

**COST Action FP1404**

***Fire Safe Use of Bio-based Building Products***



# **Fire safe use of bio-based building products – a new COST Action FP1404**

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**Tallinn, 2015-03-04**

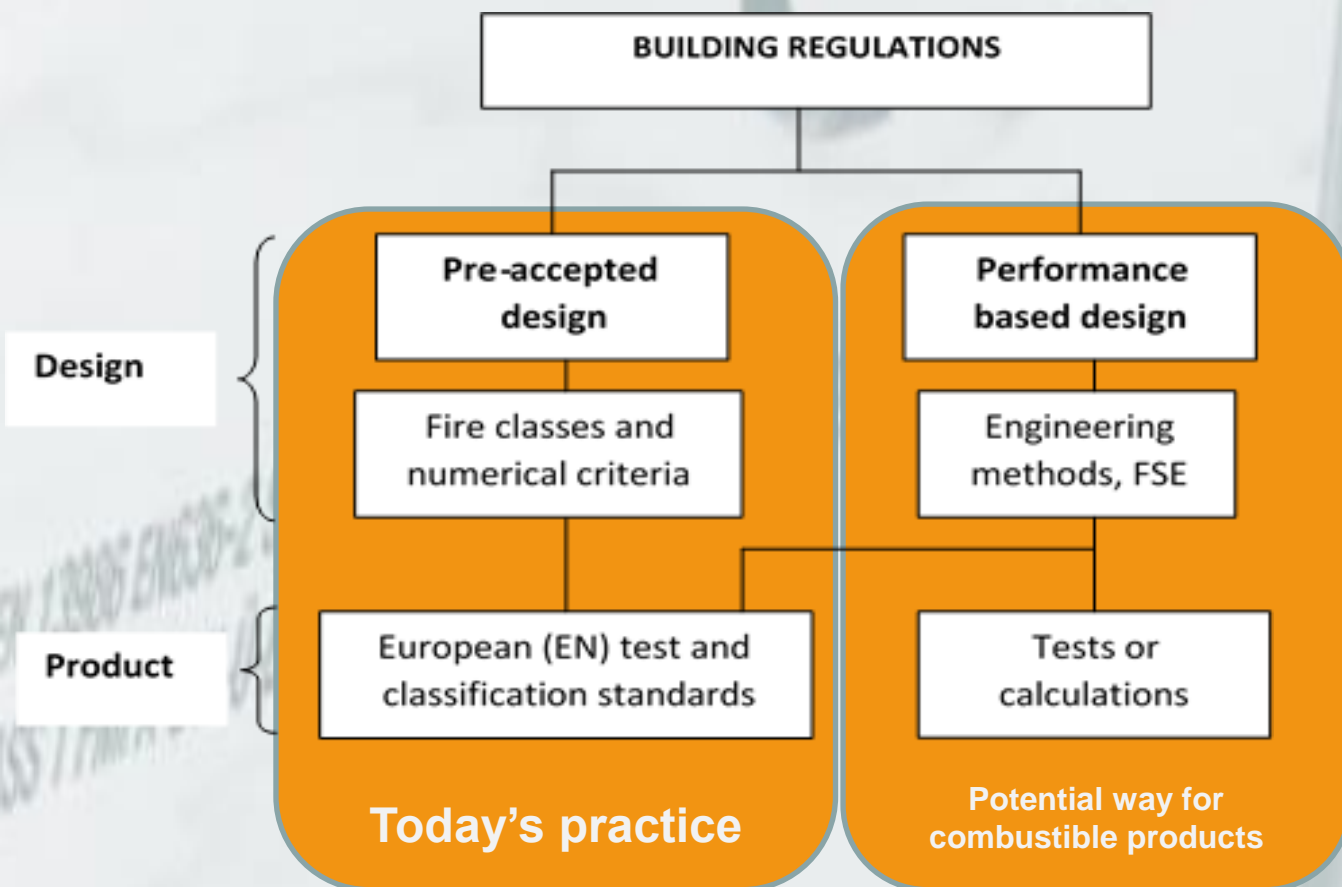


**TTÜ1918**



# 1. Fire Safety in Europe

- European verification system (testing, calculation)
- Building regulations define national safety level

