INNOVATIONS IN INTUMESCENT COATINGS LEAD TO SAFER STRUCTURES

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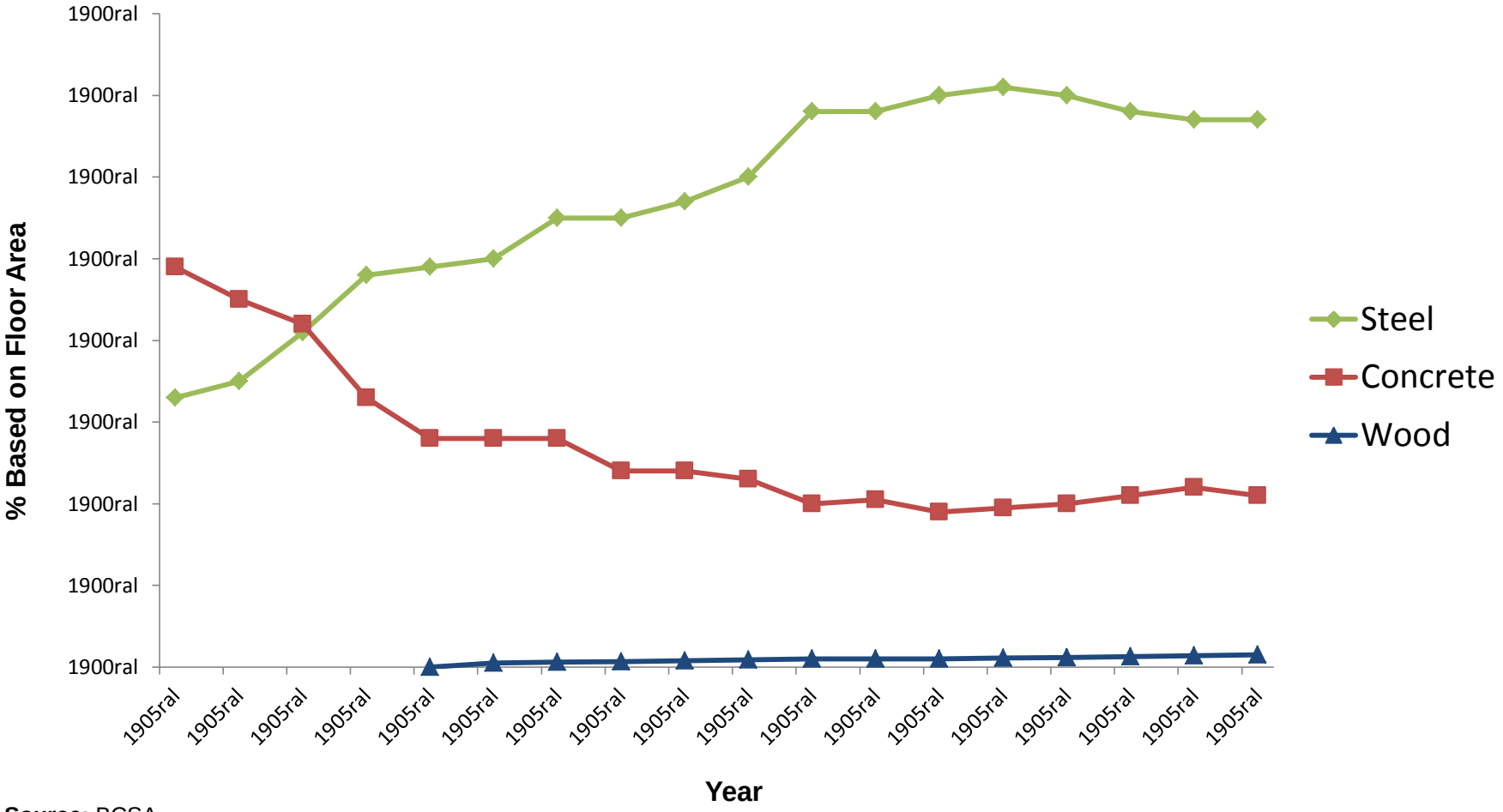
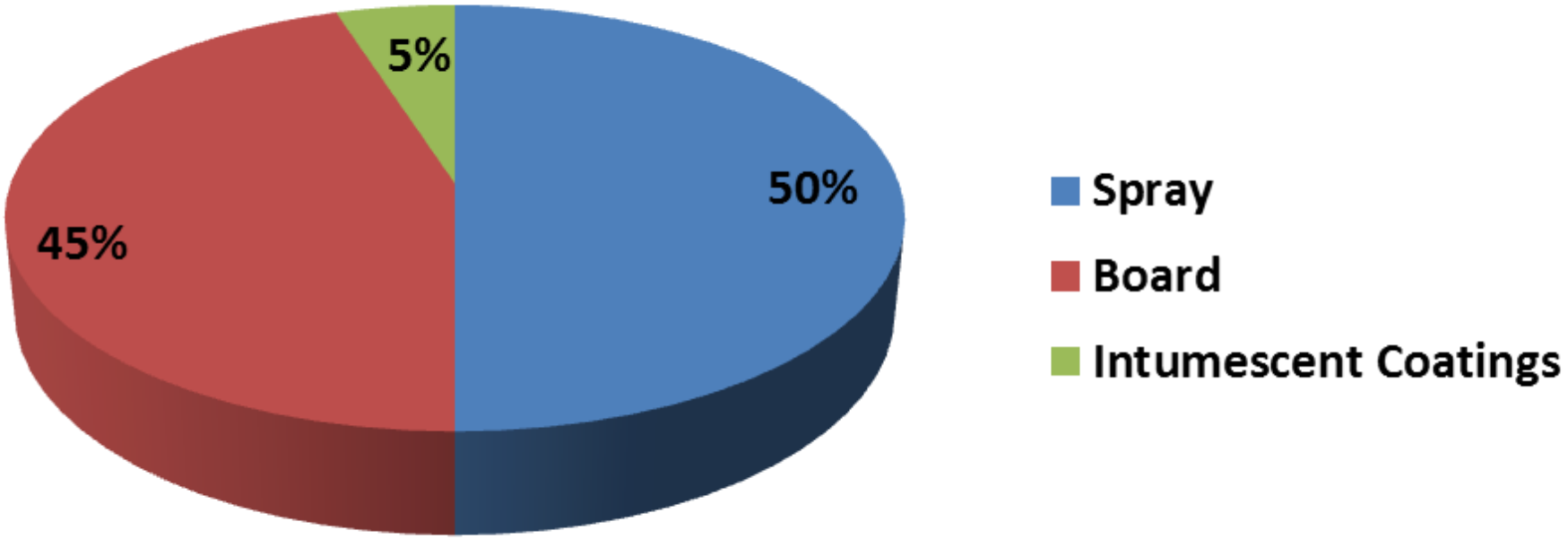
- Impact on methods of PFP application & fabrication
- Cost benefit analysis of PFP application systems
- Current innovations in building design & engineering
- Thought leadership in industry best practise for high rise iconic steel structures

