Communicatieforum CE-markering

Efectis

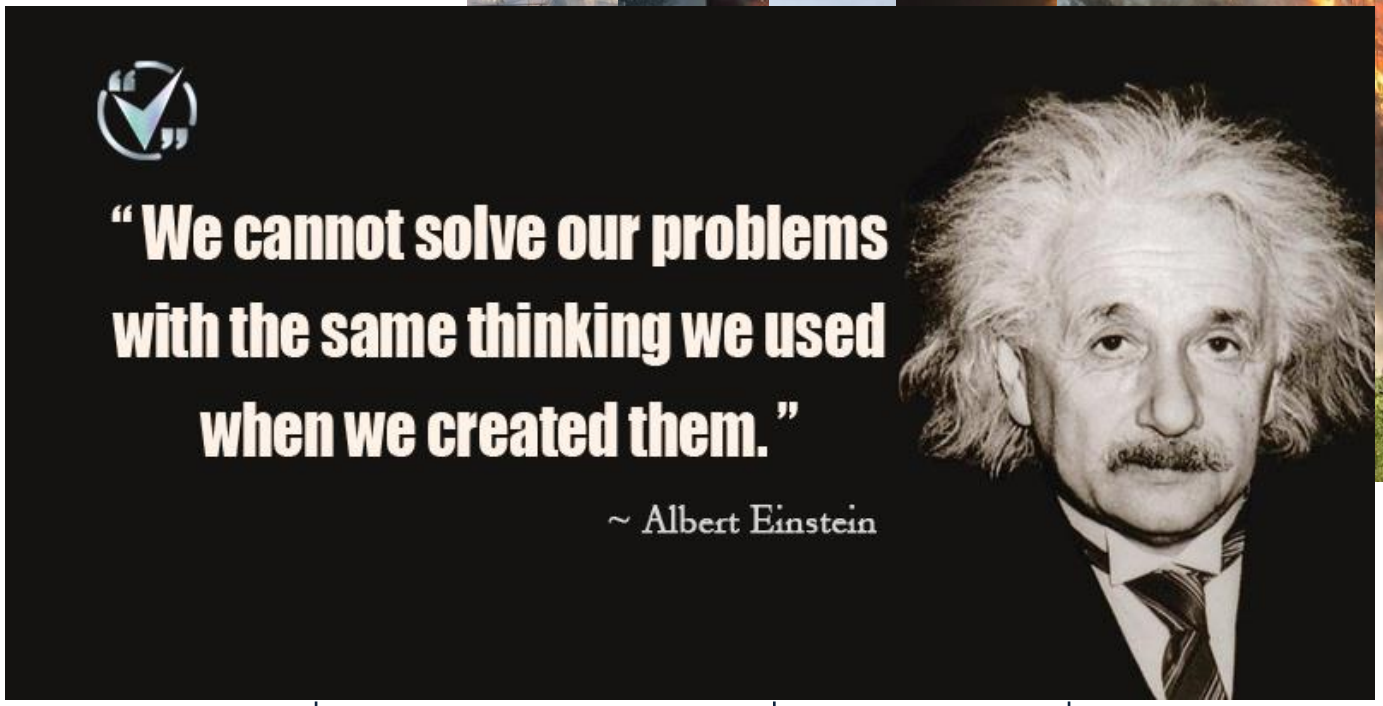
DEVELOPMENT OF A NEW EUROPEAN APPROACH

TO ASSESS THE FIRE PERFORMANCE OF FACADES

INDUCEMENTS & INCENTIVES (NO RANKING INTENDED)

Large scale fire disasters, e.g.

- ✓ 2015 Melbourne,
- ✓ 2017 Grenfell,
- ✓ 2018 Istanbul,
- ✓ 2020 Dubai,
- ✓ 2021 Milan.



INDUCEMENTS & INCENTIVES (NO RANKING INTENDED)

Increased development of high-rise buildings, in number and height

Practice has proven that risks have been underestimated

CPD to CPR:
From demonstrating a product's
'compliance to a harmonized technical specification'
changing into a product's
'contribution to performance of the works, once incorporated'.

Resulting in clarification needs (requests) and discussions, e.g.:
- Intended use perception
- Fitness for use (expression / declaration)
- Performance determination method (assessment)

Review of the CPR?

INDUCEMENTS & INCENTIVES (NO RANKING INTENDED)

Materials – properties (λ-value, ρ, etc)

vs

Works – performance requirements?

BASIC REQUIREMENTS FOR CONSTRUCTION WORKS

Construction works as a whole and in their separate parts must be fit for their intended use, taking into account in particular the health and safety of persons involved throughout the life cycle of the works. Subject to normal maintenance, construction works must satisfy these basic requirements for construction works for an economically reasonable working life.

CPR Annex I

Products – performance in the works based on properties?