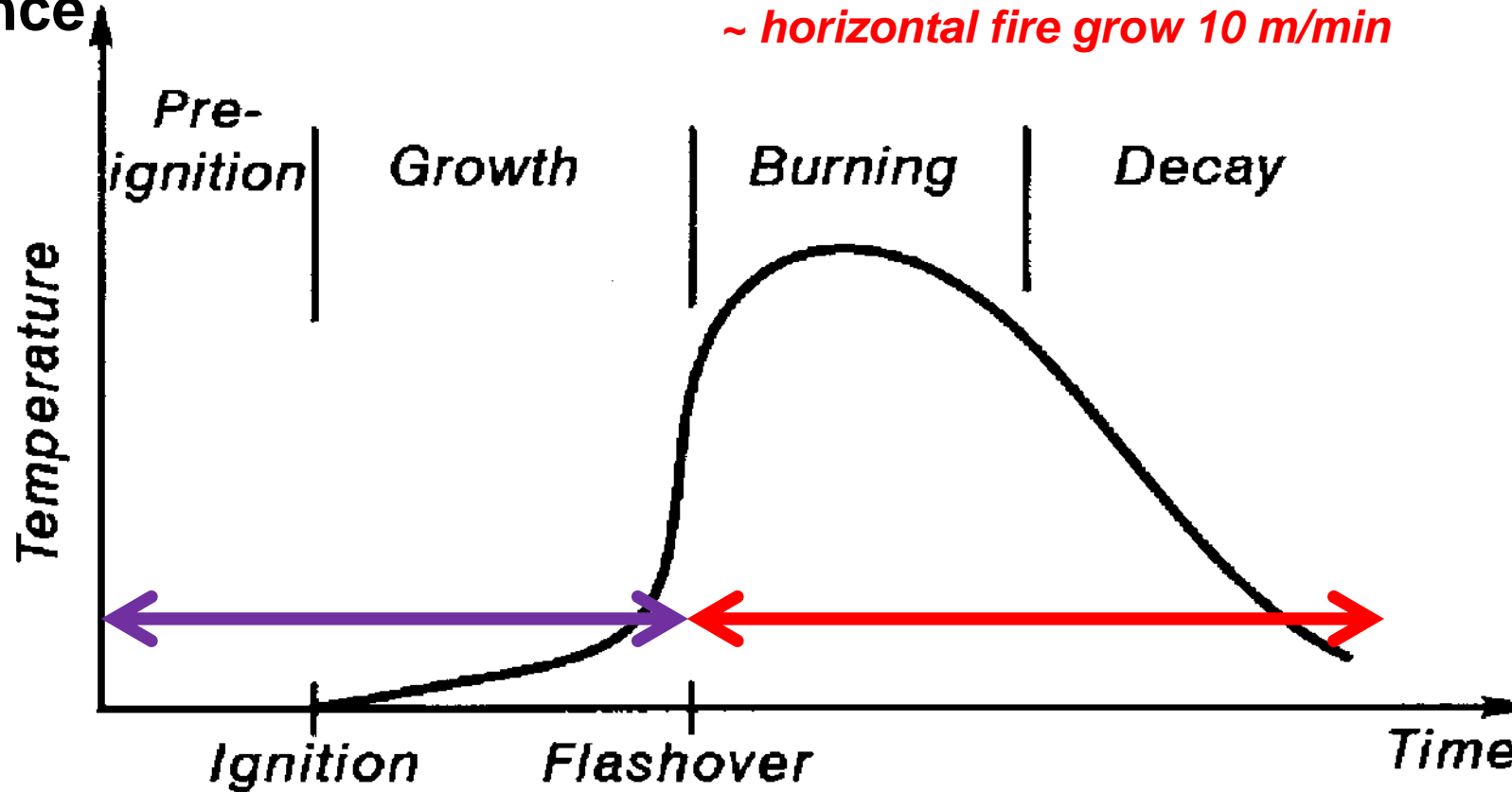


- **Ex: Effect of different building regulations in Europe**  
*Max. number of storeys of timber buildings from 1990*

# 2. Terms of fire safety

- Reaction to fire
- Fire resistance

- ~ Uniform temperature in the compartment
- ~ >600°C
- ~ horizontal fire grow 10 m/min

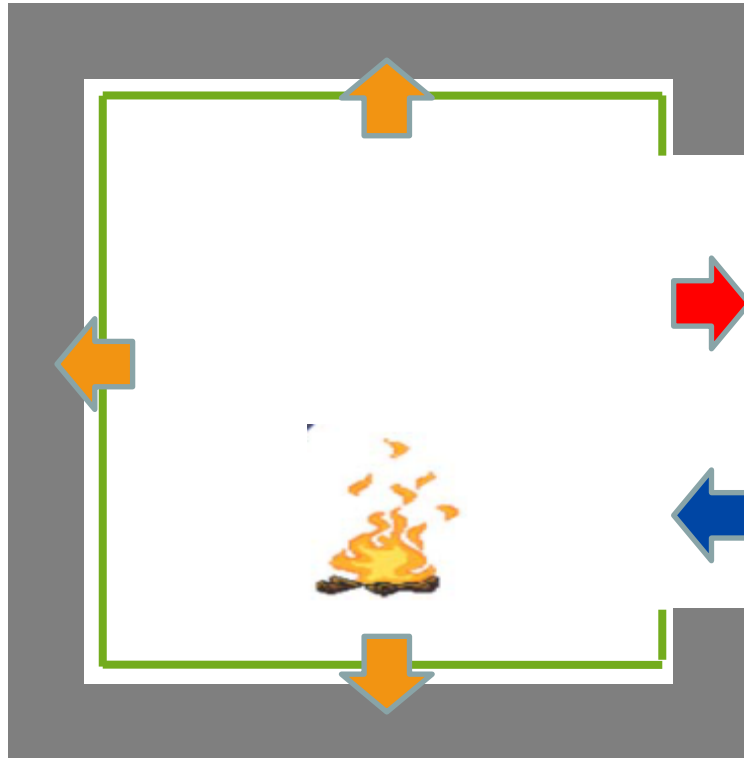


**Reaction to fire**  
 "Materials contribution to a fire development"

**Fire Resistance**  
 "Building element's behaviour in a fire"



# 2. Terms of fire safety “Reaction to fire”



*“Increased contribution to fire growth”*



Euro-class	Smoke	Burning droplets	Requirements		Typical materials
			Non-combustibility	Small flames	
<b>A1</b>	–	–	x	–	Stone, concrete
<b>A2</b>	s1 - s3	d0 - d2	x	–	Gypsum boards, mineral wool
<b>B</b>	s1 - s3	d0 - d2	–	x	Gypsum boards, fire retardant wood products
<b>C</b>	s1 - s3	d0 - d2	–	x	
<b>D</b>	s1 - s3	d0 - d2	–	x	Wood
<b>E</b>	–	- or d2	–	x	Synthetic polymers
<b>F</b>	–	–	–	–	No requirements

