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Resilient Facilities: Information's Role When Disaster Strikes

Products, Standards and Analysis

Dr Jim Glockling, Technical Director
Fire Protection Association, UK

A multi-million pound chemistry department built out of wood

GlaxoSmithKline Carbon Neutral Laboratory for Sustainable Chemistry

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A waste-recycling centre built out of wood

UK's largest ever timber frame arrives on site in Leeds

Construction of the largest timber framed structure of its type in Europe has commenced in East Leeds as work progresses on the latest phase of the City's new RERF (Recycling and Energy Recovery Facility).

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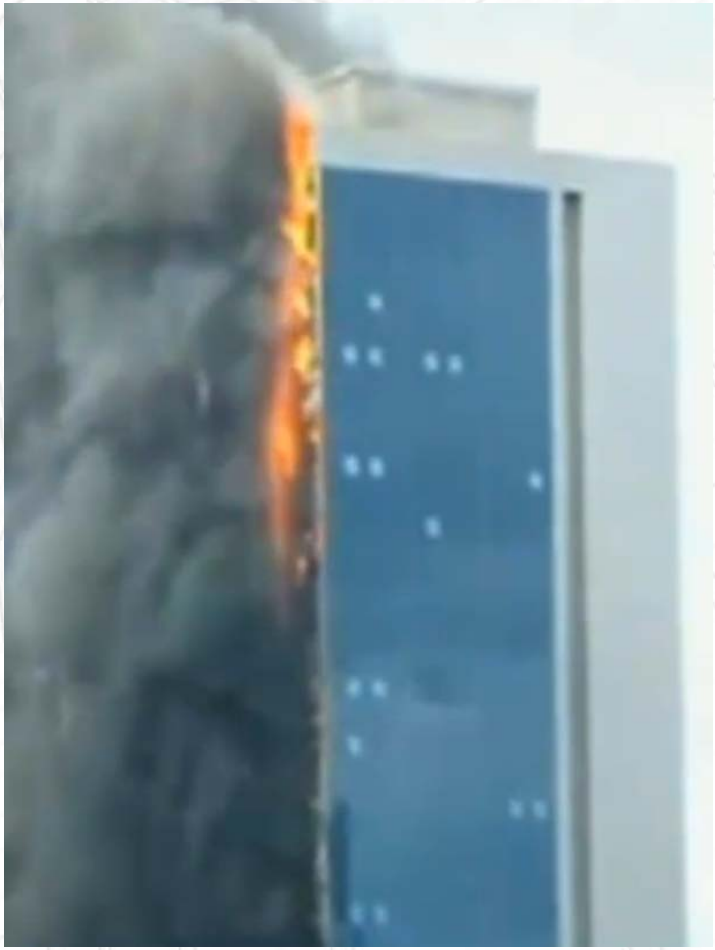
Commercial buildings clad in combustible materials



Responsibilities

- 80% of businesses affected by a major incident close within 18 months (ref: London Prepared)

Or – using more harsh wording

- 80% of business affected by a major incident show themselves to have been incompetently managed within 18 months of the event!

Have these product selections been made in the best interests of the business?

With the right information, presented in the right format, at the right time, better choices may be made

Life Safety vs. Property Protection

- In the UK there is absolute separation between Life Safety and Property Protection when it comes to fire.

- Whilst there are prescriptive codes that achieve life-safety through the use of good performing materials and systems that benefit property protection ….. these may all be avoided through the process of FIRE ENGINEERING so long as life-safety equivalency is preserved.

Sole goal: Evacuation before collapse

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BIM as a solution?

- If you ask for nothing different it is likely that you will be delivered a building that satisfies the mandatory minimum requirements only (saving cost as well).
- Established means do exist to specify buildings with a 'Sustainability Rating'.
- Why not the same for 'Resilience'?
- And against all perils?

BIM

- Full spatial inventory of:
  - Products
  - Currently relevant properties (dimensional and performance)
  - Placement within the building
- Which may be queried for compliance of:
  - Air quality
  - Lighting
  - Thermal performance / energy usage etc.

BIM for Resilience:

The system already has:

- Knowledge of the products used and their physical/performance properties (which could be augmented)
- Knowledge of product location, aggregation and accessibility
- Knowledge of product placement in respect of other products, compartmentation (fire and security), and mitigation systems (such as sprinkler systems, CCTV etc.)

By using relevant product standards for i.e. fire, security and flood with additional information where lacking, Resilience ratings to a range of perils could be simply calculated.

Data

- Window
  - Height
  - Width
  - Depth
  - U value
  - Light transmission
  - Strength against physical attack
  - Fire resistance
  - Lock security
  - Seal water tightness
- Sprinkler system
  - Area of coverage
  - Water delivery
  - Reliability
- Building product
  - Dimension
  - U values etc.
  - Ignitability
  - Combustible content
  - Ignitability
  - Exposed surface area
  - Location in respect of mitigating systems

Potential Outputs

- Detailed reports relevant to understanding the building's resilience to:
  - Fire
  - Theft
  - Social Unrest
  - Arson
  - Flood

With a rating assigned (0-10)

Example

Aggregated Fire Report to describe:

- % of building's structure that is combustible
- % of building's structure that is combustible assuming mitigation systems function
- % of building's structure that would be consumed in
  - 30 minutes, 60 minutes, 90 minutes
- % of buildings surface ignitable by (x) flame source in:
  - 10 seconds, 30 seconds, 60 seconds
- % of combustible material accessible by:
  - Public, Employees
- Compartment sizes
- Key asset duplication
- Etc. etc. etc.

Benefit

- An opportunity to see in real-time how a ‘Resilience rating’ might change with product selection:

- Polystyrene cladding insulation vs. mineral fibre
- Location (in respect of potential flood threat) of key electrical infrastructure
- Sprinklers vs. no sprinklers vs. alternative systems
- No access control vs. types of access control
- Compartment size selection

Make ‘resilience’ an accessible and key selection choice in the procurement and design of future buildings

Closing

Project Proposal 2015

- Resilient Objects for BIM User Software Tools (ROBUST)
- Take an already designed and built BIM building
- Download the product inventory from BIM
- Augment product fields with ‘resilience’ relevant data
- GAP analysis of Standards data vs. requirement
- Demonstration of Ratings change with product selection
- Assessment of value (to stakeholders)

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