1. 'construction product' means any product or kit which is produced and placed on the market for incorporation in a permanent manner in construction works or parts thereof and the performance of which has an effect on the performance of the construction works with respect to the basic requirements for construction works;

CPR Art. 2.1

MORE SPECIFIC

Perfomance of a product may be influenced by its actual specific situation (as incorporated in the works)

- by design of the facade
- due to interaction with other components;

A facade is an assembly (system) of multiple materials & products;

Individual material or product properties are insufficent to fully address fire safety risks of the system;

An all-inclusive assessment method addressing facades as a system does not exist;

National additional requirements (determination methods) however do exist

Conclusion:

A European approach to assess the fire safety performance of facades shall be developped.

And so it was commanded by the EC

ASSESSMENT METHOD DEVELOPMENT OBJECTIVE

- Establish an assessment method which
  - Will be sufficiently representative for façade systems in practice;
  - Is not exclusive for specific products or systems;
  - Addresses lessons learned from fire incidents;
  - Takes into account existing methods (e.g. BS 8414, LEPIR II, ISO 13785, DIN 4102 etc);
  - Will fit harmonized technical specifications (hEN's and EAD's);
  - Allows (future) classification

- 2 phases:
  - Technical preparation
  - Codification by an ESO: standardisation request to CEN (within the context of the CPR)

GOVERNANCE PHASE 1

- Project funded by EU

- Complexity required bringing together extensive technical knowledge & experience in a consortium

Project partners

- RISE, Sweden – project leader
- BAM, Germany
- Efectis, France
- EMI, Hungary
- University of Liege, Belgium

Subcontractors

- BRE, UK
- RISE Fire Research, Norway
- EGOLF

- Transparency
  - Reports publicly available at the site of the project leader
  - Feedback from Steering Group (outside project team)

TIMING PHASE 1

1. Theoretical round robin : Completed

2. Initial testing activities: Should be completed for mid-2022

3. Experimental round robin:

- 3 different façade systems should be tested by at least 3 different labs. Should start in 2022

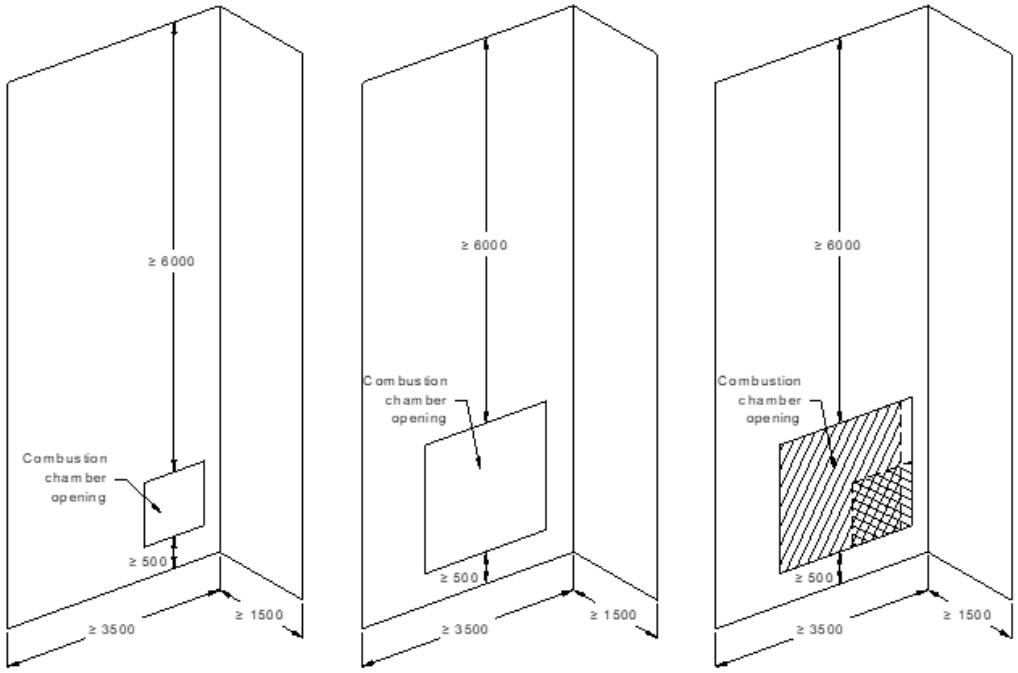
4. Analysis and fine-tuning of the assessment method: Before end of 2022

1. TECHNICAL ASPECTS

- Survey on questions to be answered
  - Including identifying boundary conditions

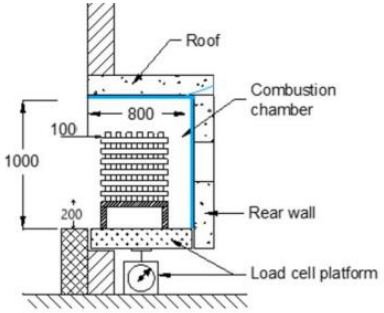
- Test rig aspects
  - Large scale (medium scale)
  - Position of combustion chamber
  - Size of combustion chamber
  - Secondary opening
    - ✓ Size
    - ✓ Position

