La valutazione del comportamento al fuoco delle pareti esterne degli edifici esistenti: la più recente normativa inglese

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1. L'incendio della Grenfell Tower, Londra 14 giugno 201, dalle caratteristiche nuove e devastanti

Figura 2.78 – *L'incendio della Grenfell Tower: ore 01.27, flashover (fonte: Guilhelm Baker, Pressframe News Pictures, The Telegraph)*

Figura 2.79 – *L'incendio della Grenfell Tower: ore 02.51, l'intero involucro esterno è in fiamme (fonte: Daniel Leal-Olivas, AFP2, The Telegraph)*

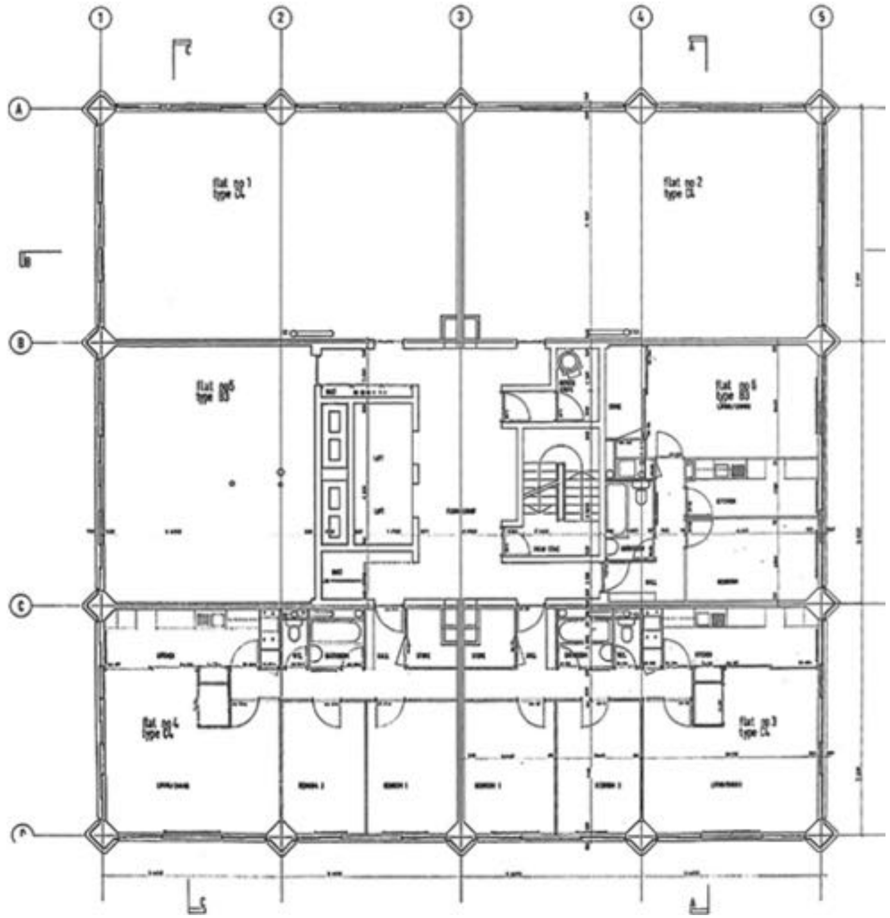

Figura 2.80 – *Grenfell Tower: pianta piano tipo (fonte: The Grenfell Tower Inquiry: Phase 1 Report, Fig. 3.5 pag. 59 (66 di 180), Vol. 1 di 4)*

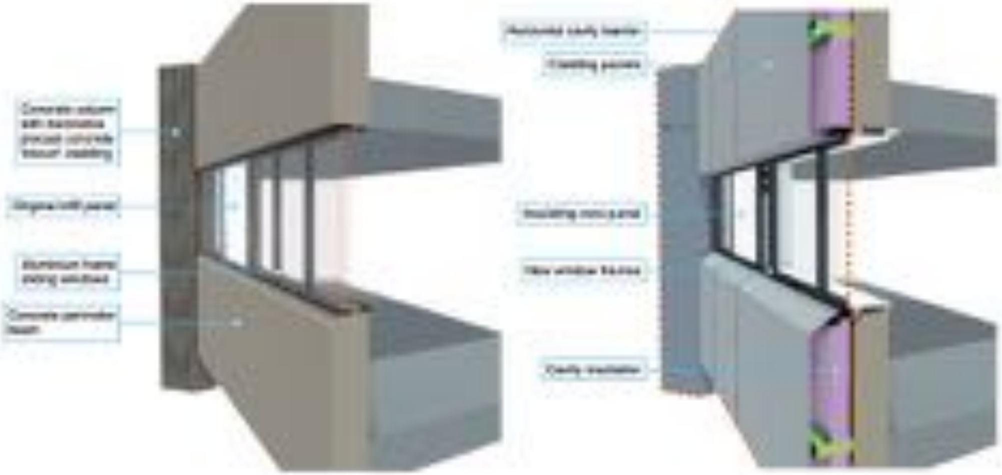

Figura 2.81 – Grenfell Tower: assonometria dello stato di fatto e dell'intervento di retrofitting (fonte: relazione peritale della dott.ssa Barbara Lane, www.grenfelltowerinquiry.org.uk/evidence/dr-barbara-lanes-presentation)

Figura 2.83 – Grenfell Tower: assonometria dell'ossatura della parete ventilata e foto di una parete di una delle facciate, dopo l'intervento di retrofitting (fonte: relazione peritale della dott.ssa Barbara Lane, www.grenfelltowerinquiry.org.uk/evidence/dr-barbara-lanes-presentation)

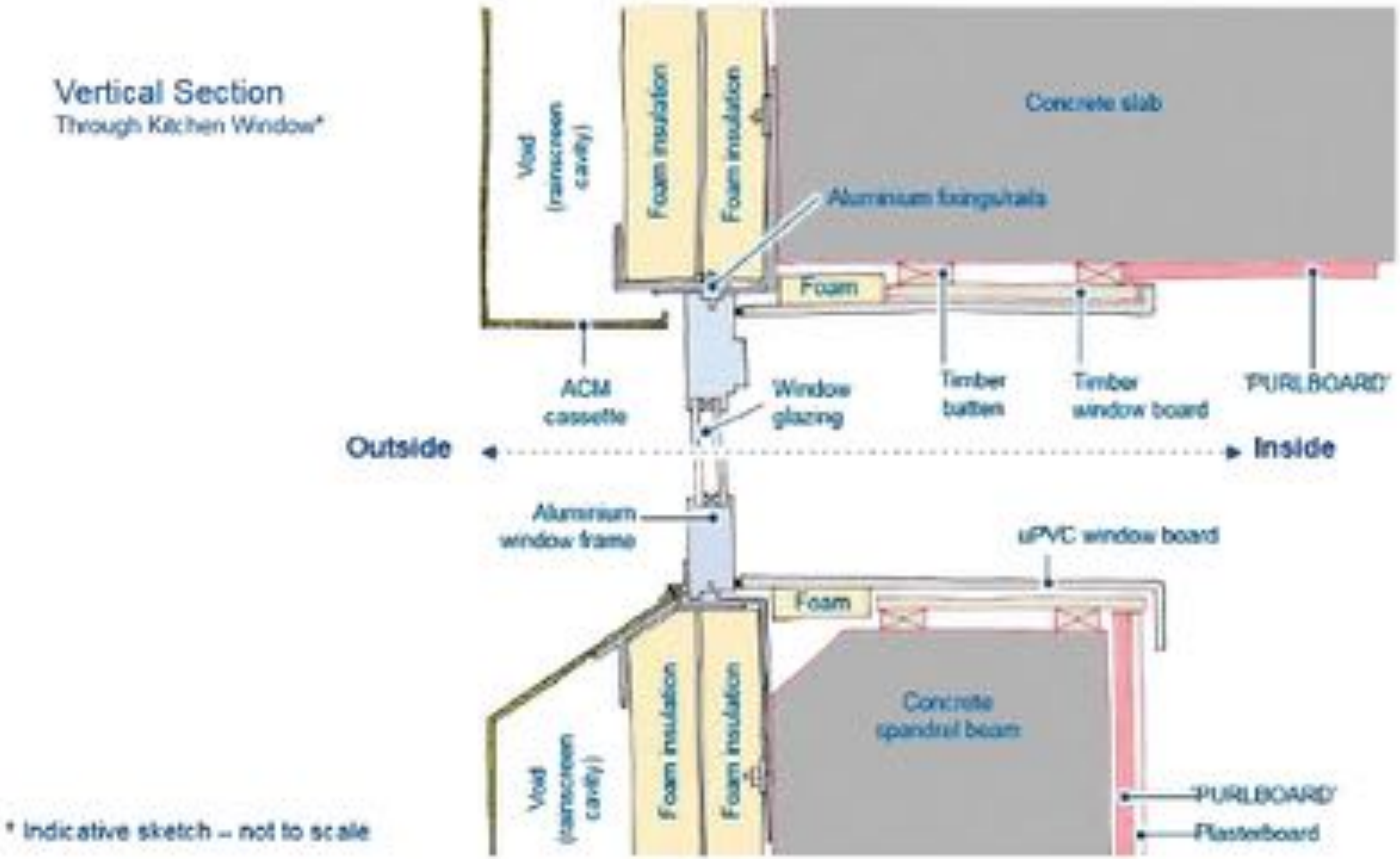

Figura 2.87 – *Grenfell Tower: disegno sezione verticale nuova finestra (fonte: relazione peritale della dott.ssa Barbara Lane, www.grenfelltowerinquiry.org.uk/evidence/dr-barbara-lanes-presentation)*

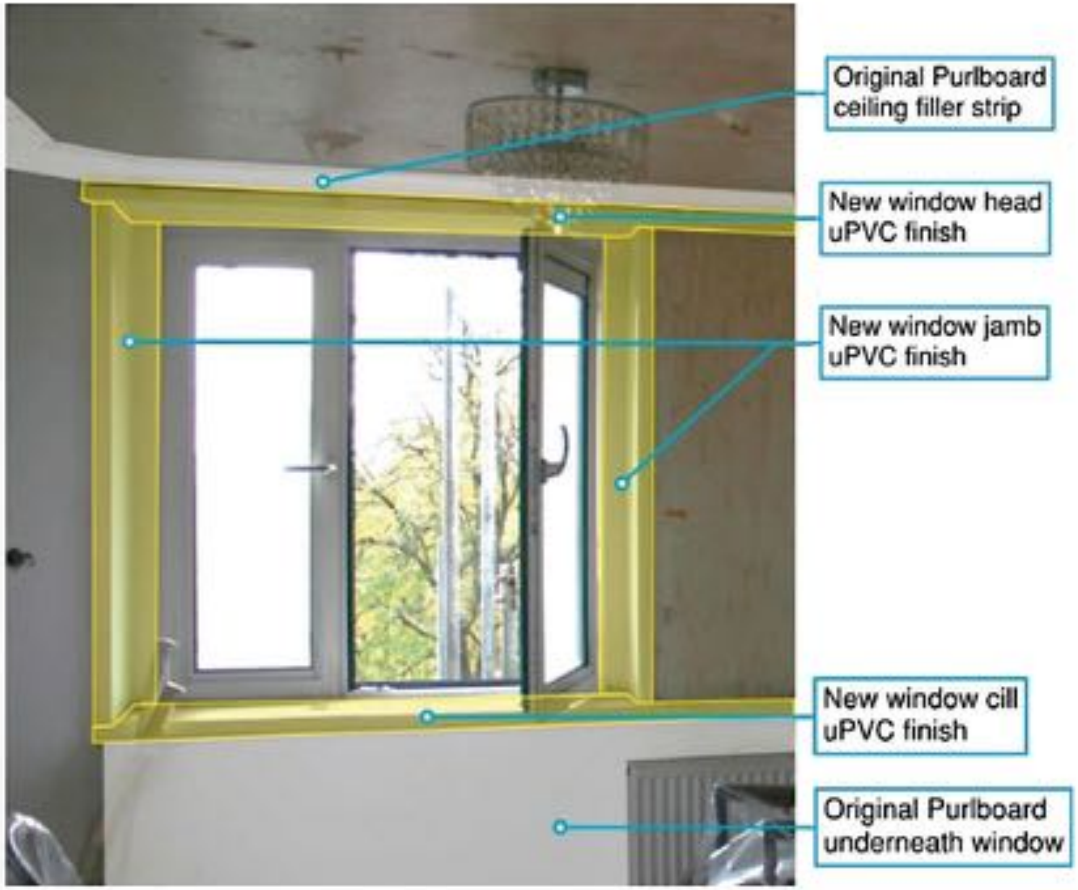

Figura 2.88 – *Grenfell Tower: foto nuova finestra con stipiti, soglie e cielini in PVC (fonte: relazione peritale della dott.ssa Barbara Lane, www.grenfelltowerinquiry.org.uk/evidence/dr-barbara-lanes-presentation)*