UK Construction Market – Multi Storey Buildings



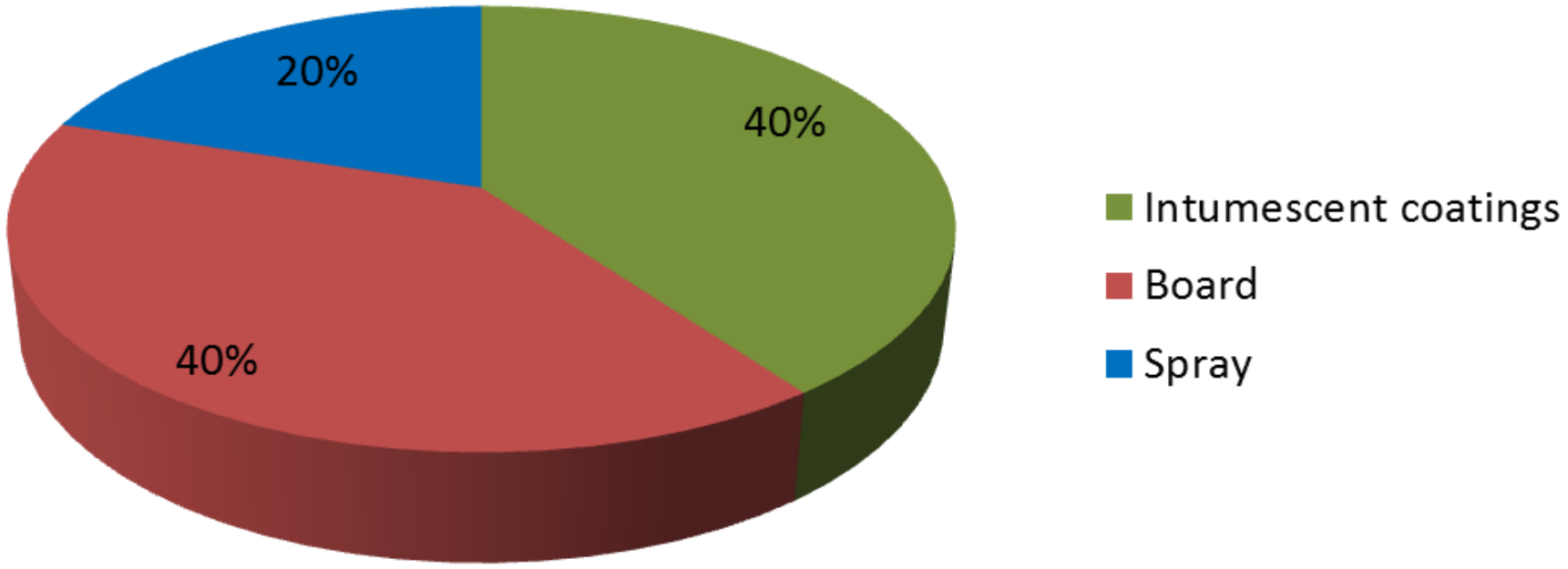
Source: BCSA

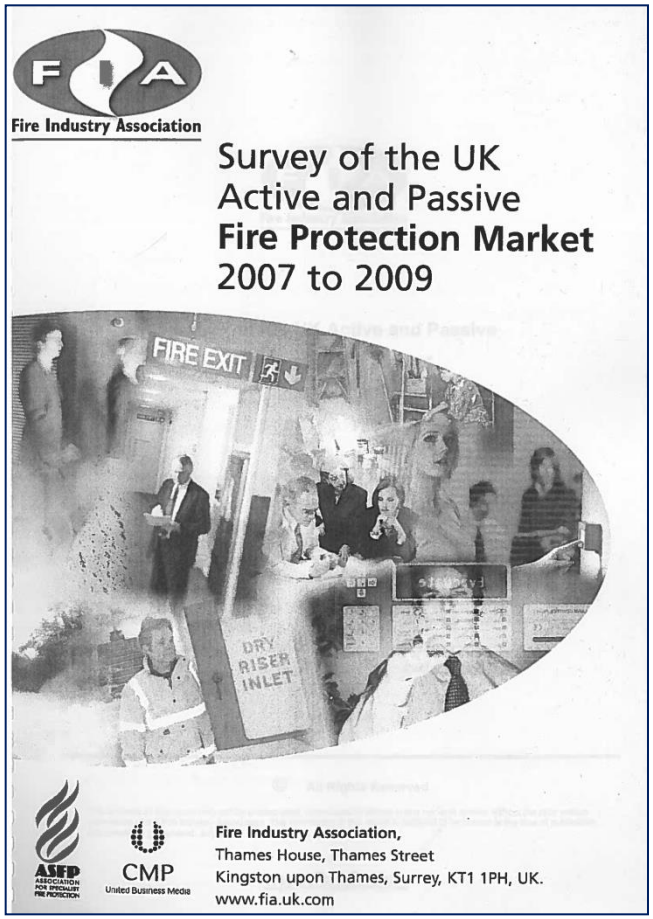
What has also happened….



