

SFPE Benelux member meeting

**SFPE BENELUX
2 June 2017
Tisselt**



SFPE Benelux member meeting and GA 2 June 2017

Agenda

1. SFPE European Conference 5 en 6 Feb 2018 Rotterdam
2. Global
3. BENELUX Chapter
4. SFPE Student Chapter
5. BENELUX Chapter working groups

12.00 Lunch & network

13.00 General Assembly GA

14.00 Bod

SFPE Benelux member meeting and GA 2 June 2017

1 SFPE European Conference 5 en 6 February 2018 Rotterdam (Hilton)

- Program
- Call for papers: **deadline 16 June!**



SFPE European Conference (2)

Theme's

- Healthcare
- Redevelopment and retrofit of offices and industrial buildings
- Transport and logistics of car parks, railroads, ships and tunnels
- Industrial hazards in power, oil and gas, and petrochemical
- Research and innovation advancements

SFPE European Conference (3)

Programme SFPE Europe conference 2018 (final draft)

Line up	subject	Possible speakers
Theme: Health care		To be decided
Stakeholder perspective		
Owner / user branch group of healthcare institution owners	Trends: impact on patients/residents safety by de-institutionalizing, low staffing, remote monitoring, flexible and open spaces. General Building code insufficient for patient safety	Suggestion: Dutch speaker of association of healthcare enterprises (BoZ actIZ)
Fire safety Consultants / Architects	?	?
Fire department / regulator	effects of demographic ageing	Suggestion: Dutch speaker IFV (academy fire Brigade)
Insurers	Continuity of commercial operations; 'forgotten risks' Awareness of risks	Suggestion: Dutch speaker Marsh (broker)
Engineering/consultants	Integrating the needs of the other stakeholders	?
Suppliers / R&D	Innovation overview/review of innovations	Suggestion: Dutch speaker TNO (R&D)

SFPE European Conference (4)

Line up	subject	Possible speakers
Theme: Redevelopment & retrofit (offices, industrial buildings)		To be decided
Stakeholder perspective		
Owner / User Represent Owner	Overview: economic and social benefits of redevelopment and retrofit vs. limitations to applying building regulations, and limits to application of FSE in simple projects.	Suggestion: Dutch speaker NL Creative Cities
Architects	which safety level to design for?	
Insurer		
Government /Fire service		
Suppliers / R&D Industry (innovations/ products)	Innovation overview/review of innovations	
Engineering/consultants	Case studies, overview of best practices /experiences with redevelopment: - SS Rotterdam re-use ship as hotel - experiences from London Docklands	Suggestion: Dutch speaker NL/ Rudolf van Mierlo, Suggestion representative of SFPE/UK ,

SFPE European Conference (5)

Line up	subject	Possible speakers
Theme: Transport / logistics (infrastructural works, car parks, mobility)		
Stakeholder perspective		
Owner / User	rational protection for tunnels and overpasses	Suggestion: Dutch speaker NL Owner infrastructure: Ministry of Transport
Fire safety Consultants / Architects	LNG: risks new energy	
Insurer		
Government /Fire service	Travelling fire in car parks Fire department regulator/research: ?? , external safety approach for rail/road/river/ducted transport of dangerous goods	Suggestion speaker from CETU
Suppliers / R&D Industry (innovations/ products)	Innovation	Suggestion speaker from Promat
Engineering	Car parks: trends in car technology, energy carriers, FD intervention doctrine require rethink of approach for fire protection	Suggestion speaker NL: Peter van de Leur (DGMR)

SFPE Benelux member meeting and GA 2 June 2017

7

SFPE European Conference (6)

