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Construction Quality & Product/System Specification

David O'Reilly TIFireE

Operations Officer
Association for Specialist Fire Protection in Ireland

European Association for Passive Fire Protection

Institution of Fire Engineers
Republic of Ireland Branch Council Member
International General Assembly

NSAI Fire Safety Standards Committee AG1

Pioneering fire protection through innovation and professionalism

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Founded ASFP Ireland 2011

To specifically support those responsible for legislation, specification, inspection and installation of passive fire protection throughout Ireland

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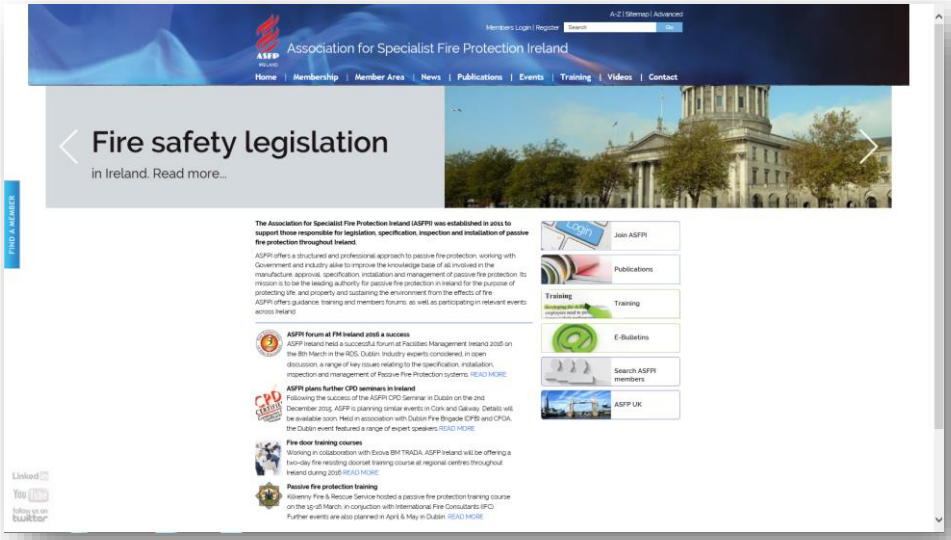
Building on 35 Years Experience

Representing Passive Fire Protection

1975 - 2010

Producing or contributing to Passive Fire Protection Standards & Guidance.



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ASFP Contribution in Ireland

- Building Regulations: ASFP Best Practice Guidance in TGD B
- Building Control (Amendment) Regulations 2014: Code of Practice draws on ASFP Best Practice Guidance
- Access to PFP Guidance through ASFP Ireland web page

So what is Passive Fire Protection ?

"Built-in measures that protect the structure of the building and subdivide it into areas to limit the spread of fire and smoke."

1. **Structural fire protection**
   – to stop it falling down to give time for people to escape and for the fire service to fight the fire
2. **Compartmentation**
   – Separating function to prevent the fire from spreading, give people time to escape and for the fire service to fight the fire

Presentation brief - Discuss the importance of:

- Careful & precise product/system specification
- Prevention of unapproved product/system substitution **before** installation
- Importance of competent independent technical control on site
- Regular product/system maintenance & servicing

Sustainability Definition provided

- Fire Safety related products & systems must perform, as originally intended, over the full life cycle of a building
- The minimum life cycle for a Sustainable Building being 100 years
- UN Secretary General Ban Ki-moon: recent G20 Statement

"We are now talking about the overall sustainable development where nobody, nobody among seven billion people, will be left behind, regardless of their socio-economic status, regardless of their ethnicity, and whatever their differences may be,"

Sustainable Fire Engineering with reference to -

- Reliance
- Reality
- Redundancy
- Resilience

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2012: Irish Government Recognition - ‘In the light of a number of recent high profile failures on the parts of developers/builders and their agents to meet their statutory responsibilities it is considered that sticking with the existing arrangements is no longer tenable’.

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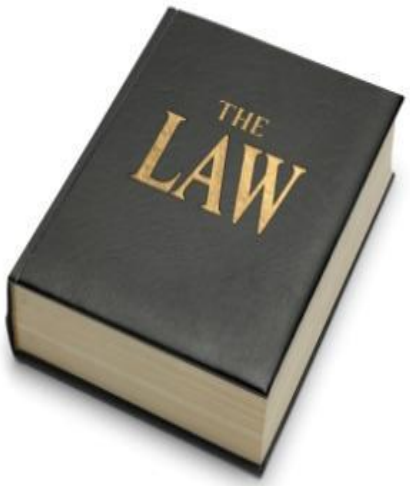
The Government Perspective

- Building Regulations are in place setting minimum standards focusing on life safety

- Introduction of new Building Control Arrangements to ensure compliance with Building Regulations



- **Property protection is a matter for Insurance companies**

- **No reference to sustainability or resilience**

- **No recognition for those whose lives have been damaged**

- **Focus of this presentation is compliance with building regulations recognising that this is only a first step but one we have to make**

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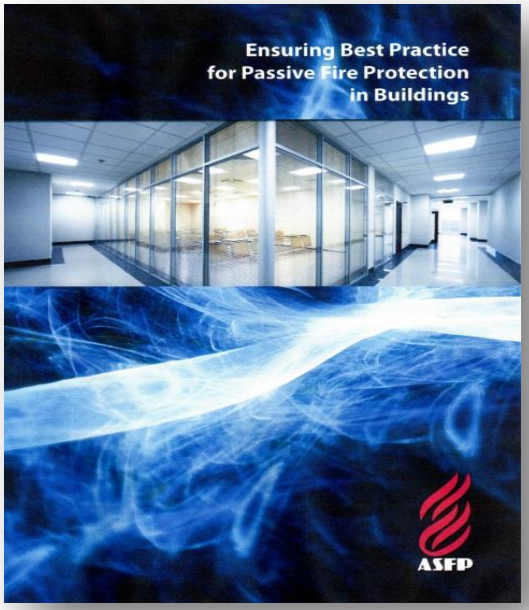
- Building Regulations include Technical Guidance Documents – TGD B



- B1 Means of escape in case of fire
- B2 Internal fire spread (linings)
- B3 Internal fire spread (structure)
- B4 External fire spread
- B5 Access and facilities for the fire service

Compliance with TGD B is considered 'Prima Facie' Compliance with Building Regulations

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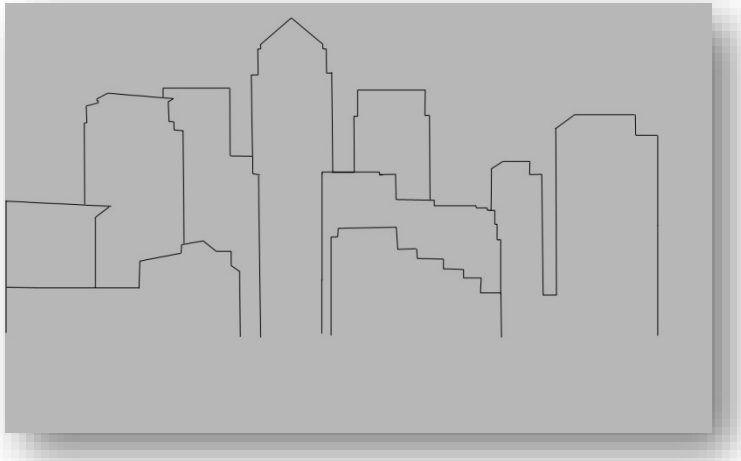

In 1998, ASFP took part in a UK government instigated three-year "Rethinking Construction" initiative based on three simple principles, client leadership, integrated teams throughout delivery & respect for people.

The initiative aimed to achieve radical improvements in the design, quality, **sustainability** & customer satisfaction.

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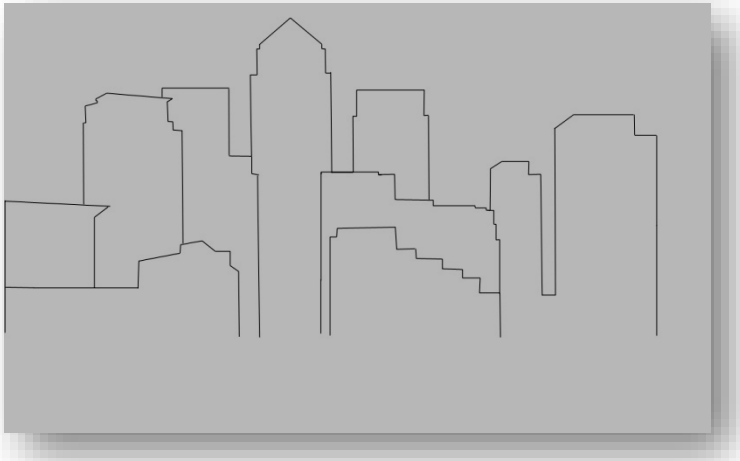

- Many buildings are constructed and operated with Passive Fire Protection either badly installed or missing altogether.

