Elizabeth Court – Fire Risk Appraisal of External Walls

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Rev.	Date	Issued By	Amendments
01		Joe Levey	

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Competency Statement

Report Writer – Joe Levey

I, Joe Levey am a full-time specialist façade consultant and fire risk assessor. I am a full member of the Fire Protection Association and have over 13 years of working experience in the design, supply, installation and assessment of all major external wall systems and architectural glazing types. I undertake in depth investigations and reviews of existing external wall systems taking note of workmanship, compliance with building legislation, installation to manufacturers requirements and government issued guidance. For this assessment I have followed the guidance in PAS 9980:2022 and used the methodology set out in clause 13 for the completion of an FRAEW to basic wall construction. My previous investigations and external wall assessment have already determined the requirement for a full FRAEW as per the executive summary below.

Due to the complexity of the as built external wall construction and observed residual risk to occupant life I have opted to enact clause 14 of PAS 9980: 2022, whereby I have worked alongside a fire engineer to conduct further assessment of the external wall system to determine an appropriate outcome.

Fire Engineer – Kimon Pantelides

I, Kimon Alexander Pantelides, am a full member of the Institution of Fire Engineers, with membership number 00054536. I am also a Chartered Building Engineer with the Chartered Association of Building Engineers with membership number 71093820. I have been undertaking external wall assessments since 2018 averaging approximately 50 such assessments each year. I can confirm that I have reviewed this report and provided commentary on the FRAEW undertaken by Buildtech. These comments are my own and have considered the methodology set out in PAS 9980: 2022.

Executive Summary

Building Description

Buildtech conducted investigations to the external wall system at Elizabeth Court on the 5th of December 2022 and found the following:

- Generally, the construction of the building appears to be of structural concrete with an existing double masonry wall construction.
- The existing external wall system has been overclad with an insulated render system. The render is mostly a concrete-based product applied directly to expanded polystyrene insulation. The insulation is installed directly to the existing double masonry external wall system with a small irregular void of 0 to 6mm deep between the insulation and the masonry.
- A portion of the render is an alternate product, being acrylic based and applied directly to a mineral wool insulation board, over an existing concrete-based wall board.
- The concrete-based render within the alcove above the main entrance appears to be installed directly to mineral wool insulation over the existing masonry wall construction.
- Fire breaks were observed regularly to the compartment floor levels and party wall junctions. The breaks were a mineral wool product, held in place by mechanical fixings and dot and dab adhesive.
- Buildtech did not observe any cavity barriers, fire breaks or fire barriers to the perimeter of windows or vent penetrations.

The building is situated in a corner plot with a perimeter garden laid to turf on all four side. The site can be accessed by members of the public via a single opening in the perimeter fence. There is no parking facility or plant equipment within the immediate vicinity of the building.

Recommended Remedial Actions

The resulting fire risk appraisal of external walls concludes residual risk of the as built external wall system is low. Therefore, the following recommendations relate to ensuring adequate maintenance of the external wall system to ensure continued protection for the occupants.

- It is recommended that all elevations of the building are monitored to identify any potential damage to the external render finish. Should any damage be identified exposing the insulation material behind, and immediate repair should be conducted using a non-combustible product.
- The estimated height of the top occupied floor is approximately 18m. an accurate height survey should be considered to identify the responsible persons requirements under the `Fire Safety (England) Regulations 2022`.
- A full and thorough fire door survey should be conducted in line with the fire safety (England) regulations 2022 to assess the functionality and remedial requirements relating to the communal fire doors and the entrance doors to each residential property.

The construction of the external wall system is such that no interim measures have been considered. The responsible person(s) should ensure that they comply with all requirements set out within the `Fire Safety (England) Regulations 2022.

PAS 9980 provides guidance on the risk of fire spread via external wall construction. It sets out a methodology to conduct and record Fire Risk Appraisals of External Walls, which can be scaled up or down depending upon the complexity of individual buildings. The methodology for completion of an FRAEW is covered specifically in clause 13 of the document and is broken into six distinct steps:

Step 1: Does the building require an FRAEW?

In this step the available documentation is reviewed, and an initial intrusive investigation is conducted to conclude whether an FRAEW is appropriate for the façade construction present on site. In some cases, an additional review by fire engineer may be required to determine the requirement.

