Fire Doors Explained

Presented by -
Peter Barker
Objectives and Outline

Building Regulations 2006

Technical Guidance Document B

Fire Safety

1. The role of fire resisting doors
2. Proving the performance of fire resisting doors
3. Common problems and solutions
The Role of Fire Doors

- Building regulations – Parts A-M
- Applies to new buildings and those undergoing substantial alteration or a change of use
- Functional building regulations
- Technical Document Guidance B
The Role of Fire Doors

Part B of Building Regulations

Provide building occupants with sufficient means of escape to reach places of safety before the environment becomes life threatening:

- B1 Means of warning and escape
- B2 Internal fire spread (linings)
- **B3 Internal fire spread (structure)**
- B4 External fire spread
- B5 Access and facilities for the fire service
The Role of Fire Doors

Section B3 of the Building Regulations requires:

• buildings are designed to maintain stability of construction

• walls are constructed to resist spread of fire between buildings

• internal fire spread to be inhibited by sub-division of the building and/or installation of fire suppression systems

• building designed to inhibit unseen spread of fire and smoke
The Role of Fire Doors

Section B3 defined as:

• Compartmentation
• Passive and Active Fire Protection
• Built In Fire Protection

Proving the Performance of Fire Doors

Test standards for measuring fire resistance:

- BS 476: Part 22: 1987 (British Standard)
- BS EN 1634-1: 2008 (European Normative standard)
- To facilitate the use of the new European fire test methods within the approval process (CE marking)
- Both are acceptable within the ROI
- Came into effect on 1st March 2003
- TGD B - Appendix A: Performance of materials and structures
- TGD B - Appendix B: Fire doors
A doorset may be called fire resisting if the complete design has been subjected to a full scale fire resistance test to one of the current test standards for non-loadbearing elements:

- BS EN 1634 -1: 2008

It is important to understand that the test standards are a measure of performance:

- They do not detail constructional requirements
- There is no such thing as a blueprint for a fire door
Proving the Performance of Fire Doors

• Evidence to show compliance with building regulations may be obtained via:
  – A destructive fire test to BS or EN standards
  – An assessment

• Fire resistance tests will be carried out at independent, nationally accredited laboratories. Typically UKAS (United Kingdom Accreditation Service) accredited laboratories - such as Chiltern International Fire

• Assessments are to be written by qualified fire consultants
Proving the Performance of Fire Doors

Fully developed Compartment fire with combustible wall linings
Proving the Performance of Fire Doors

- Melting point of aluminium: 781°C
- Critical temperature of structural steel: 945°C
- Intumescent seals begin to activate: 1006°C

Time (min) vs. Temperature (°C) graph showing temperature ranges for different materials and the critical point for intumescent seals activation.
A report of the test will then normally be written stating:

- conditions under which the test was conducted
- construction details of the specimen and installation
- a record of the data obtained during the test, including:
  - thermocouple temperatures
  - distortion measurements
  - a graph showing the temperature curve
  - observations of the test engineer
- most importantly, the report will state the integrity and insulation performance of a construction in terms of minutes to failure.
Test reports are statements of fact and therefore only apply to exactly what has been tested - no more and no less.

Assessments, however, are statements of expert opinion based on observed test performance. They allow both engineering expertise and the experience accumulated from other tests to be added to the facts of a particular test.

There are two basic types of assessment: Global and Job Specific.
Proving the Performance of Fire Doors

Manufacturers choose to have global assessments produced because:

- they provide a definite range of cover for the doorset

- they avoid the need to re-test for minor changes

- they provide confidence that the manufacturer is maximising their test data
Proving the Performance of Fire Doors

Job specific assessments needed when:

– a project specific document is required by the client or local authority

– the requirements of the proposed construction fall outside the boundaries of a global assessment

– the fire authorities may want specific confirmation of fire resistance

– a site survey is needed to assess existing doors
Emirates Stadium
St Pancras Station
Common Problems

• Understand what is being asked for (unusual design? Specific hardware or additional performance requirement?)

• Ensure it is supported by test evidence or assessment of performance

• Correct construction of fire doors

• Correct installation of fire doors

• Correct maintenance of fire doors

• Fire risk assessments

• The relevance of 3rd Party Certification
Common Problems
Common Problems

Incorrect Installation
Common Problems

Typical FD30 and FD60 proprietary glazing systems

- Steel pins or screws at 35-40° to the glass
- No aperture liner
- Proprietary intumescent detail

Basic FD30 detail

Basic FD60 detail

Steel pins or screws at 35-40° to the glass
Aperture liner
Common Problems

Damage to glazing and incorrect glazing specification
Common Problems

Glazing System Failure
Common Problems

Hardware changed and voids not made good
Common Problems
Common Problems
Common Problems

The Reality of Incorrect Specification and Installation

A BM TRADA Group Company
Ensuring Correct Solutions

- 3rd Party Certification of Products
- 3rd Party Certification of Personnel
- Training of Personnel responsible for maintenance
- Consultation during the early stages of planning
Summary

• Fire doors play a key role in fire protection

• Fire doors are performance products

• Fire doors must be correctly built in accordance with test evidence or assessment documentation

• Common problems on site can be prevented

• 3rd Party Certification of products and personnel provides confidence in the performance of the product and competence of personnel
Further guidance