EUROPEAN FIRE SAFETY WEEK 2024

FIRE LOAD AND FLAMMABLE MATERIALS IN MODERN BUILDINGS

How can Flame Retardants contribute?

pinfa

A sector group of Cefic

WEDNESDAY 20 NOVEMBER 2024
13.30 - 15.00 CEST
BRUSSELS & ONLINE

18-22 NOVEMBER
WWW.FIRESAFETYWEEK

Welcome & Introduction

Esther Agyeman-Budu

COMPETITION LAW

CHECKLIST FOR MEETINGS

DO

Ensure strict performance in areas on:

Oversight / Supervision

- Have a Cefic/Sector Group Secretariat representative at each meeting
- Consult with appropriate counsel on all questions which might be related to competition law
- Limit meeting discussions to agenda topics
- Provide each attendee with a copy of this checklist, and have a copy available for reference at all meetings

Recordkeeping

- Have an agenda and minutes which accurately reflects the matters which occur
- Ensure the review of agendas, minutes and other important documents by appropriate staff or counsel, in advance of distribution
- Fully describe the purposes, structures and authorities of the groups

Vigilance

- Protest any discussion or meeting activities which appear to violate this checklist
- Ask for those activities to be stopped so that appropriate legal check can be made by counsel
- Dissociate yourself from any such discussion or activities and for the attendees, leave any meeting in which they continue (and have it minuted)

This checklist is for the conduct of Cefic-sponsored meetings. Prohibited discussion topics apply equally to social gatherings incidental to those meetings. The checklist is not exhaustive.

Contact: Quentin Silvestre, Senior Legal Advisor at qsi@cefic.be

DON'T

in fact or appearance, discuss or exchange information not in conformity with competition law, including for example on:

Prices, including

- Individual company/industry prices changes, price differentials, discounts, allowances, credit terms, etc
- Individual company data on costs, production, capacity (other than nameplates capacities), inventories, sales, etc

Production, including

- Plans of individual companies concerning the design, production, distribution or marketing of particular products, including proposed territories or customers
- Changes in industry production capacity (other than nameplates capacities) or inventories, etc

Transportation rates

- Rates or rate policies for individual shipments, including basing point systems, zone prices, freight, etc

Market procedures, including

- Company bids on contracts for particular products; company procedures for responding to bid invitations
- Matters relating to actual or potential individual suppliers or customers that might have the effect of excluding them from any market or influencing the business conduct of firms towards them, etc
- Blacklist or boycott customers or suppliers

Agenda

1.	Welcome & Introduction	Esther Agyeman-Budu *pinfa*
2.	EU fire safety challenges	Krzysztof Biskup *European Fire Safety Alliance*
3.	Fire load and flammable materials in modern buildings: how can flame retardants contribute?	Thomas Futterer *Chemische Fabrik Budenheim & pinfa*
4.	Grenfell Tower Inquiry Phase 2: Key findings and responsibilities	Eric Guillaume *Efectis*
5.	How fire load and material flammability have changed in buildings over the last 50 years: Why has this not resulted in a multiplication of fires and fire deaths?	Suzana Draganić *University of Novi Sad*
6.	Fire safety activities in European Commission DG GROW	Heikki Väänänen *European Commission, DG Grow*
7.	Q&A	All
8.	Wrap-up & conclusion	Esther Agyeman-Budu *pinfa*
9.	Closed	

Who is pinfa?

- The **Phosphorus, Inorganic and Nitrogen Flame** Retardants **Association.**
- Has 32 members: **manufacturers and users** of the three major technologies of non-halogenated flame retardants.
- Established in 2009 as a Sector Group within **Cefic**, the European Chemical Industry Council.
- **pinfa-na** (North America) and **pinfa China**, sister associations, established in 2012 and 2018.

Pinfa members' shared vision

Vision: continuously improving the environmental and health profile of their flame-retardant products, offering innovative solutions for sustainable fire safety.

Commitment: to maintain high fire safety standards across the world, standards which minimize the risk of fire to the general public.

Meet the team

A. Beard
Chairman

T. Futterer Vice-Chair

Z. Fahimi
Vice-Chair

H. Tebbe
Vice-Chair

E. Agyeman-budu
SG Manager

F. Filippini
SG Manager

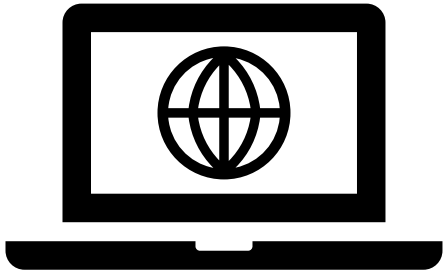
H. Haddouch
Assistant

B. Boynukalin
Communications

C. Thornton
Communications

Phosphorus, Inorganic and Nitrogen Flame Retardants Association

How to reach us



www.pinfa.eu

www.linkedin.com/company/
pinfa-sector-group-of-cefic/

Krzysztof Biskup

European Fire Safety Alliance

“We care about the safety of people all over Europe”

EU fire safety challenges

EUROPEAN FIRE SAFETY ALLIANCE

European Fire Safety Alliance

What

Independent alliance of fire professionals whose **mission is to reduce the risks from fire**, especially in domestic area – NGO based on voluntary work

Why

We do believe that in Europe, **most of the fire victims in homes are preventable**

How

- creating **international network of relevant actors** acting for improvement of fire safety and for putting it on a **higher level in a political agenda**
- defining the biggest EU fire safety challenges expressed in the **European Fire Safety Action Plan** – the first evidence and knowledge-based fire safety agenda for Europe
- organising EU-wide fire safety initiatives e.g.: **European Fire Safety Week**, **European Fire Safety Award, European Smoke Alarm Day**

EUROPEAN FIRE SAFETY ALLIANCE

Fire safety in the EU

The need to act

- approx. **5,000 fire deaths** and **70,000 injuries** in domestic buildings each year in the EU only
- **behind all the figures there are people** - people who died, who lost their homes, who lost a loved one or who will carry scars for the rest of their lives
- majority of these **fires and deaths are preventable**

"The simple truth is that the deaths that occurred were all avoidable,"
Martin Moore-Bick, chairman of the public inquiry into the Grenfell Trower fire

EUROPEAN FIRE SAFETY ALLIANCE

Fire safety in the EU

New challenges

- **Energy transition** - the deployment of PV panels, EV charging points, and heat pumps, while central to reducing carbon emissions, introduce **new ignition risks** due to increased electrical loads or subpar installation and maintenance
- **Modern Methods of Construction -** new building materials and new construction methods aiming to achieve **higher energy performance or sustainability** also have an **impact on fire dynamics** and make fire environment less predictable
- **Ageing demographics** poses unique fire safety challenges, requiring tailored attention for increased vulnerable groups and people affected by **energy poverty, substandard housing or disabilities,** who are much more vulnerable to fires

the role for **flame retardants**, which belong to the available effective solutions
for **extending the time for safe evacuation** by avoiding or at least slowing down the development of fire

EUROPEAN FIRE SAFETY ALLIANCE

Fire safety in the EU

What can the EU do?