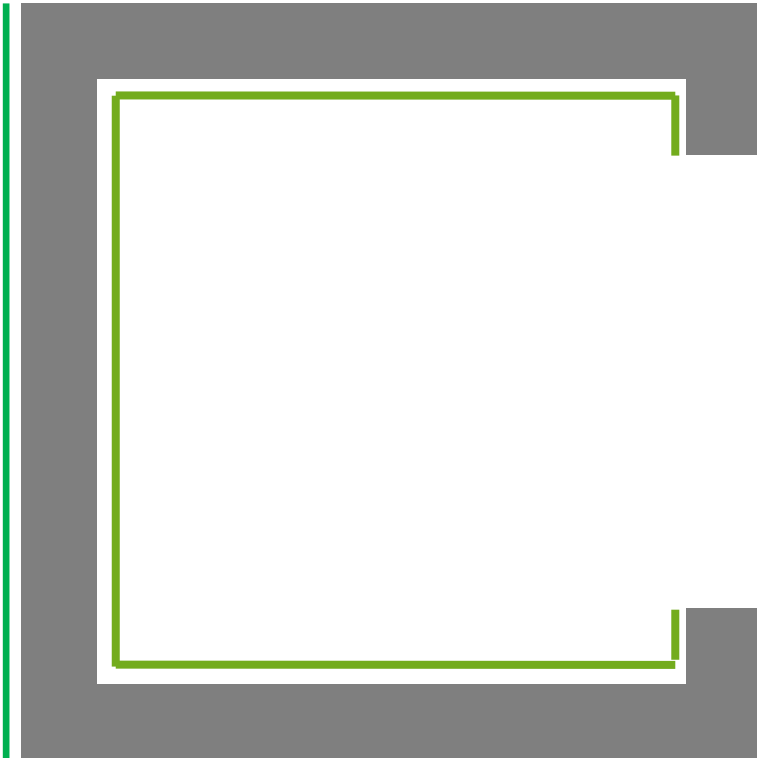
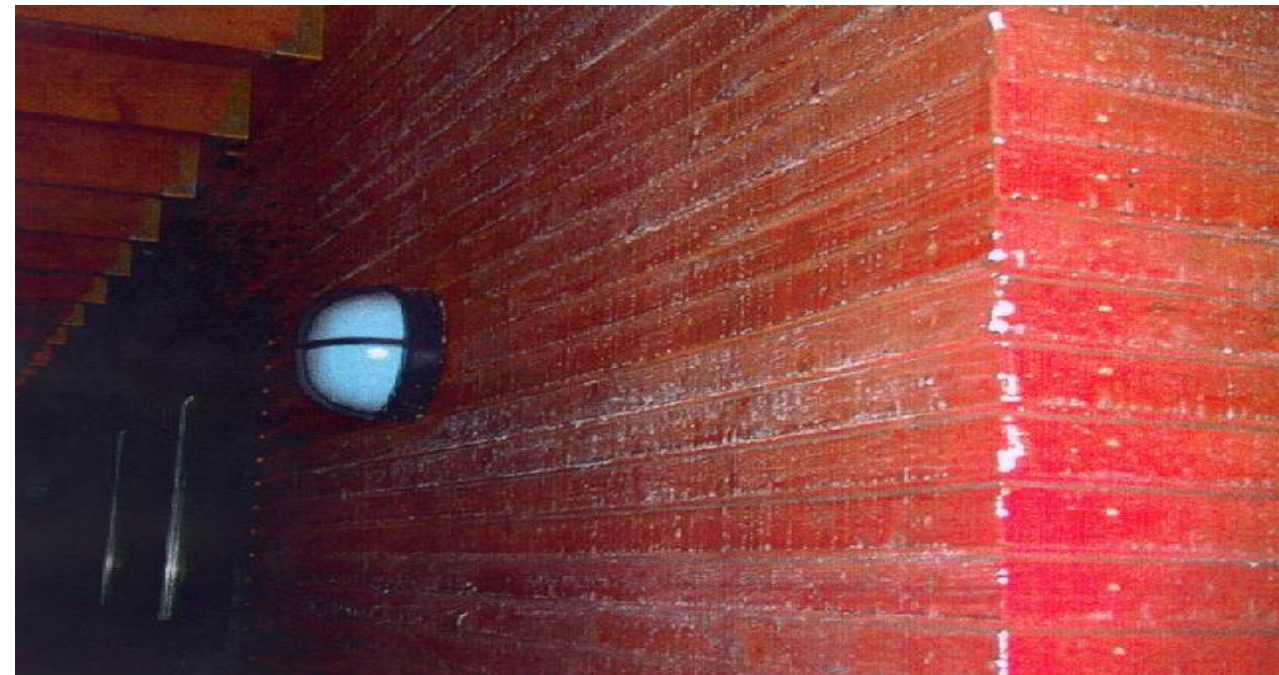
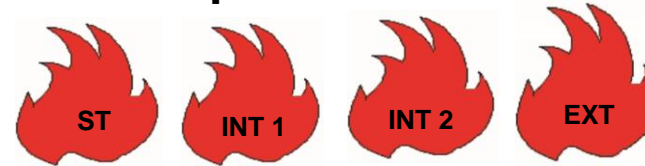
## 2. Terms of fire safety “Reaction to fire”

- Linings
- Flooring
- Insulation materials
- ...
  
- Facades
- Stair cases
- Emergency routes
- ...

