however publicly available for façade designers/ installers/ specifiers to check such status. |
| 8 | Published classification evidence | Third party certificates should no longer be published without all test data – pass or fail – relevant to it, including the specific material composition to which it applies. | 2.28.11 | Centrally held, publicly available database of certificates and supporting data. | No | No | No – Advice Note 17 with respect to composite doors merely states Certification schemes “ <i>should ensure their documentation clearly shows the nature of testing that has been used in order to support any classification and justification of the test methodology</i> ”. | No | Yes All products reviewed were found not to have supporting relevant fire test data for my Phase 1 report. I identified in Appendix O12, O13, O14 and O15 respectively that limitations of the classified performance of the Arconic Reynobond panels caused by fixing type, core composition, substrate classification, or surface coating were not conveyed in the BBA certificate for the panels. |
| 9 | Published classification evidence | First page and title of the 2017 2nd issue amended BBA certificate 08/4510, which is the currently available version for Reynobond Architecture Wall Panels, to be immediately changed to state that the certificate is only valid for Reynobond 55 FR panels with a fire-retardant core, in a riveted form, and when installed within the field of application stated in the BS EN 13501-1 classification report RA06-0372. | 2.28.12 | Specific update required. | No | No | No | No | Yes I have shown in Appendix O16.1.5 and O16.1.7 that the title and front page of the 2017 2nd issue amended BBA certificate 08/4510 refers to ‘Reynobond Architecture Wall Cladding Panel’ as having “ <i>a class B-S1,d0 reaction to fire classification to BS EN 13501-1:2007</i> ” despite this classification only applying to Reynobond 55 FR panels with a fire retardant core, in a riveted form, and when installed within the field of application stated in the BS EN 13501-1 classification report RA06-0372. |

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|----|-----------------|---|-------------------|--|---|--|---|--|---|
| 10 | Update to tests | It should be the responsibility of the test house to reject BS 8414 assemblies that cannot be produced in real construction projects. | 2.28.15 | Public records of the coordination between test houses, manufacturers and contractors. | No | No | No | No | <p>Yes</p> <p>This concern is substantiated by the evidence in my detailed review of the BS 8414-2 test on a Celotex RS5000 insulated system with a ventilated Eternit rainscreen, produced by BRE on 01/08/2018, as set out in Section E4.6 and specifically Section E4.6.8. There I identified that the test involved the complete sealing of the junction of the combustion chamber and the façade with non-combustible cement fibre board and a 90-minute integrity 30-minute insulation 'fire break'.</p> <p>This junction detail is a higher standard than would be provided in real construction, where instead this would be a window frame with 30-minute integrity/15-minute insulation cavity barriers installed behind it (as required by ADB).</p> |

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|----|------------------|--|--------|--|----|----|----|----|---|
| 11 | Updates to tests | Full scale testing of rainscreen cladding systems ought to be carried out but must include window openings and other relevant fixtures and fittings, rather than the current arrangements in BS8414 Parts 1 and 2. | 2.28.6 | BSI to update and reissue BS8414 using a revised form. Withdraw BR135 and create process to produce a robust alternative. | No | No | No | No | <p>Yes</p> <p>This should be considered under Phase 1 recommendations as I state in Section 2.28.6 of my Phase 1 report.</p> <p>This is due to the following evidence:</p> <p>In Sections 11.15, 11.16, 11.18 and 11.20 of my Phase 1 report, I describe the materials and cavity barriers provisions around window openings in Grenfell Tower and their non-compliance with the specific provisions of 12.6-12.9 of Approved Document Part B. Should a designer follow the provisions of 12.5 of ADB, that is by classification of the external wall by BR135 using test data from BS 8414 to demonstrate compliance, these materials and their specific detailing to form the window construction would then be omitted from the BS 8414-1 test sample. Further, none of the disclosed BS 8414 test reports I reviewed in Section 11.22 and Appendix E of my Phase 1 Expert Report include these materials or construction details.</p> <p>BS 8414-1 also states <i>“This British Standard does not cover the performance of glazed window openings or the detailing at such openings”</i>. Features such as window openings are not included in the test.</p> <p>In Sections 9.2 and 9.3 of my Phase 1 Expert Report, I explain the multiple routes for fire spread via the window openings to the external wall and vice versa in Grenfell Tower and the physical evidence regarding such routes of fire spread on 14 June 2017 in Section 9.5.</p> <p>I further note the report <i>‘A review and investigation of potential shortcomings of the BS 8414 standard for the approval of cladding systems such as those commonly used on tall buildings’</i> produced by the Fire Protection Association (FPA) commissioned by the Association of British Insurers (ABI) which found further issues with the test method (I have summarised these in section 6 below).</p> <p>All of this clearly demonstrates work needs to commence on changes to BS8414 and</p> |
|----|------------------|--|--------|--|----|----|----|----|---|