- This situation is compounded by subsequent alterations to the building as changes in occupancy and systems take place.

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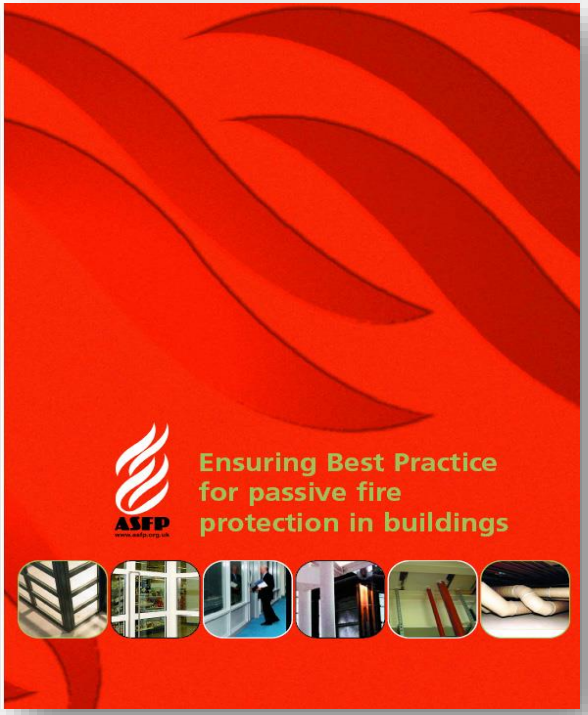
- Traditional selection processes should be radically changed because they don't give best value

- An integrated team which includes the client should be formed before design and maintained throughout delivery

- Change of culture between stakeholders from confrontation to collaboration

- 3rd Party Certified Systems installed by 3rd Party Certified Installers



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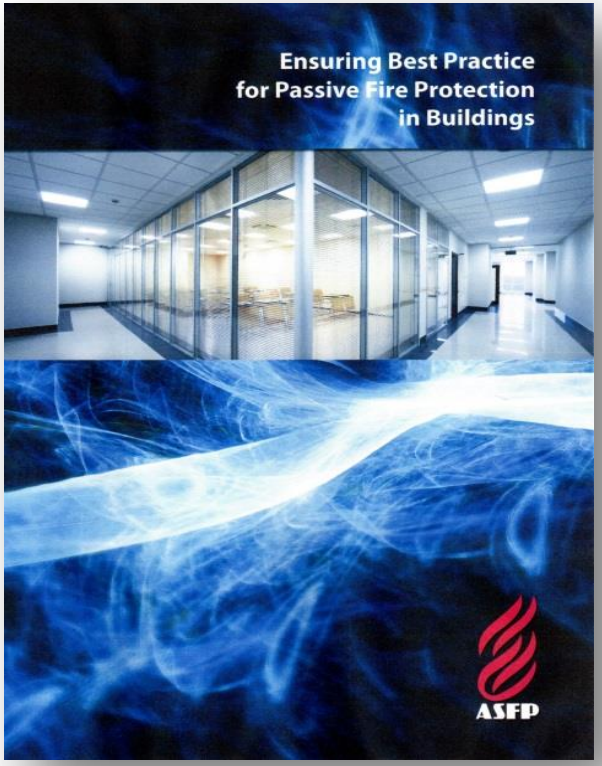
Ensuring Best Practice for Passive Fire Protection in Buildings provides

- Guidance based on Research
- Input from Leading Industry Authorities
- Feasible guidance for the design, installation & management of PFP
- TGD B Revision 2006 (Reference)



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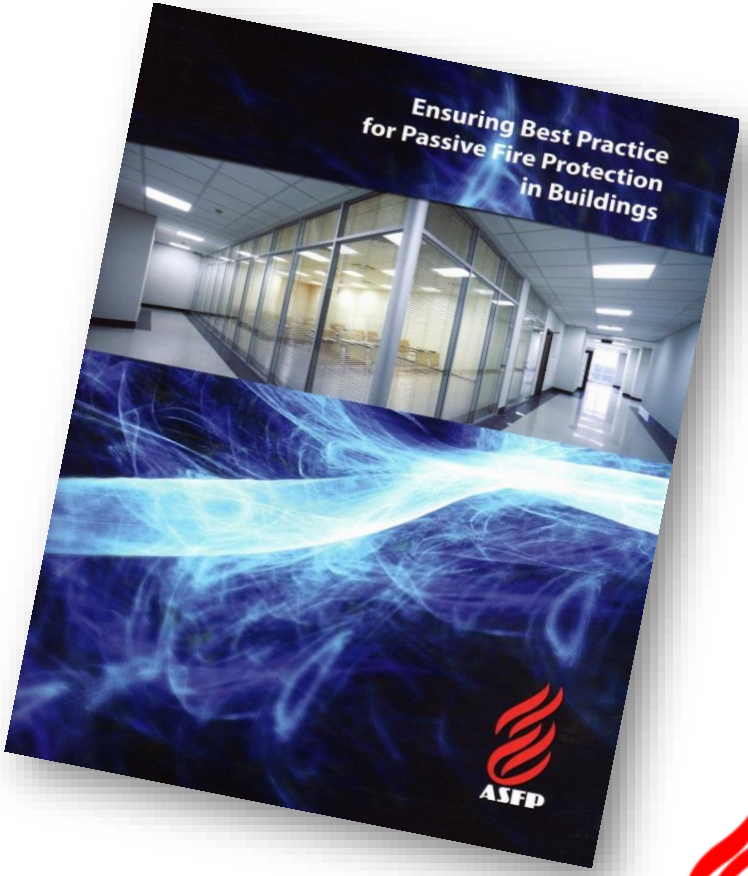
- Only PFP products which can be shown to have a fire performance that satisfies the relevant test standard(s) should be put in the market place.

- Relevant documents to verify this must be made available to the user and enforcement authorities



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Discuss the importance of,

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- Importance of competent independent technical control on site
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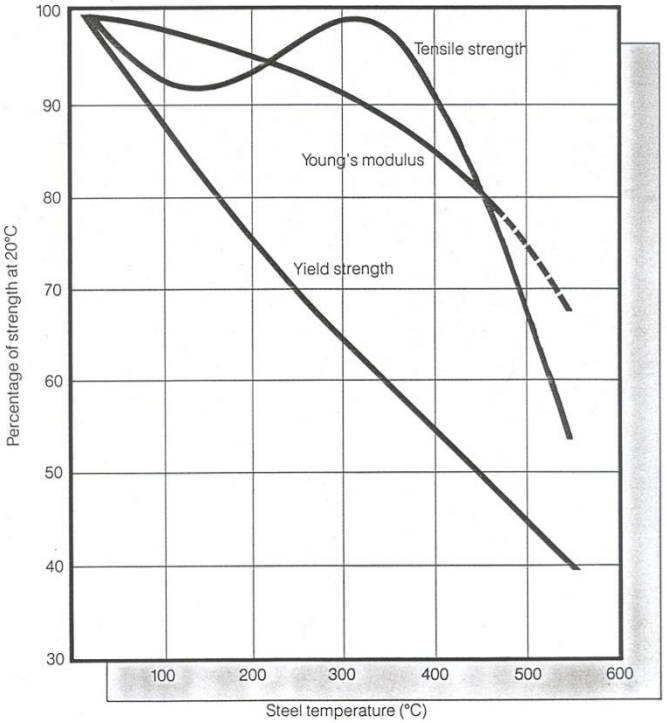
Structure Intact & Fire Contained within Compartment

This is the result!

Structural Protection: "To maintain the stability of the structure during the period of the fire and ensure that it does not collapse"

Structural steel loses about half its strength at about 500°C.