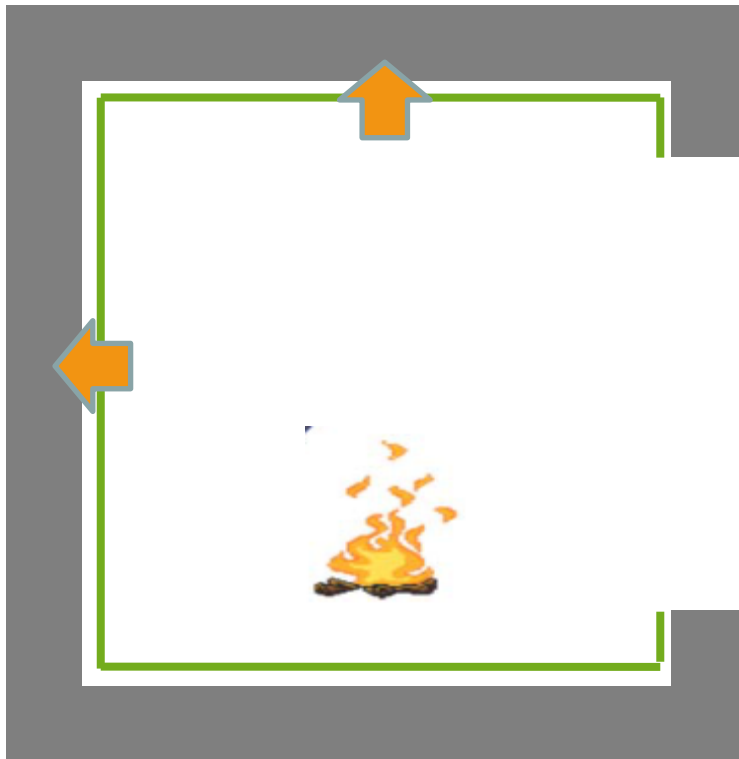


## 2. Terms of fire safety “Reaction to fire”

Improved reaction-to-fire properties by treatments:  
fire-retardant treated wood-based products



## 2. Terms of fire safety “Fire resistance”



- R 90
- EI 30
- REI 60



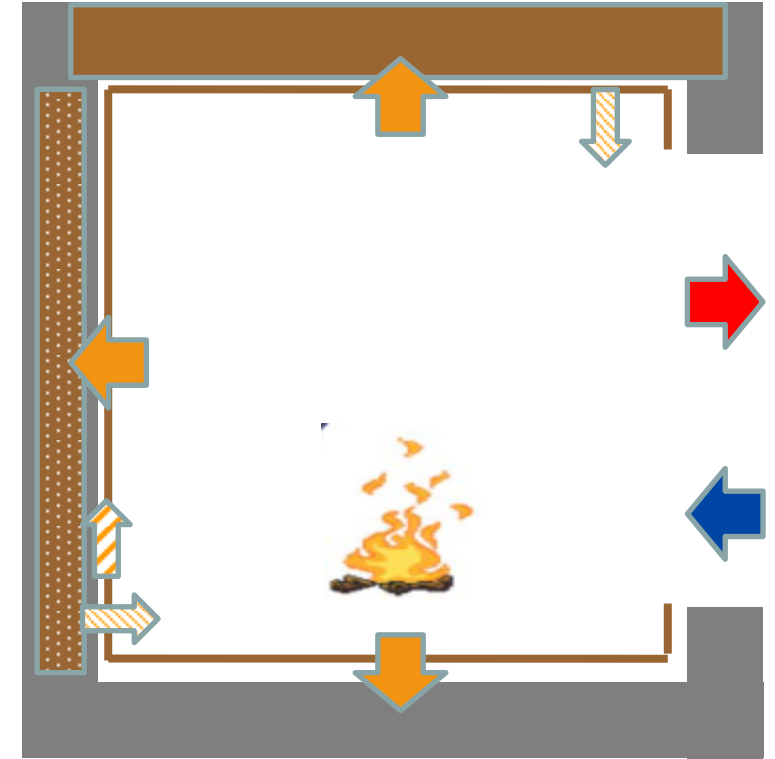
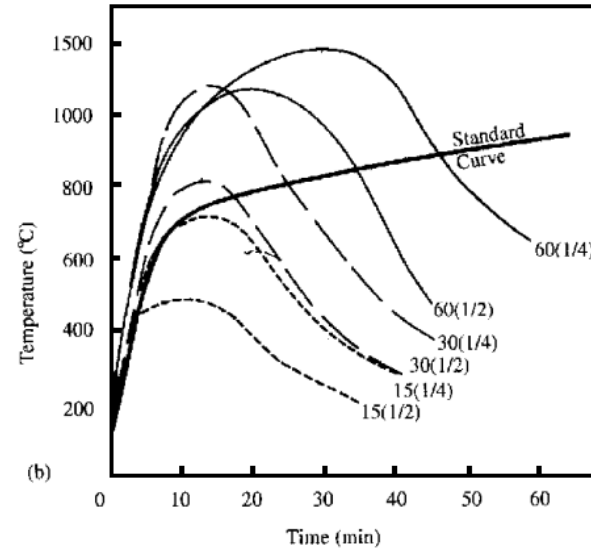
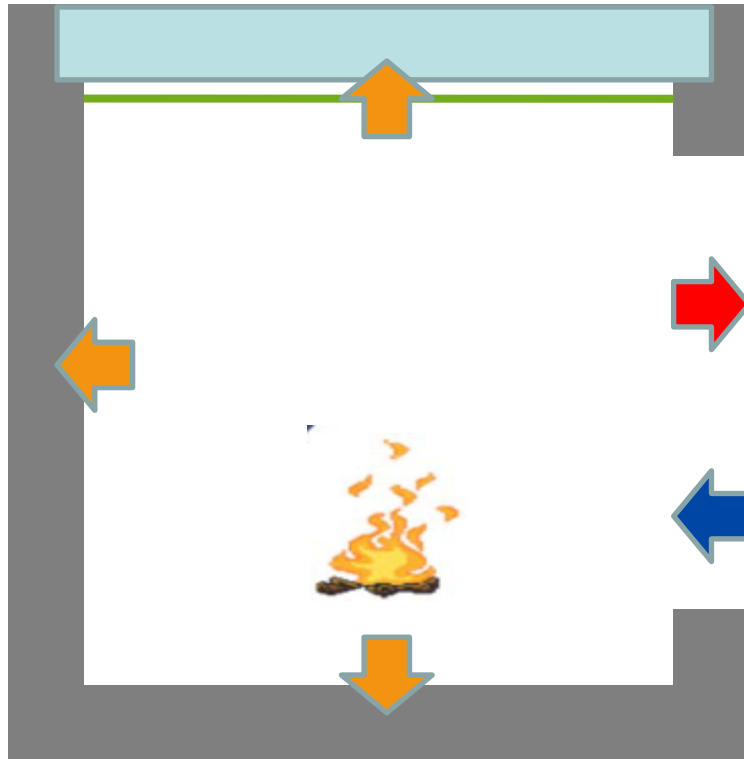