Line up	subject	Possible speakers
Theme: Industrial hazards	overview: need for rational, risk based approaches to large industrial hazards; to each his own (let each public and private stakeholder take responsibility for requirements protecting their interest.	
Stakeholder perspective		
Owner / User	Harbour Rotterdam CEFIC: Basic-net? Will I be allowed to transport my dangerous goods at all? Mitigation of container terminal fires, hazardous/nonhazardous products;	NL: Gemeentelijk Havenbedrijf Rotterdam: https://www.portofrotterdam.com/en
Architects		
Insurer	How to handle risks of harbours? lessons from Tianjin accident 2015	Suggestion speaker UK: Steward Kidd (Zurich)
Government /Fire service		Suggestion speaker NL: TU delft
Suppliers / R&D Industry (innovations/ products)	Grain/cereal storage / distribution: dust explosions	
Engineering / Consultants	Protecting highrise on quay against pool fire on the river Maas	Suggestion speaker NL: DGMR
Engineering / Consultants	High airflow and fire protection (input Paul Rivers)	Suggestion speaker US: Amada Kimbel?
Engineering / Consultants	Chemicals transport ducts (e.g., connecting Rotterdam – Antwerp harbour)	?
Engineering / Consultants	FP for floodgate	Suggestion speaker NL: TU Eindhoven
Engineering / Consultants	standard NEN 6079, risk analysis for fire protection of large compartments	Suggestion speaker NL: Save / DGMR

SFPE Benelux member meeting and GA 2 June 2017

8

2018 Europe: Fire Safety Engineering
Deadline: 16 June 2017

Guidelines for Presentation Abstracts

Presentation abstracts should provide sufficient detail regarding scope, results and applications to determine the quality and applicability of the engineering concepts that would be presented. References, where applicable, should be included. Presentations must be noncommercial in nature. Presentations are expected to be 25 minutes in length with 5 minutes for Q&A.

For 2018, the conference planning committee has developed the following list of topics that we would like to have included in this year's program.

- ☐ Healthcare
- ☐ Redevelopment and Retrofit: Offices and Industrial Buildings
- ☐ Transport and Logistics: Car Parks, Railroads, Ships Tunnels
- ☐ Industrial Hazards: Harbor, Power (onshore) Oil & Gas, Petrochemical
- ☐ Research and Innovation

Application must be filled out completely in order to be considered.

2 Global

- International developments in standardisation, CEN ISO
- SFPE Global activities
- CFPA Education & Recognition scheme

WG8 – car parks

INPUT DATA

Number of Car parks: 1931

- 41% with a fire
- 59% without a fire

5 years of fires:

- Dates of fires : 92% of recorded fires between 2010 and 2014

Probability:

- The probability that a fire does occur during the life of a car park is close to 1 : about 5000 fires in 30 years!
- The probability that two fires occur in one car park is not nil.
- The probability of fire in a car park with more than 1000 bales (12% of Car parks) is 6 times the probability for a car park with less than 1000 bales



CONCLUSION

- Same number of fires
- Severity is strongly increasing (4% with more than 10 cars)
- Duration is very high (10% with than 4h)
- These fires are not taken into account the recent evolution of the activity in car parks
- Fire fighting conditions are very difficult and require more means
- Statistics will continue for following the evolution

EN 1991-1-2:2002 (E)

Annex E (informative)

Fire load densities

E.1 General

(1) The fire load density used in calculations should be a design value, either based on measurements or in special cases based on fire resistance requirements given in national regulations.

(2) The design value may be determined:

- from a national fire load classification of occupancies; and/or
- specific for an individual project by performing a fire load survey.

(3) The design value of the fire load $q_{f,d}$ is defined as:

$$q_{f,d} = q_{f,k} \cdot m \cdot \delta_{a1} \cdot \delta_{a2} \cdot \delta_n \quad [\text{MJ/m}^2] \quad (\text{E.1})$$

where

m is the combustion factor (see E.3)

δ_{a1} is a factor taking into account the fire activation risk due to the size of the compartment (see Table E.1)

δ_{a2} is a factor taking into account the fire activation risk due to the type of occupancy (see Table E.1)

$\delta_n = \prod_{i=1}^{10} \delta_{ni}$ is a factor taking into account the different active fire fighting measures i (sprinkler, detection, automatic alarm transmission, firemen ...). These active measures are generally imposed for life safety reason (see Table E.2 and clauses (4) and (5)).

EUROPEAN STANDARD
EUROPÉENNE
NORME

EN 1991-1-2

November 2002

2:2002 (E)

Annex D (informative)

Advanced fire models

zone models

zone model should apply for post-flashover conditions. Homogeneous temperature, density, and pressure of the gas are assumed in the compartment.

temperature should be calculated considering:

balance of mass conservation and energy conservation equations;

- the exchange of mass between the internal gas, the external gas (through openings) and the fire (pyrolysis rate);
- the exchange of energy between the fire, internal gas, walls and openings.