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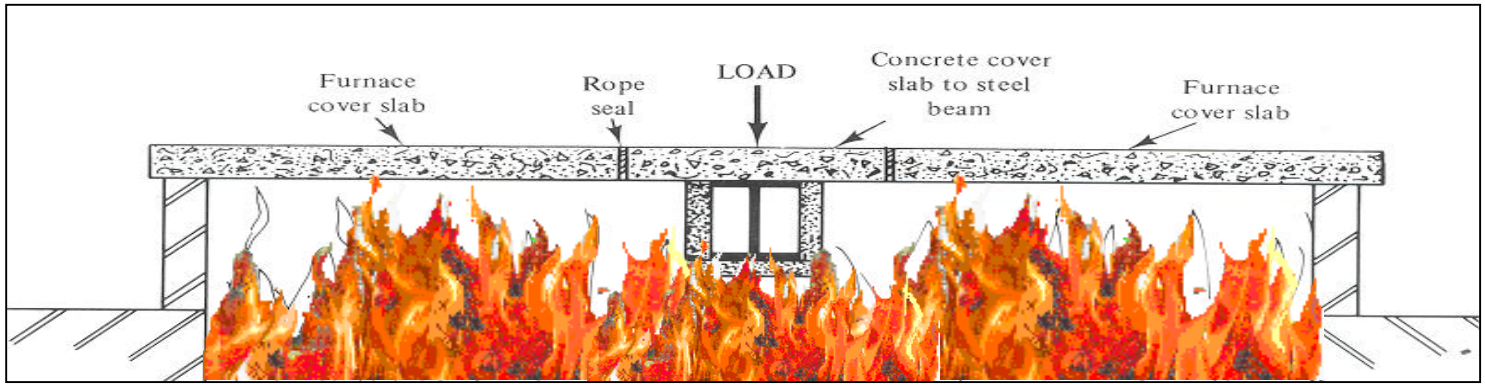
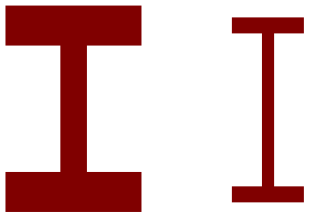


- Beam is tested under load with the fire protection applied.
- Fire resistance test criteria Loadbearing capacity
- Calculation methods predict the thicknesses required for
  - Section factor of beam to be protected (surface area to volume ratio)
  - Fire resistance period (30, 60, 120 minutes)



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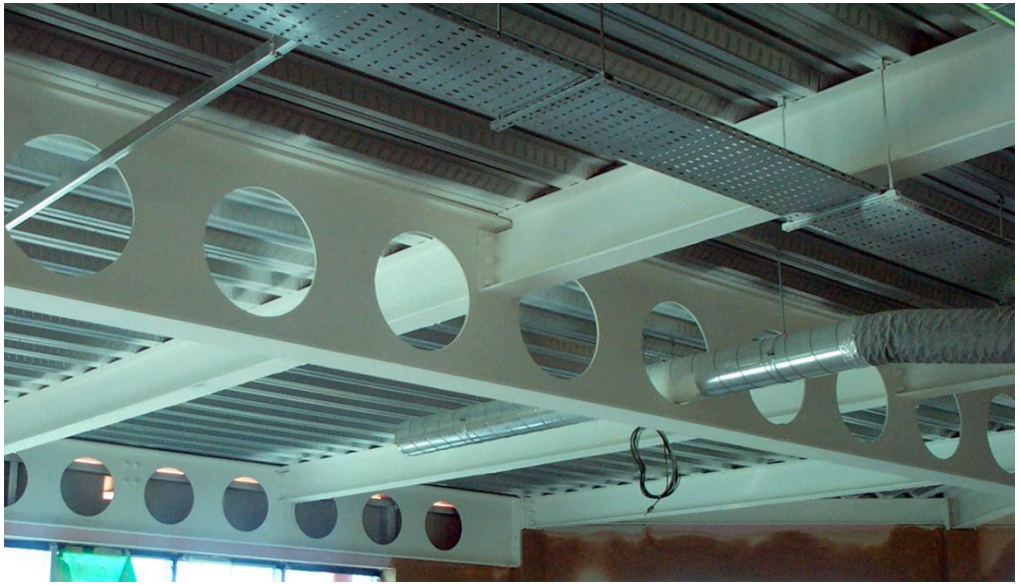
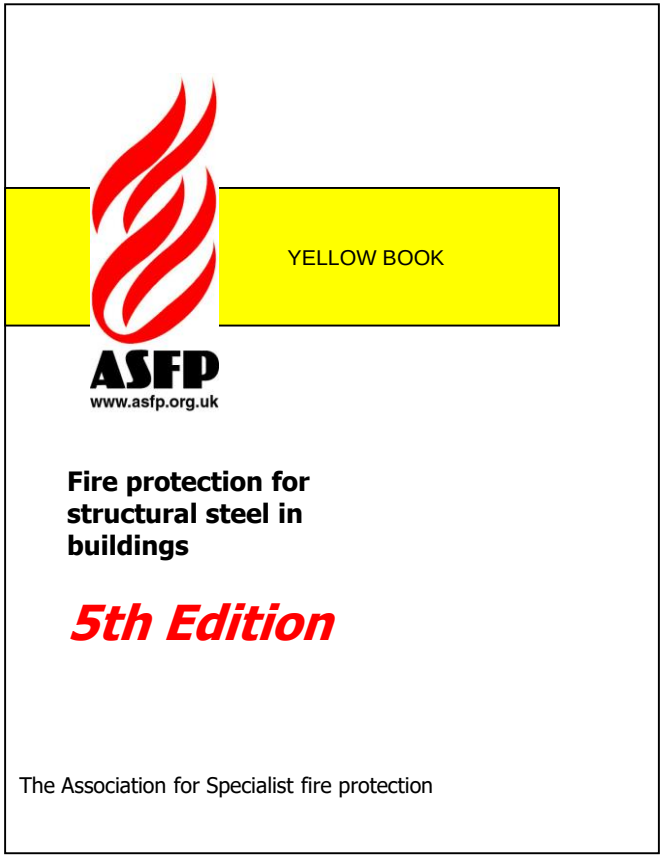
Example: Reactive coatings

- Spray or brushed
- Thin Film (1-4mm)



Where can I find more information?

- ASFP website www.asfp.org.uk
- ASFP Yellow book
- Guidance on:
  - Structural fire engineering
  - How fire protection works
  - Testing & assessment
  - Product listings with thickness tables
  - 3rd party product certification.



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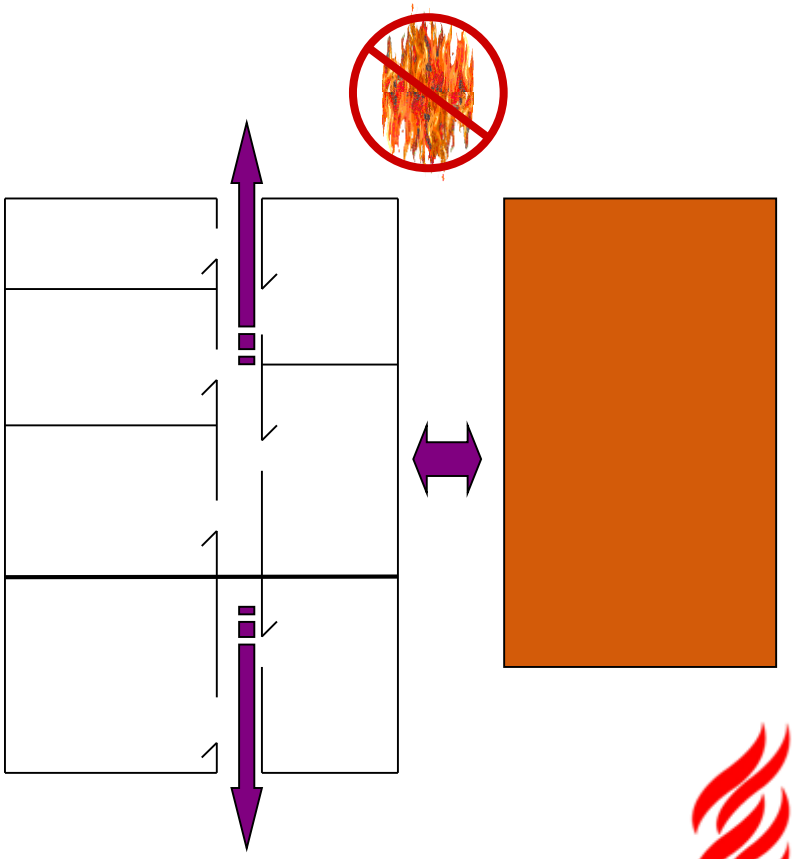
Fire Compartmentation is designed to:

- Subdivide buildings into areas of manageable risk
- Provide adequate means of escape
- Provide fire separation between adjacent/adjoining buildings
- Control the properties of materials/surfaces of buildings



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INTEGRITY

The time for which a specimen can maintain separation without:

