

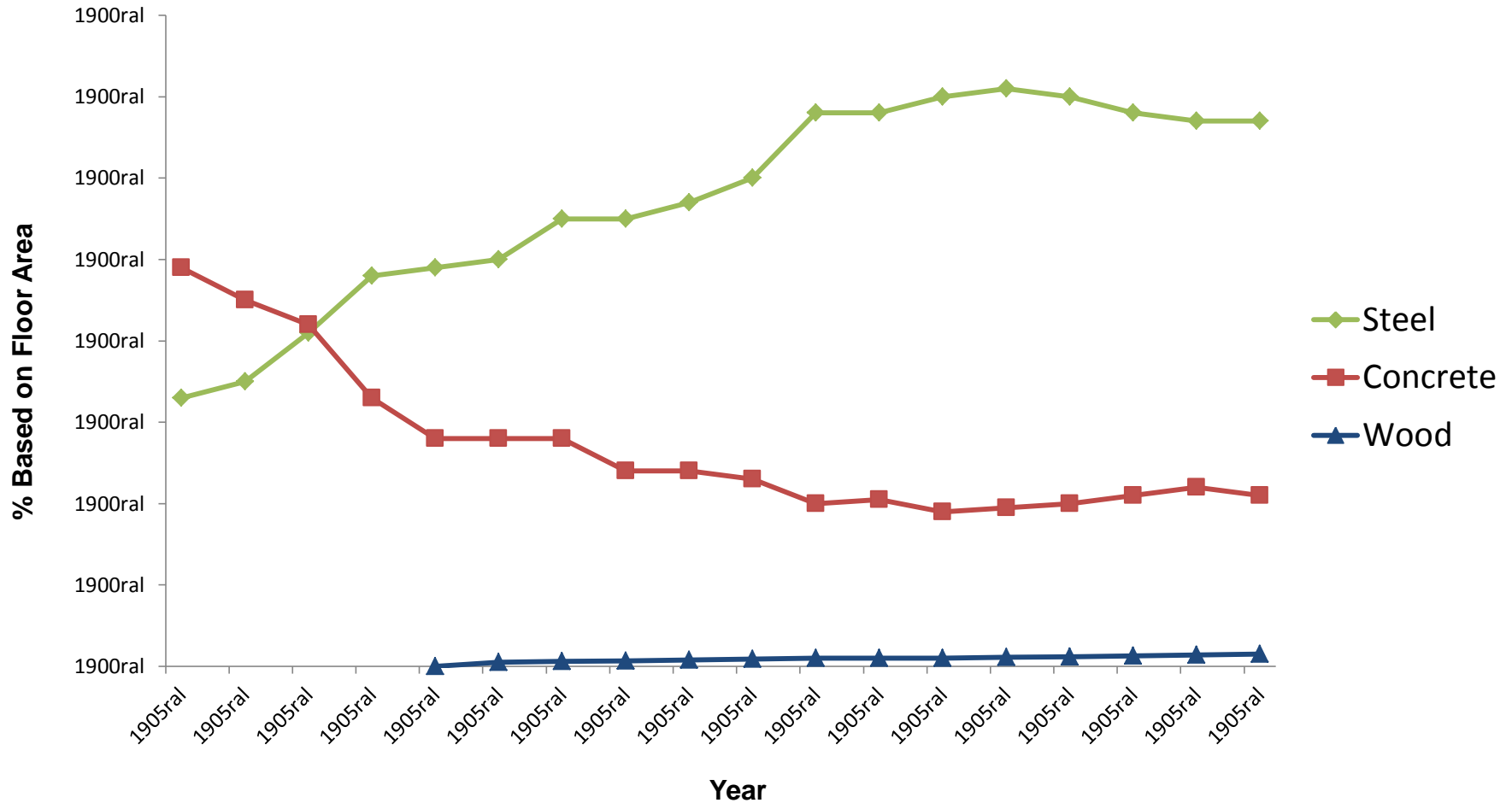
# INNOVATIONS IN INTUMESCENT COATINGS LEAD TO SAFER STRUCTURES

Roger J. Williams  
Global Market Director  
Sherwin-Williams

# Contents:

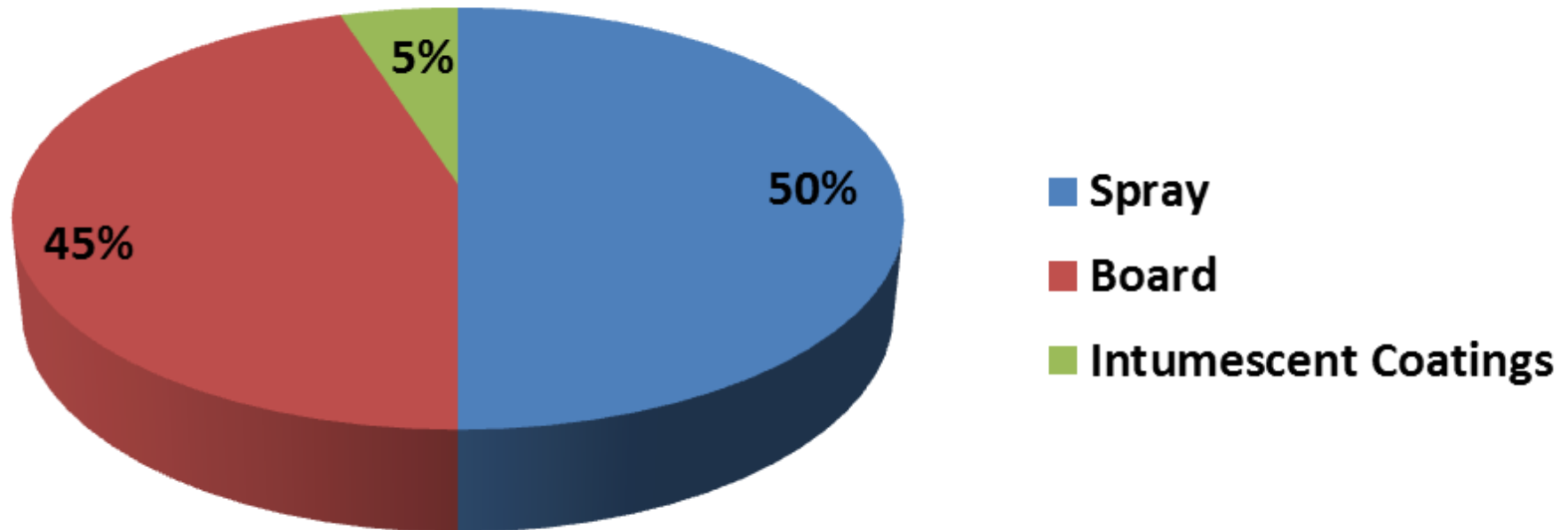
- Dynamics of UK Construction Market
- Impact on methods of PFP application & fabrication
- Cost benefit analysis of PFP application systems
- Current innovations in building design & engineering
- Thought leadership in industry best practise for high rise iconic steel structures

