



Façade Refurbishment Strategy for Fire Performance
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Last Longer ME

Learning Objectives

1. Briefly explain what fire performance a façade needs
2. Outline a strategy for evaluation
3. Explain a successful refurbishment

2



Structure of this presentation – presented by an expert speaker
 - bullet points are provided as a speaker aid only



The Presenter
 Andy Dean
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3

Andy has over 30 years of experience in the field of Building and Construction, ranging from structural testing within the nuclear industry to fire testing. Having established the Dubai Façade Technology Centre and Laboratory in 1997, and operated it for 10 years, he has particular knowledge of heavy structures testing and weathertightness testing of facades, curtain walling and building envelope systems; and business in the Middle East.

Andy is a Fellow of the Chartered Institute of Building, Fellow of the Society of Façade Engineers (CIBSE) and member of the Glass and Glazing Federation; holding or having held senior committee positions in the local chapters of these organisations.

As a façade consultant he continues to provide input into the GCC codes and is a regular speaker at industry technical seminars across the region.



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4

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Overview

5



Source: Wikipedia

- What fire performance does a façade need?
- A strategy for evaluation
- A successful refurbishment



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Reaction to Fire

6



Source: Element

- **Reaction to Fire**
 - Usually materials
 - Early stage fire development
 -
 - Various measurement format
 -
 - Ignitability
 - Surface spread of flame
 - Smoke development
 - Toxicity
 - Combustibility



The Requirement for Reaction to Fire Performance

- Facades

- Limit ignitability
- Limit flame spread (propagation)
- Limit smoke production
- Limit toxicity of smoke
- Limit falling, flaming debris

7

- Combustibility? (Should a façade be fully non-combustible?)

- Non-combustible – ideally for large components (glass, panels, insulation)
- Some limited-combustible components practically are required – sealants, gaskets, shims, setting blocks, etc
 - These present a very small surface area and hence create very limited contribution to spread of flame



Fire Resistance



Source: Element

- Fire Resistance

Usually systems

- Preventing a fully-developed fire from getting from one compartment into an adjacent one

Compartmentation – internal fire spread

Walls, doors, windows, floors, ceilings, penetration seals

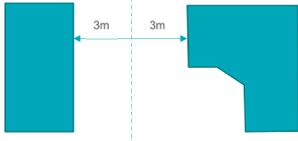
Measured in time (temperature, integrity, structural, heat radiation, insulation) eg, 30mins, 45mins, 1 hour performance etc

8



The Requirement for Fire Resistance - Facades

Preventing flame spread out of, or into, a building
Protecting an essential space (internal or external)

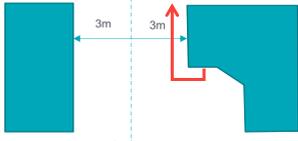


9



The Requirement for Fire Resistance - Facades

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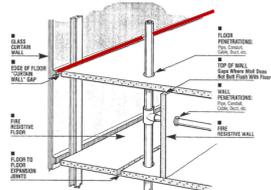
Certain sections may need to be fire resistant, on a project-specific basis
More frequently an internal requirement (internal partitions)

10



Perimeter Firestopping

- A horizontal barrier providing a fire resistance performance, limiting vertical flame spread
- A specialized linear joint seal between the slab edge and the façade

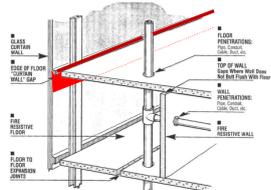


11



Perimeter Firestopping - Perimeter Area Protection

- It is practically likely that the backpan and brackets will have to be protected too, to pass the tests – now also a code requirement

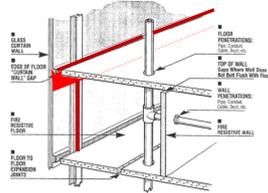


12



Perimeter Firestopping - Vertical Separation

- Don't forget about horizontal separation (between adjacent spaces on the same floor)
- review the fire safety strategy



Other Terminology Explained

- Fire rated...
 - the material / system being considered has some quantified fire performance characteristic
 - note that this can be acceptable or not acceptable for the authorities or the project
 - it could be a 'reaction to fire' or 'fire resistance' characteristic



Why Refurbish?



- Mandatory requirement
- Change of use
- There's been a fire
- There is a known fire risk
- Tenants / customers are asking about safety
- Insurance premiums
- There's a refurb due
- There's work ongoing



Strategy – Based on Experience

- Evaluation of risk
 - single building
 - building stock
 - may be different to general fire risk reviews
- Mitigation options
- Design
- Demolition / construction
- Closeout



Façade Fire Risk Evaluations (1)

Review and Audit Process

- Fire safety strategy review
- Identification of:
 - project-specific particular aspects
 - façade materials
 - façade geometry
 - façade component arrangement
 - perimeter firestopping
 - fire resistance façades

17



Source: Skidmore, OWINGS

Façade Fire Risk Evaluations (2)

Review and Audit Process

- Document review
 - information may be incomplete
 - information gaps must be filled
- Site inspections
 - may have to be visible only
 - may be iterative
- Material testing
- Identification of strengths and weaknesses
- Initial recommendations
- NFPA EFFECT evaluation tool
 - a high-level screening tool only

18



Refresh Fire Safety Strategy in Parallel

Fortification of the fire safety strategy

- making sure the installed systems work
 - suppression systems
 - fire alarms (no false alarms)
 - familiarity (drills) clarity (signage)
 - knowledge of the risks
 - access to and from the building
 - properly maintained passive systems (firestops, coatings, lighting, etc)

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Mitigation Options Phase

Mitigating Opportunities

- Review risk levels
- Target highest risks
- Provide options
 - re-evaluation with each option
 - existing (proven), and potential (unproven) options
- There may be limited opportunity for dismantling and replacing parts of the façade
- Review with client – risk appetite
- Maybe an early cost estimate

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In-principle Authority Approval

Discuss with the Authorities

- Explain the background
- List the findings
- Present the chosen options and the intended effect
- Listen to feedback
- Agree the direction

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Design

Detailed Action Stage

- Detailed site review (quantification)
- Deeper exploratory study
- Use photos and drawings
- Quantification of extent
- Clarification of scope

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Tender

- Thorough technical presentations of intent to contractors
- Contractor site visit and review
 - quantification of extent
 - clarification of scope
- Pricing
 - flexibility
 - rates
 - contingency - allow for the unknown
 - similarly with the programme

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Construction

- Focus on safety
 - demolition
 - access
 - ongoing operation
 - tenants, customers, other members of the public
 - be informative
 - full time presence
- Storage of materials
 - immediate removal of waste
 - just-in-time delivery approach
- Delineation of responsibilities
- Review constantly – immediate attention to issues

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Close-out

- The usual as-built information
- What did you achieve?
- Residual risk report

25



Thank you!

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