## Bio-based Building products

- mostly used as insulation and lining materials (interior, exterior)
- non load-bearing and load-bearing
- new potential in structural elements/composites



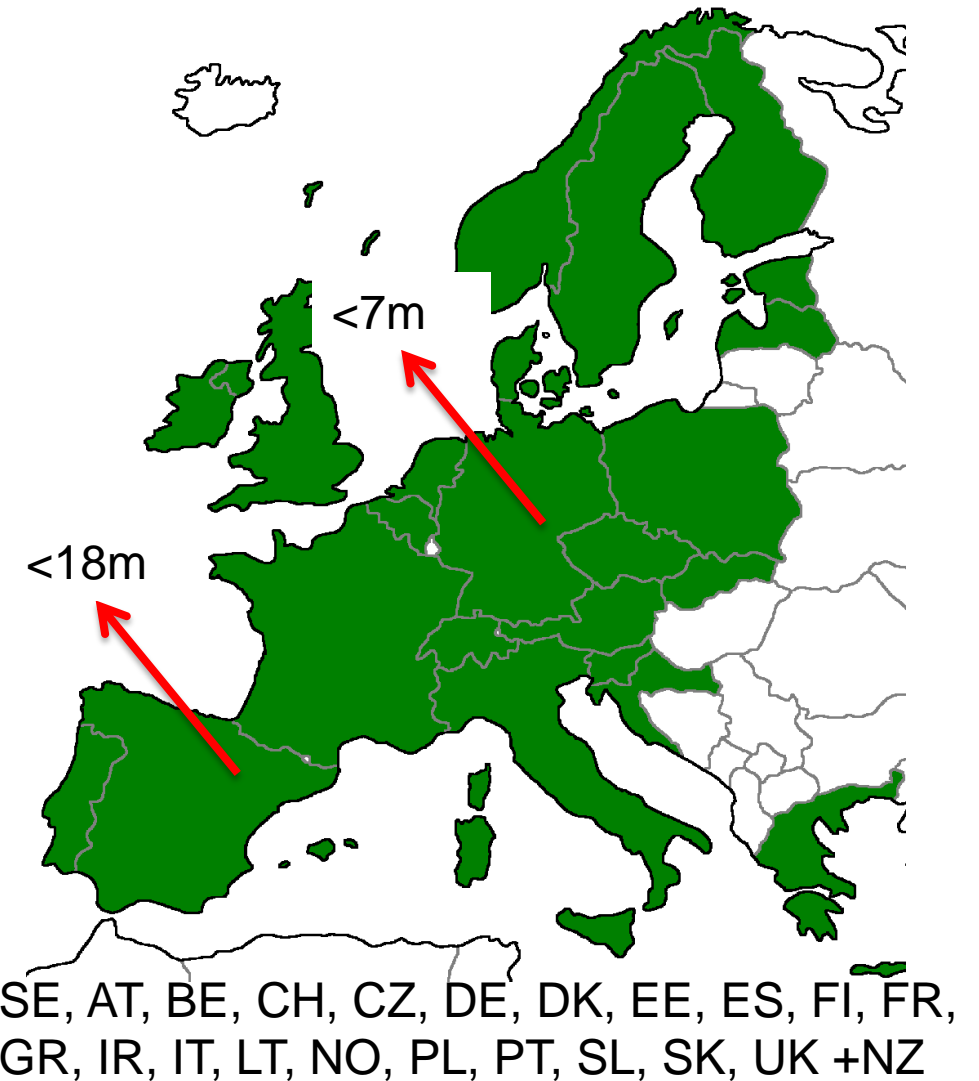
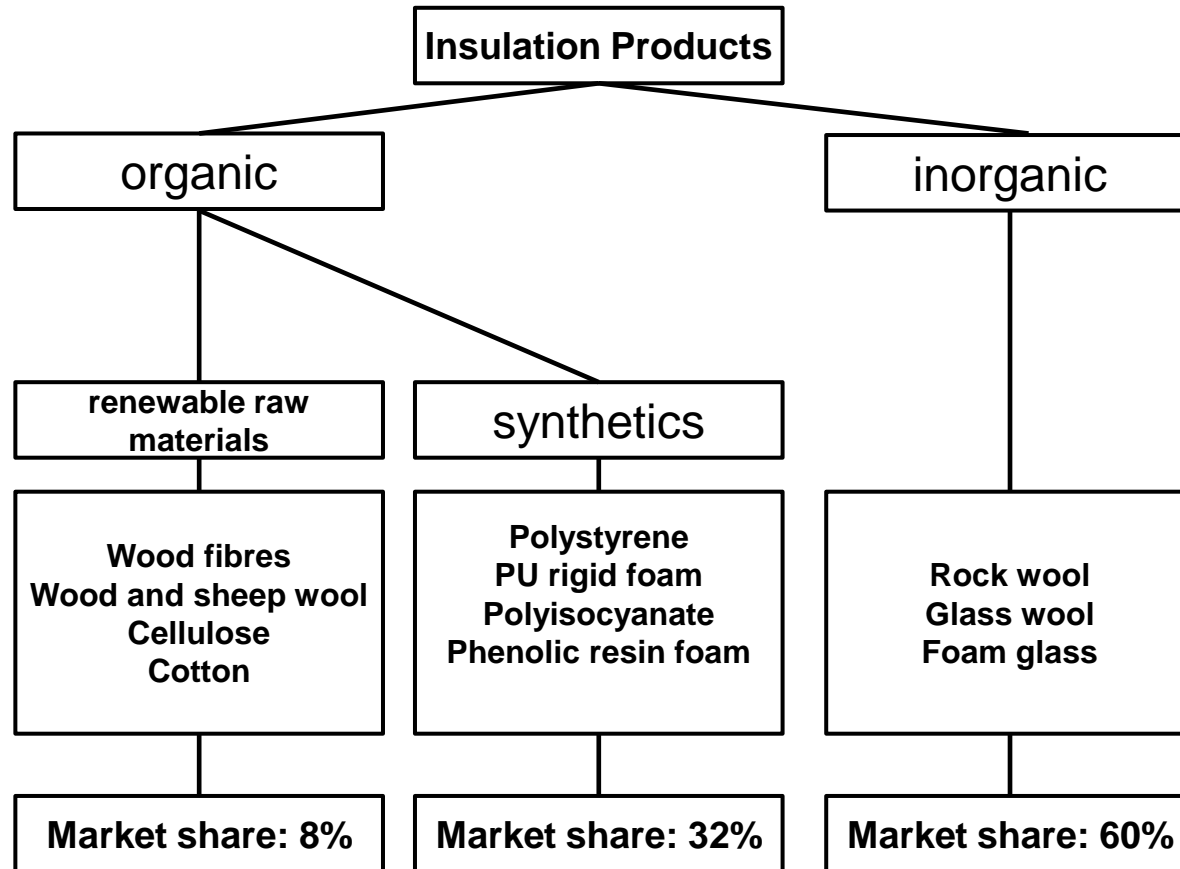
# 3. Challenges - Engineering