# UK Construction Market – Multi Storey Buildings



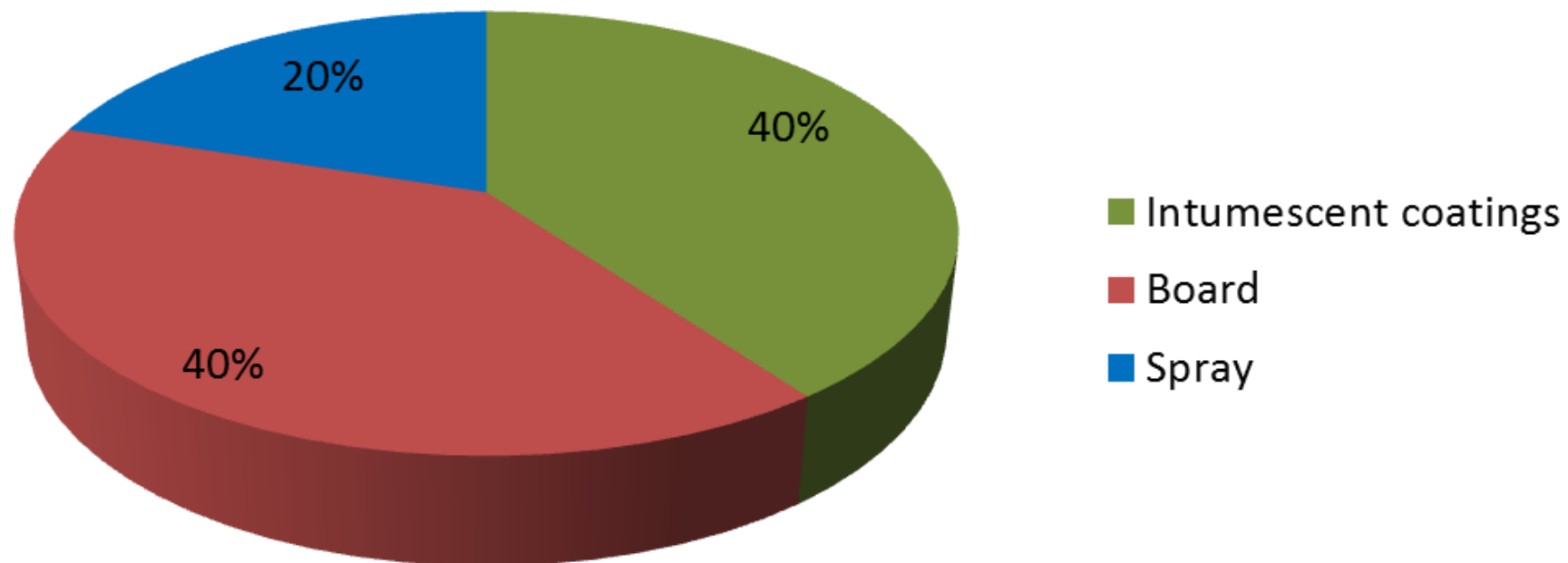
Source: BCSA

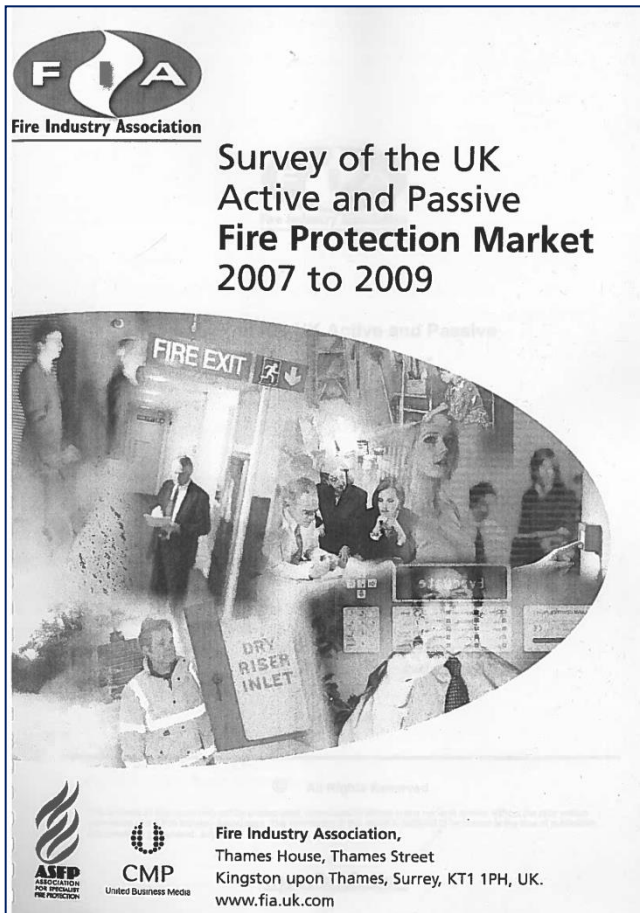
What has also happened....



