Al Futtaim Exova, & Exova Warringtonfire

Reaction to Fire Versus Fire Resistance.
Demonstrating a Full Scale Façade Fire Test.
Testing Versus Certification.

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Copyright Materials

Course Description (1)

Fire Resistance versus Reaction to Fire

Reaction to Fire
Reaction to fire tests tend to be small-scale test methods on materials, evaluating – ignitability, flame spread, heat release, smoke development and toxicity.
Samples tend to be small in size (mm rather than m) and relate to the development stages of a fire.

Fire Resistance
These tests are generally used to determine the fire resistance of complete systems (eg. a wall, ceiling, floor structure, jet fan, fire damper, ducting etc). Specimens tend to be large in size (m rather than mm).
They generally evaluate the duration of time that a complete structure will hold back a fire (eg. how long a fire will take before breaking into the adjacent room). Fire resistance tests integrity, and/or insulation and/or load bearing capacity (all measured in minutes)
It relates to performance in a fully developed fire.

Course Description (2)

A Full Scale Façade Test

Video showing a fire-rated façade material versus a non-fire-rated material, when subjected to BS 8414.

(Photographs are shown in the presentation handouts.)

Course Description (3)

Certification versus Testing

Many jurisdictions require products claiming a fire protection performance to be certified by an accredited third party. Third party product certification is a different process to product testing, although testing is usually a part of certification. If you conduct testing, only a test report is issued.

Certification is an independent statement of confidence about the ongoing production of the product, and aims to give the authorities or purchasers of a product confidence that all outputs from the production process meet a consistent level of quality. The outcome of third-party product certification is a performance certificate for a product and inclusion in an online listing of certificated products.

Third party product certification is a longer term process and involves (amongst other processes) random sampling of materials for the test (samples may be selected from stock, the manufacturing line or the open market).

Learning Objectives

At the end of the this course, participants will have been shown:

1) The principles of reaction to fire versus fire resistance

2) A demonstration of a full-scale fire test

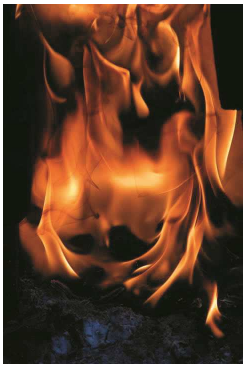
3) The principles of testing versus certification

Reaction to Fire (RtF) and Fire Resistance (FR)

- RTF and FR

  - Reaction to fire

  - Fire resistance

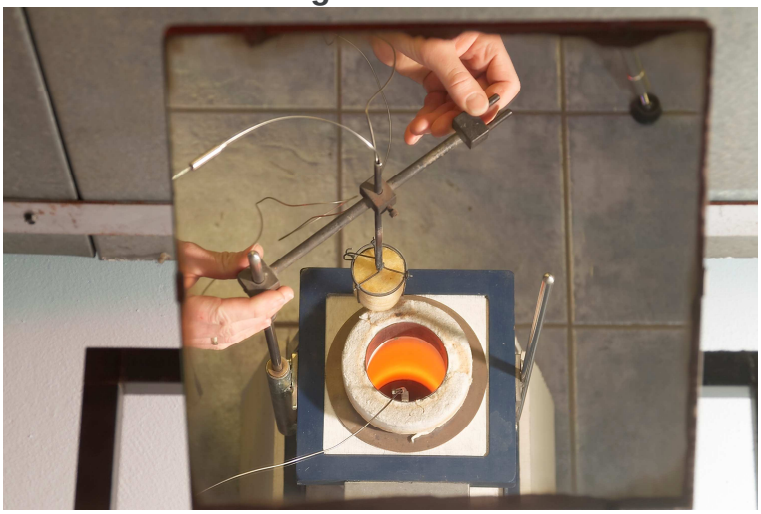


Reaction to Fire 1

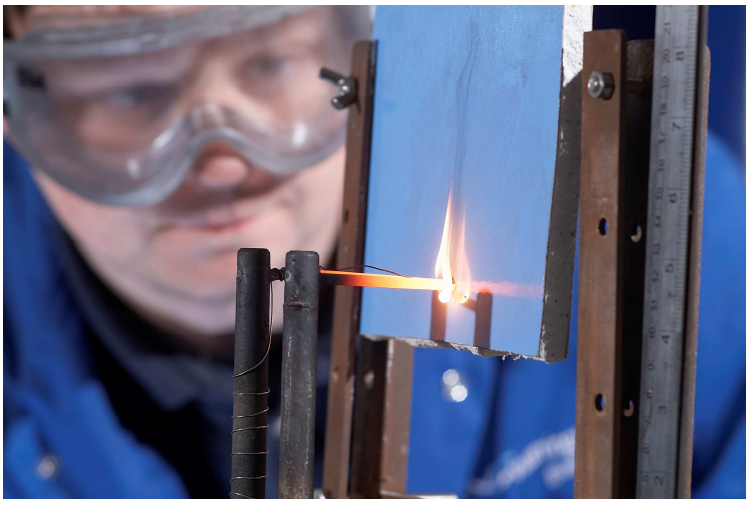
- Combustibility
- Ignitability
- Surface spread of flame
- Smoke development
- Toxicity