- Causing ignition of a cotton pad
- Resulting in sustained flaming
- Penetration by:
  - 25mm diameter gap gauge
  - 6mm diameter gap gauge traversed 150mm
- Other/extra criteria for ducts and dampers

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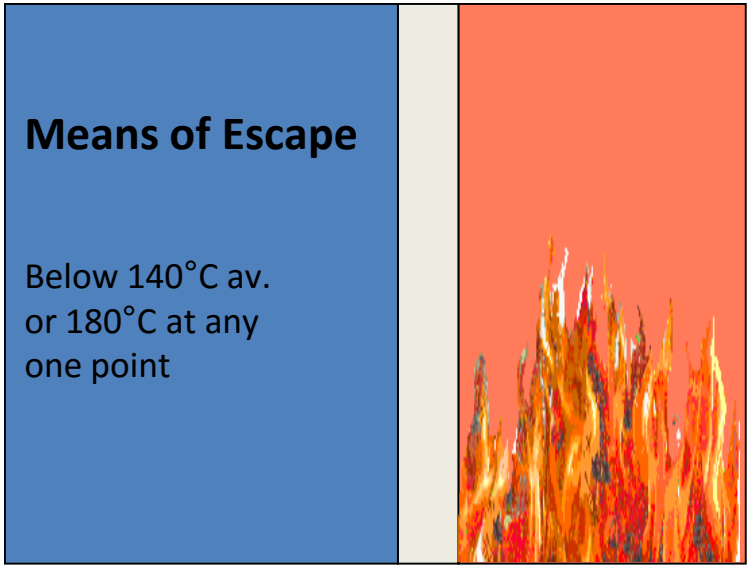
INSULATION

The time for which a specimen can maintain its separating function without the temperature on its unexposed face:

- Rising on average in excess of 140° C above the initial average
- Rising at any one location in excess of 180° C above the initial average



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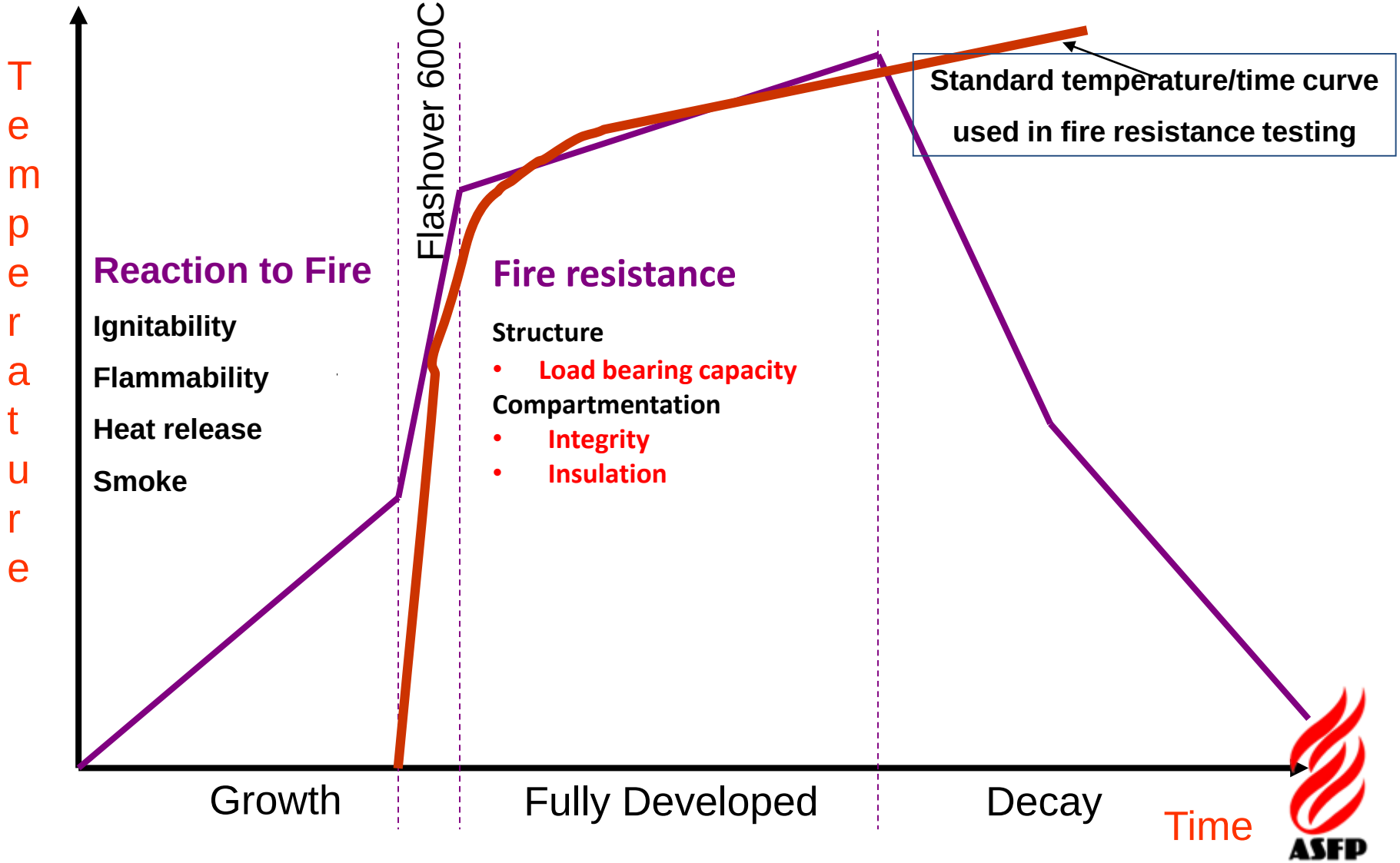

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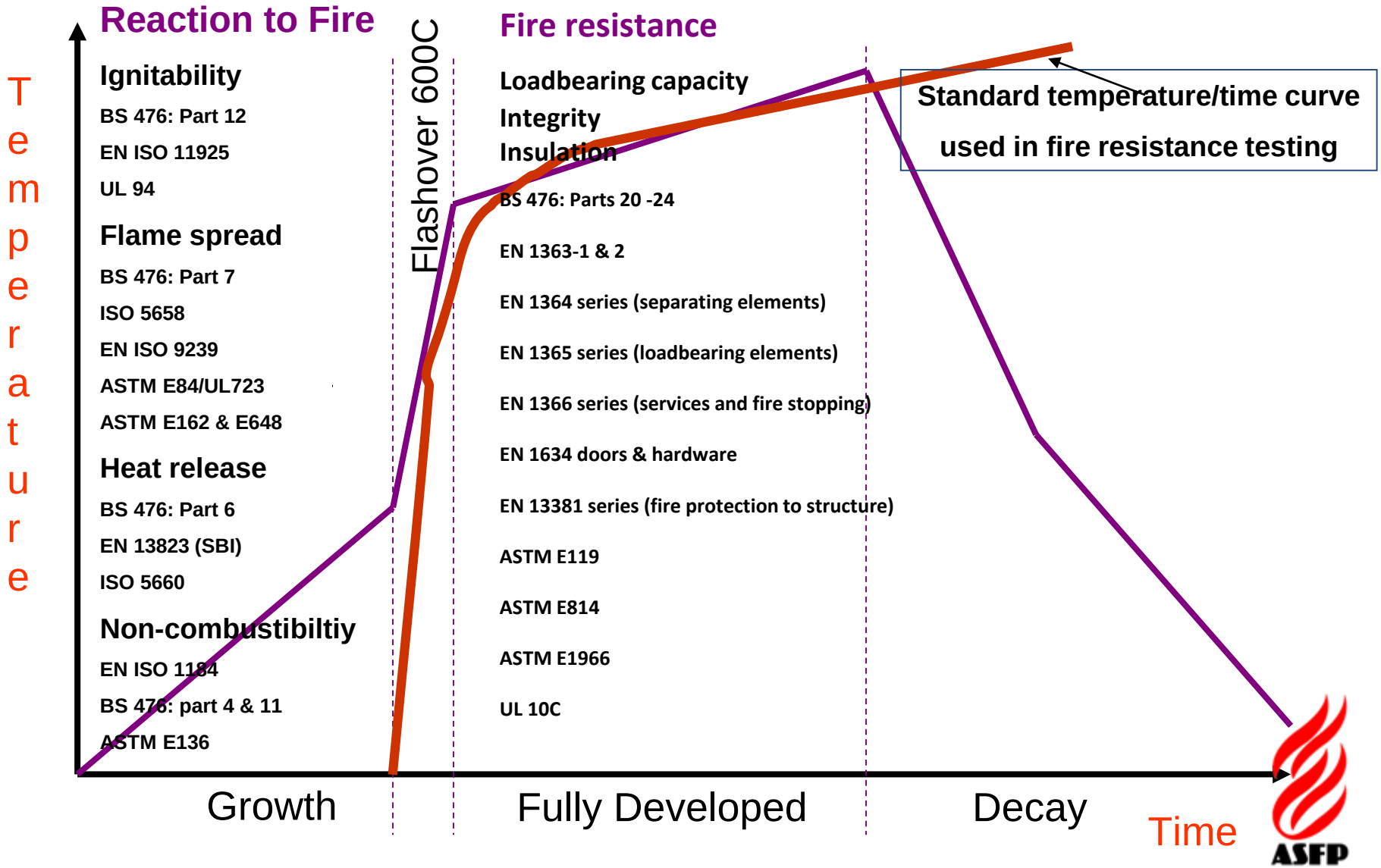