PFP Steel estimate circa 1980's

## PFP of steel 2006 from FIA report





## Fire Industry Association market report:

**“60% growth in the use of  
intumescent coatings  
in the last 5 years”**

## STRUCTURAL FIRE DESIGN:

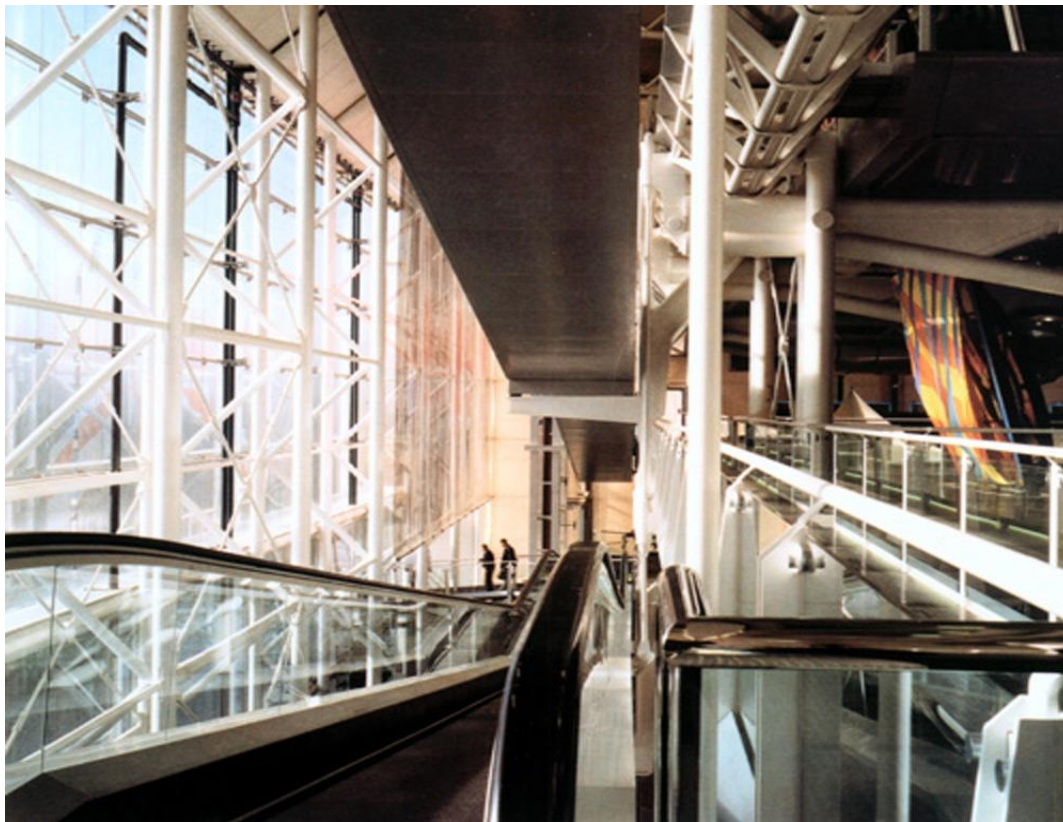
“Guide to Off-site Applied Intumescent Coatings”

Sponsored by:

SCI, ASFP, BCSA, British Steel



## SCI report prompted by 1992 Seville expo pavillion



This was fabricated and coated in the UK because of complex Design:-

1994 “Cost Benefit Analysis” by SCI



# SCI Cost Benefit Report Table 4:

Off-site Fire Protection Application for Commercial Buildings



**Table 4** *Fabrication and fire protection costs for composite universal beam and deck option - Short span beams (excludes services and cladding)*

Activity	CASE					
	Masonry			Curtain Walling		
	Spray	On-site	Off-site	Spray	On-site	Off-site
	SCI1	SCI2	SCI3	SCI4	SCI5	SCI6
Sub-Structure (£ 000's)	328	328	328	328	328	328
Steel Frame Construction (£ 000's) <sup>1</sup>	525	525	508	525	525	508
Decking (£ 000's)	331	331	331	331	331	331
On-site spray for beams (£ 000's)	82	-	-	82	-	-
On-site intumescent coating for beams (£ 000's) <sup>2</sup>	-	130	-	-	130	-
Off-site intumescent coating for beams (£ 000's) <sup>2</sup>	-	-	169	-	-	169
On-site board treatment for columns (£ 000's)	53	53	53	53	53	53
Saving in Construction Time (weeks)	-	1	3	-	1	3
Savings in Preliminaries (£ 000's) <sup>4</sup>	-	(17)	(51)	-	(17)	(51)
Saving due to early rental (£ 000's) <sup>3,4,6</sup>	-	(75)	(224)	-	(75)	(224)
Saving in finance costs at 10 % p.a. (£ 000's) <sup>4</sup>	-	(22)	(66)	-	(22)	(66)
Total cost for activities (£ 000's)	£ 1,319	£ 1,328	£ 1,272	£ 1,319	£ 1,328	£ 1,272
Total cost for activities per gfa (m <sup>2</sup> ) <sup>5</sup>	£ 73.28	£ 73.78	£ 70.67	£ 73.28	£ 73.78	£ 70.67

## Cost benefit study 1994:

Overall cost of an 8 storey office block with composite beams  
3 methods of PFP on the beams were compared

PFP Method	Applied Cost GBP £
Cementitious spray	82,000
Intumescent coating On Site	130,000
Intumescent coating Off Site	169,000

## BUT

The project worked a complete construction model from starting on site to handover

- A critical path showed the time required to construct and all the costs
- These costs included of preliminaries incl. site services, financing, and rental income opportunity when completed.