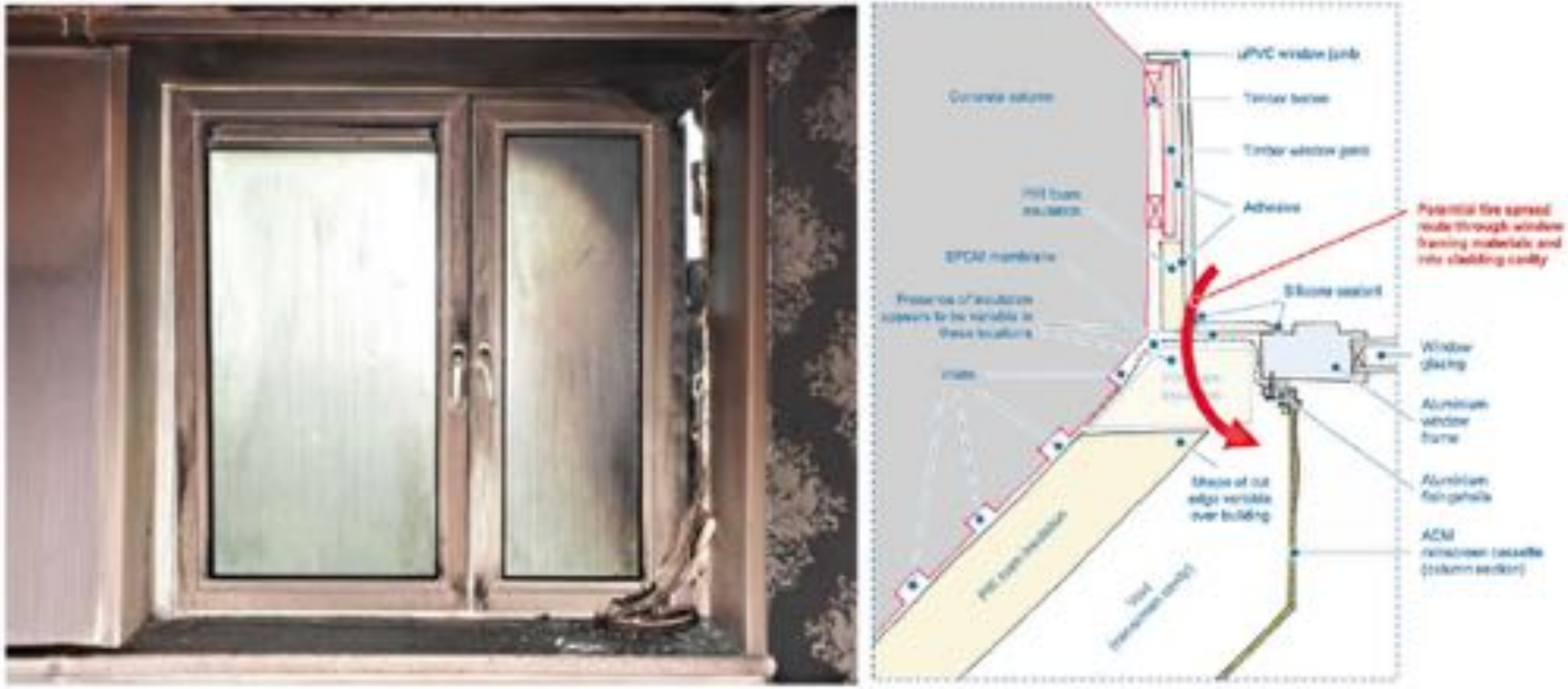

Figura 2.89 – *Grenfell Tower: foto di una delle finestre meno danneggiate e disegno in cui è indicato (freccia in rosso) il percorso compiuto dal fuoco (fonte: prof. Luke Bisby, Phase 1 – Final Expert Report, fig.17, pag. 44 https://www.grenfelltowerinquiry.org.uk/evidence/professor-luke-bisbys-expert-report-supplemental)*

Figura 2.90 – *Grenfell Tower ad incendio in corso: brucia fuori e dentro (fonte: EPA, The telegraph)*

Figura 2.91 – *Grenfell Tower ad incendio avvenuto (nel riquadro in rosso, posizione dell'alloggio di origine dell'incendio)(fonte: foto a sinistra, Rick Findler, PA Wire, The Telegraph; foto a destra, relazione peritale della dott.ssa Barbara Lane, www.grenfelltowerinquiry.org.uk/evidence/dr-barbara-lanes-presentation)*

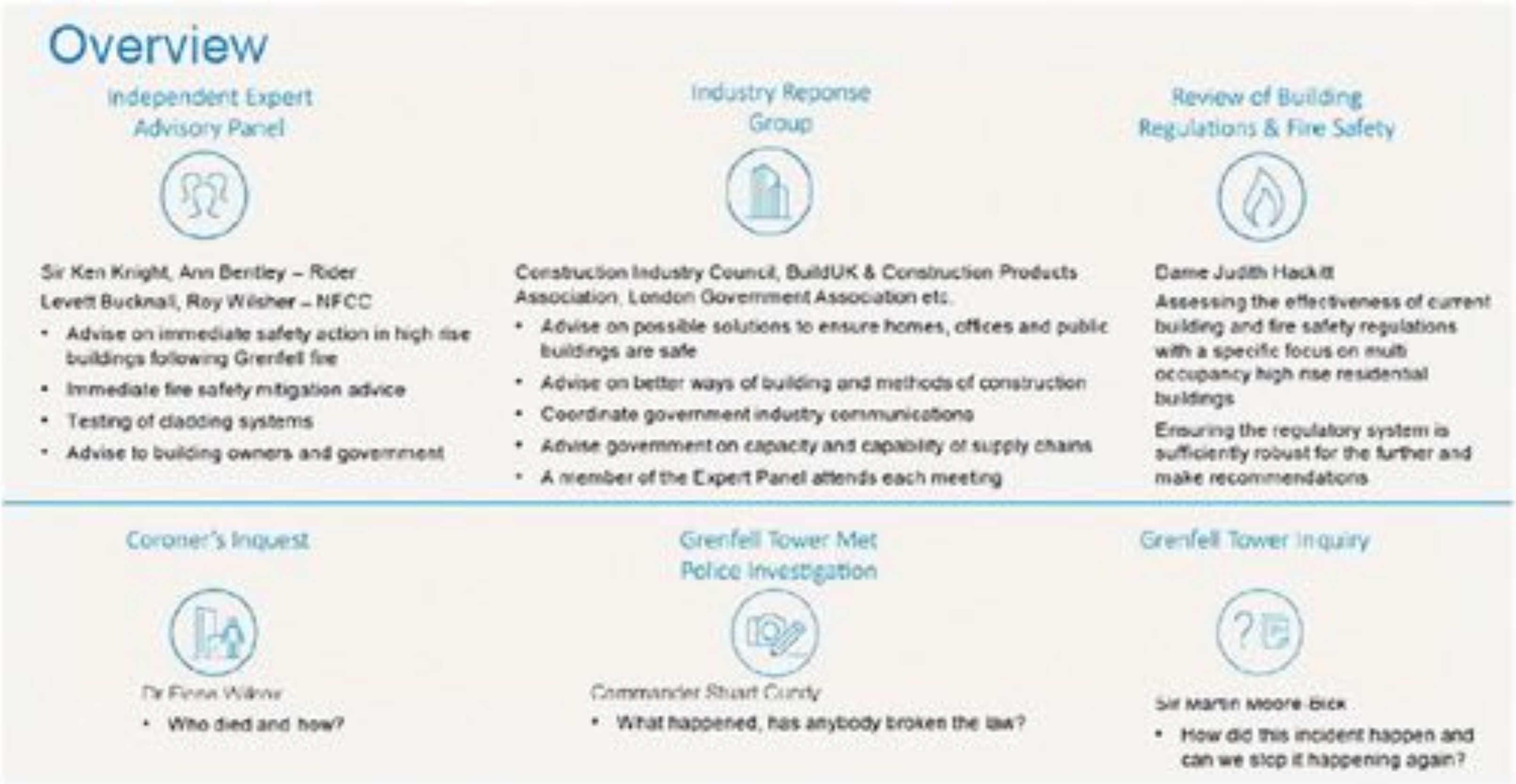

Figura 2.92 – *Quadro delle risposte che il sistema politico, economico e tecnico inglese ha messo in campo dopo l'incendio della Grenfell Tower (fonte: Martin Weller, The lessons learned so far from the Grenfell Tower fire and their potential impact on the construction industry, www.CIBSE.org>HCSW-Events, slide 24)*

2. La scoperta dell’esistenza di centinaia di edifici simili in Gran Bretagna e nel resto del mondo

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Table B.1 – Notable fires involving external wall construction and cladding

Building name (where known), town/city, country	Year	Cladding type
Manitoba, Canada	1990	ETICS
Knowsley Heights, UK	1991	GRP rainscreen
Munich, Germany	1996	ETICS
Eldorado Hotel, Reno, Nevada, USA	1997	Curtain wall
Palace Station, Las Vegas, USA	1998	ETICS
Irvine, UK	1999	Mixture (fire involved GRP spandrel/infills)
Magdeburg, Germany	2000	ETICS
Lakeside Plaza, Virginia, USA	2005	ETICS
Berlin, Germany	2005	ETICS
Rin Grand Hotel, Bucharest, Romania	2007	Rainscreen
Water Club Tower, Atlantic City, USA	2007	Metal composite rainscreen
MGM Hotel, Las Vegas, USA	2008	ETICS
Miskolc, Hungary	2009	ETICS
Millenium Business Centre, Bucharest, Romania	2009	ACM rainscreen
Centre International Plaza, Nanjing, China	2009	Unknown
Lakanal House, London, UK	2009	Curtain wall
CCTV Tower, Beijing, China	2009	Mixture including ETICS (system involved)
Dijon, France	2010	ETICS
Wooshin Golden Suites, Busan South Korea	2010	ACM rainscreen
Shanghai, China	2010	Unknown
Bucharest, Romania	2011	Rainscreen
Mermoz Tower, Roubaix, France	2012	ACM rainscreen and decorative panels
Al Tayer Tower, Sharjah, UAE	2012	ACM rainscreen
Tamweel Tower, Dubai, UAE	2012	ACM rainscreen
Saif Belhasa Building, Tecom, Dubai, UAE	2012	ACM rainscreen
Targu Mures, Romania	2012	ETICS
Polat Tower, Istanbul, Turkey	2012	Rainscreen
Grozny City Tower, Chechenia, Russia	2013	Metal composite rainscreen
Karlstad, Sweden	2013	Unknown
Krasnoyarsk, Russia	2014	Rainscreen
Lacrosse Tower, Melbourne, Australia	2014	ACM rainscreen
Seoul, South Korea	2015	ETICS
Baku, Azerbaijan	2015	Unknown
Ream Island, Abu Dhabi, UAE	2015	Rainscreen
Address Downtown Hotel, Dubai, UAE	2015	ACM rainscreen
Torch Tower, Marina, Dubai, UAE	2015	ACM rainscreen
Shepherds Court, London, UK	2016	Mixture (fire involved composite spandrel/infills)
Grenfell Tower, London, UK	2017	ACM rainscreen
Torch Tower, Marina, Dubai, UAE	2017	ACM rainscreen
Taksim Training and Research Hospital, Istanbul, Turkey	2018	Rainscreen
NEO 200, Melbourne, Australia	2019	Rainscreen
Shenyang, China	2019	Unknown
The Cube, Bolton, UK	2019	HPL
Abbco tower, Sharjah, UAE	2020	Unknown
Ulsan, South Korea	2020	Unknown
Shijiazhuang, China	2021	Unknown