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BS 476:20 1987

BS 476:21 1987	BS 476:22 1987	BS 476:21 1987	BS 476:24 1987
Loadbearing elements	Separating elements	Contribution to fire resistance	Fire resisting ducts

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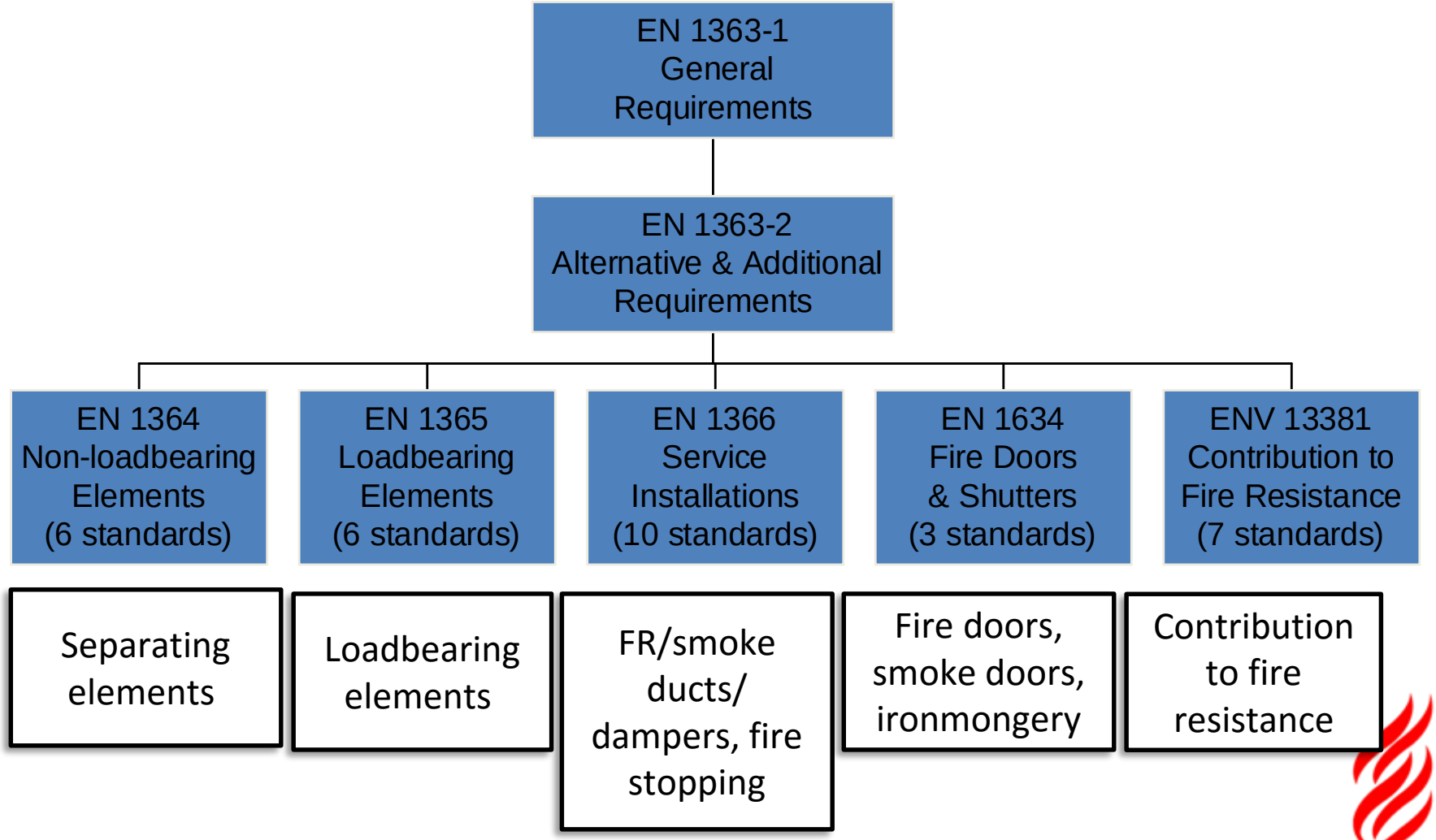

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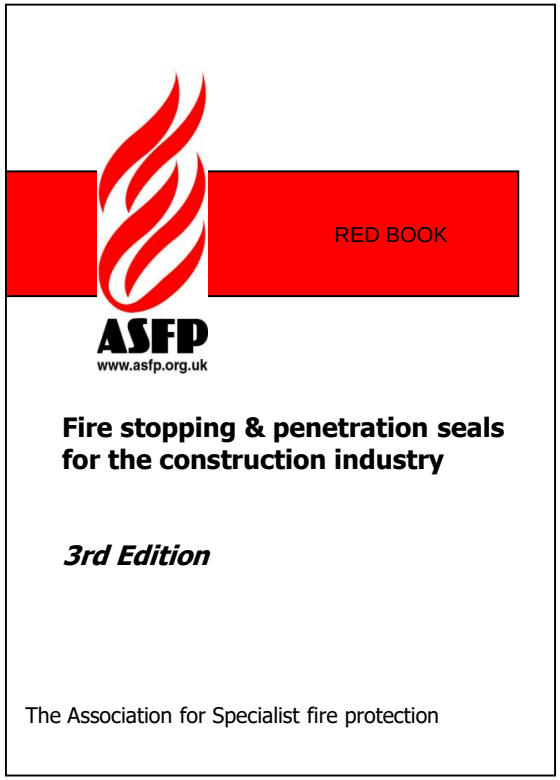

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- Designers rely on performance specification
- Real design/specification is largely by specialists
- Little knowledge or reference to other elements
- Lack of focus on compatibility Design
- Appropriate Competence – Understanding terminology and what is required

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Isn't product test evidence good enough?

'Pecking Order'

1. **Certificate from a Third Party Certification Body**
2. **Assessment / Expert Judgment from an accredited fire test laboratory or qualified fire consultant**
3. **Fire test report**
   - I. Standard test
   - II. Indicative test
   - III. Ad-Hoc test

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BRANZ
1222 Moonshine Road
Judgeford RD1
Porirua 5381
New Zealand
T +64 4 237 1170
F +64 4 237 1171
branz@branz.co.nz
www.branz.co.nz

FIRE ASSESSMENT REPORT

FAR 4137

ASSESSMENT REPORT ON FIRE PERFORMANCE OF VARIOUS BORAL PLASTERBOARD WALL AND CEILING PRODUCTS

CLIENT
Boral Australian Gypsum Ltd
3 Thackery Street
Port Melbourne
VIC 3207
Australia

PROJECT NUMBER:	ISSUE DATE:	PAGE:
FC4137	10 September 2013	1 of 7

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FIRE TEST REPORT

FH 4887

CONE CALORIMETER TEST AND NCC BCA SPECIFICATION C1.10 PERFORMANCE OF BORAL IMPACTSTOP

CLIENT
Boral Australian Gypsum Ltd
676 Lorimer Street
Port Melbourne
VIC 3207
Australia

International Accreditation New Zealand (IANZ) has a Mutual Recognition Agreement (MRA) with the National Association of Testing Authorities, Australia (NATA). Users of test reports are recommended to accept test reports in the name of either accrediting body.

PROJECT NUMBER:	ISSUE DATE:	PAGE:
FT4887	18 May 2012	1 of 10

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What can be expected from 3rd Party Product Certification?

- Performance of products from a range to be tested (not single tests)
- Evidence from tests used in assessments to create a scope of certification to cover performance of product range
- Factory Production Control audits / inspections of production of the products, typically these will be conducted annually.
- Requirements for manufacturers to declare changes to products
- Ongoing product verification (audit tests / inspections) at predetermined frequencies.