- What is the contribution of combustible products?
- What is the response of bio-based products?

# 3. Challenges - Regulations

Ex: Bio-based insulation



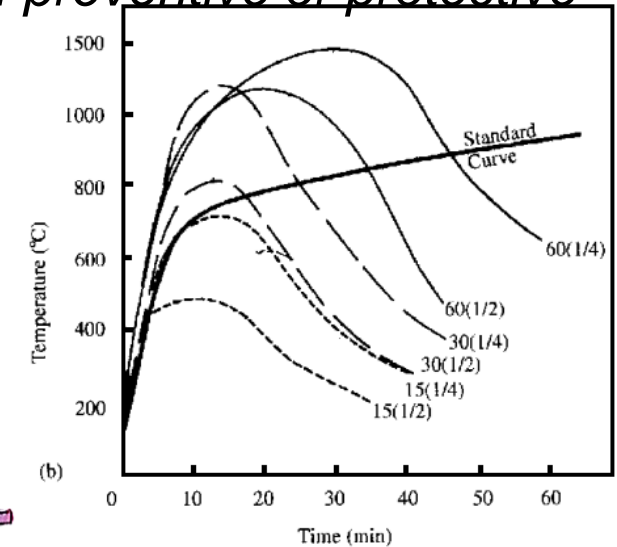
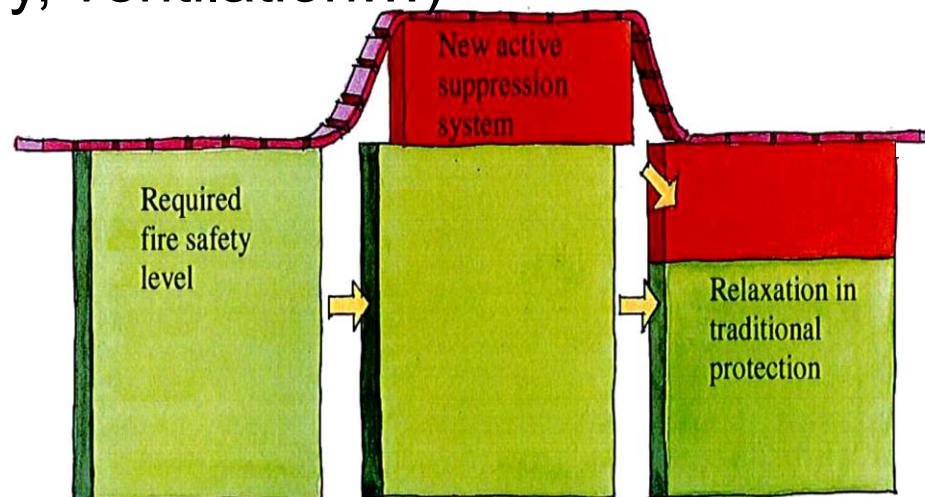
[Welter, M., Wirtschaftlich und umweltverträglich dämmen, 2008]