Step 2: Gathering all necessary information to complete the FRAEW

If it is confirmed that an FRAEW is required, the next step is to gather all relevant information on the building and its external wall construction. This needs to cover all the different external wall build-ups and attachments, what materials and components the system is constructed with, the extent of each of the cladding on each elevation and all relevant building documentation including FRA's O&M's and construction drawings.

Step 3: Identify and group factors that are significant in determining the risk rating.

Using the information gained on the building and its external wall construction, the third step is to determine and collate, from knowledge of the external wall construction and the building's fire safety features and attributes, the factors that are influential and relevant to the risk posed by fire spread over the external walls.

Step 4: Consider each group of risk factors to determine their potential contribution to the overall risk.

This step requires consideration of the influence that the various positive, negative and neutral risk factors have on the perception of where the overall risk lies for each group of factors.

Step 5: Review the risk factor analysis against the benchmark for success to determine an outcome.

Step five involves overlaying the findings from step 4 for each group on the low to high scale to establish where this positions the overall risk.

Step 6 (Clause 14): Application of fire engineering analysis as part of further technical assessment

Where the conclusion for step 5 is inconclusive further assessment may be required by an appropriately competent fire engineer. This may involve but is not limited to further review of the evidence gathered previously or potentially further investigations taken of the building.

Limitations

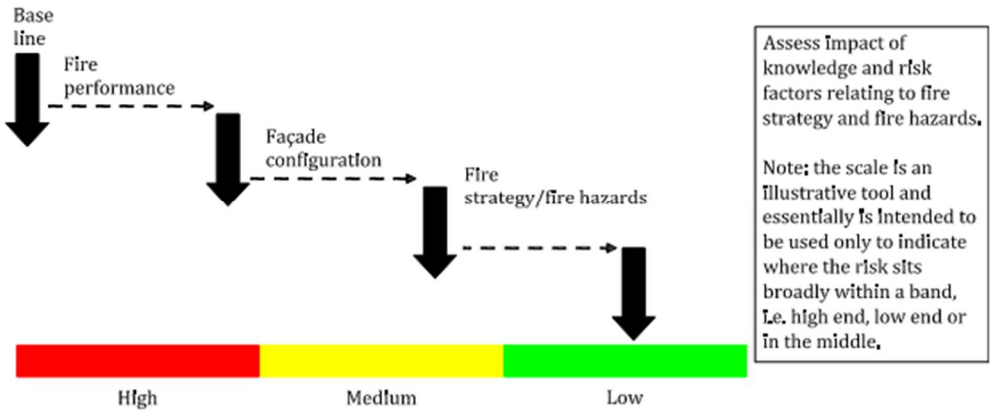
The construction of the PAS 9980:2022 guidance is such that it possesses certain limitations when compared with other methods of assessing the external wall construction of a building. These include:

a) It is intended primarily to inform the buildings fire risk appraisal.
b) It cannot warrant absolute safety, as it will be risk-based and therefore reliant on professional judgement.
c) It might not be possible to identify the full scope of work needed as part of the FRAEW from the outset, as the conclusion might be that a further inspection or in-depth technical assessment Is needed.
d) It is not specifically intended to address protection of firefighters.
e) It is not intended to address property protection.
f) It can only be based on available industry knowledge at the time of FRAEW and more definitive information on the fire performance or external wall construction might come to light subsequently.

Therefore, the advice given within this report is specifically in the interest of life safety to the occupants / users of the building as addressed in the title of this document. Any recommendations or conclusions given should not be applied to alternate properties despite apparent similarities. Should any changes be made to the design or fire safety features of the building, a re-assessment may be required to ensure any advice or conclusions made are still appropriate.

Risk Factors

On completion of the evidence gathering portion of the FRAEW process all appropriate risk factors will be identified and collated into relevant groups. For each group, the likely influence of each of these factors needs to be considered when assessing their contribution in terms of achieving the success criteria. Each group will be concluded to have a positive, negative or neutral influence on the residual risk presented by the external wall system. Once each risk factor is identified and its influence weighted the results are applied to a High, Medium, Low scale, with the base line set as the highest risk and each group effecting the position of the risk along said scale. Please see below illustration as an example.