Presentation brief; Discuss the importance of:

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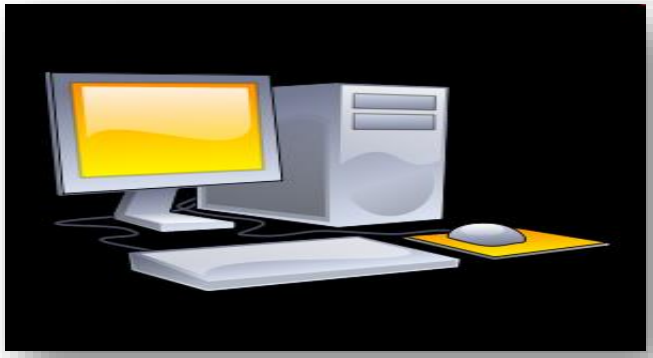

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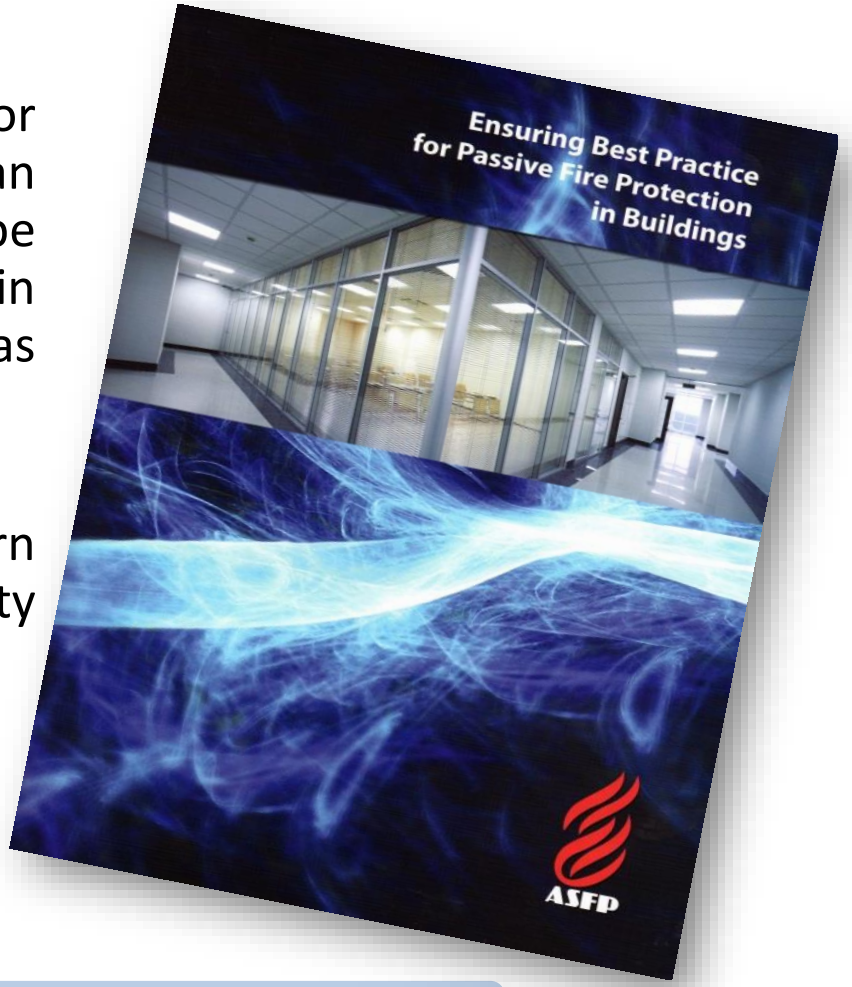
- Schemes are available for certification of installers and an appropriate scheme should be selected by the main contractor unless the client has already specified a scheme.

- Chosen schemes should in turn be accredited by a third party (UKAS)



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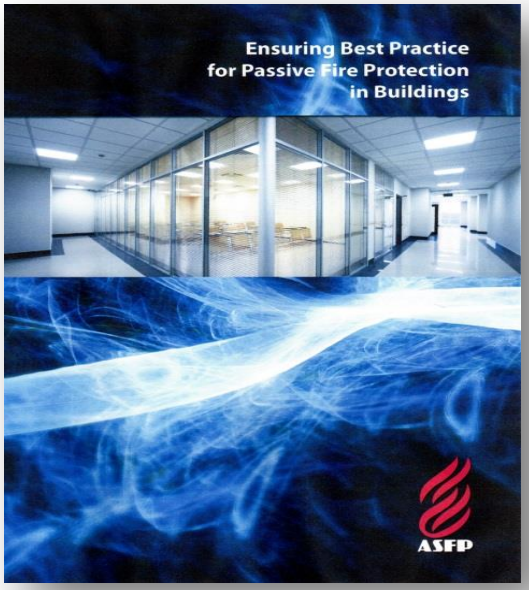
- Verification of the skills & training of management, designers and estimators
- Suitable materials used in accordance with approved details
- Random inspection of sites to monitor quality
- Certificate of Conformity - Provision of an audit trail
- Verification of limitations of certification to product areas covered



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For the last 20 years, 3rd Party Certification from a UKAS accredited Certification Body has been a requirement for ASFP contractor membership

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Certified Contractors are required to follow procedures

- ASFP website www.asfpireland.ie
- ASFP Red book
- Guidance on:
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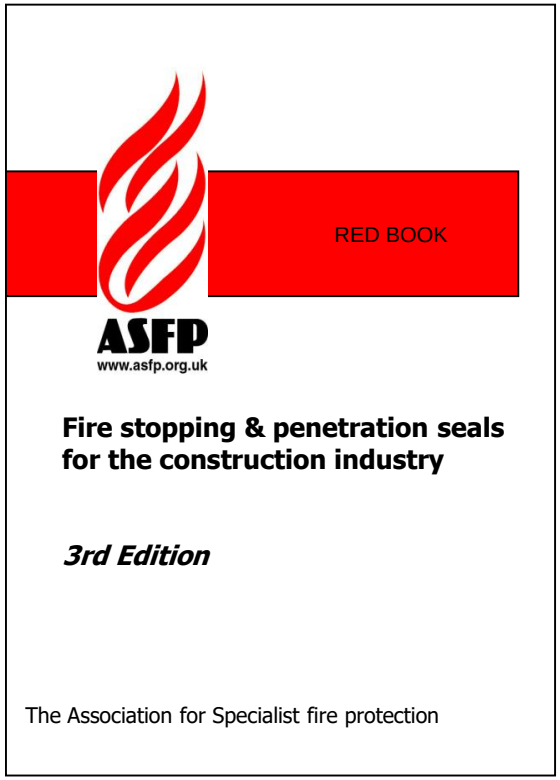
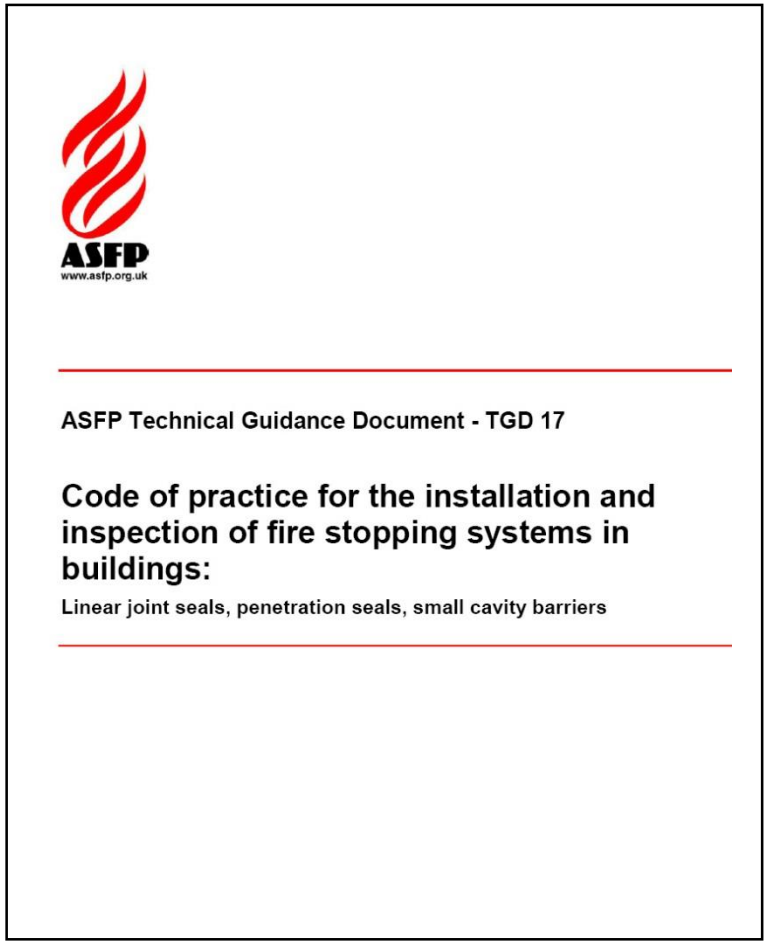