- fire safety is primarily addressed by **building codes that are a national** competence, and **it should remain like this**
- but **building codes do not cover many important fire safety aspects** (fire awareness, some elements of prevention, fire statistics, research, market surveillance or information exchange)
- the **EU institutions have both potential and interest to coordinate action and support MSs** because **fire safety impacts and is impacted by several of the EU core objectives** (concerning mainly energy transition, but also: tourism, environment, human health or consumer protection)
- EU offers a unique perspective that will enrich and strengthen the development of knowledge in the field of fire safety and **help to address common challenges across the Member States** (harmonisation of **fire statistics** collected in MSs, shared **fire safety research**, development of **fire safety competencies** and **exchange of experience**)
- it is possible **without challenging subsidiarity principle** – EU can develop, coordinate and support solutions which next will be implemented by MSs

EUROPEAN FIRE SAFETY ALLIANCE

Fire safety in the EU

EU Fire Safety Manifesto 2024-2029 ***Keeping EU citizens fire safe in all buildings***

- **collaborative effort of 25 different organizations** working on the improvement of fire safety in Europe
- calling on the EU for a **European Fire Safety Strategy** to support MSs, coordinate and supplement their actions when needed

- launched on 14th December 2023
- support campaign #KEEPEUFIRESAFE
- https://www.keepeufiresafe.org/
- already supported by 15 MEPs and many other relevant stakeholders

Further support is welcome

EUROPEAN FIRE SAFETY ALLIANCE

Thank you very much for your attention

Krzysztof Biskup
Chair, European Fire Safety Alliance
kbiskup@eurofsa.org
www.eurofsa.org

EUROPEAN FIRE SAFETY ALLIANCE

pinfa

Thomas Futterer

PINFA Vice-Chairman

Chemische Fabrik Budenheim

Fire load and flammable materials in modern buildings: how can flame retardants contribute?

Thomas Futterer

PINFA Vice-Chairman

Chemische Fabrik Budenheim

pinfa

Cefic sector group

The European Chemical Industry Council, AISBL – Rue Belliard, 40 - 1040 Brussels – Belgium
Transparency Register n°64879142323-90

Pinfa Members (EU, China & North America)

ADEKA
AIMPLAS PLASTICS TECHNOLOGY CENTRE
AsahiKASEI
AVAKIAN POLYCHEM
AVIENT
BASF We create chemistry
Budenheim
Celanese
CLARIANT
CTF2000 flame retardants & chemical specialities
domo
DSM BRIGHT SCIENCE. BRIGHTER LIVING.
FR Adviser LLC From Ideation to Commercialization
GC GreenChemicals IMPROVE YOUR PERFORMANCE
Grolman International Distribution
HUBER NON-HALOGEN FIRE RETARDANT ADDITIVES
ICL
IMERYS
Italmatch Chemicals
Javachem 佳華精化
JLS Professional Flame Retardants
Kingfisher
KREMS CHEM
LANXESS Energizing Chemistry
lyondellbasell Advancing Possible
Nabaltec
NORDMANN
OMYA
POLYMER ADDITIVES GROUP FLAME RETARDANTS & SMOKE SUPPRESSANTS
PPA PERFORMANCE POLYMERS and ADDITIVES, LLC
PRESAFER
RADICI GROUP
20 MULE TEAM BORAX RioTinto
sabic
Schneider Electric
SCOTT BADER
THOR
TOLSA
云天化集团 YUNTIANHUA GROUP
williamblythe Excellence in chemistry
TOTAL

Fire load and flammable materials in modern buildings: how can flame retardants contribute?

- **Humans**
- Communication
- Space
- Functionality & Design

- Materials
- Movement & Transport
- Logistics
- Energy (fuels, electricity, materials)
- Complexity

- Well-being
- **Safety**

Worldwide Fire Statistics
2017-2021, for 38 reporting countries

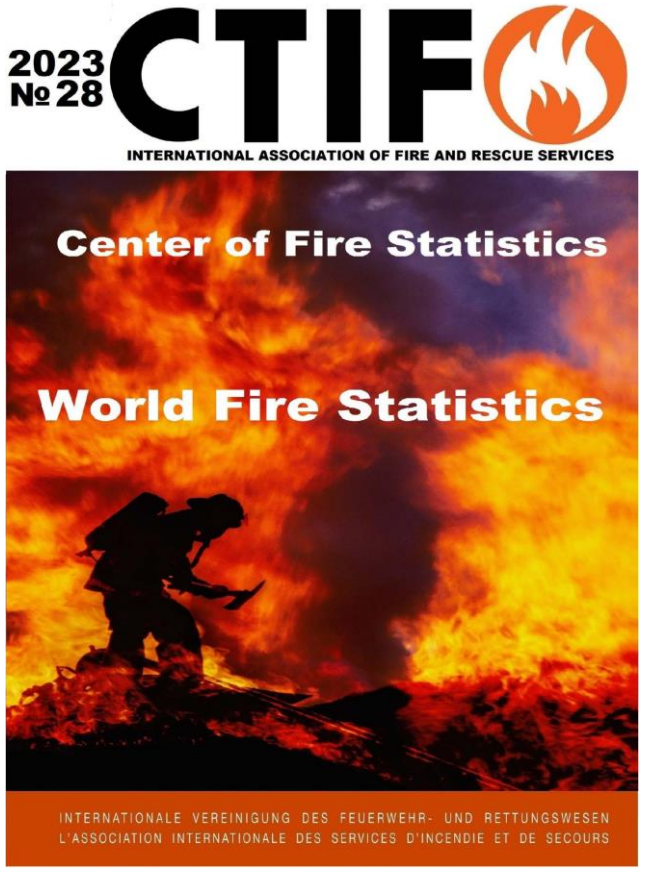
Numbers of fires (per year and million population):

7	37	800
FIRE DEATHS	FIRE INJURIES	FIRES

In 2017, the Geneva Association (bringing together nearly 100 insurance companies worldwide) estimated that:

1% OF GDP WORLDWIDE

1% of world GDP is **Approx. 1 trillion USD** = somewhat more than the GDP of Poland or Belgium



CTIF report 2018 n° 28 (statistics for 2017-2021) – Center of Fire Statistics, World Fire Statistics
https://www.ctif.org/world-fire-statistics
Geneva Association, Bulletin World Fire Statistics n°29, 2014
https://www.genevaassociation.org/sites/default/files/research-topics-document-type/pdf_public//ga2014-wfs29.pdf

Fire regulations for buildings in Europe

- **EU Construction Products Regulation** (CPR, 305/2011) defines categories for fire performance and smoke emission
- Construction materials sold in Europe **must be tested and labelled**
- The CPR covers construction materials, balconies, internal finishings, paints, cables and electrical installations, PV panels and carpets
- Building Regulations do not cover building contents: furniture, decoration

➢ **PIN flame retardants are enabling materials to achieve CPR fire and smoke specifications**

Photo Efectis facade fire testing
https://efectis.com/en/fire-performance-facade/

Building fire regulations – keeping people safe

- 5000 people die in fires each year in Europe, **mostly inside buildings**
- Fire risks are increasing:
  - **Increasing fire load** of building contents
  - **Flammable modern and sustainable materials**
  - **24/7 electrical equipment**
  - Renewable energy installations
  - **Tall buildings**
  - Ageing population

- Fire performance **standards will becoming more demanding**
- Flame retardants are needed **to achieve fire safety**

➢ **PIN flame retardants provide fire safety solutions**

pinfa members continue to develop new products to improve performance and minimise health and environmental risks.

Photo Credit: Getty Images

Increase the Escape Time by Preventing or Slowing Down Ignition and Fire Growth

Time to flashover can increase from 5 minutes to 15 minutes which can make the difference between escape and fatalities.