- Usually materials
- Fire development
- Various measurement formats

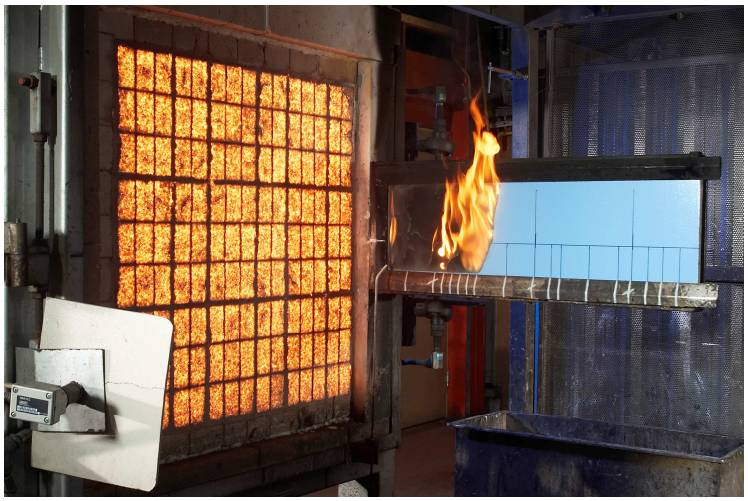
Reaction to Fire Testing 1



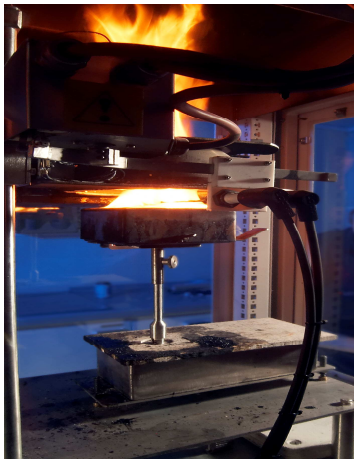
Reaction to Fire Testing 2



Reaction to Fire Testing 3



Reaction to Fire Testing 4

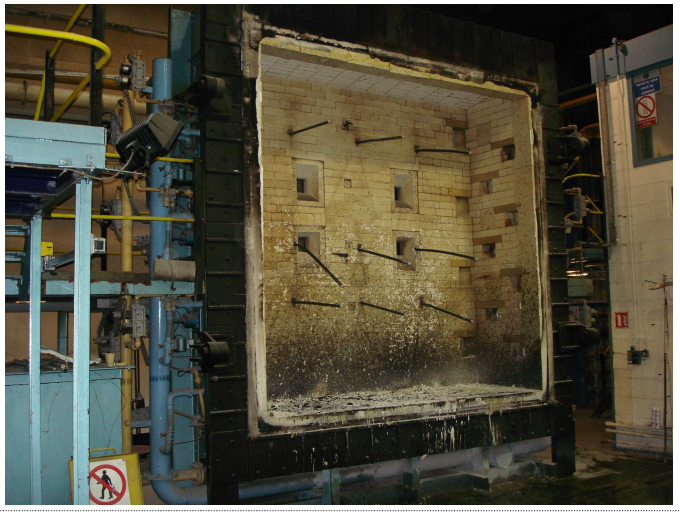


Reaction to Fire Testing 5

Fire Resistance

- Compartmentation
- Walls, doors, windows, floors, ceilings, penetration seals
- Measured in time (temperature, integrity, structural)
- Usually systems
- Preventing a fully-developed fire from getting from one compartment into an adjacent one

Fire Resistance 1 (vertical furnace)



Fire Resistance 2

Fire Resistance 3

Fire Resistance 4 (horizontal furnace)

Full Scale Fire Testing

- To address
- Test: BS 8414 – Fire Performance of External Cladding Systems
- Demonstrate fire-rated versus non-fire rated MCM (metal composite material) ACP (aluminium composite panelling)

Residential Block, Sharjah, 2011

Khalidiya Road,
Abu Dhabi

Tamweel Tower,
Dubai

Full Scale Fire Testing

Videos of a façade material under test

- Test: BS 8414 – Fire Performance of External Cladding Systems

Test Comparison - Fire-rated after 15 minutes

Test Comparison – Non-fire-rated after 5 minutes

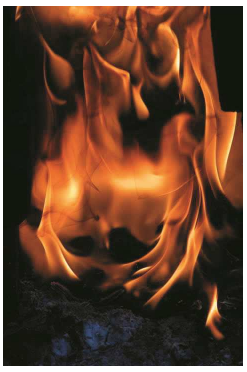
Performance Evaluated

- Flame spread
- Flame penetration (but not fire resistance)
- The above aspects should be limited
- Existing criteria from LPS 1582

Relevance

- BS 8414 evaluates spread of flame on façade systems
- This is **reaction to fire** testing, not **fire resistance**
- This test is included in the new codes being used in jurisdictions such as the UAE.
- This is being considered by authorities in KSA in the development of product standards.

- Certification
  - Provides:
    - end-user confidence
    - supplier market entry



Certification – outline and aspects

- Certification is not just testing (there is no such thing as a 'test certificate')
- Testing is part of the certification process
- A test produces a test report – this is a factual statement about a single sample

- Certification links the performance determined by the test, to the ongoing production of the product
- Certification is undertaken by an accredited organisation (ISO Guide 65) with a specific scope
- Several types of process – most are highlighted in ISO Guide 67
- CE Marking is an example (European minimum requirement)
- Confidence (consumer) and market entry (product supplier)
- Often called 'listing' in North America – the concept is the same

Certification – process elements

1. Application
2. Document review
3. Factory Production Control (FPC) audit
4. Quality Management System (QMS) audit
5. Product sampling (must be independent)
6. Type testing
7. Assessment
8. Certification decision

9. Ongoing monitoring (periodical audits and audit testing)

This concludes The American Institute of Architects Continuing Education Systems Course

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Learning Objectives - Review

You have been shown:

1) The principles of reaction to fire versus fire resistance

2) A demonstration of a full-scale fire test

3) The principles of testing versus certification

Thank You

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