TGD 17

Technical Guidance Document 17: Code of practice for the installation and inspection of fire stopping systems in buildings


ASFP
www.asfp.org.uk

ASFP Technical Guidance Document - TGD 17

Code of practice for the installation and inspection of fire stopping systems in buildings:

Linear joint seals, penetration seals, small cavity barriers

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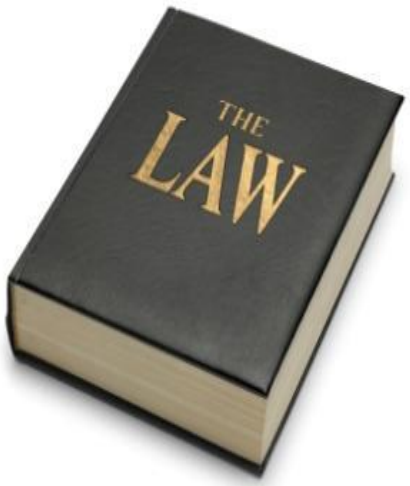
TGD B assumes an adequate level of fire safety management in occupied buildings

- Describes the importance of managing Active & Passive Fire Protection Systems to ensure that levels of Fire Safety won't deteriorate over the life of the building.

- Draws attention to duties under the Fire Services Acts and the Safety, Health & Welfare at Work Act 2005

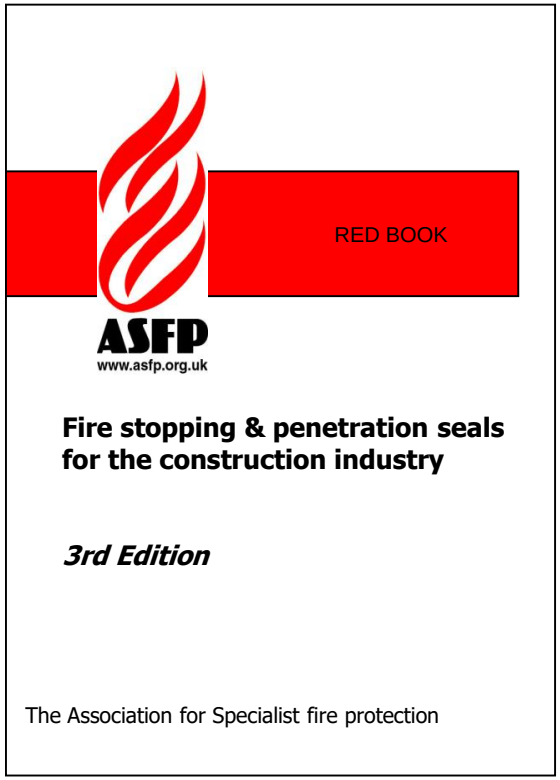
•EC Framework Directive (89/391/EC) & EC Workplace Directive (89/654/EC) – Irish Law in the HSA General Applications 2007



Where can I find more information?

www.asfpireland.ie

- ASFP Red book
- Guidance on:
  - Inspection, Maintenance & Repair
  - Manufacturer's Specifications
  - Inappropriate unauthorised modifications
  - Repairs using more of the same material
  - Competence – 3rd Party Installers



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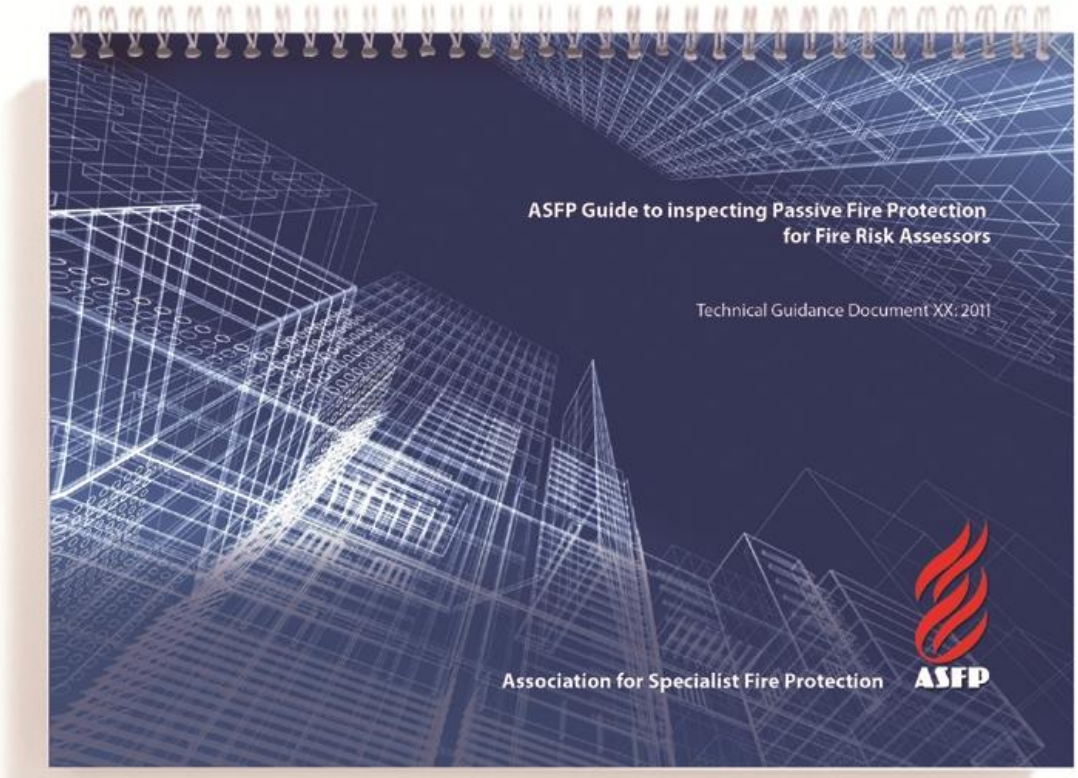
ASFP Guide to Passive Fire Protection for Fire Risk Assessors



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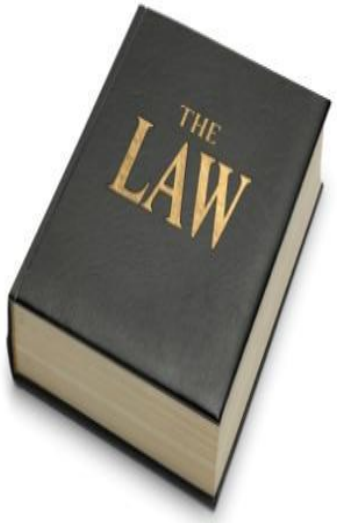
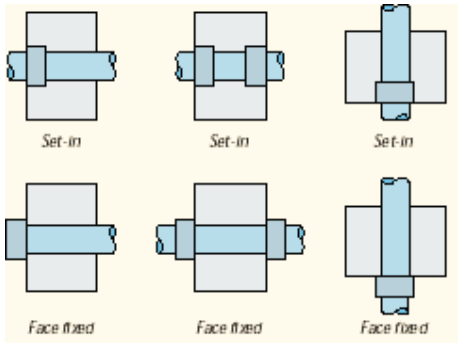
"Strengthening the Building Control System" pointed out that a clear framework exists for construction activity, underpinned by the Building Control Act 1990 and based on

- Clear Legal Standards set out in the Building Regulations
- Detailed Technical Guidance Documents to outline how these standards can be achieved in practice
- The burden of responsibility for compliance resting first and foremost with developers/builders, designers and building owners
- A statutory responsibility for professionals to design in accordance with the building regulations
- Technical Guidance Document B 2006 – Fire Safety



- So nothing to worry about?