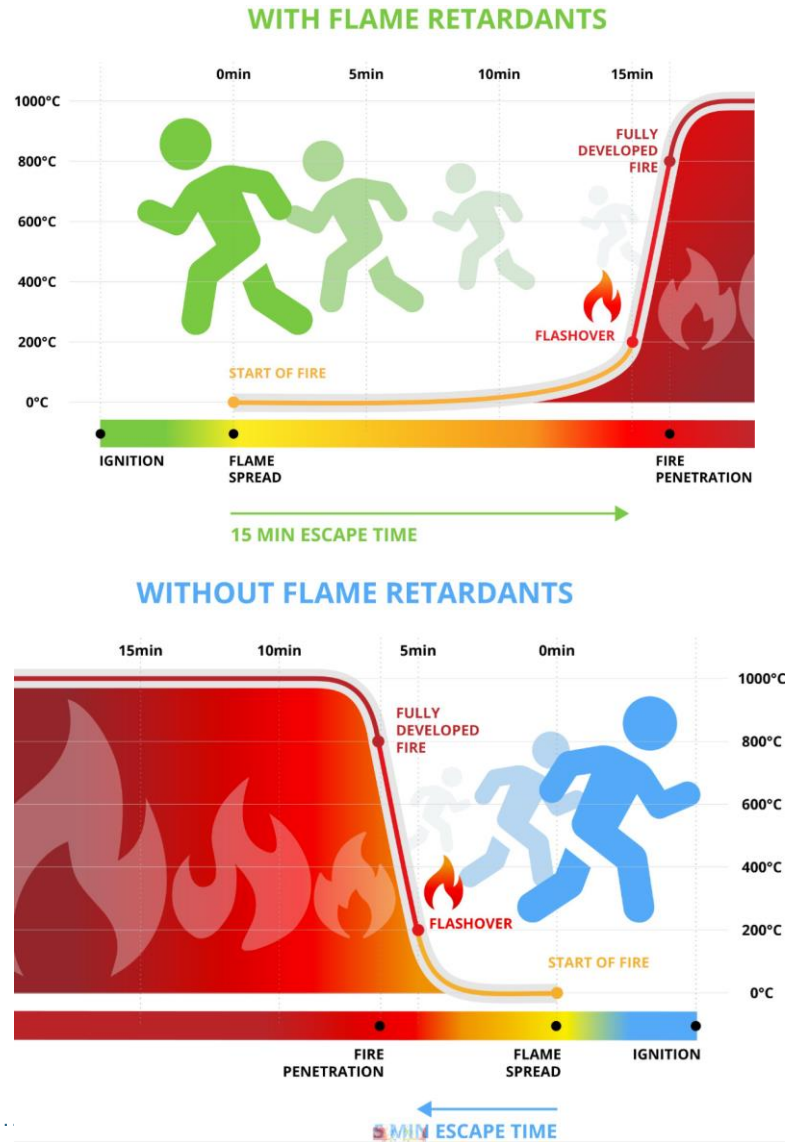
Escape time includes:

- Time to discover the fire,
- Alert other people
- Take the decision to call the fire brigade
- Take own actions to extinguish
- Take the decision to evacuate the building

The times and temperatures in the graphs are typical numbers but can vary according to the circumstances and materials involved.

➢ **PIN Flame retardants reduce the risk of ignition and fire spread of many plastic and textile materials which results in more available escape time for occupants.**

How Flame Retardants can increase escape time in fires



(1) Start of fire (2) Flashover (3) Fully developed fire

Flame Retardants play a crucial role in modern buildings

Fire Prevention and Control: Flame retardants help prevent fires from starting and slow the spread of fire if it does start. This is particularly important in buildings with a high volume of combustible materials and electronic devices

Decreased Smoke Production: They also help in reducing the amount of smoke produced during a fire, which is critical as smoke inhalation is a leading cause of fire-related injuries and deaths

Increased Escape Time: By slowing down the spread of fire, flame retardants provide additional time for occupants to evacuate safely and for emergency responders to arrive.

Compliance with Safety Regulations: Many building codes and safety regulations require the use of flame retardants in construction materials to ensure buildings meet fire safety standards

Reduced Heat Release: Flame retardants reduce the amount of heat released during a fire, which can help in controlling the fire and minimizing damage

Protection of Property and Lives: Overall, the use of flame retardants helps protect both property and lives by mitigating the risks associated with fires

Outlook and future challenges for fire safety in modern building

- **High Fire Safety Standards**: EU fire safety standards in buildings and construction must be maintained or improved

- **Regulatory Challenges:**
  - **Stricter flame-retardant regulations and compliance challenges ahead** to meet current and future fire safety standards
  - PIN flame retardants provide **recognised fire safety solutions**
  - pinfa members **continue to develop new products** to improve performance and minimise health and environmental risks

- **Future Challenges:**
  - **E-mobility:** Increased use of electric vehicles
  - **Digitalization**: Growing integration of digital technologies
  - **Consumption:** Rising demand for electric power **Electric Energy**

Need for enhanced Safety: These factors collectively demand even higher fire safety measures and **Innovation**


Photo Credit: Getty Images

Thank you

Thomas Futterer
PINFA Vice-Chairman

Chemische Fabrik Budenheim

Cefic sector group

Notes and references

pinfa

Eric Guillaume

Efectis

EUROPEAN FIRE SAFETY WEEK 2024

GRENFELL TOWER INQUIRY PHASE 2
KEY FINDINGS AND RESPONSIBILITIES

RECOMMENDATIONS FOR PREVENTING FUTURE DISASTERS

HDR DR ERIC GUILLAUME
NOVEMBER 2024

Efectis

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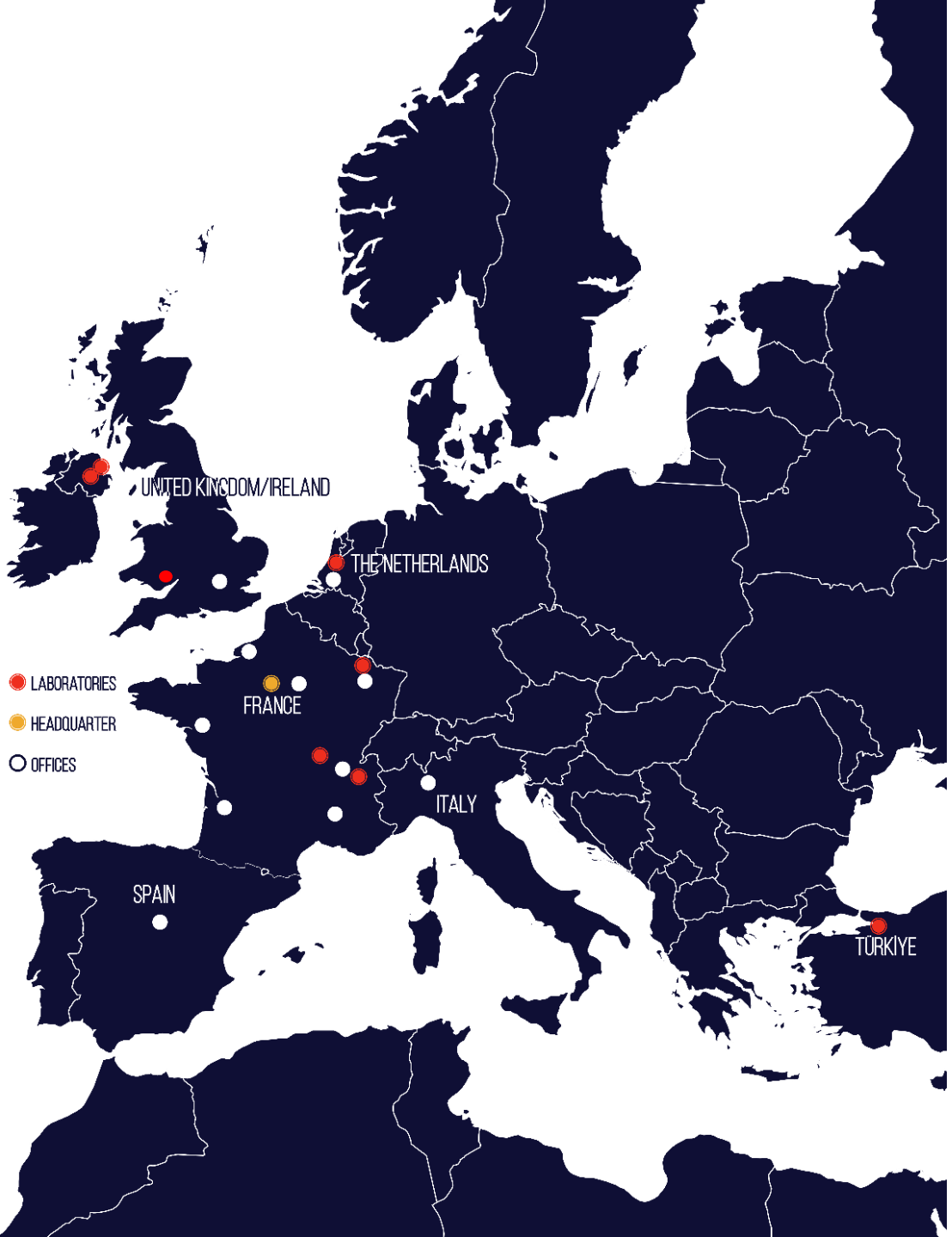
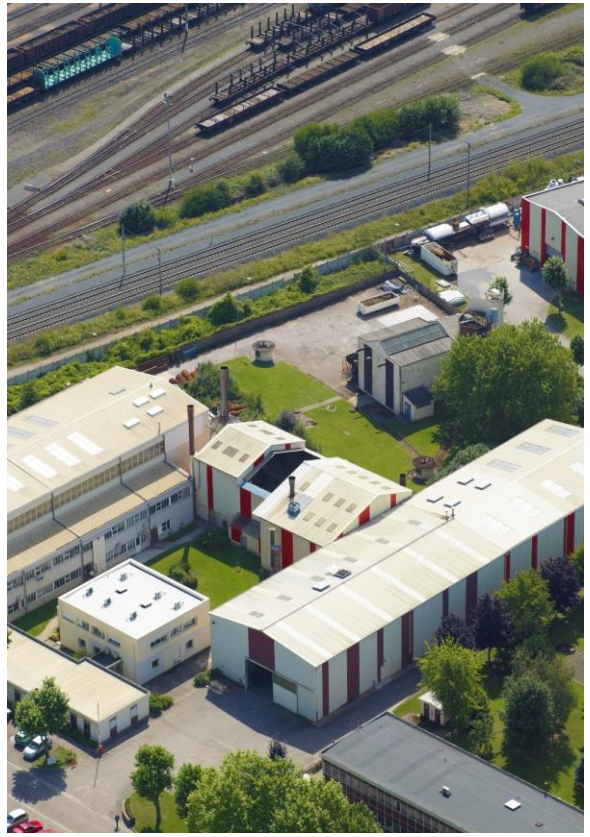
Who are we?