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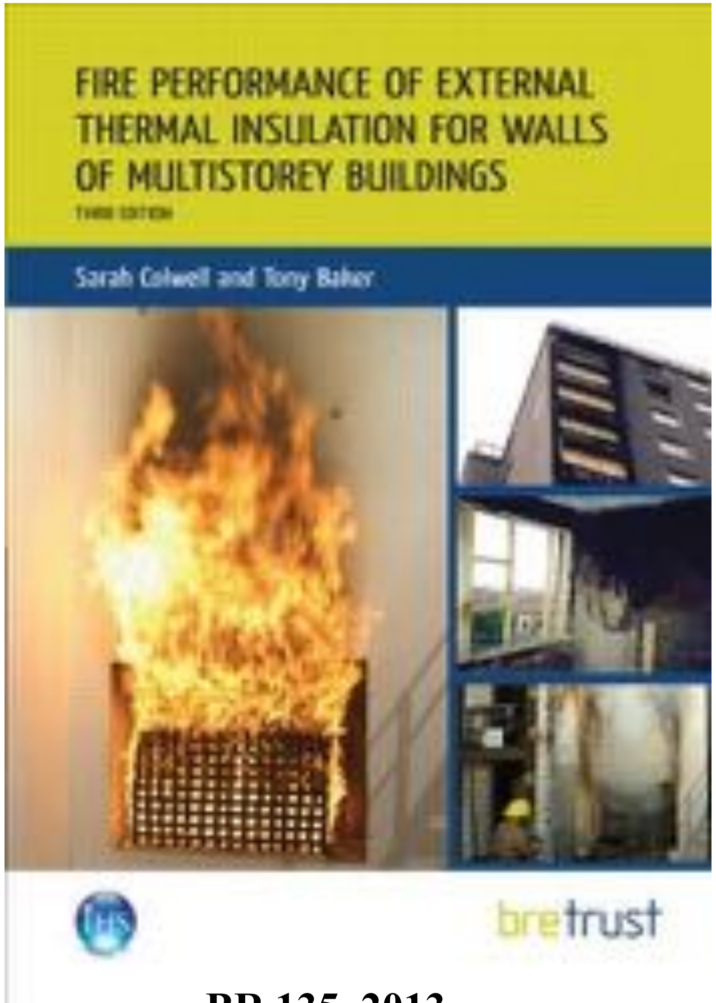

BR 135_2013

BS 9414:2019

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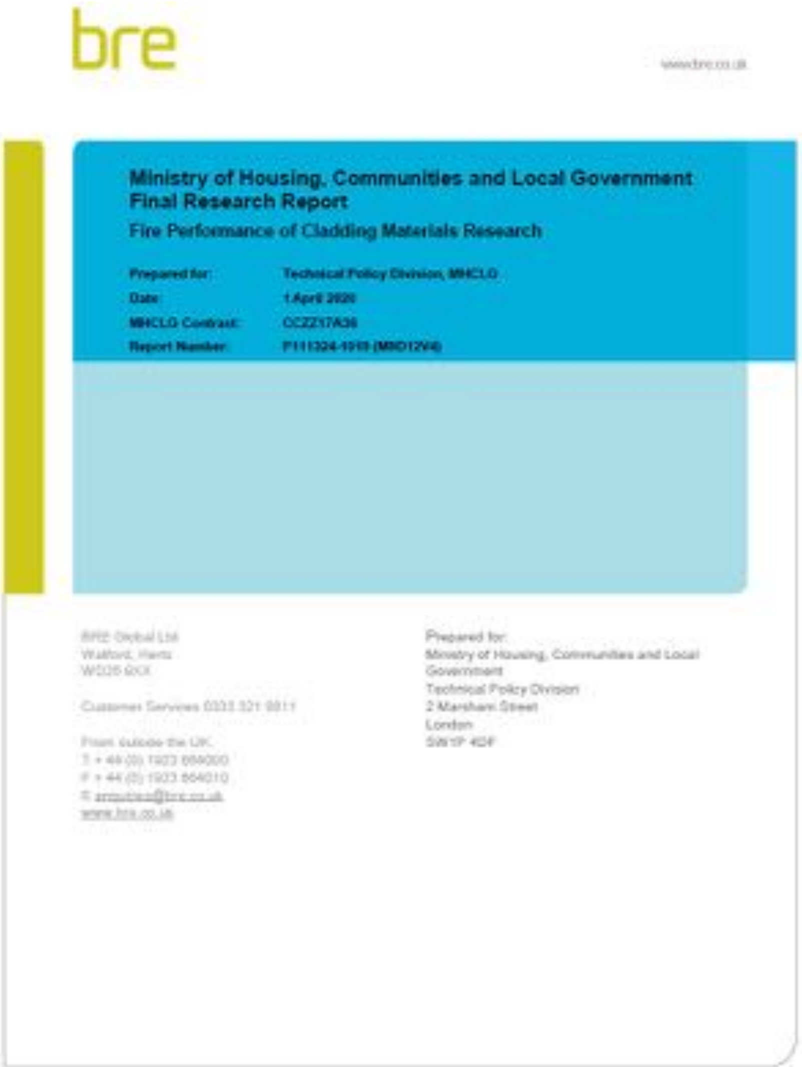

Ministry of Housing, Communities and Local Government
Final Research Report
Fire Performance of Cladding Materials Research

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Table P.9 – Building Regulations 2010 and Approved Document B 2019

Parameter	Provision
Critical height for additional provisions	18 m
Surface and/or cladding provisions above critical height	External surface to be Class B-s3, d2, regardless of height, if situated within 1 m of relevant boundary Class A2-s1, d0 or better (imposed on relevant buildings by the regulations since 2018)
Underlying construction provisions	Class A2-s1, d0 or better (imposed on relevant buildings by the regulations since 2018)
Baseline fire resistance requirements (absent any space separation or loadbearing requirements)	None
Non-combustible definition	Term no longer used Definitions in previous edition carried over via transposition table (Table B1 of ADB)
Limited combustibility definition	Term no longer used Definitions in previous edition carried over via transposition table (Table B1 of ADB)
Class 0 definition	Term no longer used Definitions in previous edition carried over via transposition table (Table B1 of ADB)
Co-existence of UK and European standards?	No – European standards only
Large-scale test as alternative to small-scale?	Not for relevant buildings

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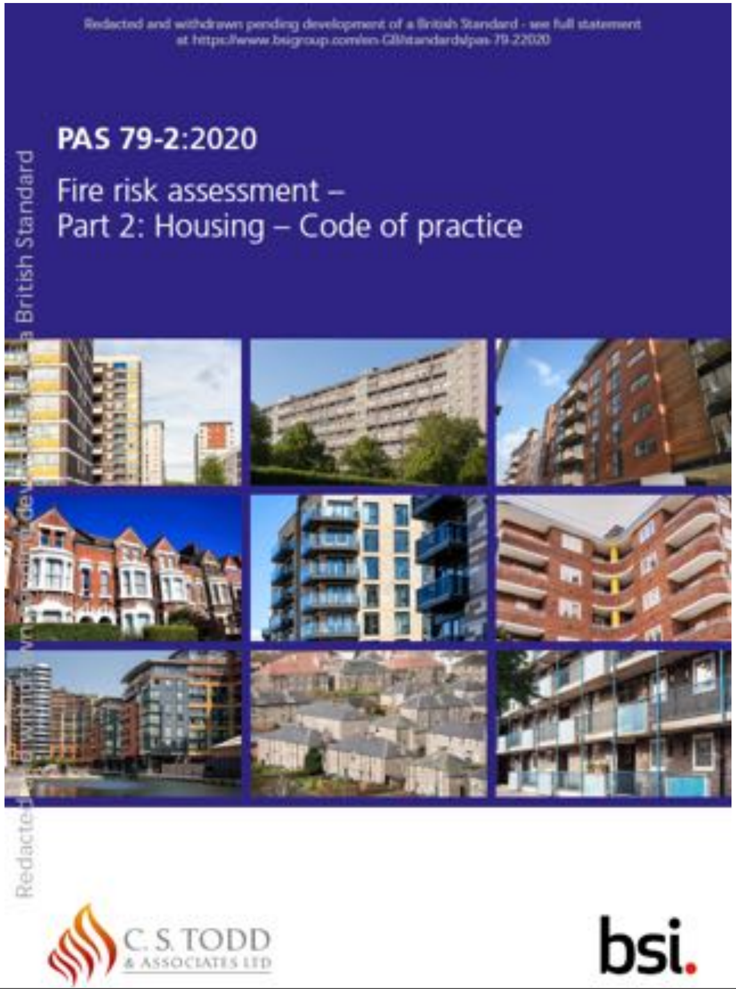
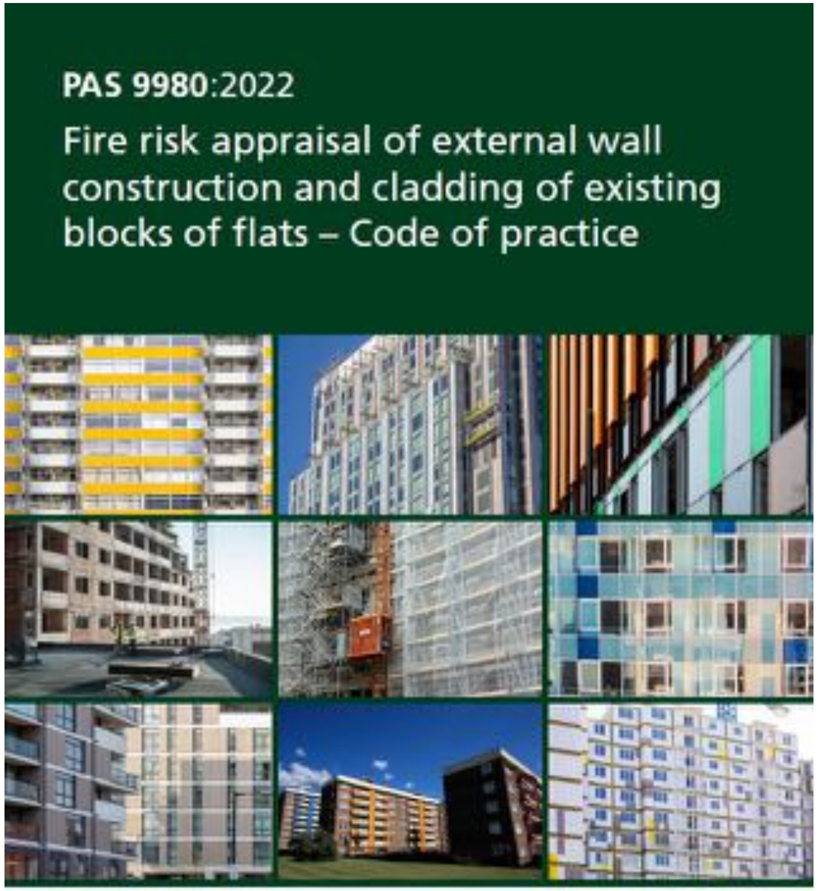
3. La ricerca di nuove normative e metodi di indagine sul rischio di incendio delle facciate



[PAS: Publicly Available Specification]



Department for Levelling Up, Housing & Communities

Home Office

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There has been a growing recognition over time and amongst, in particular, Government, enforcing authorities, building owners/occupiers, and fire risk assessors, that a prescriptive approach in the application of the Consolidated Advice Note [17] is no longer the appropriate way in which to determine whether existing buildings are safe. Amongst the drawbacks of a prescriptive approach are the following.

- This approach has proved to be very conservative, giving rise to excessive caution on the part of many applying the Consolidated Advice Note [17].
- It promotes a degree of certainty that cannot be provided for external wall construction on many buildings.
- It takes no account of changes in the regulations and guidance on new buildings over the years, and the fact that a building meeting the regulations that were in place at the time of construction many years ago would probably not conform to current standards and the recommendations in the current version of ADB.
- Where combustible material is present, the benchmark recommended in ADB ([8], [9]) cannot be readily demonstrated without arranging for large-scale fire tests to be carried out to prove that a building is safe, something which is not practicable, given the time and cost of the exercise, as a tool for making assessments for existing buildings. Moreover, the approach cannot be used for cladding systems that are not within the scope of BS 8414.
- It has resulted in expensive investigations and remediation works which, by comparison to blocks of flats with unsafe ACM cladding systems, are of demonstrably lower concern and which have diverted resources and effort away from buildings that are more important in terms of ensuring the safety of the occupants.