| # | Type | Recommendation presented in B Lane's Expert Report | Section reference | Potential Solutions | Addressed by changes to Building Regulation 2018? | Addressed by NFCC Guidance to support a temporary change to a simultaneous evacuation strategy in purpose-built blocks of flats? | Addressed in any of the MHCLG Advice notes? | Would Phase 1 B Lane recommendation reduce the risk to life in the 433 buildings with 'Unsafe ACM cladding'? | Should the Chairman therefore consider an interim recommendation? |
|----|----------------|---|-------------------|--|---|--|---|---|--|
| | | | | | | | | | BR135, before the end of Phase 2 of the Inquiry. Any additional evidence in Phase 2, will be of further assistance. |
| 12 | Updates to ADB | ADB should be updated to include performance requirements to provide means for the escape of mobility impaired occupants. | 2.27.8 | Evacuation lifts, refuges to shelter residents for extended periods, consultation with experts in this field about suitable regulatory change. | No | No | No | No [noting a temporary minimum standard should be made a requirement for all unsafe buildings, by the MCHLG] | Yes This lack of guidance poses a current risk to life. |
| 13 | Updates to ADB | Practitioners cannot rely on current version of BS 8414 testing and BR135 classification. | 2.28.6 | Remove BR135 as a method of demonstrating compliance. Create process to produce a robust alternative. | No (New Regulations only prevent use of BS 8414 and BR 135 for purpose groups 1(a)(b)(c) and 2(a) where the height of the building is greater than 18m. Purpose groups 2(b), 3, 4,5,6,7(a) and 7(b) with a building height above 18m can still rely on current version of 8414 and BR135 [See Section 5 for the Purpose Group definitions]. | No | No | No | Yes Please refer to the relevant evidence under "update to tests" (Row 11 of this table). |
| 14 | Updates to ADB | Include requirement for robust and resilient processes for confirming location, rescue needs, self-evacuation abilities, localised and overall fire conditions, and providing tailored advice regarding conditions in the stairs and lobbies. | 2.28.4 | Regulation change. | No | No | No | No [noting a temporary minimum standard should be made a requirement for all unsafe buildings, by the MCHLG] | Yes |

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|----|----------------|---|-------------------|---|--|--|---|--|--|
| 15 | Updates to ADB | All parts of the surface for high rise residential buildings should be European performance classification A1. | 2.28.8 2.31.13 | Update ADB and/or Building Regulations. | No (New regulations set requirement as A2, s1, d0 for all materials that form the external wall of high rise residential building above 18m) | No | No | No | No This should be considered under Phase 2 recommendations. The issue of the new Regulations not being retrospective requires consideration by the Chairman. |
| 16 | Updates to ADB | All parts of the surface for all hospitals where there are exceptionally complex evacuation needs, and for any other assembly building with either 'stay put' evacuation requirements, or complex phased evacuation requirements, regardless of height, should be European performance classification A1. | 2.31.15 | | No (New regulations set requirement as A2, s1, d0 for all materials that form the external wall of high rise residential building above 18m) | No | No | No | Yes Issue of the new Regulations not being retrospective requires consideration by the Chairman. |
| 17 | Updates to ADB | 18m based split should be removed from diagram 40 of the statutory guidance. | 2.31.13 | | No (New Regulations only prevent use of multiple classifications for purpose groups 1(a)(b)(c) and 2(a). Purpose groups 2(b) 3, 4,5,6,7(a) and 7(b) for building heights above 18m can still comply with the existing version of diagram 40 with the split at 18m) | No | No | No | No This should be considered under Phase 2 recommendations. |
| 18 | Updates to ADB | British national test standards, including Class 0, should be removed entirely as a means of demonstrating compliance with Section 12 of ADB. | 2.31.21 | Use European classification system. | No (New Regulations only prevent use of national standards for purpose groups 1(a)(b)(c) and 2(a). where the height of the building is above 18m. Purpose groups 2(b) 3, 4,5,6,7(a) and 7(b) for building heights above 18m and all purpose groups below 18m can still rely on national standards). | No | No | No | Yes |