(3) The ideal gas law considered is:

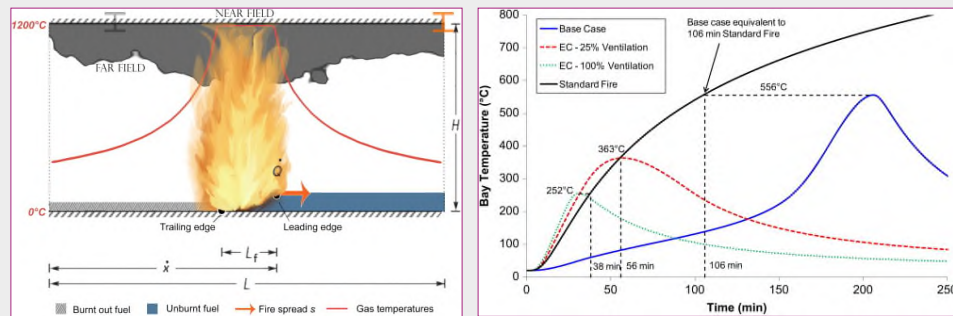
$$P_m = \rho_g R T_g \quad [\text{N/m}^2] \quad (\text{D.1})$$

(4) The mass balance of the compartment gases is written as

$$\frac{dm}{dt} = \dot{m}_0 - \dot{m}_{out} + \dot{m}_g \quad [\text{kg/s}] \quad (\text{D.2})$$

FSE in TC250 (Eurocodes), cont.

- Hot issue ... travelling fire (appears more severe)



- Other topics
 - Timber
 - Definitions
 - Relation between testing and calculation
 - Taking into account restraint (or not)

Benefeu ...

The EC financed "Benefeu", a research project on "FSE".

Most **national regulations define fire safety in prescriptive terms**. The CPD Interpretative Document Number 2, "Safety in case of fire", **recognises the value of a performance based** approach.

The “Benefeu” study showed that:

- **Few countries** have performance-based approaches to fire safety legislation for buildings
- However, the majority of Member States **intend to implement** an FSE approach, as alternative to the current prescriptive rule-based approach
- Introduction of performance based solutions for fire safety, as a response to the CPD-ID, requires:
 - availability of **research and education systems**, focused on FSE and having adequate coverage in all MS
 - the availability of a system of **performance based codes and regulations**
 - including guidance to **regulators and fire safety engineering practitioners**

In the absence of support and intervention from the European Commission, the change from prescriptive to performance based codes may **create** further barriers to the free circulation of products, services and people.

Interpretative document No. 2:
Safety in case of fire

1. Purpose and scope of Interpretative document No. 2

(1) This Interpretative Document relates to Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products, hereinafter referred to as "the Directive".

4.3 Engineering approach in the field of Fire Safety

Regarding fire safety of construction works, the tools of fire safety engineering can be used in several ways:



Overview FSE in CEN, ISO



ISO - International Organization for Standardization

- An independent, non-governmental international organization
- Members (163): national standardisation bodies (NBN, NEN, BSI, DIN, ...) – voluntary !
- Organised (as CEN) in TC's, e.g.
 - 162: Doors, etc.
 - 167: Steel, etc.
 - 218: Timber structures

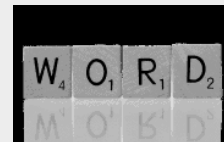
92: Fire safety



TC's have WG's, in which you can be appointed through national standardisation institutes

FSE in ISO TC92 – SC4

- Chair: Daniel Nilsson, Uni Lund (Sweden)
- Last meetings: March 27-31
- Main WorkItems:
 - Vocabulary (FDIS 13943)
 - General Principles (ISO 23932-1)
 - Design fires (WD16733-2) "FSE– Selection of design fire scenarios and design fires – Part 2: Design fires"
 - Fire investigation – statistical data collection (TR 17755)
 - Fire Risk Assessment (16732)
 - (TS 13447) "Guidance for use of fire zone models"
 - Evacuation (TR 17886 "Design of evacuation experiments")
 - Algebraic equations (24678-1 FSE— Requirements Governing Algebraic Equations — Parts 1-8)
 - PWI 20710 "Fire safety engineering – Active fire protection systems"
 - And of course: facades !



