HARMONISATION OF FIRE SAFETY ENGINEERING IN EUROPE: A DREAM?
1. ABOUT EFECTIS
EFECTIS GROUP

- 180 persons with 80% engineers
- 4 fire testing laboratories:
  - Laboratory of Bleiswijk (The Netherlands)
  - Laboratory of Gebze (Turkey)
  - Laboratory of Maizières-lès-Metz (France-57)
  - Laboratory of Les Avenières (France-38)
EFECTIS : FIRE SPECIALIST AND EXPERT

NUCLEAR

RAILWAY

TUNNEL

SHIPWAY

INDUSTRY

BUILDINGS
2. PRESCRIPTIVE AND NATIONAL REGULATIONS
HISTORICAL PRESCRIPTIVE NATIONAL REGULATIONS

- Regulation requires a minimum level with means to be satisfied:
  - 8m between buildings
  - EI30 for doors
  - R60 for building stability if more than 3 storeys
  - 1.40m width of evacuation if more than 20 persons
  - Corridor max 20m long
  - Room linings Cs2d0
  - 2% of Natural SHEVS

- Easy to define and to control

- Difficult to justify when not applied
FIRE SAFETY IN EUROPE

- Essential requirements
- Harmonisation of testing
- « Product » performance
- CE marking


European Safety level and requirements?
NATIONAL REQUIREMENTS

- Different national safety levels in Europe
  - Quantification?

- Different national fire safety strategies
  - Passive
  - Active
  - FireFighters

- Different scopes of application frame of FSE
  - Open (free use)
  - Closed (strict, controlled..)

How to harmonize: PBC and FSE?
3. FIRE SAFETY ENGINEERING PRINCIPLES
The application of engineering principles, rules and expert judgement based on a scientific appreciation of the fire phenomena, of the effects of fire, and of the reaction and behaviour of people, in order to:

- save life, protect property and preserve the environment and heritage;

- quantify the hazards and risk of fire and its effects;

- evaluate analytically the optimum protective and preventative measures necessary to limit, within prescribed levels, the consequences of fire
FIRE SAFETY ENGINEERING: SCOPE OF APPLICATION

❖ Aim of use?
  • Design
  • Verification of performance of product/system/construction

❖ Control?
  • Step of validation
  • Third party
  • Qualification of engineers
  • Qualification of tools
  • Qualification of users
  • Standardisation of data
  • ..
PROCESS OF APPLICATION

ISO 23932:2009(E)

Figure 1 — Flowchart illustrating the fire-safety engineering process — Design, implementation and maintenance
FSE : SEVERAL SKILLS TO BE MANAGED

Ignition

Fire propagation

Smoke propagation

Fire compartmentation

Structural behaviour

Egress conditions

Fixed Extinguishing system

Fire fighting Conditions and strategy

Several scientific skills to be managed: the result of a team
FSE NEEDS TESTING

- Standard Test
- R&D tests
- Ad hoc tests
- Large scale tests
- In situ tests
FSE NEEDS TO INCLUDE FIRE FIGHTING CONDITIONS

- Performance assessment of Intervention
- Improvement of fire fighting conditions
- Evolution of fire (high kinetics of fires)

- Evolution of means (professional / volunteers)
- Regions
- Adaptation of firefighting means to risks
FSE NEEDS PROFESSIONAL REFERENCES (MODELLERS)

- Training
- Validation
- Years of experience
- Result of a team
- Independence design / performance assessment

WHAT TYPE OF CONTROL?
FSE NEEDS OF RESEARCH

- Combustion (effluents, models)
- Connexion between elements/products/protection
- Egress model and interaction with fire/smoke spread
- Thermal and mechanical properties of materials

Fire behaviour plaster board partition
FSE NEEDS FIRE INVESTIGATIONS

- Understanding the effect
- Understanding the limit
- Knowing what comes from unbelievable and goes to possible
- Understanding the global approach of the fire safety
FIRE INVESTIGATION

Unbelievable does not mean impossible
FSE NEEDS FIRE STATISTICS


- European: Report on Comparison of European fire statistics - 2011

- German: Workgroup 14 „Fire Safety Systems“ of the Association for the promotion of German Fire Safety - 2015

- French: new process of use of statistics within specific national group. First example on Car Parks.
FSE NEEDS STANDARDIZATION

- Design fire Scenarios
- Design fires
- Criteria
- Effluents production rate
- Methodology

... 

What about the life of the building...
4. EUROPEAN STANDARDIZATION GROUP : CEN TC 127 WG8
WHY A WG8 FOR FSE AT CEN LEVEL

- ISO development and initiatives
- New EU countries need help to update their regulation
- SFPE introduces « FIRE SAFETY ENGINEERS » certification for Europe
- Hotel union introduces « Safe hotel » in europe

So

- Need to highlight the objectives
- Reinforce the work performed
- Need to prepare the future ourselves, and not from the others
EUROPEAN FSE GUIDELINES : CEN TC 127 WG8

- How to satisfy the needs of national regulators to develop and provide Performance based codes?