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”

Source: Fire Industry Association: Survey of the UK Active & passive Fire Protection Market 2007 to 2009

STRUCTURAL FIRE DESIGN:

"Guide to Off-site Applied Intumescent Coatings"

Sponsored by:

SCI, ASFP, BCSA, British Steel

Source: Steel Construction Institute (SCI), First published 1996, second edition 2005

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:

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)[1]	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)[2]	-	130	-	-	130	-
Off-site intumescent coating for beams (£ 000's)[2]	-	-	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)[4]	-	(17)	(51)	-	(17)	(51)
Saving due to early rental (£ 000's)[3,4,6]	-	(75)	(224)	-	(75)	(224)
Saving in finance costs at 10 % p.a. (£ 000's)[4]	-	(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 (m²)[5]	£ 73.28	£ 73.78	£70.67	£ 73.28	£ 73.78	£ 70.67

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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 **= <u>£39,000 week</u>**
(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	**52,000**

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

The SCI Report highlighted the advantages of doing this as …

Reference: The SCI Report publication 160 9/96

- ✓ **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

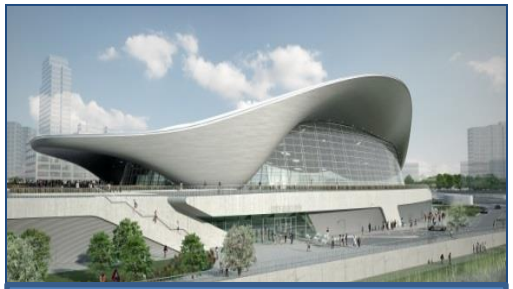
Overall intumescents allow greater freedom to the designer:


Victoria Station - Manchester

Bay Arena - Germany


The Shard - London


New Street Station - Birmingham

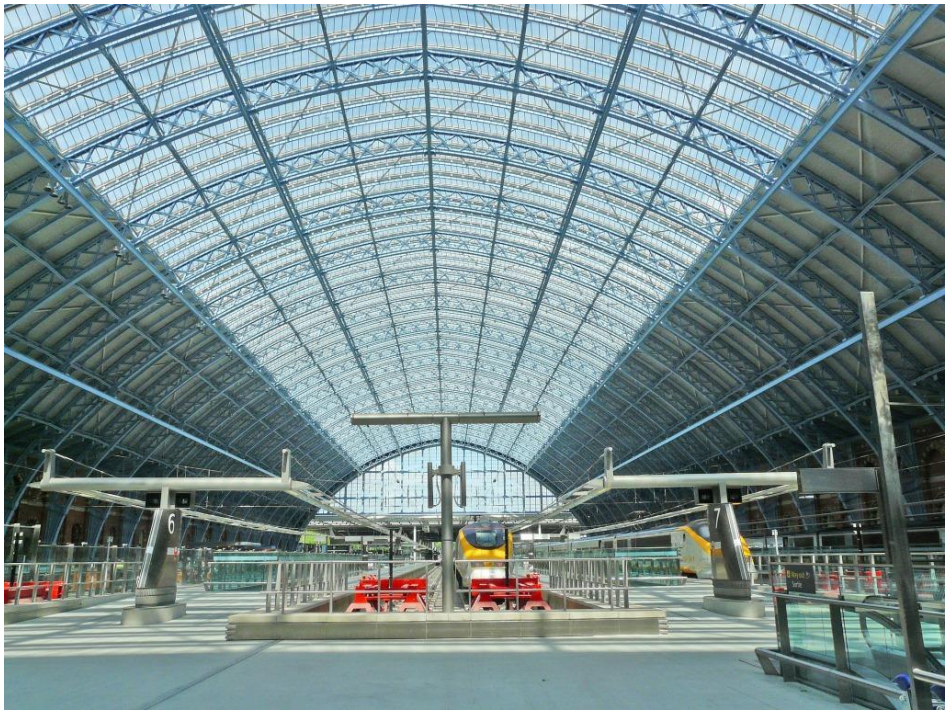

Aquatic Centre – London 2012


Audi - London

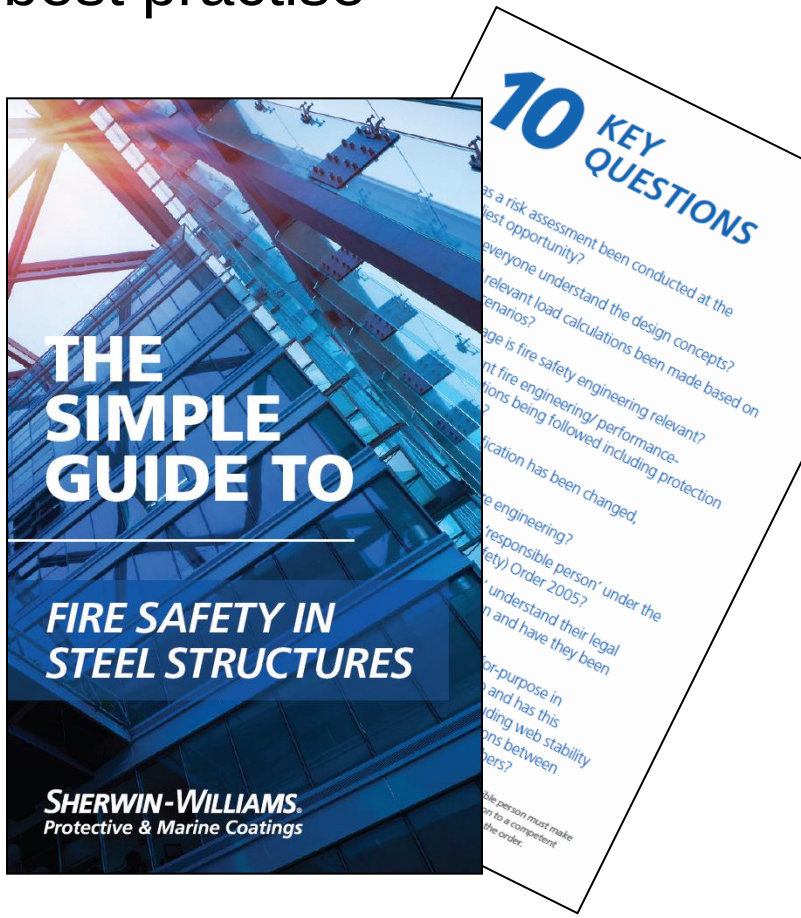

Heathrow T5 - London


Olympic Arena – London 2012


Flame Towers - Azerbaijan



Thought leadership & industry best practise



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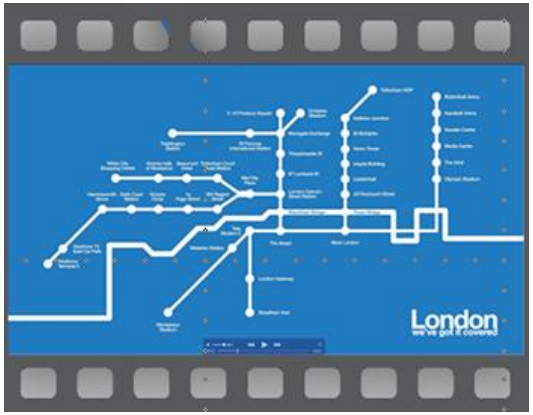

https://youtu.be/WpwbM8zJZhM

Thank You

Any Questions?