## Critical path analysis showed:

PFP Method	Steel Erection Time (weeks)	Project Time to Completion (weeks)	Saving (weeks)
Cementitious spray	17	65	0
Intumescent coating On Site	13	64	1
Intumescent coating Off Site	11	62	3

Value of 1 week saving on project time is shown as:

Preliminaries £17,000 week and Financing £22,000 week = **£39,000 week**  
 (Rental opportunity ignored)

## Real Value or Real Cost to the project ?

## Real value or real cost to the project:

PFP Method	Applied Cost GBP £	Critical Path Saving GBP £	New Applied Cost GBP £
Cementitious Spray	82,000	0	82,000
Intumescent on site	130,000	- 39,000	91,000
Intumescent off site	169,000	-117,000	<b>52,000</b>

THE FINANCIAL VALUE TO PROJECT OF APPLYING OFF SITE  
Vs. CEMENTITIOUS IS **£30,000**

The SCI Report highlighted the advantages of doing this as ...

- ✓ **Faster construction** reduces the critical path
- ✓ Overall **cost savings** can be quantified
- ✓ **Improved quality** of shop work
- ✓ **Reduced site disruption**, less wet trade work
- ✓ **Environmentally friendly**
- ✓ **Improved access conditions** benefit other trades
- ✓ **Steel is always fire protected**
- ✓ **Special case benefits**, eg: when site access is limited or coastal



Overall intumescent allow greater freedom to the designer:



Victoria Station - Manchester



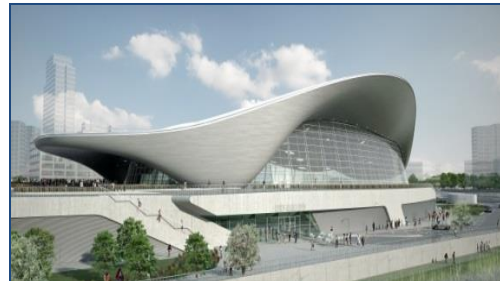
Bay Arena - Germany



The Shard - London



New Street Station - Birmingham



Aquatic Centre – London 2012



Audi - London



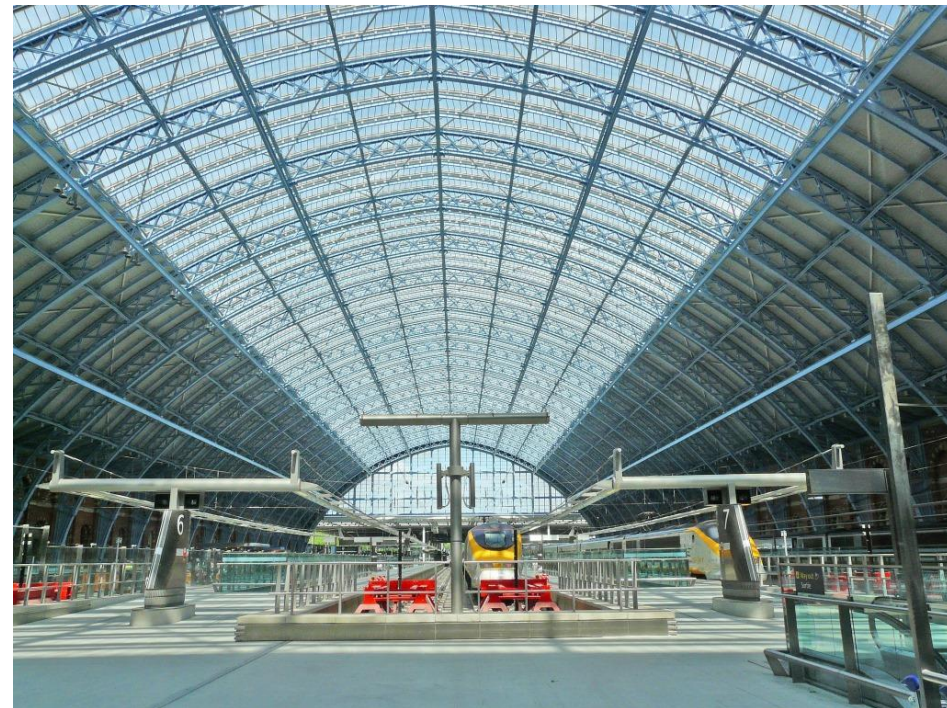
Heathrow T5 - London



Olympic Arena – London 2012



Flame Towers - Azerbaijan





# Thought leadership & industry best practise




**INVITATION**

## FIRE SAFETY IN STEEL STRUCTURES SEMINAR

THURSDAY, 22<sup>ND</sup> OCTOBER 2015 | 10.00AM - 3.00PM

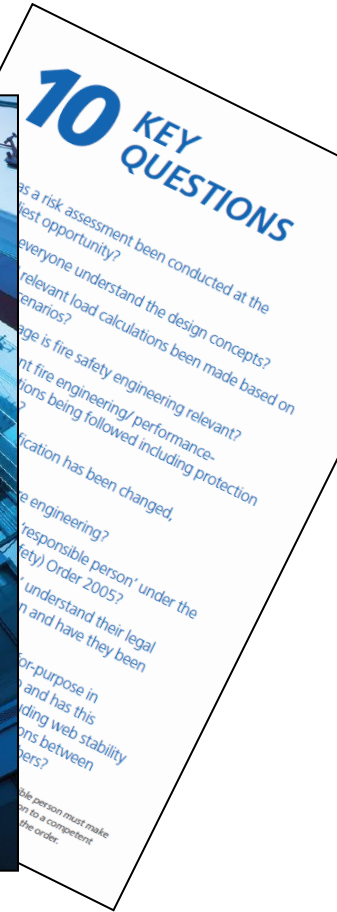
Presentations will be made by leaders of major industry organisations including:

- The Institute of Fire Engineers (IFE); The Fire Protection Association (FPA); Chief Fire Officers' Association (CFOA);
- Association for Specialist Fire Protection (ASFP) and Local Authority Building Control (LABC).



## THE SIMPLE GUIDE TO FIRE SAFETY IN STEEL STRUCTURES

**SHERWIN-WILLIAMS.**  
Protective & Marine Coatings



## 10 KEY QUESTIONS

Is a risk assessment been conducted at the best opportunity?  
 Have everyone understand the design concepts?  
 Have relevant load calculations been made based on scenarios?  
 What fire safety engineering/performance-based design is fire safety engineering/performance-based design being followed including protection?  
 Has the specification has been changed, fire engineering?  
 Is the 'responsible person' under the Regulatory Order 2005?  
