SFPE's Research Roadmap for Fire Safety Engineering

- SFPE Benelux September 2016 views -

The following is a modified, extended and prioritized list of research topics. Please add your comments, juggle the items them around to suit your priority.

An initial list of fire safety engineering research topics have been developed for the roadmap. Please review and provide up to three additional research topics that you think are missing from this list:

Top 10

1. Changing demographics and impact on fire safety (Examples: aging population, mobility, accessibility, aging in place and home healthcare)
2. Data used in fire safety engineering (Examples: gaps in the data, data accessibility)
3. Define quantify societal needs in restricting businesses wrt fire safety (we can with some trouble quantify target performance for loss of life; insurance companies can – or should be able to – calculate optimum investments in prevention in relation to property loss. We lack models and limits to argue, let alone quantify, how much smoke emission in the atmosphere is allowed in relation to fire compartmentation/sprinkler. The same for weighing other societal damages of a fire: mass evacuation of buildings or city quarters, temporary closure of vital infrastructure, job losses.
4. Economic impact of fire (Examples: cost of fire events, value of fire departments to community, cost/benefit of proposed changes/additions to code and standards)
5. Environmental protection and sustainability and impact on fire safety (Examples: tall timber buildings, hazards of new sustainable building materials, batteries and energy storage, PV arrays, impact of fire on the environment, eco-impact of fire protection, toxicity of fire retardants)
6. Fire initiation and development (Example: facades, fire dynamics, hazards of new materials (e.g. combustible facades), toxicity
7. Health and safety of fire service personnel and first responders (Example: risk of cancer, advances in personal protective equipment, new hazards and fire fighting) (+more risk-adverse attitude on scene; no risks accepted for property protection)
8. Human behavior in fire (relevant, but needs some more specification, e.g. evacuation in smoke / under smoke layers, …)
9. Industrial fire protection (relevant, but needs some more specification, e.g. on- and offshore, oil&gas related and/or non oil &gas related (storage/handling/manufacturing/….),
10. Methods used in fire safety engineering (Examples: validation and verification of methods, acceptance criteria, correlations used by engineers, guidance on tools for fire safety engineers, tools for emerging countries, fire test methods)Resilience and role of fire protection (Examples: fire safety engineering for resilient systems/buildings, reliability of fire protection systems)

Less relevant issues, in arbitrary sequence

11. Applying technology to the practice of fire safety engineering (Examples: building information modeling, data)
12. Big data and fire protection (Examples: smart fire fighting, smart buildings, smart enforcement for communities)
13. Informing fire service operations (Examples: tactics for new hazards)
14. Models used in fire safety engineering (Examples: things that models cannot do today, verification and validation of models)
15. Performance of fire protection systems (Examples: smoke detection nuisance, new system technologies (e.g. O2 reduction), reliability of systems/aging of systems)
16. Risk and fire safety engineering (Examples: risk informed performance based design, risk management)
17. Structures in fire (Examples: tall timber buildings, high rise buildings)
18. Tunnels and underground fire protection
19. Wildland fires
20. Harmonisation of fire safety regulations (explain national differences; retain sensible ones, broaden & harmonise others)
21. Underpin risk based analyses: couple fire safety measures to safety targets; allot targets & measures to appropriate problem owner
22. Evacuate or stay in place. Where, when is each appropriate; which factors contribute and how.
23. Well thought through fire safety concept as the major component of fire engineered solution, with calculations to support the design. Not: intimidating calculation results to start and end the discussion.
24. Who is the client, who is the boss? Professional ethics and national mores (can SFPE provide common recommendations/protocol that helps consultants and control officials to deal with pressures)
25. Reappraisal of ASET/RSET (pre-movement time when ASET < 3 minutes; long waiting times OK?)