Existing Fire Safety Features

General Construction

The property at Elizabeth Court consists of properties 1 – 27 in a single block format with ground plus six floors. The ground floor consists of three flats and a designated storage area. Floors one to six had four residential properties per floor with a communal balcony to either end of the central communal hall. Each property is accessed via a single communal stair well or lift shaft and communal hallway.
Typically, the building is constructed from a structural concrete frame with a double masonry wall to the external envelope. A retro fitted insulated render system has been installed over the double masonry wall construction. The render appears to be a concrete based system installed to a modified extruded polystyrene insulation to 80% of the external wall and installed to mineral wool insulation to approximately 20% of the external wall system.
The central stair well, lift shaft and communal areas appear to be a protected area with FD30 fire doors to all entrances, including to the service risers and meter cupboards.

Evacuation plan and escape.

No evacuation procedure has been provided. For the purpose of this report, it is assumed the building employs a defend in place (Stay put) policy requiring residents of un-effected properties to remain in their properties while the situation is managed by the authorities. As a result of this escape routes will need to be available for an extended period in line with the firefighting operations.
Automatic detectors/sounders and manual call points are present to all protected corridors and stair wells as part of the evacuation's routes, with two automatic opening vents to each corridor on floors one to six.
The design principles of this building are such that residents are expected to be safe in their own properties while a fire is fought at the point of origin, and an escape route will be available with firefighting assistance if required.
A dry riser inlet is present internally to the ground floor and a fireman's switch is installed to the lift controls to override the operations of the lift.

Building Environs

The building is situated in an individual plot with grass and public highway to the north, south and west elevations. To the east is a separate residential plot with an open area laid to grass separating the two buildings. The buildings are more than a meter apart from each other. There is no parking facility on the plot.
A public hydrant is less than 15m from the building in a northeast direction.
The nearest fire house is less than 3 minutes away in reasonable traffic. It is expected that the fire service are able to attend in a reasonable time to tackle an occurrence.

External Wall Construction

External Wall type 1 – Render to EPS insulation with masonry construction

The existing double masonry wall construction observed is constructed as such that is exempt from cavity barrier requirements in line with approved document B. The retrofitted insulated render system to the external face of the masonry wall construction contains a combustible insulation product likely to contribute to the intensity of a fire. The render finish is a 10mm thick concrete based system of limited combustibility. The build-up generally is of 10mm render to 90mm EPS insulation and double masonry wall construction internally.
Effective fire barriers are evidenced to the floor level and party wall compartment lines adequately preventing the passage of fire and smoke. Vent penetrations appears to be lined with a plastic flue sufficiently to exhaust all gasses to atmosphere. The PVC windows appear to be set within the double masonry wall construction, with a rendered reveal externally encapsulating the EPS insulation.

General risk of fire spread across the external wall	Low
Risk of fire entering the external wall system from an external or internal source	Low
Risk to building occupants from a fire effecting the external wall system	Low
Overall risk of this external wall system against PAS 9980: 2022 guidance	Low

Remedial Action required:	**None**

The existing wall system between windows across the floor slab consisted of a fibre based board. The board was not clearly identified on site as the operative was concerned the panel may contain asbestos. The board is finished with a bitumen-based building paper. The render system in this location is an acrylic based topcoat applied to a 100mm thick mineral wool insulation. The mineral wool insulation is installed between the underside and the top of a window across the compartment floor level.
There are no penetrations through this render. The acrylic based topcoat is combustible in nature.

General risk of fire spread across the external wall	Low
Risk of fire entering the external wall system from an external or internal source	Low
Risk to building occupants from a fire effecting the external wall system	Low
Overall risk of this external wall system against PAS 9980: 2022 guidance	Low

Remedial Action required:	**None**

Balconies

The Balcony constructions are inset within the external wall reveals and formed into the structural concrete frame. The adjacent external wall finishes consists of concrete based render applied to full fill mineral wool insulation over the existing double masonry wall construction.
There balconies are arranged vertically, though do not contain any combustible wall coverings or attachments. It is anticipated that a fire involving a flat and potentially breaking out through a window to the balcony is not likely to spread vertically at these locations.