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|----|----------------------|--|-------------------|---------------------|---|--|---|--|---|
| 19 | Updates to LGA guide | In my view, the LGA guidance should be updated to adequately deal with persons requiring assistance from "general needs" blocks. | 2.27.11 | | No | No This guide states the LGA guide remains appropriate for all purpose-built blocks of flats. | No | Yes | Yes, Phase 1 recommendations should include a requirement for works to commence on the need for this guidance to be reviewed and changed as required. |
| 20 | Updates to LGA guide | "Upgraded FD30S" and notional "FD30S doors" must be removed as means of demonstrating compliance with the LGA guide. | 2.29.7 | | No | No | No | Yes | Yes |

4 Declaration

The opinions I have expressed represent my true and professional opinion on the matters to which they refer. I have had regard to the evidence that is material to my discipline (including the oral testimony) and I can confirm that I have discharged my overriding duty to the Inquiry”.

Signature



Date

3rd April 2019

Name in full

Dr Barbara Ann Lane

5 Purpose Groups (Table D1 Approved Document B)

B PURPOSE GROUPS

Table D1 Classification of Purpose Groups

| Title | Group | Purpose for which the building or compartment of a building is intended to be used |
|------------------------------------|--------|---|
| Residential (dwellings) | 1(a)* | Flat. |
| | 1(b)† | Dwellinghouse which contains a habitable storey with a floor level which is more than 4.5m above ground level. |
| | 1(c)†+ | Dwellinghouse which does not contain a habitable storey with a floor level which is more than 4.5m above ground level. |
| Residential (Institutional) | 2(a) | Hospital, home, school or other similar establishment used as living accommodation for, or for the treatment, care or maintenance of persons suffering from disabilities due to illness or old age or other physical or mental incapacity, or under the age of 5 years, or place of lawful detention, where such persons sleep on the premises. |
| (Other) | 2(b) | Hotel, boarding house, residential college, hall of residence, hostel and any other residential purpose not described above. |
| Office | 3 | Offices or premises used for the purpose of administration, clerical work (including writing, book keeping, sorting papers, filing, typing, duplicating, machine calculating, drawing and the editorial preparation of matter for publication, police and fire and rescue service work), handling money (including banking and building society work), and communications (including postal, telegraph and radio communications) or radio, television, film, audio or video recording, or performance (not open to the public) and their control. |
| Shop and commercial | 4 | Shops or premises used for a retail trade or business (including the sale to members of the public of food or drink for immediate consumption and retail by auction, self-selection and over-the-counter wholesale trading, the business of lending books or periodicals for gain and the business of a barber or hairdresser and the rental of storage space to the public) and premises to which the public is invited to deliver or collect goods in connection with their hire repair or other treatment, or (except in the case of repair of motor vehicles) where they themselves may carry out such repairs or other treatments. |
| Assembly and recreation | 5 | Place of assembly, entertainment or recreation; including bingo halls, broadcasting, recording and film studios open to the public, casinos, dance halls; entertainment, conference, exhibition and leisure centres; funfairs and amusement arcades; museums and art galleries; non-residential clubs, theatres, cinemas and concert halls; educational establishments, dancing schools, gymnasia, swimming pool buildings, riding schools, skating rinks, sports pavilions, sports stadia; law courts; churches and other buildings of worship, crematoria; libraries open to the public, non-residential day centres, clinics, health centres and surgeries; passenger stations and termini for air, rail, road or sea travel; public toilets; zoos and menageries. |
| Industrial | 6 | Factories and other premises used for manufacturing, altering, repairing, cleaning, washing, breaking-up, adapting or processing any article; generating power or slaughtering livestock. |
| Storage and other non-residential+ | 7(a) | Place for the storage or deposit of goods or materials (other than described under 7(b)) and any building not within any of the Purpose Groups 1 to 6. |
| | 7(b) | Car parks designed to admit and accommodate only cars, motorcycles and passenger or light goods vehicles weighing no more than 2500kg gross. |

Notes:

This table only applies to Part B.