Accordingly, there has been an increasing recognition that a more flexible and pragmatic approach is needed, which is inherently risk-based. While this will inevitably be more subjective compared with one that is compliance-based and will offer less certainty, it is seen as a necessary means to progress the assessment of risk on existing blocks of flats and focus effort on those buildings that present the most concern to life safety from external wall fires.

By contrast to the compliance-based approach adopted in satisfying building regulations for new buildings, the Fire Safety Order [18] is inherently risk-based in its application to existing buildings. Given that this is the appropriate legislation to apply when considering external walls on existing buildings, a risk-based approach has been adopted in the preparation of this PAS. Risk assessment is seen as the means of determining whether a building is safe and what preventive and protective measures are needed.

Benchmarks in guidance supporting the Fire Safety Order [18] are, intentionally, less prescriptive than in guidance supporting building regulations. It is also an established principle that guidance that supports legislation applicable to existing buildings is less stringent, in respect of many measures, than guidance applicable to new buildings, or new building work, such as ADB ([8], [9]). A greater degree of latitude can usually be applied, by taking into account a broader range of factors relating to the particular circumstances and features of the building, than would normally be applied when following guidance for new buildings in ADB.

In principle, this applies equally when considering the external walls, thus allowing a degree of latitude to be applied, rather than compliance with the benchmark set in ADB ([8], [9]).

It is also an established principle that, to apply, retrospectively, the current guidance relating to the design and construction of new buildings when assessing existing buildings, is likely to be unduly onerous and is therefore likely to be inappropriate. An exception would be where the original design principles are far removed from those that are acceptable today. Use of Category 3 ACM (see 3.1.1) on the external walls of buildings is one such case. It is regarded today as being far removed from the standards acceptable in relation to the combustibility and surface propagation of external wall construction and cladding on buildings of any height.

Figure 1 – Key considerations in arriving at a risk rating for external walls

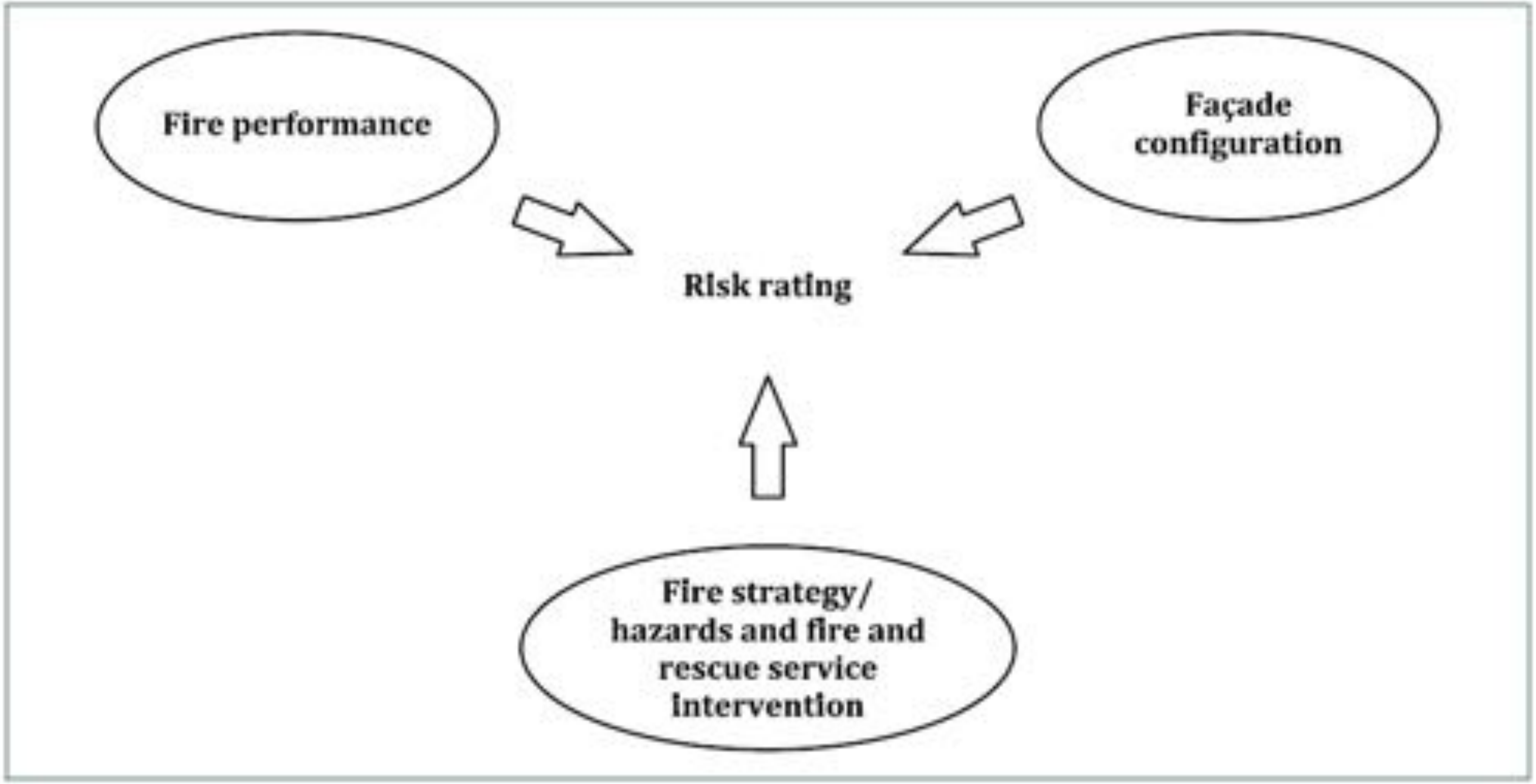

Figure 2 – Risk outcomes in relation to expectations of the rate of fire spread over the external walls

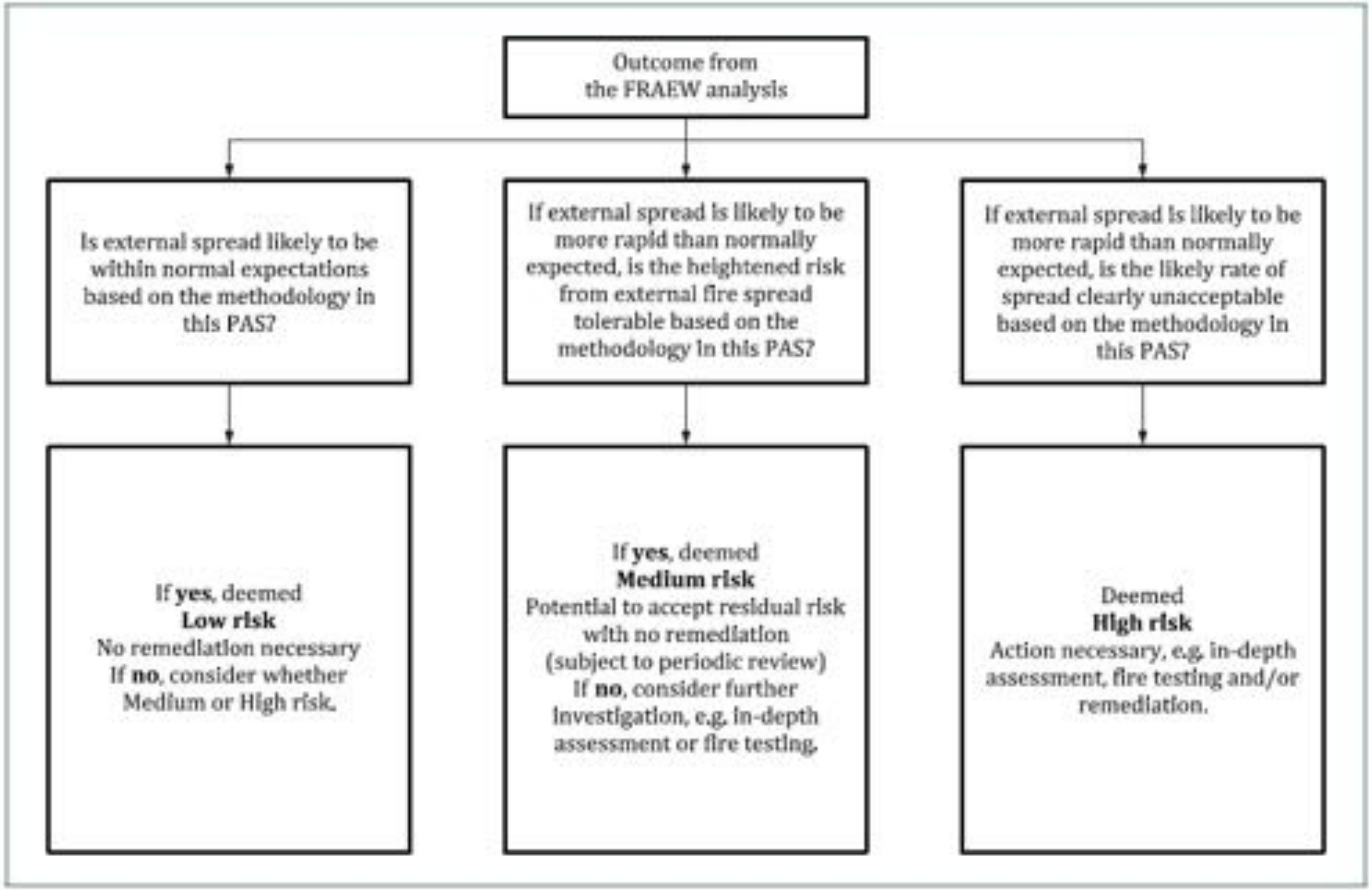

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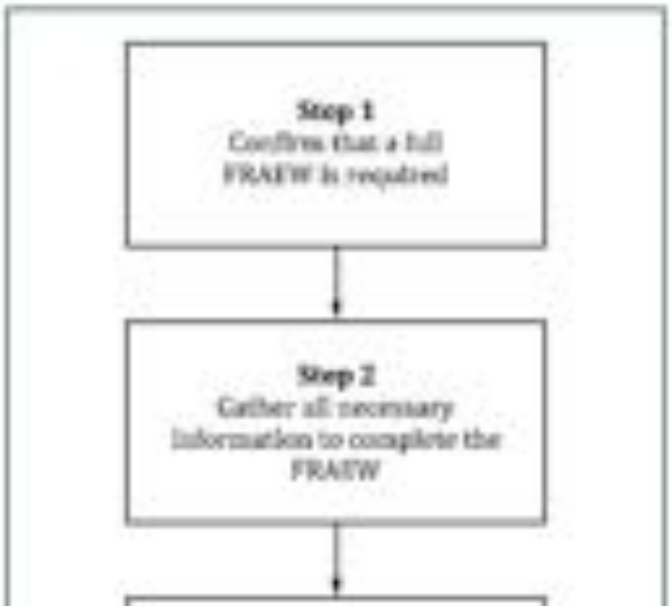
Figure 3 – Five step approach to the basic level of assessment