General risk of fire spread across the balconies	Low
Risk of fire entering the external wall system from an external or internal source	Low
Risk to building occupants from a fire effecting the external wall system	Low
Overall risk of this external wall system against PAS 9980: 2022 guidance	Low

Remedial Action required:	**None**

Summary

The principle features of the external wall system at Elizabeth Court do not present a significant risk of fire spread over the façade. The majority of the outer finishes consist of non-combustible cement based render providing an appropriate barrier against external fire source. The combustible polystyrene insulation is encapsulated with non-combustible materials to the external and internal surfaces and appears to have adequate compartmentation with fire breaks to floor level and party wall compartment lines.
No fire barriers were observed to the perimeter of the façade openings (windows, doors vents) however, the PVC windows and doors appears to be set within the internal (masonry wall) opening, with the external reveals finished in non-combustible render, and the internal reveals being a plaster board finish.

To the areas where acrylic render is installed to mineral wool insulation across the compartment floor level, the external wall system does not present a significant risk of fire spread. The existing build up is not known across the floor level compartment due to the possible presence of asbestos. It would be recommended to conduct an intrusive investigation to the internal junction behind the external wall system to assess the compartmentation of the properties.

Access for attending emergency services is good from each roadside elevation, and to the east elevation access is present across the grass area. It is likely that the fire service would be able to deploy in an acceptable time, and that the fire fighting provisions within the building are sufficient to provide an adequate response to a fire.

The external wall system as viewed in the sample locations within the external façade report appears to present an appropriate level of protection to suit a defend in place evacuation policy.

Fire Engineers Comments

As the building was developed in 1968, it is anticipated that the relevant benchmark for fire safety standards at the time of construction would have been CP3 IV Part 1 (1962). This standard does not make comment on the fire performance of external wall materials. Fire performance of external wall materials did not come in to play until the implementation of the Building Act 1984. However, at this time the building construction was inherently safe, being represented by a masonry cavity wall and other non-combustible materials used on the external walls.

It appears that in 2014, additional works were commissioned to an install a rendered EPS system to the external wall façade. As is often the case with purpose built high-rise blocks of flats of that era, insulation was poor creating damp issues inside the flats, and the works were most likely commissioned to address this issue. The provision of additional materials would need to satisfy design guidance at the time of construction.

Paragraph 12.6 of ADB, 2006 (as amended) would not permit the provision of combustible insulation materials on buildings over 18m in height. In this regard, the insulation used on the rendered EPS system would not have satisfied design guidance at the time of installation, unless the wall system had successfully passed a BS 8414-1 test to the criteria of BR 135. No such evidence has been produced for review.

As horizontal and vertical fire breaks are provided, it is anticipated that a fire will be contained at the compartment boundaries without rapid development beyond the fire floor such that the fire service resources deployed in the initial pre-determined attendance for high-rise residential would be overwhelmed in the early stages of a fire.

Another potential issue is that the rendered EPS wall system starts at ground floor level, meaning that an external fire could spread directly to impinge on the EPS insulation materials. However, the building perimeter is set-back from the roadway meaning that the impact of a vehicle fire on the external walls of the building is low, although arson cannot be precluded.

Although the insulation is shielded from either side with non-combustible material, the 7mm thick cement based render would likely not satisfy the provisions for a ‘thick’ inorganic render described in section K.10 of PAS 9980. In this respect, it is unlikely that the risk rating would be neutral. However, as the EPS is applied directly onto the masonry substrate the risk of fire spread to the interior of the building by the wall configuration is not possible via this route. As the façade openings sit inside the masonry cavity wall, fire spread is unlikely.

Secondary fires can originate above the fire floor from a flash-over fire inside a flat, although BR 135 demonstrates sufficient performance of horizontal fire breaks in rendered EPS wall systems. As such, vertical spread is not considered to present an unacceptable risk. There is no heightened risk of fire spread anticipated from the balcony structures.

As such, it is our opinion that the rendered EPS wall would not have satisfied design guidance criteria at the time of construction (circa 2014) unless the entire system had successfully passed a BS 8414-1 test to the criteria of BR 135. No such evidence has been produced for review and therefore we assume that the wall system would not have satisfied any such test criteria. Nonetheless, we agree with Buildtech that the overall risk of fire spread is generally tolerable and endorse the proposal for no further action.

Conclusion

Following the above fire risk appraisal of external walls, with supporting external façade report and intrusive investigations, it is our opinion that the overall risk presented to occupants by a fire effecting the external wall system is **Tolerable**. As a result, our recommendations made in the first section are advisable and maintenance based to ensure the continued performance of the external wall system.

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