 Do you understand their legal obligations and have they been met?  
 Is the purpose in mind and has this been reflected in the web stability analysis between members?  
 Has the person must make sure to a competent person in the order.

*The complex steel structures which increasingly make up the fabric of our new, modern buildings, present new challenges for all involved in the protection of lives and property assets.*

As professionals working in these supply chains, from the original concept and design through to structural engineering and fire estimation, there is a responsibility to get it right.

This seminar – organised by **Sherwin-Williams Protective & Marine Coatings** in conjunction with the fire engineering community – examines what can be done to clarify the existing process, guidance and legislation.

You will also have the opportunity to raise questions and to further discuss the issues through a networking lunch.

*Raising Standards, Protecting People and Property*

**Institution of Civil Engineers**  
 One Great George Street  
 Westminster  
 London  
 SW1P 3AA

Thursday, 22<sup>nd</sup> October 2015

*To register a place at this free event please call Ben Hewes on +44 (0)1772 888400 or e-mail [ben@freshfield.com](mailto:ben@freshfield.com)*

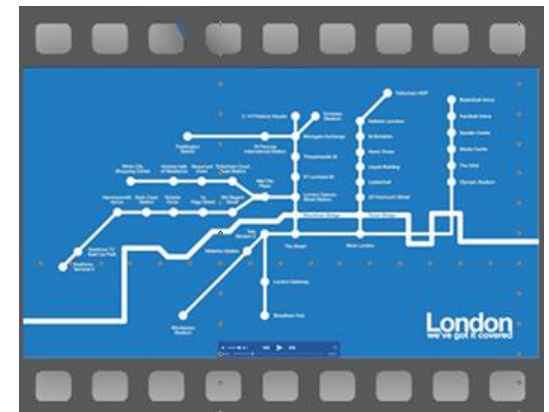
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<https://youtu.be/WpwbM8zJZhM>

# Thank You

## Any Questions?