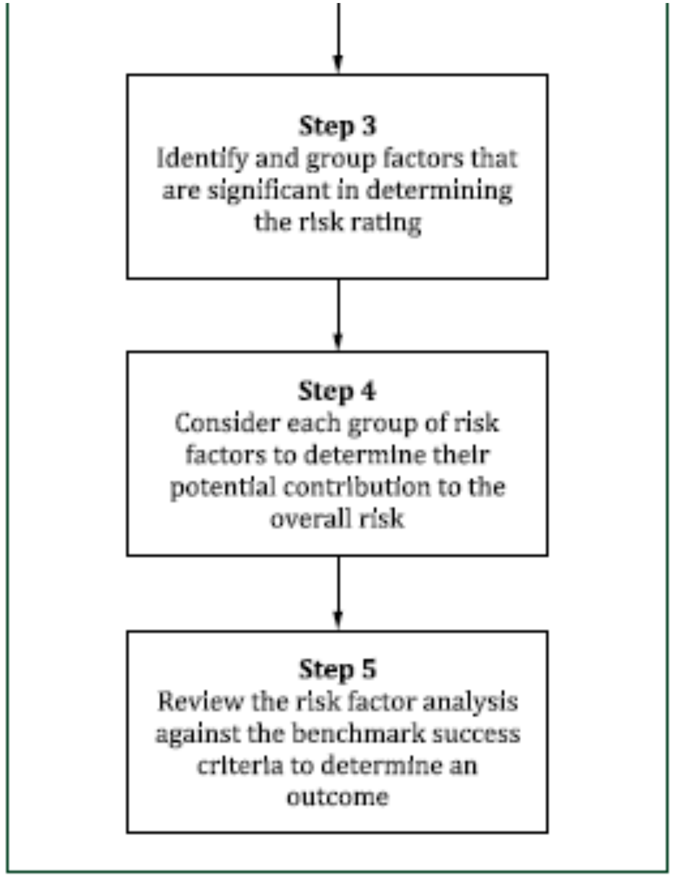
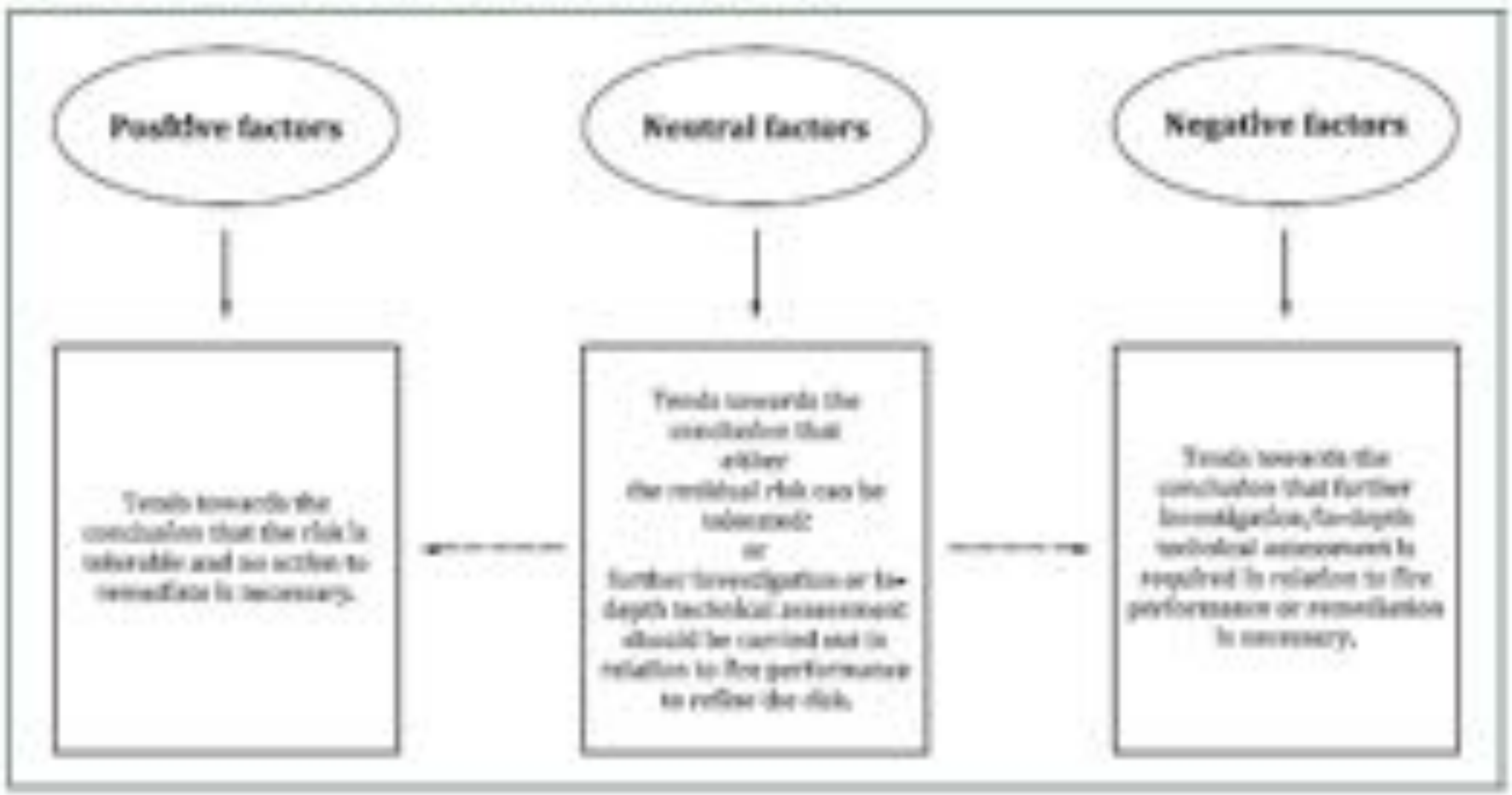


Figure 5 – Possible outcome of risk factor weighting



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Annex A (informative)
Small, intermediate and large-scale fire tests for external wall construction

A.1 Small-scale reaction to fire tests

COMMENTARY ON A.1

The following tests are presented with national tests first, in ascending order of severity/achievable performance/classification, followed by European tests, also in ascending order of severity/achievable performance/classification.

Since its 2019 edition, ADB [38], [9]) has only recommended European tests, but existing buildings constructed since the 1990s might rely upon national tests.

A.1.1 BS 476-7 – Surface spread of flame

The BS 476-7 surface spread of flame test uses a radiant panel with a pilot flame ignition source to measure the speed at which flame spreads across the surface of a product.

Specimens are mounted into a water-cooled steel frame specimen holder such that the edges of the specimen are protected. The specimen holder is on a swing mechanism so that, at the start of the test, it swings into position perpendicular to the surface of the radiant panel (see Figure A.1).

The radiant panel is made from porous refractory type burner block. Premixed natural gas and air (or propane and air) is introduced from the rear of the panel so that it diffuses through to the front. The mixture burns inside the panel, emitting heat radiation. The radiation is most intense nearest the panel and decreases over distance, as shown in Figure A.2.

A pilot flame is provided which projects a flame onto the bottom corner of the specimen, nearest the radiant panel (see Figure A.1).

Tests are run for 10 min, with the pilot flame ignited for the first minute only. The extent of flame spread along a reference line (approximately one third up from the bottom of the specimen) is measured and recorded. A class is assigned to the product depending on the extent of flame spread after 1.5 min and 10 min. Class 1 is awarded for the least flame spread whereas Class 4 is awarded for the most flame spread.

Table A.1 sets out the classification criteria. One specimen in a sample is permitted to exceed any of the limits by 25 mm or less with the sample still being classified to that class.

Achieving Class 1 can go towards achieving Class 0, although this is not defined within this PAS but within earlier versions of ADB.

The advantage of the BS 476-7 test is that it is relatively inexpensive to conduct compared with the equivalent European tests (BS EN 13823 in particular). However, its principal weakness, insofar as it has been applied to external wall construction under statutory guidance, is that it only exposes the surfaces of products, with their edges being protected by the water-cooled specimen holder. Any reliance on the results of a BS 476-7 test, when applied to external wall construction, therefore needs to be treated with caution (see **A.1.6**).

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A.3 Large-scale cladding test and classification – BS 8414-1, BS 8414-2 and BR 135

Figure A.7 – Location of thermocouples for a cladding test

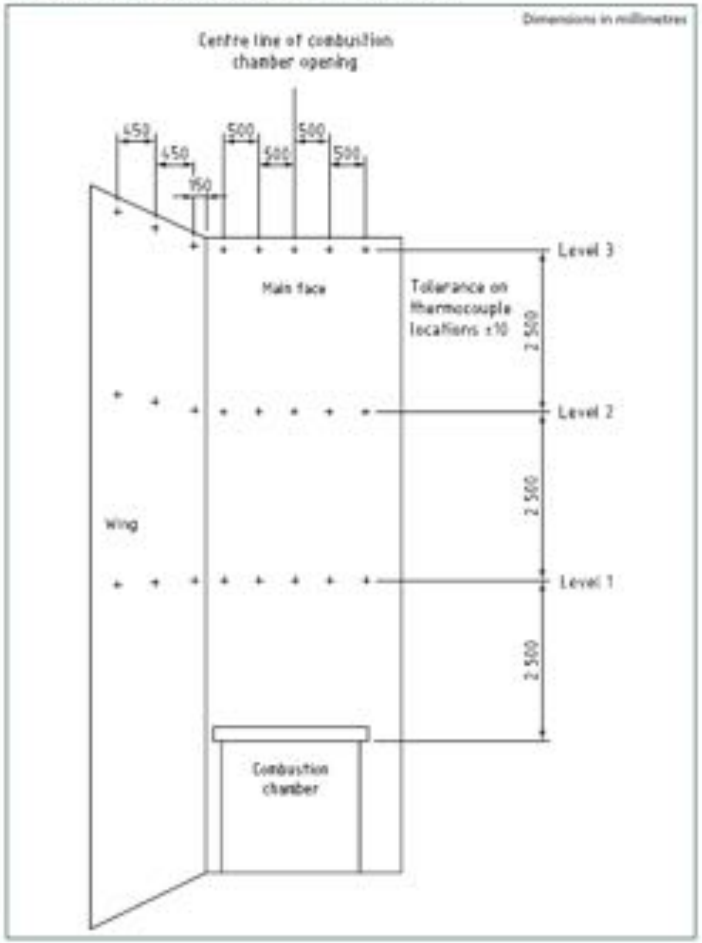

Figure A.9 – BS 8414-1 rig with a timber crib installed in the combustion chamber but no test specimen installed onto the rig

Image courtesy of BRE Global

Figure A.10 – BS 8414-1 rig with a timber crib fully alight but no specimen installed, indicating severity of test when there is no contribution from a test specimen

Image courtesy of BRE Global

Figure B.5 – Fire at Samuel Garside House, Barking

Image courtesy of London Fire Brigade

Giugno 2019: logge in legno

Figure B.6 – Fire at the Cube, Bolton

Image courtesy of Greater Manchester Fire and Rescue Service

Novembre 2019: rivestimento in HPL

Annex E (informative)
Fire and rescue service intervention

E.1 General

Whilst fire and rescue service attendance at any incident is to be expected, there are many factors that inform its effectiveness. These include the time it takes for the fire and rescue service to arrive after they have been alerted, the resources that can be allocated to the incident, and the time taken for firefighting operations to commence on arrival at the scene. An assessor carrying out an FRAEW needs to be mindful of these multiple factors when considering fire and rescue service attendance as part of the appraisal, as over-reliance on the fire and rescue service can lead to an ill-informed and incorrect assessment of the overall risk.

The key factors affecting fire and rescue service effectiveness are discussed in **E.2** to **E.4**.

E.2 Fire and rescue service attendance

There are no longer national minimum standards for the attendance of the fire and rescue service based on risk. Attendance is now assessed individually by each fire and rescue service through their respective integrated risk management plan (IRMP). With varying models of governance across the UK fire and rescue services, coupled with differences in the way they source equipment and implement policies and procedures, as well as differences in the geographic areas they serve, assessors need to recognize that a blanket approach to fire and rescue service attendance cannot be taken.

When considering fire and rescue service attendance times, expectations need to be realistic. The time of attendance is generally defined as the period between the time of call to the fire and rescue service and the arrival of the first appliance. This does not represent the time for adequate resources to be in place to deal with an incident safely and effectively; that time will be influenced by multiple factors.

Although not an exhaustive list, the factors that need to be taken into account include:

- the nature of the premises;
- the access, both internally and externally;
- availability of local fire and rescue service resources, taking into account the time of day;
- availability of water supplies;
- the nature and location of the fire;
- the priorities of the fire and rescue service on arrival;
- occupant characteristics;
- the environmental conditions;
- other factors affected by the time of day; and
- the physiological effects of the circumstances on firefighters.

Fire and rescue service attendance is determined locally, so there are differences in securing resources to deal with some incidents effectively, and this varies geographically across fire and rescue services.

After arrival of the fire and rescue service at an incident, the time for effective intervention depends on the circumstances found by the officer in charge. It can take some time to resource and implement a safe system of work, and where rapid external fire spread is anticipated or experienced, the immediate priority of the fire and rescue service might be to perform activities such as instigating evacuation, undertaking rescues, etc., before attempting to fight the fire.

The delay between ignition and the time of call also needs to be taken into account, as there might be a latent delay before the fire and rescue service is summoned. For example, if the call to the fire and rescue service results from someone hearing a smoke alarm, seeing visible signs of fire, etc., the time between ignition and the call to the fire and rescue service, during which the fire develops, is indeterminate. On the other hand, where the call to the fire and rescue service is from someone within the flat of fire origin, or there is automatic transmission of fire alarm signals to an alarm receiving centre, the delay before the time of call could be significantly shorter.

Considering all of the above, and other factors that might be identified during the FRAEW (see Annex F), it is important that the assessor does not place an over-reliance on fire and rescue service intervention when assessing the risk.