- Fuel
  - Type (wood, heptane, gas)
  - Amount
  - Combustion speed
  - Air velocity, position & direction

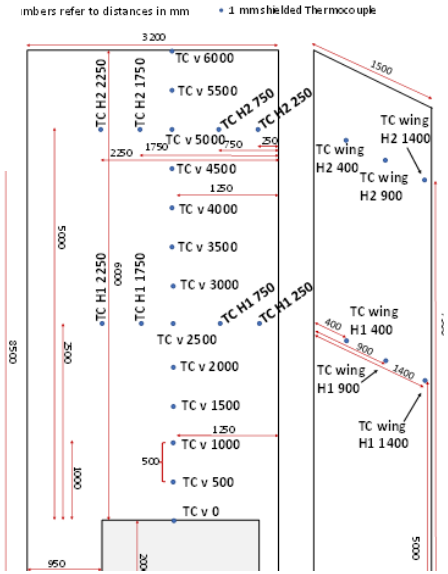


1. TECHNICAL ASPECTS

- Measurements
  - Fuel mass loss rate
  - Heat release rate
  - Heat flux and temperature
  - Type of sensors
  - Position of sensors
- Falling parts
  - (Burning) Droplets
  - Measurement
  - Effect on testrig
- Other…



Picture 1: Sketch of the cross section of the combustion chamber



2. EVALUATION PLAN

- Determination & verification technical aspects by testing, e.g.
  - Effect eccentrally vs. symmetrical second opening
  - Effect airflow rate variations (speed & direction)
  - Scanning techniques for falling parts.

Step	Test group	Type of test	Number	Location	Remark
1	A	Crib parametric tests	8 large exposure	Efectis	Indoor
1	B	Crib parametric tests	3 medium exposure	Efectis	Indoor
2	C	Average test – large exposure	3	RISE	Indoor
2	D	Average test – medium exposure	3	BRE	Indoor
3	E	Parametric test air flow - medium exposure	2	BRE	Indoor
3	F	Parametric test uplift - medium exposure	2, 1 or 0	BRE	Indoor
3	G	Parametric test uplift - large exposure	2, 1 or 0	RISE	Indoor
3	H	Parametric test with 1 m/s - large exposure	1	RISE	Indoor
3	I	Parametric test with higher speed velocity - large exposure	1	Efectis	Outdoor
3	J	Secondary opening parametric test – large exposure	3	RISE	Indoor
3	K	Secondary opening parametric test – medium exposure	3	BRE	Indoor
3	L	Non fire test for measuring falling parts and burning debris	1	BAM	-

The reference crib configurations selected in first phase will be installed in the combustion chamber of the test rig with an inert façade

- Medium heat exposure
  - Air flow rate: 400 m^3/h
  - Wind speed: 0.5 m/s
  - Uplift: 0.5 m
  - Secondary opening: Eccentrically and at 1500 mm above the combustion chamber
- Large heat exposure
  - Air flow rate: Natural
  - Wind speed: 0.5 m/s
  - Uplift: 0.5 m
  - Secondary opening: Eccentrically and at 1500 mm above the combustion chamber

- Medium heat exposure
  - Air flow rate
    - 360 m^3/h
    - 440 m^3/h
  - Uplift of rig
    - 1.0 m
    - 2.0 m
- Large heat exposure
  - Wind speed
    - 1 m/s
    - 3 m/s
  - Uplift of rig
    - 1.0 m
    - 2.0 m

3. EXPERIMENTAL ROUND ROBIN

- 4 different systems to determine repeatability and reproducibility of the proposed method
  - Rainscreen and render
  - ETICS
  - Solid wood with ventilation gap
  - Inert façade

- At different fire testing laboratories, both
  - medium scale and large scale
  - Indoor and outdoor

4. ANALYSIS AND FINE-TUNING OF THE ASSESSMENT METHOD

- Based on results obtained during the experimental round robin
- Delivery of assessment proposal (to facilitate codification)
  - technical content
  - including supporting evidence
- Other questions may arise from this project
  - Direct and Extended Field of application
  - Comparison with current national methods
  - Measurements data needed for FSE

NEXT

- Results as input for standardisation request by EC
  - Intention to position as horizontal “façade fire testing” standard
  - Getting adopted estimated at 2-3 years
  - Classification still to be defined, process could run in parallel with SR
  - To be used in the development of new harmonized technical specifications as from 2027-2028
  - Taking effect in current product standards might take 10-15 years
- National legislators shall specify the requirements at the level the works accordingly.

QUESTIONS

- How will national legislators specify requirements and demand proof of firesafety performance of facades in the mean time?