# 4. Fire Safety Engineering (FSE)

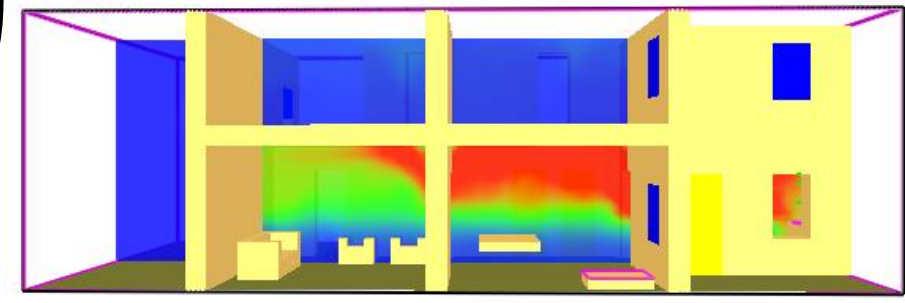
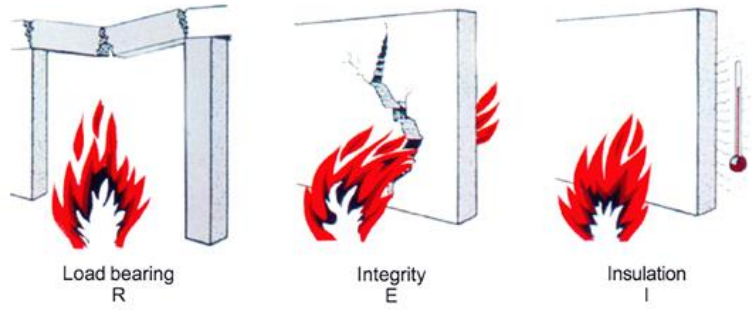
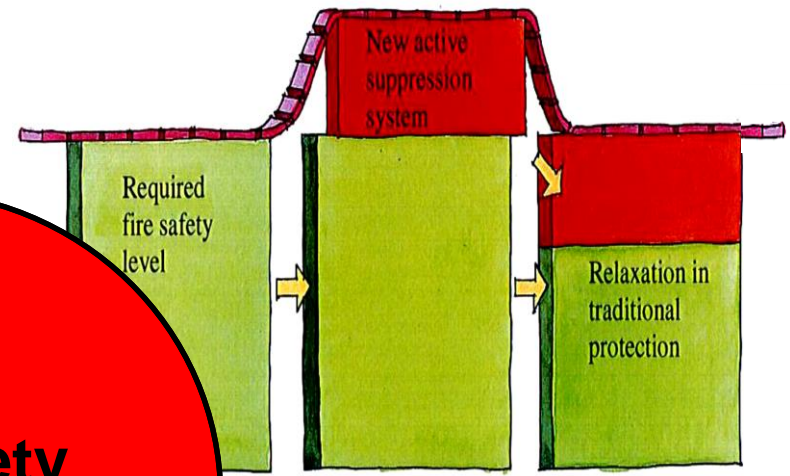
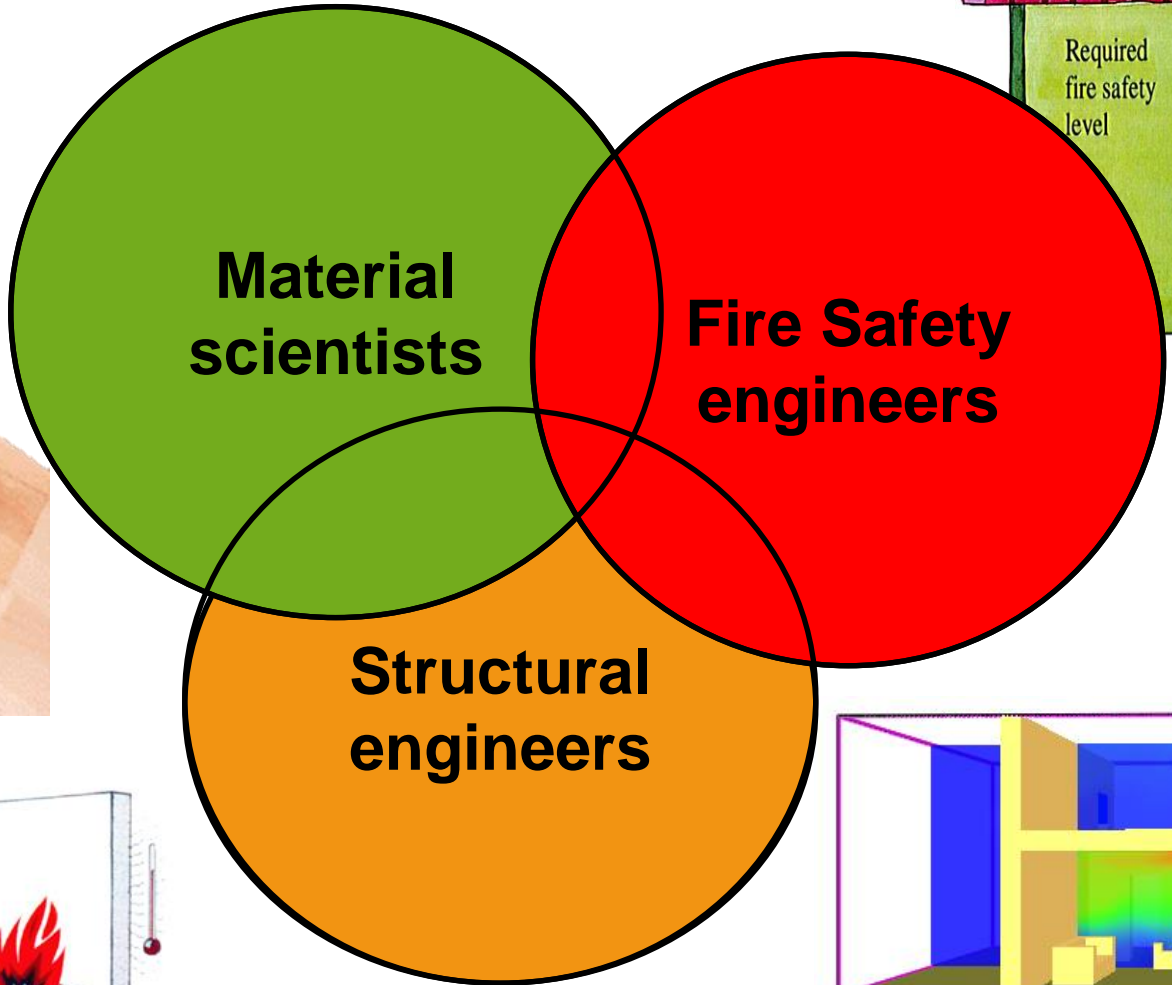
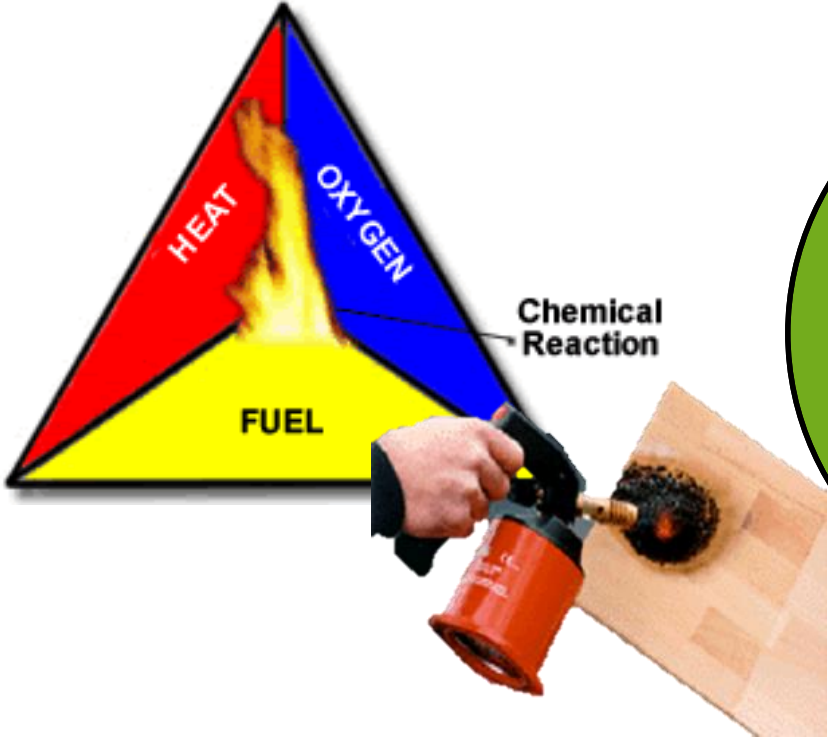
*Fire safety engineering can be defined as the **application of scientific and engineering principles** to the **effect of fire** in order to **reduce the loss of life and damage to property** by quantifying the risks and hazards involved and provides optimal solution to the application of preventive or protective measures.*