EFECTIS GROUP LOCATIONS

- **1 Holding (Saint-Aubin - France)**
- **4 companies**
  - Efectis France
  - Efectis Nederland
  - Efectis Era Avrasya
  - Efectis UK/Ireland
- **Representation in Espagne**
- **Representation in Italie**
- **8 test laboratories**
  - Maizières-lès-Metz (France)
  - Les Avenières (France)
  - Saint Yan (France)
  - Bleiswijk (Netherlands)
  - Gebze (Türkiye)
  - Belfast – 2 sites (UK)
  - Cardiff (UK)

OUR LABORATORIES



Maizières les Metz
France | 1962

Bleiswijk
The Netherlands | 2013

Belfast
UK | 2017

OUR LABORATORIES

Gebze
Turkiye | 2017

Les Avenières
France - 2013

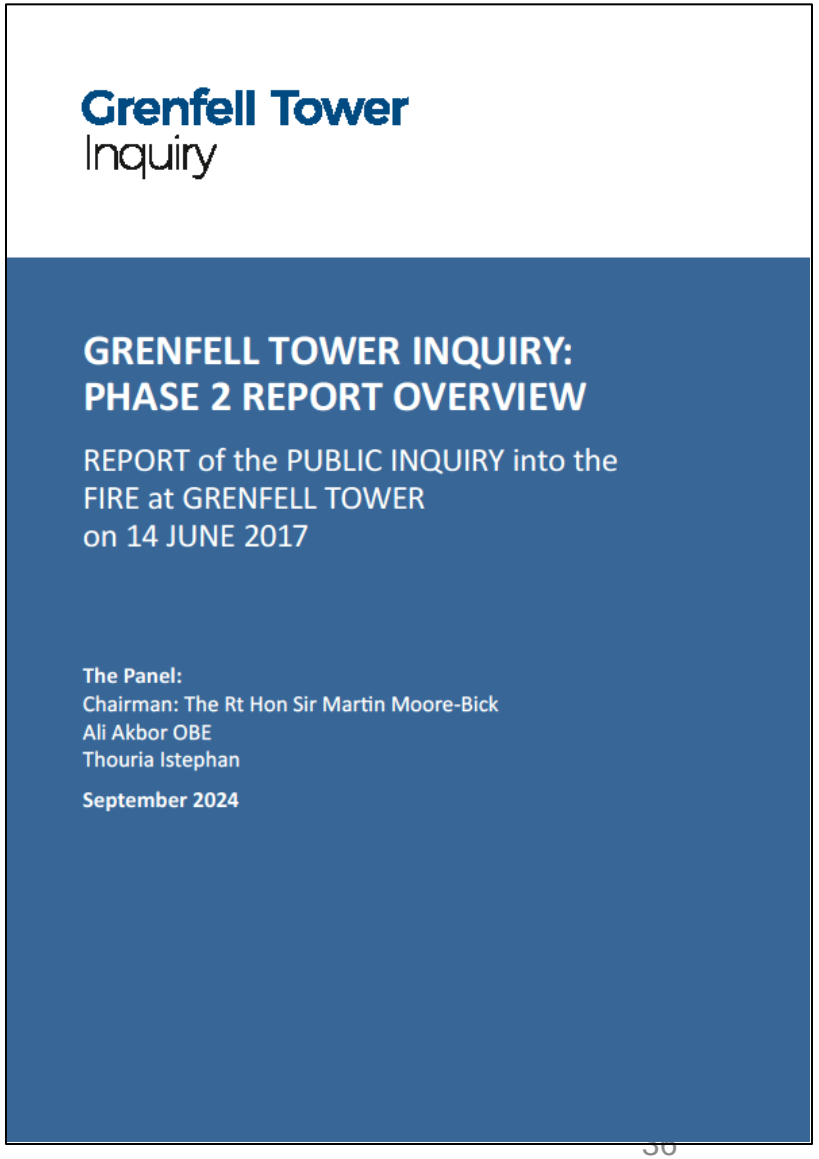
Saint Yan
France | 2018

2

The road to a disaster

OVERVIEW OF THE GRENFELL TOWER INQUIRY PHASE 2

- Inquiry into the fire at Grenfell Tower on 14 June 2017
- Examination of systemic failures across government, industry, and regulatory bodies
- Focus on preventing a recurrence of such a tragedy



GRENFELL TOWER FIRE: KEY FACTS

- Date: 14 June 2017
- Start Time: Fire broke out at 00:54
- Fatalities: 72 people lost their lives
- Survivors: 223 residents escaped the building
- Location: 24-story residential building in West London
- Cause: The fire started in a fourth-floor flat due to a kitchen fire (a priori faulty refrigerator)

TIMELINE OF THE GRENFELL FIRE SPREAD

- The fire started on the fourth floor, inside a kitchen
- Spread rapidly up the exterior of the building due to the ACM cladding and insulation
- Cladding’s polyethylene core and insulation contributed to "chimney effect," causing fire to engulf the tower within minutes
- Failure of fire compartmentation and evacuation procedures

THE PATH TO DISASTER – FAILURES LEADING TO GRENFELL

- Decades of failure by the government and construction industry
- Use of combustible cladding materials in high-rise buildings
- Key events: Knowsley Heights (1991), Lakanal House (2009)
- Inadequate response to warnings about the dangers of ACM cladding

Lakanal House fire, 2009

THE CONTROVERSY AROUND APPROVED DOCUMENT B

- Approved Document B4 sets rules for external fire spread in high-rise buildings
- Vague wording allowed for misinterpretation and misuse of dangerous materials like combustible cladding
- Approved Document B was intended to prevent the spread of fire via external walls, but the lack of clarity enabled dangerous practices
- The Grenfell Tower refurbishment misapplied B4 guidance, leading to the approval of highly flammable materials on the tower's facade

BISBY AND TORERO'S FINDINGS ON THE FIRE'S CAUSES

- Professor Luke Bisby demonstrated how the ACM cladding and combustible insulation were primary accelerants in the fire's rapid spread
- Professor Jose Torero identified systemic failures, including poor compartmentation and design flaws that allowed fire to bypass protections. Highlighted the lack of a holistic fire safety assessment, especially with the interaction of different materials
- Both experts concluded that the failure to evaluate fire behavior under real conditions was a key cause
- Both rejected tests conducted by BRE in the framework of the enquiry, stating they were not representative enough
- Efectis reached the same conclusions from experimental and numerical fire reconstruction since 2019.