Intumescent Fire Collars



Example: For surface mounting instructions state – Secure pipe collar to the structure with 50mm x 8mm masonry screws or minimum 50mm expanding metallic bolts

Remember the purpose is to protect the hole in the structure after the pvc pipe has melted and fallen away

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Intumescent pipe wrap installed around a plastic pipe in a basement car park in East London

The instructions…

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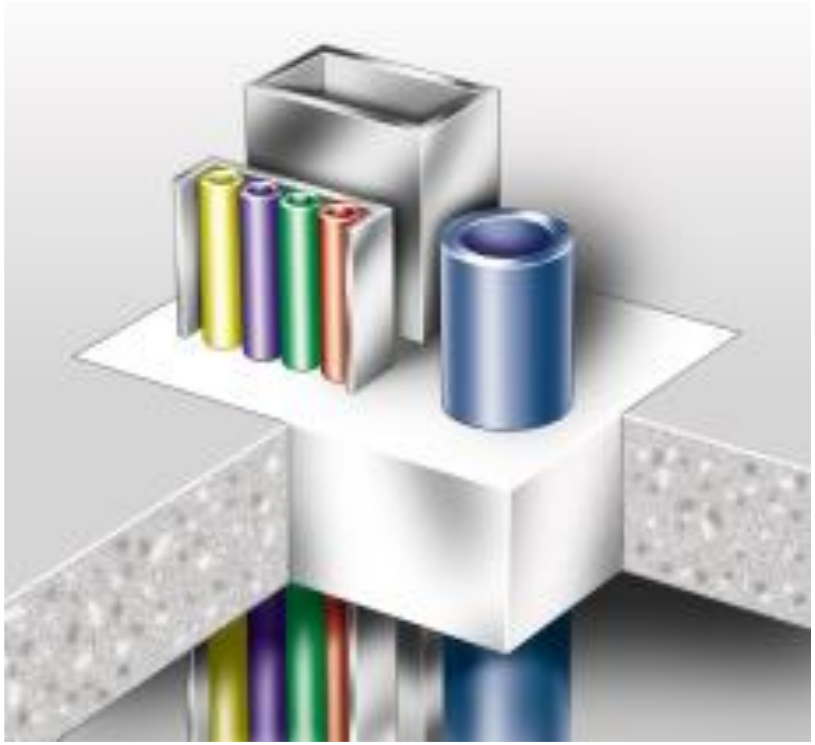

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Even when it looks right, can you be sure ?

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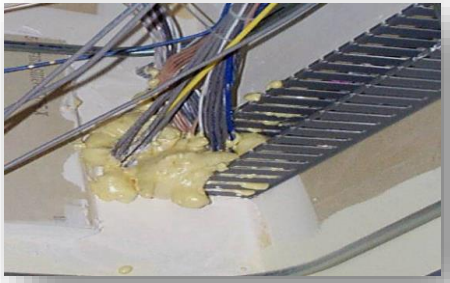
Product designed for Linear Gap Sealing



Depth mm	Width mm				
	10	**20**	**30**	**40**	**50**
10	280	140	93	70	56
20	140	70	46	35	28
30	93	46	31	23	18
40	70	35	23	17	14
50	56	28	18	14	11

Up to 4hrs fire rating

But only in the right context

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Understanding where and how a fire stopping measure can be used is absolutely essential to its performance

Time to failure?
9 minutes!

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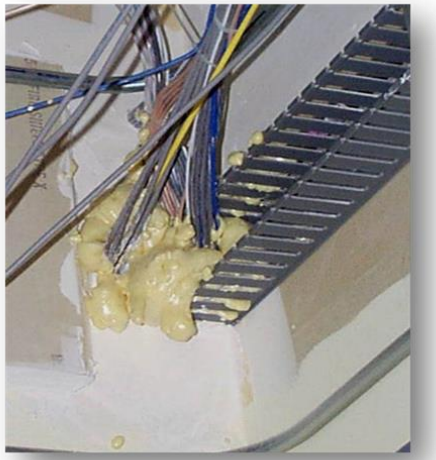
Understanding where and how a fire stopping measure can be used is absolutely essential to its performance

Remember this?



Time to failure?
4 minutes!

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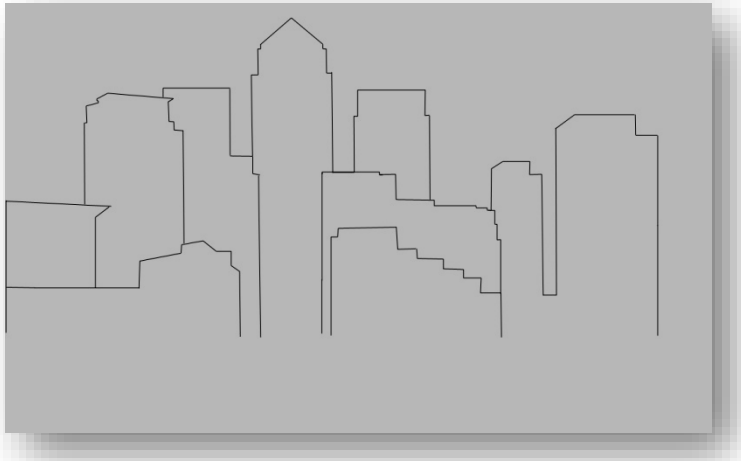

- The reality is that many buildings are constructed and operated with Passive Fire Protection either badly installed or missing altogether.

- This situation is compounded by subsequent alterations to the building as changes in occupancy and systems take place.

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- Building Control (Amendment) Regulations (BCAR) Code of Practice for Inspecting & Certifying Buildings and Works was enacted in March 2014

- BCAR is effectively **'Private Sector Building Control'** managed by Registered Professional Certifiers who must be **Competent** to carryout their design and co-ordinate the design & construction activities of others.

- Competent Person Definition: A person is deemed to be competent where, having regard to the task he or she is required to perform and taking into account the size and/or complexity of the building or works, the person possesses **sufficient training, experience and knowledge appropriate** to the nature of the work to be undertaken.

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- Light Touch Regulation in Banking
- Matthew Elderfield (newly appointed Financial Regulator in 2009) declared:

"For Self Certification to work we need Invasive Scrutiny & Effective Sanctions"

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Appropriate Competence – How do you define it ?

Gynaecological Surgeon

Plastic Surgeon

Heart Surgeon

Veterinary Surgeon

All Competent but who do you want to carry out your triple heart bypass?

Institution of Fire Engineers (IFE)

- The IFE is a registered charity working for societal benefit.
- Founded in 1918, the IFE assesses knowledge of fire and professional experience, awarding internationally recognised membership grades & fire-related qualifications
- The Institution is a truly global organisation connecting fire professionals and sharing expertise since 1918.

IFE Membership Grades

Achieved By:

- IFE Qualification – Examinations
- Relevant Academic Qualifications
- Necessary Experience – Professional Review Report
- Continuous Professional Development (CPD)
- Mature Candidate Route

Republic of Ireland Branch (IFE) - Education

- IFE Level 3 Certificate in Fire Science, Operations, Fire Safety & Management
- 22 Week Preparatory Course - September
- Examination Centre in Dublin in March
- Qualification – TIFireE Academic Requirement
- Professional Review Report – Mentoring Process

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- **Traditional processes of selection should be radically changed because they do not lead to best value**
- **An integrated team which includes the client should be formed before design and maintained throughout delivery**
- Contracts should lead to mutual benefit for all parties and be based on a target and whole life cost approach
- Suppliers should be selected by Best Value and not by lowest price
- Performance measurement should be used to underpin continuous improvement within the working process
- **Culture and processes should be changed so that collaborative rather than confrontational working is achieved**

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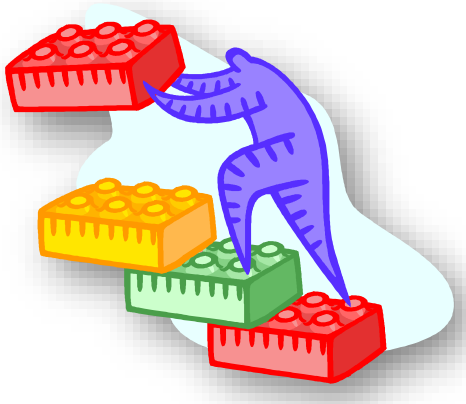
Remember - A Building is for Life, all Parties must be in accord

Building Design



Construction

Building Maintenance

Training, Experience & Appropriate Knowledge = Competence

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Fire Compartmentation Works

The Burnt out Compartment of Origin

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Internally - Minor smoke damage on non-fire side of fire resisting doorset

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Externally - Fire Contained

Limited to smoke damage to the Floor above

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David O'Reilly TIFireE

Operations Officer
Association for Specialist Fire Protection in Ireland

Thank You for Your Time

Questions ?

E-mail: david.oreilly@asfpireland.ie Website: www.asfpireland.ie

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