Fire safety of ventilated curtain walls

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CSR
Adding value to the community around our College at Moreton-in-Marsh

Corporate Social Responsibility

http://www.fireservicecollege.ac.uk/about-us/csr/
Fire risk

- Probability of a fire occurring x consequences of that fire
  - Public requirements > safe escape, safety of adjacent buildings (plot/parcel),
    - Safety of rescue teams
  - Private requirements > business interruption, property loss

- Predictability fire scenario
- Predictable = Preventable
Fire spread

Rapid Fire Spread  Restricted Fire Spread

- Cladding system contributes to flame spread resulting in risk of multiple simultaneous secondary fires.
- If the external cladding contributes to the flame spread there is a risk of secondary fire spread to all levels.
- Initial fire is allowed to develop and flash over.
- Flames break out and attack adjacent windows.
- Secondary fire.
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- Secondary fire.
- If a secondary fire is allowed to develop, the process is repeated.
- Flames break out and attack adjacent windows.
- Secondary external fires arising from falling burning debris.
The combination of combustible and non-combustible materials may introduces risks and requires attention

- External flaming
- Through the voids between façade and floor systems
- Through the façade structure;
  - the insulation material
  - across the external facade surface
  - through any concealed cavity voids
Smoke production of combustible materials

- Especially important in phases 1 and 2 of a typical fire scenario. Smoke from the building fabric/envelope and its contents can hamper an occupant’s ability to safely escape by reducing visibility and affecting the senses.

- Many fire safety engineering calculations used to quantify the effects of smoke production are based on products such as softwood, typically 100m²/kg.

- Smoke production of other materials
  - More than 300 m²/kg (cars 400 m²/kg)
    - A visibility of 1 m in a room of 300 m³ after burning only 1 kg
    - Or 10 m visibility in a room of 100 m³ after burning only 30 g
How to prevent the risk of fire development via facade assemblies

- Fire repression > new methods to develop
- Additional tests
- Other precautions

For building owners these measures can also be necessary to limit the amount of damage, environmental impact and business interruption
K-factor: This material property is defined in EN 1364-4. The fire protection ability K is the ability of a wall or ceiling covering to protect for the material behind the covering protection against ignition, charring and other damage for a specified period of time.

Available test methods

- EN 1364-4

**Key**
- Furnace wall
- Furnace closure
- Supporting floor
- Part of curtain walling (spandrel panel - combination upstand / downstand)
- Perimeter seal
- Mineral wool packing
Some regulatory guidance provided for over-cladding systems recommends interrupting any combustible material by extending the fire stopping to the external cladding. How such a fire stop must be designed and constructed and the interaction with a cavity and the outer layer is generally not clear.

For this to be effective in practice, the fire barrier should be evaluated in a large scale test in conjunction with the other components of the system to assess:
- Movement capability
- Fire resistance period
- Heat transfer which may ignite the material above the barrier
- Ventilation
Fire safety during renovation

- Perform a risk analysis and inform the owner or user about the potential risks.
- Consider temporary re-housing of occupants if a potential risk is identified.
- Report all hot work to site manage and provide adequate supervision and precautions.
- Report incidents.
- Limit the amount of combustible building materials on site and ensure all flammable products are safely stored. Address the risk of arson by implementing suitable security measures.
- Ensure fire compartmentation is not compromised for any significant period of time to minimize spread of fire and toxic smoke.
- Ensure appropriate fire stops are installed as building work progresses.
- Exchange if possible/needed combustible materials for non-combustible

- Use of independently certified passive fire protection products installed by trained and competent contractors can significantly reduce these risks.
Questionnaire

- How are these topics addressed in your country?
- What are the requirements related to reaction to fire classes of materials in façades, and are these requirements in accordance with EN 13501-1?
- What are the requirements in accordance with fire resistance EN 13501-2?
- Are there additional requirements to minimize the risk of fire spread through or along a façade? There are a number of different standards available that address with this specific topic. For instance are there requirements for the connection between façades and fire barriers or is it necessary to test façade structures to determine the risk of fire spread through, or along the surface?
- Any other issues regarding fire and façades that are not addressed above?
A sustainable building must be a fire safe building
Other references

- The magazine for claims managers Issue 1/2013
- See page 48.

The fire brigade inspects the burnt-out façade of a new residential and office complex in Frankfurt.
Fire Safety – The Clock is Ticking
Why the EU Must Improve Fire Safety for Europe’s Citizens

http://www.firesafeeurope.eu/
Thank you!

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