3

The players and their responsabilities

STUDIO E'S ROLE – INCOMPETENCE AND COST-DRIVEN CLADDING DECISION

- Studio E Architects, the lead architects for the refurbishment, were incompetent in dealing with fire safety considerations.
- Originally planned to use zinc cladding, but switched to ACM PE (Aluminum Composite Material with Polyethylene core) for cost reasons only, ignoring safety concerns.
- The decision was made without properly assessing the fire risks associated with the cheaper ACM PE material.
- The lack of competence in dealing with regulatory and safety guidelines contributed directly to the fire

BBA’S ROLE IN CERTIFYING DANGEROUS MATERIALS

- BBA (British Board of Agrément) is responsible for certifying building materials, including Arconic's ACM panels used in Grenfell Tower.
- BBA issued certificates for Arconic’s ACM PE cladding despite knowing about its combustibility and fire risks.
- Lack of proper testing and oversight, allowing dangerous materials to be approved for use on high-rise buildings like Grenfell Tower.
- BBA failed to communicate the known risks of the product, contributing to the disaster

GOVERNMENT RESPONSIBILITIES

- Multiple missed opportunities to regulate combustible materials
- Failure to act on critical findings from 1999 onwards
- Complacency and lack of urgency in addressing fire safety risks
- Use of old test methods (BS 476-6 and -7) poorly representing such fire scenarios
- No adaptation to Euroclasses

ROLE OF EXOVA/WARRINGTONFIRE IN COMPLIANCE ASSESSMENTS

- Exova was hired to assess fire safety during the Grenfell refurbishment
- The company failed to highlight the risks associated with combustible cladding in their fire strategy reports
- Exova's report downplayed the risk of fire spread, even after significant changes to the cladding design were made
- Responsibility for providing incorrect fire safety assessments that contributed to the disaster

ROLE OF THE BUILDING RESEARCH ESTABLISHMENT (BRE)

- BRE failed to uphold rigorous standards during fire testing of materials like Celotex RS5000
- Not seen as independent enough and helped industrials to “pass” the tests
- Overreliance on flawed BS 8414 testing led to certification of dangerous materials for high-rise buildings
- Lack of oversight allowed dangerous materials to be approved for use on Grenfell Tower

ACCOUNTABILITY OF PRODUCT MANUFACTURERS

- Systematic dishonesty by manufacturers like Arconic, Celotex, and Kingspan
- Manipulation of fire tests and misrepresentation of product safety
- Continued sale of dangerous products despite known risks
- Lack of ethics from construction products industry

LONDON FIRE BRIGADE (LFB) – PRE-EXISTING WEAKNESSES

- LFB failed to learn from previous high-rise fires, such as Lakanal House (2009)
- Despite formal recommendations after Lakanal, LFB did not revise its operational policies
- Continued over-reliance on the "stay put" policy, even in cases where the fire was not contained
- Lack of fire survival guidance procedures before Grenfell

LONDON FIRE BRIGADE (LFB) – OPERATIONAL FAILURES AT GRENFELL

- The stubborn adherence to the "stay put" strategy, despite clear signs that the fire was spreading externally, was a fatal error
- The stay put policy is based on the assumption that fire compartmentation will prevent spread, which failed at Grenfell
- LFB missed the opportunity to order a full evacuation, which could have saved nearly two-thirds of the victims
- Communication and coordination failures in handling fire survival guidance calls and managing evacuation efforts

4

The recommandations

RECOMMENDATIONS FOR THE CONSTRUCTION INDUSTRY

- Stronger regulation and oversight of high-rise building materials
- Need for independent testing bodies and clearer product certification
- Recommendations for improved industry practices

FIRE SAFETY MANAGEMENT RECOMMENDATIONS

- Enhanced oversight of fire safety assessments in residential buildings
- Greater attention to the needs of vulnerable occupants
- Urgent need for modernized fire risk management in high-rise buildings

5

Conclusions

CONCLUSION AND NEXT STEPS

- Implementation of recommendations is essential to preventing future tragedies
- Collaboration between government, industry, and regulatory bodies is required
- Ongoing monitoring of fire safety standards in high-risk buildings

EN SAVOIR PLUS ?

- Retrouvez tous les détails sur le rôle des laboratoires, leur histoire, leur avenir…

https://efectis.com/app/uploads/2023/02/Efectis-Livre-50-ans-.pdf

Efectis

Suzana Draganić
University of Novi Sad
Faculty of Technical Sciences

HOW FIRE LOAD AND MATERIAL FLAMMABILITY HAVE CHANGED IN BUILDINGS OVER THE LAST 50 YEARS?

Why this has not resulted in a multiplication of fires and fire deaths?

Suzana Draganić, Igor Džolev and Mirjana Laban

Presenter:
PhD Suzana Draganić, Assistant Professor
suzanav@uns.ac.rs

EUROPEAN FIRE SAFETY ALLIANCE

EUROPEAN FIRE SAFETY WEEK 2024
18-22 NOVEMBER

UNIVERSITY OF NOVI SAD
FACULTY OF TECHNICAL SCIENCES
Department of Civil Engineering and Geodesy
Novi Sad, Serbia

HOW FIRE LOAD AND MATERIAL FLAMMABILITY HAVE CHANGED IN BUILDINGS OVER THE LAST 50 YEARS?

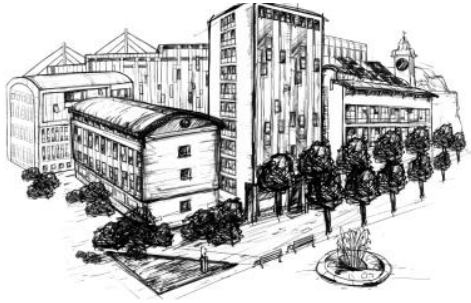
EUROPEAN FIRE SAFETY ALLIANCE

University of Novi Sad (UNS)

14 faculties
3 scientific institutes
50,000+ students
5,000 employees
350 study programmes

The only state university in the Autonomous Province of Vojvodina

https://www.uns.ac.rs/



Faculty of Technical Sciences (FTS)

established at UNS (**1960**)
13 departments
31 research centres
126 laboratories
17,000+ students
1,200+ employees

FTS ranks among the largest and most developed faculties in the region

https://ftn.uns.ac.rs/

Department of Civil Engineering and Geodesy

established at FTS (**1971**)
65 employees
Civil Engineering
Geodesy and Geoinformatics
Disaster Risk Management and Fire Safety