Further guidance on fire and rescue service intervention can be found in PD 7974-6.

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Annex G (informative) Considerations in an in-depth technical assessment using fire engineering analysis

G.1 General

This annex provides guidance on a methodology for in-depth technical assessments using fire engineering principles when assessing the fire risk posed by external walls. Basic level assessments are addressed in Clause 13.

G.2 Methodology

G.2.1 Differentiation of wall constructions

The first stage in the methodology is to divide the wall constructions into appropriate sections/types as a function of:

a) systems: likelihood, rate and extent of fire spread specific to each system;

b) location and coverage: location on a building and extent of coverage of a system, including:
- continuity with other systems (i.e. whether fire spread via one system can lead to fire spread over another);
- likelihood of ignition: whether there are credible ignition sources adjacent to the construction;
- likelihood of fire spread: how far and over what parts of the building fire could spread via the construction in question; and
- consequence of fire spread: the people and fire protection features/systems that might be compromised by fire spread over the construction.

G.2.2 Strategy identification

The second stage in the methodology is to identify, for each wall construction system, potential fire and smoke spread hazards and the strategy for resisting fire and smoke spread.

Hazards typically comprise:

a) unprotected routes for fire spread between flats and other compartments via external walls (e.g. poorly installed structural framing systems); and/or

b) cavities through which extensive fire and smoke spread can occur; and/or

c) extent and continuity of combustible materials.

Hazard mitigation strategies might include one or more of the following.

1) Isolation (i.e. limiting coverage): The location and extent of coverage of a wall construction system is such that:
- it is not a medium for fire spread (e.g. is limited to a small area of coverage such as spandrel and infill panels); and/or
- fire spread over the construction is not possible (e.g. there are no external ignition sources and no openings through which fire could spread from inside the building to the wall construction) or is not likely to be a risk to health or safety (e.g. the wall construction system is only located on an elevation with no window or vent openings through which fire could spread from outside to inside).

2) Encapsulation (see **G.3.1**): Combustible materials and cavities are encapsulated by construction that is not combustible and is adequately fire-resisting (i.e. prevents fire penetration to the combustible material/cavity).

3) Restricting fire spread in the absence of a cavity (cavity absence) (see **G.3.2**): There are no cavities and the hazard of fire spread via materials and surfaces is adequately low.

4) Compartmentation continuation (see **G.3.3**): The internal fire-resisting construction continues through to the outside of the building such that any cavities and combustible materials do not span between compartments.

5) Limiting combustibility (see **G.3.4**): The combustibility of materials is such that they would not be a medium for fire spread.

6) Subdivision (see **G.3.5**): Combustible materials and/or cavities are subdivided by construction that adequately resists fire spread.

G.2.3 Assessment

The third stage in the methodology is to identify the critical success criteria for each wall construction system (as a function of the hazard mitigation strategy) and assess the wall construction system using the following steps.

a) Identify the skills, knowledge and experience, including any specialist input by others, necessary to assess adequacy.

b) Assess the adequacy of the system against the critical success criteria.

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Annex M (informative)
Fire performance considerations of different external wall materials, systems and configurations

External cladding systems involve the combination of several different components, including cladding panels, ventilated cavities, thermal insulation, breather membranes, cavity/fire barriers and support systems. These systems can be applied to a variety of substrates, ranging from existing precast concrete panels to lightweight steel or timber framing sheathed in ply, OSB or CP board.

Each of the components, of both the cladding and the substrate systems, might incorporate different types of material, all with differing characteristics in relation to their reaction to fire. Also, different combinations of these materials can interact in different ways, resulting in differing levels of risk.

In addition to the characteristics of the various individual materials, the way in which the design combines them, the standard of workmanship achieved in the construction and the architectural detailing of the junctions between different elements of the building all have an impact on the behaviour in fire of the external envelope as a whole. Particular care is needed in respect of unusual forms of construction, such as modular building systems, where the fire performance might differ from that of traditional construction types.

The result of this variety and complexity is that there can be no universally applicable means of definitively determining the likely behaviour in fire and rate of fire spread for any particular external cladding system, other than to test it in a representative large-scale fire test. Hence, the approach in ADB of BR 135 [15] classification using the data from a BS 8414 test was the benchmark referred to in MHCLG's 2020 Consolidated Advice Note [17] as the principal basis of determining whether a building is safe in terms of external fire spread.

As stated elsewhere in this PAS, a benchmark using BR 135 [15] classification cannot be readily applied as an approach to determining whether an existing building is safe. This would effectively require a substantial number of responsible persons and other persons having control of buildings to carry out large-scale fire tests to match the exact wall build-up on a building. Potentially, there could be many different variations to the wall build-up on the same building or, indeed, many different forms of cladding on the same building. It is not, therefore, seen as a practical approach.

Equally, assessment-in-lieu-of-test in accordance with BS 9414 is not considered a practical means of assessing the fire risk posed by external walls on existing buildings; given the many types of cladding and variations that have been used on buildings, there is simply insufficient BS 8414 test data to apply the rules set out in BS 9414 to determining whether the differences between an untested cladding system and one that has been tested are significant. In addition, BS 9414 is intended and structured to enable cladding system manufacturers to reliably establish the manner in which tested systems might reasonably deviate from the specific system (or number of similar systems) that has been tested to BS 8414; it is not intended as a means of reverse engineering an applicable BS 8414 test based upon site observations.

There is a wide variety of cladding types, and different façade linings and insulation materials, in use within the external walls of existing multistorey, multi-occupied residential buildings. This PAS focuses on those that are combustible or contain combustible components.

There are many varieties of facings and insulation materials, which, individually and in combination, all perform very differently in fire. The initial focus following the Grenfell Tower fire was on ACM, given the combustible polyethylene core that was present to provide rigidity while reducing use of expensive aluminium. Other composite panels, such as insulated core sandwich panels, can also have a combustible core.

However, insulated core metal panels of this type differ markedly from ACM; the fire performance of sandwich panels was a significant issue in the 1990s, following a series of large loss fires, in particular, in food processing factories (see Research report no. 76 [35]). While much of the concern related to the internal use of sandwich panels, it led to the development of fire test standards (see LPS 1181, Part 1 [33]) that include external use of such panels.

In relation to fire spread, the performance of an external wall is dependent not only upon the fire behaviour of the facing material, but also, where present, on that of the thermal insulation behind it. Equally, as discussed in Clause 5 and Annex B, the presence or otherwise of cavities, and barriers to restrict fire spread within those cavities, is highly significant.

PAS 9980:2022

Annex N (informative)
Façade configuration risk factors

Table N.1 gives a non-exhaustive list of examples of common factors influencing the likely speed and extent of fire spread based on:

- the extent to which the building is covered by combustible cladding;
- the presence or otherwise of continuous cavities;
- the extent of openings in the external building envelope; and
- the location of the cladding.

No single row in Table N.1 gives a definitive answer on risk. Whether an entry is considered positive, negative or neutral is purely indicative of the potential influence it might have. Careful judgement is needed when using the table to determine the actual relevance of each factor and its significance in the context of the particular building under consideration. Where numeric values are given, these are only intended to be indicative as to the possible influence the particular factor might have in a risk-based assessment.

The relevance of the factors in Table N.1 can vary on different elevations or different parts of the same elevation. Consideration will need to be given as to how significant such variations are when assessing the fire risk on the building as a whole.

Where a risk factor is marked with an asterisk (*), this indicates that it is notably more of a positive influence.

Table N.1 – Façade configuration risk factors

Positive	Neutral	Negative
Where a risk factor is marked with an asterisk (*), this indicates that it is notably more of a positive influence.		
N.1 Building height		
<11 m	<18 m	18 m to 30 m* >30 m
NOTE *These are commonly used trigger heights, but it is important that these are considered, along with all other pertinent factors in the round. Indeed, in risk terms, there is a reducing gradation in risk for heights below 18 m.* *On buildings below 18 m in height, the extent of cladding is inherently limited by virtue of the number of storeys. For such buildings, traditionally, there have been no explicit restrictions on the combustibility of the external wall construction and, only in limited circumstances, any requirements relating to the reaction to fire classification of surfaces; it has still been necessary to provide cavity barrier protection, where applicable. It is therefore possible, and indeed likely, that rapid external fire spread would occur in buildings where elements of the external walls are combustible.* *It is reasonable to expect that an assessment of the fire risk posed by external walls of low-rise blocks of flats (buildings below 18 m in height) ought normally to place the building in the low-risk category. However, with current knowledge of the burning behaviour of certain materials and how the configuration of these on the building can promote rapid fire spread at a rate much greater than previously anticipated for low-rise buildings, it is possible that an external wall assessor might place the risk in the medium risk category, albeit still considering the risk tolerable. Where extremely rapid fire spread is likely (e.g. where Category 3 ACM is present or there is excessive use of timber or other combustible materials configured in such a way as to promote unusually rapid and extensive fire spread), this would suggest that fire spread would be at a rate far greater than previously considered acceptable for a low-rise building, with the conclusion that the risk is unacceptably high. Issues around deficiencies in the construction of the walls might also lead an external wall assessor to conclude that further and more in-depth technical assessment might be necessary to refine the risk. Concerns regarding effective intervention by the fire and rescue service might also lead to this conclusion; even in low rise buildings the difficulties of tackling a fire involving external wall construction when operating at ground level using typically available equipment need to be recognized (see Annex E).*		
N.2 Height of base of cladding above ground		
>5 m **NOTE** *At this height, the likelihood of a fire originating externally (e.g. involving a parked vehicle or waste skip and started either accidently or deliberately) igniting the cladding is highly unlikely*	2 m to 5 m **NOTE** *At this height, the scope for a fire originating externally (e.g. involving a parked vehicle or waste skip started either accidently or deliberately) igniting the cladding is considered possible, but not likely at an early stage in the development of the fire.*	<2 m **NOTE** *At this height, the likelihood of a fire originating externally (e.g. involving a parked vehicle or waste skip started either accidently or deliberately) igniting the cladding is highly likely.*

Table N.1 – Façade configuration risk factors continued

Positive	Neutral	Negative
N.3 Extent of cladding		
Limited in extent and not vertically aligned, such as to delay significantly fire spread to windows and other openings on upper levels	Limited in extent such as to delay fire spread over the external walls	Entire façade covered
NOTE *In the case of a high-rise building with only partial cladding, the limited extent of combustible cladding might not be materially different, in terms of external fire spread, from the same extent of cladding on a low-rise building. However, its location could lead to a situation that is very different in terms of overall risk because of the difficulty of fighting a fire involving the cladding at that height. This exemplifies the need for consideration of the potential for firefighting by the fire and rescue service. Also, in this situation, even when a high-rise building only has combustible cladding on a limited number of lower floors, a fire involving that cladding could impact on fire protection measures, such as smoke control systems, required to protect the upper floors (see also Annex F).*		
No scope for a cladding fire to breach compartment wall and floor boundaries	—	Scope for a cladding fire to breach compartment wall and floor boundaries significantly worsened by the nature and the extent of combustible material in the external wall construction
N.4 Cavities		
No cavity	—	—
Cavity not continuous, due to façade being only partially clad or broken by building features (Examples include: • projecting floor slabs that divide part of the wall and isolate sections of cavity from each other; and • walls that project out or are set back, such as to limit the vertical extent of cavities) Continuous vertically running cavity with cavity barriers or fire stops as appropriate	Cavity limited in vertical extent, e.g. ventilated rainscreen that spans more than one floor level but not all floor levels Cavity limited in extent and running horizontally only	Continuous vertically running cavity without cavity barriers or fire stops
Limited or no windows or openings in façade	Openings in façade limited to ventilation outlets	Windows and other openings in line with vertical cavity

Table N.1 – Façade configuration risk factors continued

Positive	Neutral	Negative
N.5 Infill/spandrel panels		
Sufficiently remote from windows and not forming a continuous vertical section, such that fire and smoke spread into the building to give rise to secondary fires is unlikely and fire will only spread by cascading up panels* Continuous vertical sections but sufficiently remote from windows such that fire and smoke spread into the building, causing secondary fires, is unlikely Isolated areas of panels that do not cross compartment boundaries or cause a fire to cross a compartment boundary	Adjacent to, but not in a vertical continuous line with, windows	In a vertical continuous line with windows such as to increase the likelihood of secondary fires Where spanning a compartment boundary and in particular a compartment floor
NOTE 1 *The above relates to panels that could, due to their combustible facing or content, contribute to fire spread. Non-combustible panels might serve to divide a façade and positively reduce the scope for fire spread where other parts of the walls are combustible. Spandrel and infill panels are terms often used interchangeably for panels within a window or curtain wall framing system. However, spandrel can denote a panel that, by virtue of being between the sill of a window and the head of a window below it, spans a floor of the building. Thus, where floors are compartment floors, the significance of such panels lies in the potential for fire spread to bypass the compartment floor.* **NOTE 2** *The above is only indicative of some of the considerations relating to infill/spandrel panels. It does not address all potential situations where panels are present, such as in curtain wall systems also incorporating glazing.*		