The Address Downtown Hotel Fire (Dubai). Source: <http://www.express.co.uk/>

 FSE in ISO TC		ISO/DTR 23932-2:2017(E) 2017-01-03 ISO TC 92/SC 4 Secretariat: AFNOR
Contents		
Introduction..... Fire safety engineering — General principles - Part 2: Case study on a dry cleaning shop		
1	Objective.....	
2	Scope of the project concerning fire safety engineering process (chapter 5 of ISO 23932).....	2
3	Identification of fire safety objectives, functional requirements and performance criteria (chapter 6 of ISO 23932).....	7
3.1	Compatibility with prescriptive regulations.....	7
3.2	Fire safety objectives of interested/affected parties.....	8
3.2.1	Safety of life.....	8
3.2.2	Conservation of property.....	8
3.3	Functional requirements.....	8
3.3.1	Occupant Protection.....	8
3.3.2	Protection of neighbours.....	8
3.3.3	Protection of fire fighters.....	8
3.3.4	Property protection.....	8
3.4	Performance criteria.....	9
3.4.1	Occupant Protection.....	9
3.4.2	Protection of neighbours.....	9
3.4.3	Protection of fire fighters.....	9
3.4.4	Property protection.....	9
4	Hazard identification (chapter 7 of ISO 23932).....	10
5	Fire safety design plan (chapter 8 of ISO 23932).....	10
5.1	Development of the proposed solution.....	10
5.1.1	Prevention.....	10
5.1.2	Protection.....	11
5.1.3	Forecast.....	12
5.2	Description of the management of fire safety.....	12
5.3	Design proposal.....	12
6	Fire and behavioural scenarios (chapter 9 of ISO 23932).....	14
6.1	General.....	14
6.2	Fire scenarios.....	15
6.2.1	Identification of potential fire scenarios.....	15
6.2.2	Selection of design fire scenarios.....	16
6.3	Selection of behavioural scenarios.....	18
7	Selection of engineering methods (chapter 10 of ISO 23932).....	18
8	Scenario-based evaluation of trial design (chapter 11 of ISO 23932).....	19
8.1	Quantification of design fire scenarios.....	19
8.1.1	Input data.....	19
8.1.2	Evaluation of consequences.....	21
8.2	Comparison with performance criteria.....	38
9	Conditions of use of the built environment (see chapter 12.1.2 of ISO 23932).....	38
9.1	Operating Conditions.....	39

- Chair: Daniel Nilsson, Uni Lund (Sweden)
- Last meetings: March 27-31

Examples

- ISO/TR 24679-2 "Example of an airport terminal"
- ISO/TR 24679-3 "Example of an open car park"
- ISO/TR 24679-4 "Example of a fifteen-storey steel office building"
- ISO/WD 24679-5 "Example of a multi-storey building"
- ISO/DTR 24679-6 "Example of six-storey reinforced concrete building"
- Note: an additional part on probabilistic design (work in progress) is being prepared

Main Liaisons to:

- IMO
- CEN (TC127)



FSE in CEN, ISO




Concluding remarks:

- A wealth of knowledge - not all directly applicable to (local, Benelux) engineering practice
- SFPE HQ is official liaison, but many SFPE members participate in WG's, facilitating early adoption in (revised) SFPE HandBook

3 BENELUX Chapter

- Charter
- Research agenda
- Network
- NEW! Website : <http://sfpebenelux.eu/>

3 BENELUX Chapter : Charter

General objectives

- Protection of people, animals, property, environment, society against fire
- FSE=Models + architecture + service installations + organisation
- Entire spectrum of FSE, FPE
- Innovation, correct implementation, recognition
- Balanced platform for all professionals
- Quality transparent:

3 BENELUX Chapter : Charter

Concrete objectives

- Become authoritative, go-to organization in FP
- Take lead in further developments in FP
- Collect, produce, disseminate FP knowledge, tools
- Manage competence profiles
- Promote introduction of certification schemes

3 BENELUX Chapter : Charter

Action Plan

- Organize events : seminars, discussion meetings
- Set up position papers, whitepapers
- Set up discussion forum
- Provide educational material
- Develop working relationships with partners
- Recruit
- Position Benelux in SFPE Europe's activities