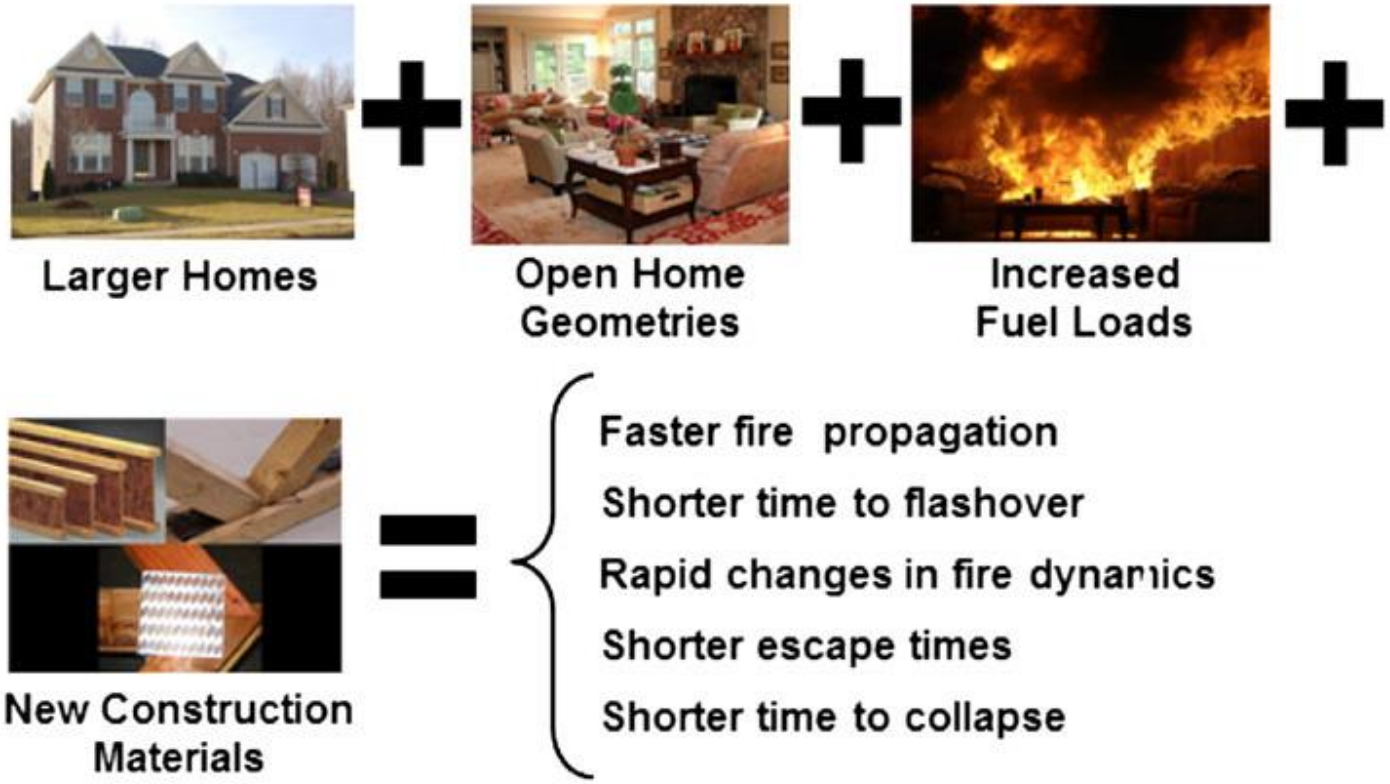
http://gradjevinarstvo.ns.net

EUROPEAN FIRE SAFETY ALLIANCE

Introduction - Evolution of Residential Fire Dynamics

Result of changes over the past 50 years in:

- Dwelling size
- Geometry
- Spatial organization
- Contents
- Construction materials

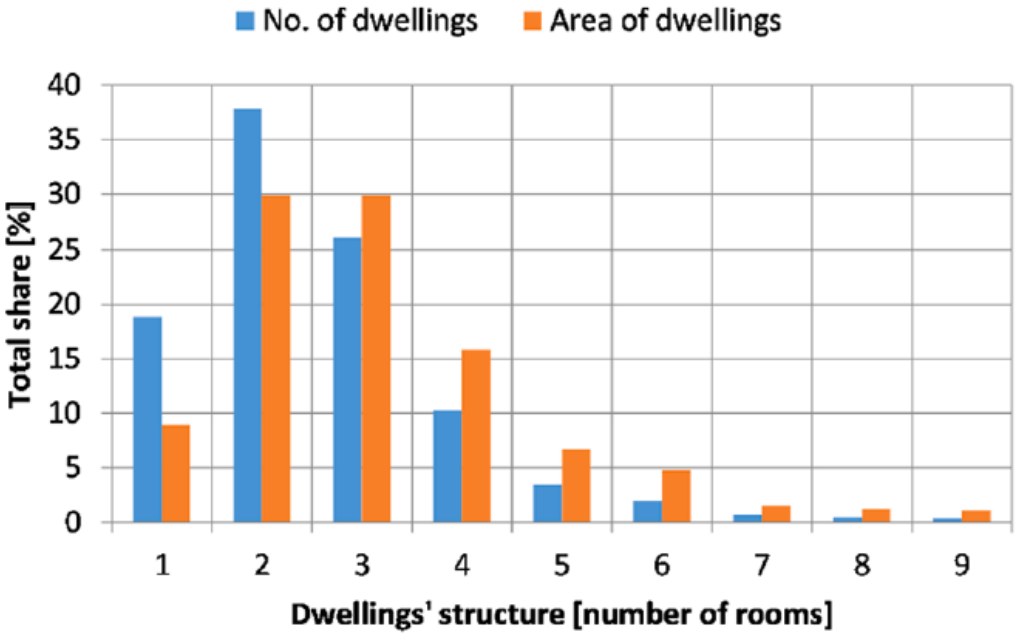


Source: Kerber, S., 2012. Analysis of Changing Residential Fire Dynamics and Its Implications on Firefighter Operational Timeframes. Fire Technol. 48 (4), 865–891. https://doi.org/ 10.1007/s10694-011-0249-2

EUROPEAN FIRE SAFETY ALLIANCE

Fire load survey in residential family apartments in Serbia

- Location: Novi Sad, Serbia
- Building type: residential buildings and houses
- Apartment type: three-room family apartments
- Sample: 120 apartments (8.700 m^2)



Fire load calculation methodology

$$P_i = \frac{\sum_{i=1}^{N} \gamma_i \cdot V_i \cdot H_i}{S}$$

γ_i = specific density of material, kg/m^3
V_i = volume of combustible substances, m^3
H_i = net calorific value of the material, MJ/kg
S = floor area of the fire compartment, m^2.

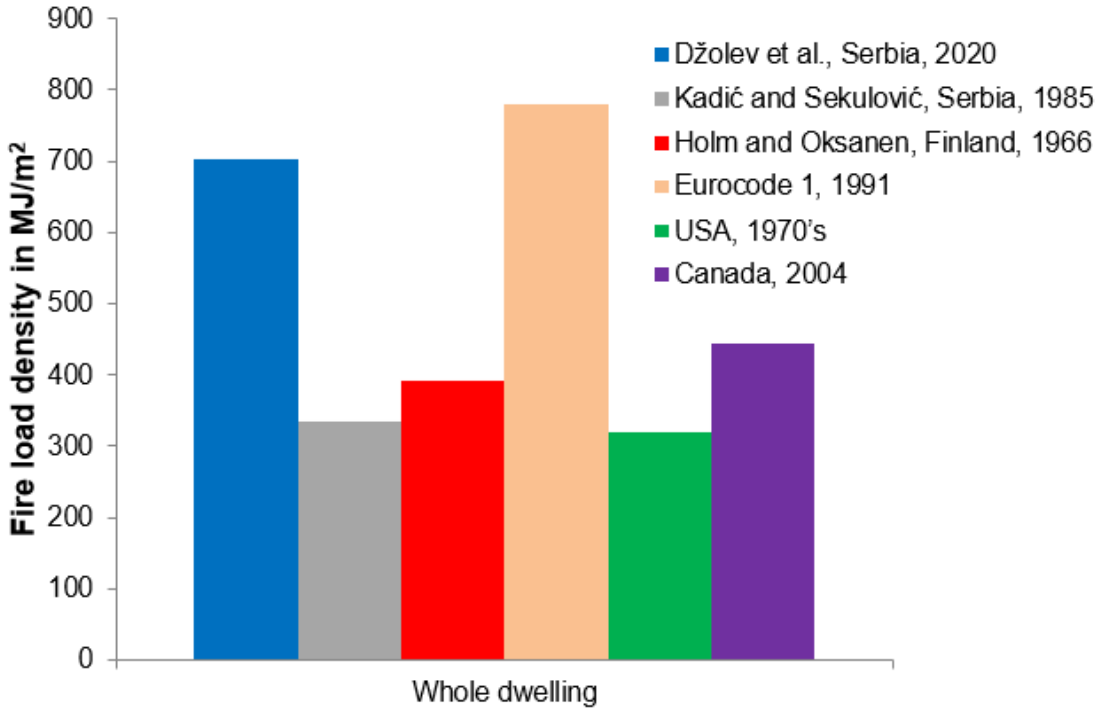
Serbian standard
SRPS U.J1.030: 1976 Fire protection - Fire load