- How to use the current European testing and product standards for generating data within an FSE approach?

- How to satisfy a national safety level?
TC127/WG8 OBJECTIVES

- **Long term objectives**
  - HARMONIZE THE FSE APPROACH IN EUROPE (SERVICES FREE CIRCULATION)
  - ASSIST REGULATORS OF EU MEMBER STATES FOR MOVING TO PERFORMANCE BASED CODES

- **Mid Term objectives**
  - PRODUCE TECHNICAL REPORTS FOR ASSISTING REGULATORS AND FSE USERS OR CONTROLLERS
  - BE THE MAIN MEMBER ON ISO/TC92/SC4 WITH A EUROPEAN POINT OF VIEW
  - MODIFY THE STANDARDS TESTS TO BE AN INPUT DATA FOR FSE USERS

- **Short term objectives**
  - UNDERSTAND THE SITUATION IN EUROPE
  - REVIEW OF GENERAL ISO/TC92/SC4 STANDARDS TO BE ADAPTED TO EU SITUATION
  - INCLUDE THE RECENT INITIATIVES
  - INTRODUCE SCIENTIFIC APPROACH ON EXAP AND EXTENDED TO NATURAL FIRE CONDITIONS

- **General review:**
  - TC’S LIAISON
  - SFPE EUROPE’S LIAISON
  - ISO TC92 SC4 LIAISON
What areas of FSE do you consider to be most mature and reliable so as to form the basis of regulatory compliance?

- SS1 - Fire initiation & development
- SS2 - Smoke propagation
- SS3 - Compartmentation & stability
- SS4 - Detection, activation & suppression
- SS5 - Fire service intervention

MUCH WORK

LITTLE WORK

MATUR

NO ANSWER
SITUATION IN EUROPE: BENEFEO UPDATED 15 YEARS AFTER

EDUCATION AND TRAINING ON FSE
What are the available sources of education and training which incorporate FSE in your country?

Bachelor level
Masters level
Continuous professional development

YES
NO
NO ANSWER

UK
SW
N

IR
DK
SW
IC
N
A
D

CH
UK

FI
NL

ES
I

FINLAND

P

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EDUCATION AND TRAINING ON FSE

Is there educational support available to professionals in the fire safety area?

SS1 - Fire initiation & development
SS2 - Smoke propagation
SS3 - Compartmentation & stability
SS4 - Detection, activation & suppression
SS5 - Fire service intervention

Number of affirmative answers

To regulators To enforcers To practitioners To regulators To enforcers To practitioners To regulators To enforcers To practitioners To enforcers To practitioners
EN ISO 13 943 : VOCABULARY : VERSION 2014

- Terminology is an obstacle to the FSE harmonization and development
  - Scientific terminologies
  - Fire Safety Engineers terminologies
  - Authorities / firefighters terminologies (prevention, intervention)

- EN ISO 13 943 is not adapted

- Initiatives are existing in many countries (Germany, France, ..)

- How to consolidate for a European vision?
CEN-ISO LINKS

CEN TC127 WG8

Transformation into EN ISO 23932

EN specific to building occupancies in European context

- Car parks
- Stations and airports
- Cultural heritage buildings
- ...

Development of certification guidance

- For companies
- For practitioners

ISO TC92 SC4

ISO 23932
FSE general principles

Various standardized tools available:
- Fire risk analysis
- Evacuation
- Analytical and numerical modelling tools
- Structural assessment

ISO 16730
verification and validation
CONCLUSION : HARMONIZATION IS A CONCRETE GOAL

- Member states of Europe increase their knowledge on FSE each year
- Member states of Europe voted unanimously for an official WG at CEN TC127
- All member states of Europe have experienced in FSE application
- CEN TC127 WG8 shall include all European initiatives (from member states, from CEN TC’s, from other European association / organization)
- Based on international works, based on the work performed in CEN, performance based code is the only way to for European fire safety harmonization, if FSE becomes a common practice with European rules.
- Performance based codes should then include relationship with national prescriptive codes!
5. THE NETHERLANDS: AN EXAMPLE OF IMPROVEMENT IN FSE
IMPROVEMENTS FROM THE NETHERLANDS

- New regulation published in 2012
- IFV research and development on Firefighters intervention conditions
- Fire investigation practice with a dedicated scientific publication
- Fire Safety Engineering trainings and courses
- Fire Safety Engineering Book for national harmonization
- Fire Safety Application: example of DHV building