3 BENELUX Chapter : Research Agenda

- Changing demographics (aging, home care)
- Gaps in knowledge, accessibility
- Societal needs
- Economic impact of fire
- Environmental protection, sustainability
- Fire initiation & development
- HSE of first responders
- Industrial fire protection
- Methods (validation/verification)

4 SFPE Student Chapter

- Activities
- Coalition:
 - o Ghent University
 - o Lund University
 - o the University of Edinburgh
 - o ETH Zürich
 - o the University of Queensland
 - o and the University of Maryland

5 BENELUX Chapter working groups

- Tunnels
- Parkings

Parking garage fire safety

Discussion on concepts

- Existing fire safety strategies
- Problems
- Ideas for alternative strategies
- SFPE Benelux Working Group

Existing fire safety strategies for car parks

- Normal structural protection (closed) or no/low protection (open), small and large car parks
- Sprinkler protection: some countries, depending on size/depth
- Measures to enable fire service to suppress fire
 - Smoke extraction ,designed on basis of CFD
 - Design fire: 1 car (sprinklered) , 2 cars (unsprinklered), 3 cars (NL) (very low probability of fire propagation)
 - Limited access distance; fire detection/localization; water supply

Mini seminar SFPE-Benelux

Documentnummer:
Datum:
Contactpersoon:

2 June 2017

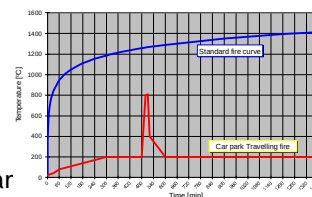
Peter van de Leur | p.van.de.leur@sfpe.nl | t 088 - 346 7704

Problems, currently not taken into account

- New vehicle energy supply systems with new hazards: Electrical; high pressure gas (CNG, H₂, ...) scheduled to take over 100% of the market by 2050
 - Gas container failure: explosion (fire service personnel, building structure)
 - Gas flare: ignition of other vehicles
 - Battery fire: long time, toxic release; switchoff, suppression difficult
- Sprinkler currently cannot prevent propagation by flare, explosion
- Fire service already reluctant to enter smoky car park; reluctance expected to grow with only gas/electrical cars

→ Propagation to >> 3 cars much more probable

- No early suppression: long duration travelling fire
Effect on structural stability unknown
- CFD simulations reliability doubtful for complex car doubtful
- New car parks designed for 2020 - 2070 !!



Mini seminar SFPE-Benelux

Documentnummer:
Datum:
Contactpersoon:

2 June 2017

Peter van de Leur | p.van.de.leur@sfpe.nl | t 088 - 346 7704

Parking garage fire safety

Discussion on concepts

Ideas for alternative strategies

- Treat car park as any other occupancy fire compartment, count on full involvement and loss of content
- Take into account specific fire behaviour (travelling fire; explosion) hazards
 - Make structure resilient to long duration travelling fire
 - Make structure resilient to gas container explosions
 - Make fire separations resilient to flares, explosions
- Take into account higher failure probability of sprinkler
- Accept higher probability of loss of all content (cars)
- Accept structural collapse where consequences acceptable (“risk-based”)
- Separate interests of different stakeholders
 - Public interest, Building permit: life safety of occupants
 - Private interest, car owners: damage to cars (sprinkler, smoke management)
 - Private interest, car park owner: damage to building
 - Public interest, environment: loss of infrastructure, housing, environment...

Mini seminar SFPE-Benelux

Documentnummer:
Datum:
Contactpersoon:

2 June 2017

Peter van de Leur | p.van.de.leur@sfpe.nl | t 088 - 346 7704



Parking garage fire safety

Discussion on concepts

SFPE Benelux Working Group

- Discuss, reach consensus on validity of problems identified
 - Promote research where data is insufficient
- Discuss validity of current (national) concepts in view of problems
- Discuss alternative approaches
- Discuss necessity of new strategy for existing car parks
- Produce whitepapers to influence national approaches

Mini seminar SFPE-Benelux

Documentnummer:
Datum:
Contactpersoon:

2 June 2017

Peter van de Leur | p.van.de.leur@sfpe.nl | t 088 - 346 7704