Source: Džolev, I., Laban, M., & Draganić, S. (2021). *Survey based fire load assessment and impact analysis of fire load increment on fire development in contemporary dwellings. Safety Science, 135, 105094.* doi:10.1016/j.ssci.2020.105094

EUROPEAN FIRE SAFETY ALLIANCE

Fire load survey in residential family apartments in Serbia

- Fire load density **DOUBLED** in the past 40 years (from 335 MJ/m² to **702 MJ/m²**)



Mean value and standard deviation of fire load density.

[MJ/m²]	Whole apartment	Living room	Bedroom	Kitchen
Present case study				
Mean value	702	772	930	1020
Standard deviation	59	135	205	225
Kadić and Sekulović, Serbia, 1985				
Mean value	335	–	–	–
Holm and Oksanen, Finland, 1966				
Mean value	391	–	–	–
Vassart, 1991				
Mean value	780	–	–	–
Standard deviation	234	–	–	–
Cambell, USA, 1970				
Mean value	320	350	390	290
Bwalya, Canada, 2004				
Mean value	445	412	534	801
Standard deviation	–	127	135	123

Source: Džolev, I., Laban, M., & Draganić, S. (2021). *Survey based fire load assessment and impact analysis of fire load increment on fire development in contemporary dwellings. Safety Science, 135, 105094.* doi:10.1016/j.ssci.2020.105094

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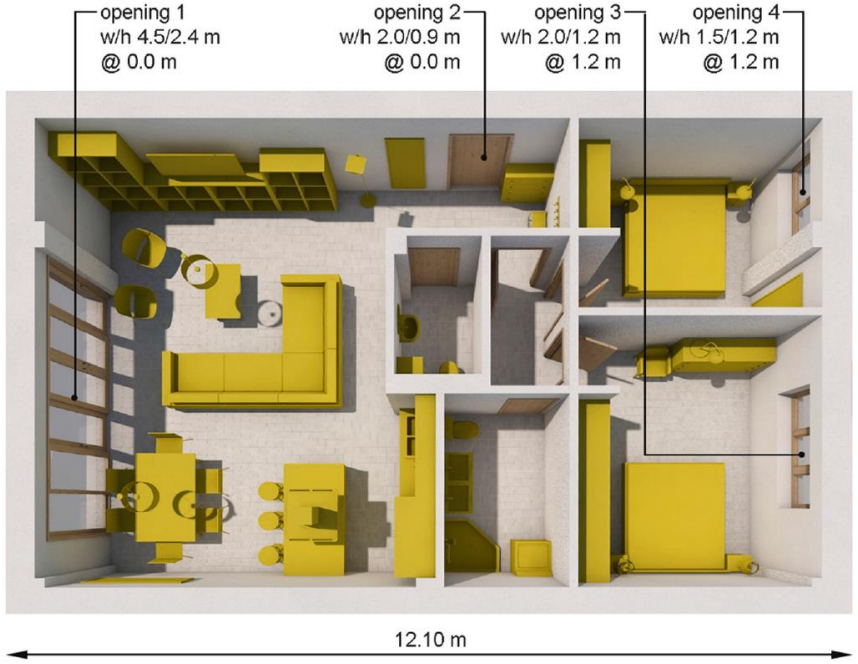
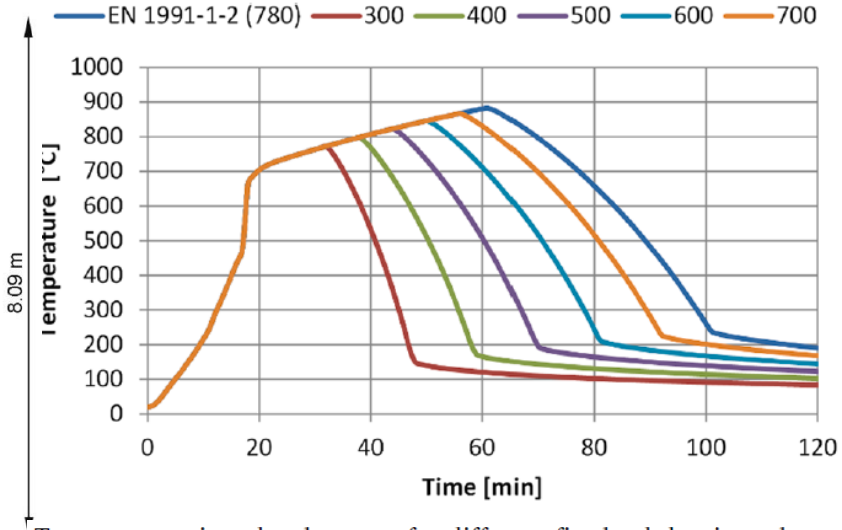
Numerical analysis on the influence of fire load on fire development

(Computer code **OZone**)

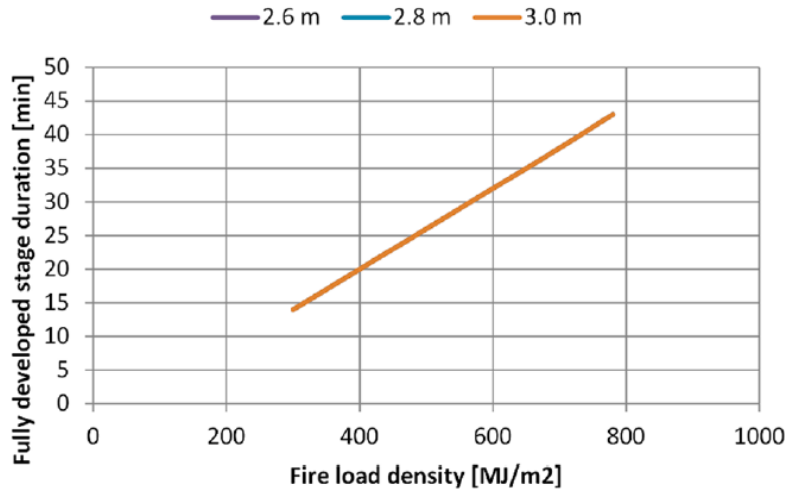
- **2.5 times LONGER** duration of fully developed fire stage
- **10% INCREASE** of max T reached in the compartment, compared to the period 30 years ago.



Geometry, openings definition and boundary layers of analysed three-room apartment



Temperature-time development for different fire load density values.



Duration of the fully developed fire stage for different fire load density values

Source: Džolev, I., Laban, M., & Draganić, S. (2021). *Survey based fire load assessment and impact analysis of fire load increment on fire development in contemporary dwellings. Safety Science,*

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Conclusion and Future Needs

- Changing dynamics of residential fires (the evolution of a typical family dwelling).
- The rapid onset of untenable conditions and shortening of escape time (the use of materials with unknown composition and uncertain flammability).
- Uncertainty when calculating fire performance (differences in proposed fire load values).