Table N.1 – Façade configuration risk factors continued

Positive	Neutral	Negative
N.6 Setbacks		
Combustible cladding is set back from the wall edge, such that direct flame impingement on the cladding from a fire on a lower level is highly unlikely (An example would be a penthouse flat constructed on the roof of an existing building) **NOTE 1** *This depends upon the distance from the wall edge, the nature of the construction of the external wall below the set back and the proximity of the openings in the wall from which fire can spread. Consideration might need to be given to the use of the terrace and nature of the construction of the terrace itself if it is considered that there is a high likelihood that fire could spread due to the combustibility of the terrace, e.g. where there is timber decking in conjunction with exposed polymeric roof insulation below. Management controls are outside the scope of this PAS and are considerations for the building's FRA.* **NOTE 2** *Fire engineering analysis and calculation might be able to assist by estimating the length of flame projecting from a window below and the level of radiant heat on the cladding from these flames.*	—	—

Table N.1 – Façade configuration risk factors continued

Positive	Neutral	Negative
N.7 Overhangs and projections		
Projecting floor slabs that divide combustible cladding such as to divert flames away from the walls and protect the cladding above or slow the rate of fire spread	—	Where fire spread under an overhang can give rise to extended flame lengths over the soffit and up the external wall beyond *NOTE This depends upon the size of the overhang and the distance for flames to spread before reaching the wall edge. It can occur whatever the construction of the overhang, but is exacerbated where this construction is combustible.*
NOTE 1 Overhangs, where a section of the façade projects forward from the section below, have the potential to divert flames horizontally under the soffit of the overhang and then for the flames to adhere to the vertical façade of the section above. *NOTE 2 This does not refer to balconies as projections (see **N.11**).* *NOTE 3 The potential beneficial contribution of projections in terms of dividing cavities is referred to earlier in this table.*		
N.8 Proximity to windows and other openings to the accommodation		
Remote from windows and openings, such that fire and smoke spread into the building, causing secondary fires, is not possible (Typically, this occurs when a façade has no openings for windows and other unprotected openings; see **N.9**.)	Horizontally adjacent to windows and openings, but not vertically in line with such openings, such that fire and smoke spread into the buildings, causing secondary fires, as a result of direct flame impingement, is possible, but only under adverse wind conditions	Horizontally adjacent to windows and openings, and vertically in line with such openings, such that fire and smoke spread into the buildings, causing secondary fires, as a result of direct flame impingement, is highly likely
N.9 Presence of vents or other openings for services in the façade		
Where vents pass through a cavity, either: • they are either protected by cavity barriers (including ADB "deemed to satisfy" alternatives); or • the cavity is not a medium for fire spread between compartments (e.g. because it has adequate cavity barriers on compartment lines or does connect multiple compartments)	Where vents pass through a cavity, either: • the cavity does not include combustible materials; or • the cavity is faced on either side by brick or concrete at least 75 mm thick and any combustible insulation in the cavity is not thermoplastic	Any other circumstances where vents pass through a cavity

Table N.1 – Façade configuration risk factors continued

Positive	Neutral	Negative
N.10 Proximity of combustible elements of a façade to escape route windows and other openings		
Remote from windows and openings, such that fire and smoke spread into the escape routes to give rise to untenable conditions is not possible* (Typically, when a façade has no openings onto escape routes) Remote from windows and openings, such that fire spread into the escape routes to give rise to untenable conditions is remote (Typically, when a façade has openings onto escape routes, but these are sufficiently separated by construction that would not support combustion)	Adjacent to windows and openings onto escape routes, but the same fire could not spread to affect more than one escape route (Typically, where there are two or more escape routes which can be used by occupants who all have access to multiple routes)	Adjacent to windows and openings, such that fire and smoke spread into the escape routes to give rise to untenable conditions is likely and there is only one escape for some or all occupants (This includes vents that are part of a smoke control system, where there is the potential from an external fire to prejudice the effectiveness of the smoke control system) Above doorways forming final exits from escape routes, such that burning material or debris from a fire involving the external walls above will pose a danger to escaping occupants *NOTE In this situation, burning material and debris from the fire above can also pose a danger to firefighters entering or leaving the building.*

Table N.1 – Façade configuration risk factors *continued*

Positive	Neutral	Negative
N.11 Attachments		
[Covers: • a balcony attached to an external wall; • a device for reducing heat gain within a building deflecting sunlight, which is attached to an external wall (brise soleil); • a solar panel attached to an external wall; • any other attachment which could present a fire risk] **NOTE** *A balcony approach to flats could potentially be considered an attachment if combustible, but other constraints regarding its construction and combustibility apply in the case of new buildings because of its use as an escape route. A combustible balcony used as a communal means of escape has the potential not only to impact on the fire behaviour of the external walls but also to lead to the means of escape being compromised in the event of fire.*		
Non-combustible open balconies (Where these extend along a façade, they have the potential both to: • interrupt a cavity; and • deflect flames away from the building and away from the façade)	Timber (or other combustible) balconies of limited extent Timber decking with steel plate or concrete below	Timber balconies of large extent Timber (or other combustible) balconies, with aggravating features (For example: • without protection from the underside; and • adjacent to timber or other combustible wall panelling) Combustible features such as brise soleil incorporating combustible material Photovoltaic (PV) installations, especially if incorporating combustible elements **NOTE** *PV installations present an ignition hazard as well as a potential fire load.*
NOTE 1 *There is no current guidance relating to the risk posed by balconies with combustible elements and, in particular, timber decking. While it has always been possible for fire to spread vertically over the façade of a building by a fire igniting a balcony and spreading to the balcony above and then cascading up the building, the consequences of this have usually been limited. Some high-profile fires which resulted in fire spreading into a large number of flats above by this mechanism have led some to take a very conservative approach. In practice, the scale and extent of such fires varies, and depends upon various factors, including:* • *the size of the balcony;* • *the extent to which more than the decking is combustible;* • *whether the balcony is in line with similar balconies above/below, giving the potential for a fire to cascade upwards from balcony to balcony or cause ignition to balconies below;* • *whether the balcony is staggered from others, reducing the potential for fire to cascade upwards or spread downwards;* • *whether combustible material in the balcony is exposed from below, or is simply a lining on top of a metal or concrete deck, or underdrawn with an essentially non-combustible material; and* • *whether the likelihood of ignition is minimized by virtue of the limitations on what the balcony can be used for, by virtue of its size, or by management controls that can be placed on residents by the owner of the building, e.g. a prohibition on using barbecues. Management controls are primarily considerations for the building's FRA, although recommendations relating to management controls could appear in the FRAEW report.* **NOTE 2** *Based on past experience of laminated glass in fires when used as part of balcony construction, replacement of laminated glass on balconies is not, at the present time, considered justified in relation to existing blocks of flats. Further consideration to balconies and laminated glass is given in Annex L.*		

Table N.1 – Façade configuration risk factors *continued*

Positive	Neutral	Negative
N.12 Proximity of combustible elements of a façade to a neighbouring building		
—	—	Windows or other openings in adjacent or abutting neighbouring buildings that are sufficiently close that direct flame impingement from a fire in the neighbouring building is foreseeable **NOTE** *The potential for sufficiently high levels of radiant heat flux from unprotected openings in a neighbouring building could also be a negative risk factor, although it is recognized that there will be difficulties in determining this, given the need for information relating to the neighbouring building.*

Annex O (informative) Case studies with working examples illustrating the use of the methodology

O.1 General

The following case studies are fictitious and are solely intended to illustrate the application of the framework and rationale in Clause 13. They do not purport to provide, and are not to be relied upon as, generic solutions to the particular forms of external wall construction, which, by virtue of the principles within this PAS, can only be considered in the particular circumstances of the building under appraisal and by taking into account all relevant risk factors.

O.2 Case study 1: Six-storey building with Category 2 ACM cladding panels and polymeric foam insulation on penthouse flats

O.2.1 Background

An FRAEW of a mixed-use building with residential on the top floor consisting of two, single storey flats was requested in response to testing of the metal panels on the facades of the flats. This revealed that the panels comprised ACM, but with a combustion modified core. It was classified as a Category 2 ACM, based on the results of a BS EN ISO 1716 test of samples taken from the building, which revealed that the calorific potential of the ACM was 12.67 MJ/kg.

The flats were on the top level of the building with offices below, but were independent and separated from the offices by substantial fire-resisting construction. Both flats were set back from the walls of the offices, giving both a roof terrace and gardens. Although the flats had a dedicated and independent staircase for access and escape in the event of a fire, there was also a secondary means of escape available to the residents, through shared use of one of two staircases that served the offices and that could be accessed from a roof terrace on the top level.

A Type 1 FRA had been carried out for the part of the building in which the flats had been subject to an FRA, but, while this recognized the presence of metal cladding, it concluded that, irrespective of the type of panel, there was not undue risk to the residents of the flats, who were relevant persons under the Fire Safety Order [19].

Nevertheless, given a general concern regarding ACM, the owner commissioned an FRAEW to supplement the building's FRA.

O.2.2 External wall construction

Details of the manufacturer and the ACM product were stamped on the back of the panels removed for testing and it was a product referred as an "FR" version within its range. The cladding formed side and head panels to large expanses of window glazing, which meant the panels were rarely wider than 1 m.

Some timber panelling was also present on the upright sections between windows, and timber decking was used on the roof terraces.

The external walls of the offices below comprised brick and, from the age of the building (1950s), it was expected that the walls would be of traditional construction.

There was no knowledge of how the ACM and timber were fixed (e.g. if on metal supports) and what the wall build-up comprised. However, the presence of Category 2 ACM was sufficient for it to be appropriate for the external walls of this building to be subject to an FRAEW in accordance with this PAS.

O.2.3 Findings from investigations

Given the lack of information on the wall-build and method of fixing, intrusive inspection was aimed at determining this and also establishing the nature of the horizontal separation between the two flats. However, only limited sampling was deemed necessary, especially as the points at which the flats adjoined each other were so limited.

The intrusive inspection and sampling confirmed that there was a cavity behind the ACM and timber, which contained polymeric foam insulation. The latter was determined, from markings and follow-up research, to be a form of PUR foam. There were gaps ranging from 15 mm to 20 mm where the flat panels abutted and where they were adjacent to the timber cladding. Further details of the wall build-up were established and, of note, full fill vertically aligned stone wool cavity barriers were present at the junction between the flats.

4. La nascita di nuove figure professionali:

- il *Fire Risk Assessor* (rif. PAS 79)
- l' *External Wall Assessor* (rif. PAS 9980)

8 Competence of external wall assessors

COMMENTARY ON CLAUSE 8

It is essential that persons conducting FRAEWs are competent, in order to give building owners, occupiers, enforcing authorities and other stakeholders confidence in the use of a risk based approach and in the outcome of the assessment.

Professionally ethical behaviour needs to be at the forefront of implementation of this PAS. The focus of the recommendations and guidance in this PAS is life safety. However, commercial and financial concerns have a significant influence on the attitude of clients and other stakeholders to the FRAEW and to those carrying it out. Consequently, it is likely that professionals carrying out the work will occasionally come under pressure to provide an outcome that suits a client's commercial, financial or legal position. This might manifest itself as pressure to confirm that everything is compliant, usually by reference to Building Regulations [7] and the supporting guidance in ADB ([8], [9]).

Conversely, the building owner might have an interest in future proofing the value of the building asset against new Building Regulations [7] and, where engaged in a claim against another party or applying for funding, a client might pressure the professional to exaggerate risks to bolster the client's position.