* Includes live/work units that meet the provisions of paragraph 2.52.

† includes any surgeries, consulting rooms, offices or other accommodation, not exceeding 50m² in total, forming part of a dwellinghouse and used by an occupant of the dwellinghouse in a professional or business capacity.

+ A detached garage not more than 40m² in area is included in purpose group 1(c); as is a detached open carport of not more than 40m², or a detached building which consists of a garage and open carport where neither the garage nor the open carport exceeds 40m² in area.

6 Fire protection Association (FPA) report

The Fire Protection Association were commissioned by the Association of British Insurers to produce ‘*A review and investigation of potential shortcomings of the BS 8414 standard for the approval of cladding systems such as those commonly used on tall buildings*’²

I have extracted the Executive Summary of that report which sets out the key issues as defined by the FPA because of the works presented therein:

“1. Fuel load relevance to modern materials / lifestyle

Issue: Historic work conducted on behalf of insurers on high-rise fires demonstrated that modern occupancy fuel loadings typically comprise 20% plastic-based fuels. The inclusion of plastics can both raise flame temperatures and elongate flame lengths exiting a building. Aluminium, a common external cladding material used, loses a great amount of its strength with temperature. There may be grounds to question whether the BS8414 fuel load is appropriate for determining cladding system performance if not representative of a modern-day fire source.

2. Breaching of the cladding system by un-fire-stopped vents and ducts

Issue: Aside from the simulated window in which the fuel crib sits, the cladding system is installed in perfect form without any other breaches such as other windows, vents, ducts, or pipes. The external envelope of the building is not considered part of the design ‘fire compartment’ and as such ‘weak’ devices that include, for example, plastic duct tubing, may be installed through the cladding system without fire-stopping. Such inclusions can act to provide a simple path to communicate fire and toxic by-products of fire, into the cladding system’s void, where combustible materials may be sited, from a fire originating from within the building, from outside the building, or travelling within the cladding void. There are grounds to question whether the BS8414 test, that is conducted with ‘perfect encapsulation’ of the combustible components, adequately addresses the impact of such common design features when seeking to confirm system safety.

3. Oxygen provision to materials and allowance of ‘chimney effects’ to manifest

Issue: ‘Chimney effect’ describes a mode of burning where the rate of fire spread is significantly accelerated by the geometry of airflow delivery and smoke egress. Rain-screen cladding systems demand a void between the insulation and rear of the external panel to allow the free passage of air and water drainage to prevent building fabric damp and pressurisation issues. There is a concern that the installation of test samples within the BS8414 test regime, in association with other features described in this investigation, may prevent a realistic flow of oxygen within the test specimen and as such normal burning and perhaps the allowance of chimney effects, which might exist in practice, may be inhibited. Specifically, the sealing of test piece edges which might be open in practice, the closeness of fire stopping, the omission of vents that might fail early in the fire event, and use of non-representative void depths, will all impact on the amount of air available to support fire spread and chimney-effect burning.

² <https://www.abi.org.uk/globalassets/files/publications/public/property/2018/04/abi-cladding-systems-research-report-2018-04-19.pdf>

4. Performance of cavity barriers

Issue: The aforementioned 'perfect-build' of the BS8414 test means that the only route for fire challenge is via the external cladding-material. In this situation, the cavity barriers might operate through 'pre-heating' in the period before the fire has broken through the external cladding material. If the inclusion of plastic vents allows direct flame passage from the fire into the void much earlier in the fire event, they will need to respond to a direct flame challenge. Since the intumescent material they are made of takes time to respond, flames may pass for a period of time before they activate and ignite material beyond the barrier. There is a concern that cavity barrier performance should be linked to the ignition properties of ALL materials they separate, but this is currently not the case and the configuration of the BS8414 test does not provide adequate challenge to confirm suitability.

5. System detailing differences between certification and in-use applications

Issue: Built-up-system testing demands that the test piece under scrutiny is designed and installed to the exact same specification as it would be for the end building application. There is concern that some testing has allowed significant reinforcement of the system with features that may benefit its ability to pass the test but might not be design features of end-use applications. “