Why this has not resulted in a multiplication of fires and fire deaths?

- Strengthened fire safety codes and regulations
- Improved fire detection and suppression systems
- Implementation of fire-safe building designs
- Higher public awareness and trainings
- Enhanced firefighting techniques and technology

Need to continually update fire load data through new fire load surveys

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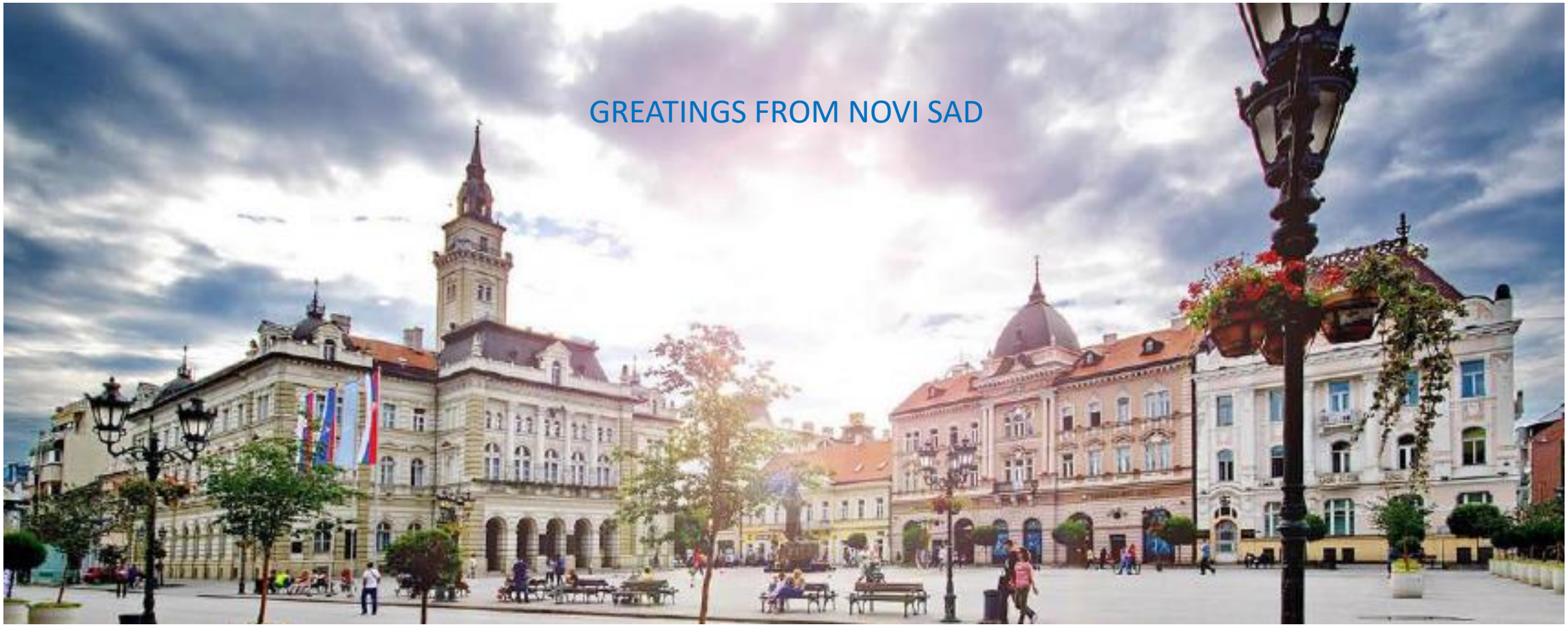
Thank you for your attention!



Heikki Väänänen

European Commission

DG Grow

Fire safety activities in European Commission DG GROW

Heikki Väänänen DG GROW.H.1 Construction

Fire Safety: Who does what in the EU?

- Under Treaty on European Union, the competence regarding the fire safety of buildings is with the Member States (and/or regions and/or local authorities).
  - ✓This follows the subsidiarity principle, and
  - ✓is logical given different building traditions, climatic and geographic conditions.
- EU level regulation is exercised through Construction Product Regulation (CPR) ensuring the Internal Market for Construction Products.
  - ✓Common technical language i.e., harmonized European (product) Standards and European Assessment Documents
  - ✓Related harmonised testing methods
- Commission can however facilitate improvements in fire safety through specific projects and activities

DG GROW activities “Big picture”

Regulatory

- ✓ Related to implementation of CPR
- ✓ Product standards
- ✓ Delegated acts

- ✓ “New CPR” and “CPR Acquis”

In between - Specific projects

- ✓ EU FireStat
- ✓ Façade fire performance testing
- ✓ Fire Safety Engineering

Non-regulatory

- ✓ Fire Information Exchange Platform (FIEP)

New CPR and fire safety

- CPR continues to address fire safety as one of the “Basic Requirements for Construction Works” – No substantial change, text more descriptive/elaborated
- At level of construction products, current approach stays relevant
  - ✓ Reaction to fire
  - ✓ Glowing combustion
  - ✓ Resistance to fire
  - ✓ External fire exposure – roofs
  - ✓ External fire exposure – facades (in the making)
- As usual these will be implemented through harmonized product standards

Project: EU FireStat

- Closing Data Gaps and Paving the Way for Pan-European Fire Safety Efforts – “EU FireStat”
- Background
  - An earlier study (Smoke toxicity from CPs) identified the general lack of data
  - Fire Information Exchange Platform (FIEP) identified common terminology, fire statistics and the need to collect such data at EU level as an area of priority
  - European Parliament identified the need to address gaps in fire data and decided to finance a Pilot Project on the subject
- Project has been finalised and the documentation is available on project website EU FireStat (eufirestat-efectis.com)
- Preparatory Action to continue the development

European Commission

Project: Façade fire performance testing

- Current situation is not optimal from Internal Market point of view
  - There is a large number of national test methods and regulations in place.
  - Requirements for more energy efficient buildings will likely increase the demand for these products
- Previous project proposed a harmonised testing method and related classification
- Report has been finalized (available in https://www.ri.se/en/what-we-do/projects/european-approach-to-assess-the-fire-performance-of-facades)
- Next step from CPR point of view is standardization request to CEN

Project: Fire Safety Engineering

- Prospects for European fire safety code using fire engineering principles by analogy to the Eurocodes:
  - common design rules, but
  - safety level remains a choice of the MS authorities through Nationally Determined Parameters
- Assessing standardization needs for incorporation of fire safety engineering in the regulatory frameworks of the MS, explore
  - the needs of the MS regulatory authorities,
  - the current Eurocodes and the current ISO standardization work
- Needs for guidance and training for professionals
- JRC Publications Repository - The status and needs for implementation of Fire Safety Engineering approach in Europe (europa.eu)

Fire Information Exchange Platform (FIEP)

- Commission considers that improvements in fire safety would be facilitated by co-operation among Member States and relevant stakeholders
- On this basis FIEP has been created in 2017 for sharing the best practices and lessons learned in the area of fire safety
- Focus on domestic fires with 5 broad areas of interest:
  - common terminology and fire statistics,
  - application of fire prevention principles,
  - new products and high-rise buildings,
  - the exchange of experience from fire accidents,
  - the use of a fire engineering approach in building regulations.

Fire Information Exchange Platform (FIEP)

- No “formal” role – platform for exchange and learning

FIEP webinars 2021-24	
Batteries in fire	Timber
Developing fire safety knowledge and awareness	eVehicles and carparks
EU projects on Fire Safety	Fire investigation
Development and risk of smoke in fires	Fire safety of vulnerable communities
Electrical fire safety	Prevention and intervention
Fire statistics	Training and education
Women involvement in “fire world”	Installation and maintenance
Photovoltaic panels	

- More information heikki.vaananen@ec.europa.eu, fiep@efectis.com

Thank you

European Commission

Q&A

All

Wrap up & Conclusion

Esther Agyeman-Budu