*Since the Grenfell Tower fire, competence has been a major consideration in changes to the way buildings will be built and maintained in future. Because professionally ethical behaviour is of such importance, this PAS includes recommendations on competence. This reflects the position taken in Issue 2 of the "Setting the Bar" report [26], which makes recommendations on assurance of competence and ethical practice.**

Whilst it is recognized that professional body memberships and professional qualifications do not guarantee ethical behaviour and competency, they do provide responsible persons and others with control of buildings with confidence regarding the competence of those engaged to carry out FRAEWs. This does not mean that those without such memberships and qualifications lack competence in carrying out an FRAEW; it is simply that there is no independent verification of their competence.

It is not uncommon for external walls to be examined by building surveyors, architects, façade engineers and others in order to establish factual information on the materials, components and systems forming the external walls and to determine the method of construction and standard of workmanship. However, an FRAEW completed in accordance with this PAS goes much further than simply establishing factual information; it requires interpretation of this information to formulate an opinion on the fire risk posed by the external walls. This requires not only an understanding of the fire behaviour and fire performance of materials, components and systems forming the external walls of blocks of flats, but also an understanding of fire hazards and the fire safety features applicable to blocks of flats, including the design principles of compartmentation, means of escape, smoke control systems, fire detection and fire alarm provisions (to the extent relevant), etc.

An external wall assessor, therefore, needs to possess knowledge of the fire strategy considerations and regulatory framework underpinning the fire safety design of such buildings.

As set out in Clause 6 and in the methodology in Clause 13, this PAS sets out a risk-based approach. It does not purport to be a means of using compliance with the Building Regulations [7] as the sole basis of determining whether a building is adequately safe with respect to external fire spread.

External wall assessors need to avoid influence on their decision-making by such pressures and need to, essentially, regard themselves as making an expert decision based on evidence that they need to be satisfied is sufficiently reliable to support the conclusions they make.

As with any professional service, external wall assessors need to be mindful that the standard of behaviour which has been followed could ultimately be tested in a court of law. The user of this PAS is advised to approach FRAEWs with that in mind.

* At the time of publication of this PAS, a suite of standards is in preparation relating to competence in the built environment. This includes PAS 8671, which deals with competence requirements for the new role of Building Safety Manager.

This does not preclude building surveyors, architects, façade engineers and others from conducting the necessary tasks to gather factual information on what the external walls on the building comprise, whether as part of a team in conjunction with a fire engineer or fire safety professional, or separately. However, they need to be able to demonstrate the necessary competence appropriate to carrying out this task.

It does not follow that all fire engineers will have the necessary skills, knowledge and experience to undertake FRAEWs, even at the basic level required by the methodology in Clause **13**, *let alone a more in-depth technical assessment, particularly one involving fire engineering analysis as discussed in Clause* **14**. *It is important that those commissioning FRAEWs seek evidence of competence with respect to those assessing the fire risk posed by external wall construction and cladding. In particular, clients need to establish that the external wall assessor has the necessary competence to match the level of assessment required.*

Guidance on relevant skills, knowledge and experience for the different roles of external wall assessors, based on the National Qualifications Framework[*], *is given in Annex H.*

It is expected that external wall assessors will consider adopting at least an internal peer review as part of their quality assurance process for producing FRAEWs.

8.1 External wall assessors should determine that they have adequate and relevant competence to undertake the FRAEW, and have sufficient knowledge, skills and experience in relation to fire safety of external walls to be able to complete an assessment at the level required.

NOTE *External wall assessors undertaking the basic assessment methodology, as described in Clause 13, are advised to consider the desirability of holding professional qualifications. Suitable professional qualifications are likely to comprise relevant membership of a professional body that:*

- *has a field of interest that includes the fire performance of building construction; and*
- *has policies and procedures that are subject to accreditation and/or audit by a certification body accredited by UKAS, the Engineering Council or equivalent; and*
- *has a whistleblowing policy, code of professional conduct and disciplinary procedure for its members; and*
- *requires a person applying for admission to full member grade to have a minimum Level 4 qualification*[*] *in a science, engineering or construction-related subject.*

8.2 External wall assessors should be able to demonstrate evidence of competence to the client with respect to assessing the fire risk posed by external wall construction and cladding, including experience in conducting investigations into the fire safety of external wall construction and cladding.

8.3 External wall assessors should understand how materials used in external walls behave in fire and should have a knowledge of the fire performance standards required for such materials. They should also be able to understand the fire strategy considerations for such buildings and be able to make judgements regarding fire hazards and fire safety features that will influence the outcome of an FRAEW. Companies engaged in conducting FRAEWs should employ people who possess such skills, knowledge and experience, or engage with others who do.

[*] https://www.gov.uk/what-different-qualification-levels-mean/list-of-qualification-levels

Annex H (informative)
Expected skillsets of a competent external wall assessor

Table H.1 sets out the skillsets typically expected of external wall assessors carrying out different tasks or levels of assessment.

This includes indicative expected skillsets based on the National Qualifications Framework[10].

Table H.1 – Expected skillsets of an external wall assessor

Task or level of assessment	Typical professional recognition	Expected skillset
Information gathering and site survey and inspection (Clause **10**)	Surveyor or other building professional such as an architect or façade engineer	Able to undertake document study and conduct on-site verification in order to establish what is known about the likely performance of materials and components that have been installed on the building. Has knowledge of materials, components and systems used in external wall construction and cladding and of the construction techniques used. Able to conduct or direct others in site surveys and inspections, including opening up works. Capable of making judgements on where components of walls need to be removed and samples taken, while avoiding undue damage and enabling the appropriate repairs to be made. Able to present, evaluate and interpret qualitative and quantitative data, in order to make sound judgements in the context of the scope, extent and findings of the inspection of the relevant external wall construction in the context of performance in fire. Capable of making judgements as to whether walls have small quantities of combustible material present which are inconsequential, and thus concluding that such walls do not need to be considered further in an **FRAEW**. Able to communicate the results of their inspection accurately and reliably. Takes personal responsibility for their work. Knows the limitations of their skillset and can draw in additional skills as required.
Basic level assessment (Clause **13**)	Fully qualified member of a relevant professional body	Knowledge of the underlying concepts and principles associated with fire engineering and an ability to evaluate and interpret these within the context of the fire performance of the relevant external wall construction. Able to present, evaluate and interpret qualitative and quantitative data, in order to develop lines of argument and make sound judgements in accordance with basic theories and concepts in the context of the fire performance of the relevant external wall construction. Able to evaluate the appropriateness of different approaches to solving problems related to the fire performance of the relevant external wall construction. Able to communicate the results of their assessment accurately and reliably, and with structured and coherent arguments. Takes personal responsibility for their work. Knows the limitations of their skillset and can draw in additional skills as required.
In-depth technical assessment using fire engineering analysis (Clause **14**)	Chartered engineer	Possesses a systematic understanding of key aspects of fire engineering, including acquisition of coherent and detailed knowledge, at least some of which is at, or informed by, the forefront of aspects of the fire engineering discipline as it relates to the fire performance of the relevant external wall construction. Able to deploy accurately established techniques of analysis and enquiry within the fire engineering discipline. Able to devise and sustain arguments, and/or to solve problems, using ideas and techniques that are at the forefront of the fire engineering discipline and relating to the fire performance of the relevant external wall construction. Able to describe and comment upon particular aspects of current research in the discipline of fire engineering as it relates to the fire performance of the relevant external wall construction. Appreciates the uncertainty, ambiguity and limits of knowledge relating to the fire performance of the relevant external wall construction. Able critically to evaluate arguments, assumptions, abstract concepts and data (that might be incomplete), to make judgements, and to frame appropriate questions to achieve a solution – or identify a range of solutions – to a problem. Able to communicate information, ideas, problems and solutions to both specialist and non-specialist audiences. Able to exercise initiative and accept personal responsibility. Knows the limitations of their skillset and can draw in additional skills as required.

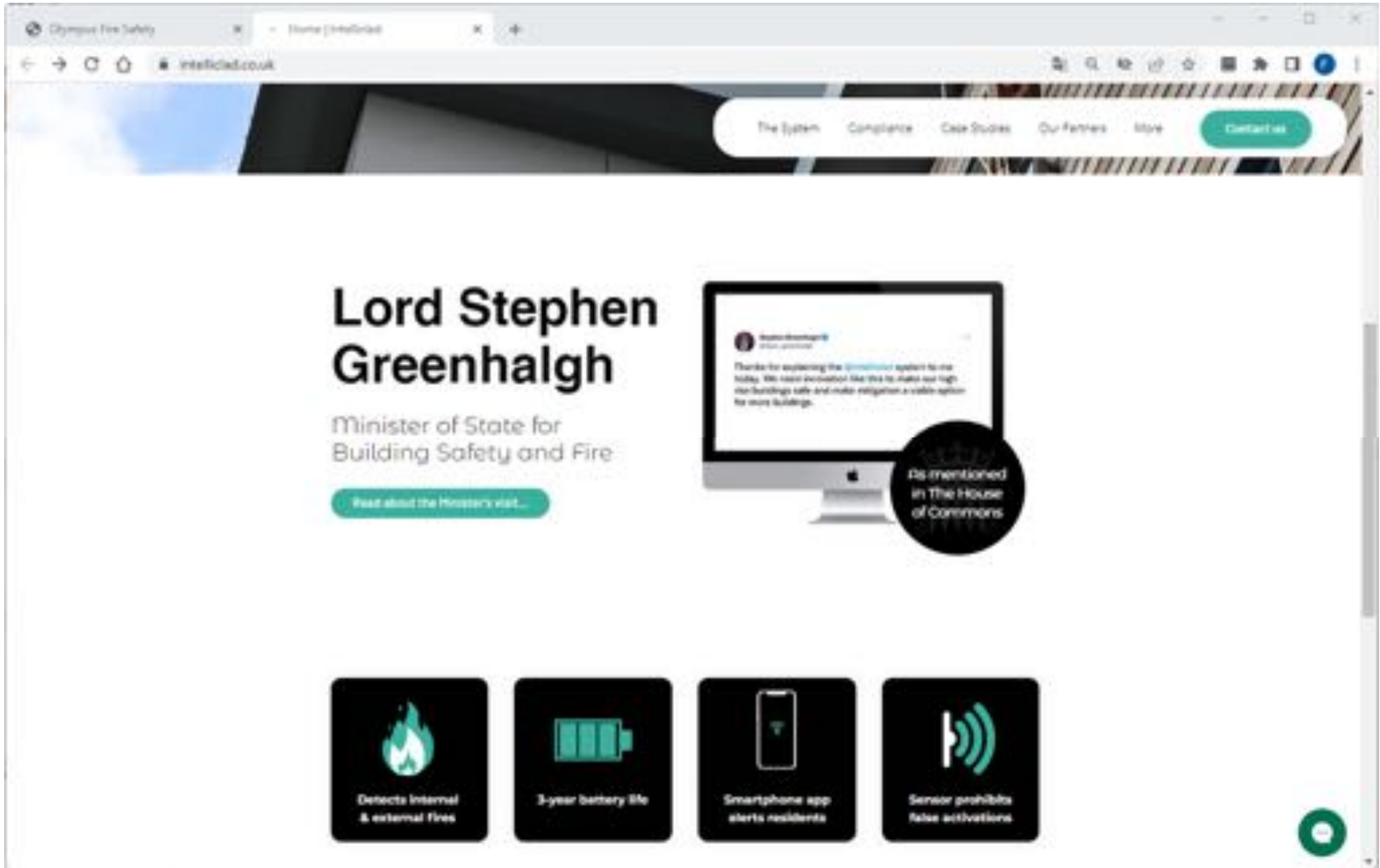
[10] Further details of this framework are available from https://www.gov.uk/what-different-qualification-levels-mean/list-of-qualification-levels.

- il *Building Safety Manager* (rif. PAS 8673)

PAS 8673, Framework for competence of individual Building Safety Managers and Nominated Individual Building Safety Managers

5. Le misure di mitigazione temporanea del rischio

per esempio: https://www.intelliclad.co.uk/


Lord Stephen Greenhalgh
Minister of State for Building Safety and Fire
As mentioned in The House of Commons
Detects internal & external fires
3-year battery life
Smartphone app alerts residents
Sensor prohibits false activations

ARMA

FPA Fire Protection Association

FIA Fire Industry Association

Simultaneous Evacuation Guidance

Guidance to support a temporary change to a simultaneous evacuation strategy in purpose-built blocks of flats

Issued on: 1/10/20
(This third edition replaces the previous version of the guide issued: 01/05/18)

The Institution of Fire Engineers

NFCC National Fire Chiefs Council

OPTIVO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