FSE takes into account

- the actual fire load and
- the actual building (geometry, ventilation...)
- the required fire safety level
- passive and active systems



## 5. New COST Action



# 5. New COST Action

**Working Group 1**  
**Contribution of bio-based materials**  
**to the fire development**

**Working Group 2**  
**Structural Elements made of bio-based**  
**building materials and detailing**

**Working Group 3**  
**Regulations for fire safety of bio-based**  
**building materials**

**WG 4**  
**Dissemination**

## 5. New COST Action - Objectives

1. Acquire relevant scientific knowledge on:
  - contribution of bio-based materials to the fire scenario
  - modelling combustible products in FSE-tools
  - combustibility of BBBP (treated, untreated)
  - fire protection ability of BBBP
  - Necessary level of fire protection for BBBP
  - Smouldering fires
  - Detailing to achieve fire safe use
  - Recycling of BBBP (treated, untreated)





## 5. New COST Action - Objectives

1. Encourage the development of test methods
2. Compare the user perspectives of different stakeholders (designers, researchers, authorities, fire brigades, insurances, producers)
3. Develop performance based criteria
4. Create documents for education, building authorities and standardisation
5. Produce guidelines for end-users
6. Upgrade expertise of designers
7. Demonstrate best practice cases
8. Identify topics for further research



## 6. Next activities within COST FP1404



Networking platform for researchers dealing with combustible building products, performance based design and fire safety engineering.



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your CNC ([www.cost.eu](http://www.cost.eu))

**1<sup>st</sup> WG meeting:**  
**20<sup>th</sup> and 21<sup>st</sup> of April 2015,**  
**Barcelona**

**1<sup>st</sup> Workshop:**  
**6<sup>th</sup> and 7<sup>th</sup> of October 2015,**  
**Munich**

**Webpage: [www.costfp1404.com](http://www.costfp1404.com)**



# COST FP1404

