SFPE Standards-Making Committee on Calculating Fire Exposures
Risk Working Group
Meeting Report -- July 28, 2016

Present: Kevin LaMalva (Working Group Leader), Charley Fleishmann, Jeff Halpert, Panos Kotsovinos, Jonathan Weigand, Craig Beyler (Committee Chair) and Chris Jelenewicz (Staff)

The following was discussed:

European Approach -- There was a discussion on how Eurocode 1: Part 1-2 handles risk in fire calculations. The Eurocode also has a Handbook (#5 -- Design of Buildings for the Fire Situation) that is an informal document that gives guidance on how to apply the provisions in the Eurocode.

The Eurocode doesn't consider the reliability of automatic sprinkler systems. Specifically, it assumes automatic sprinklers are properly designed, maintained and operating (all valves are open). Also, the Eurocode only applies a risk-based methodology in regards to estimating nominal fuel load density that includes risk adjustment factors based on a) probability of ignition, b) compartment area, c) occupancy class, d) presence/absence of active fire protection systems and e) fire service capabilities.

It was noted that the Eurocode expects the fuel load not to be exceeded 80% of the time. There was no indication where the 80% came from nor any data on how the risk adjustment factors were established.

Additionally, the Eurocode requires the selection of fire scenarios to be made by qualified and experienced personnel. The scenarios are only required to include a fire in a single compartment and it is permissible to choose the standard furnace exposure. As such, this methodology does not include for a cooling phase and a fire that extends outside a compartment. The fire exposure is calculated deterministically as a compartment or local exposure similar to SFPE Standard.01 and has information on using fire models.

From a European perspective, the Eurocode methodology has some disadvantages: a) it is not well suited for buildings with a high consequence of failure, b) it is not applied consistently

throughout European countries (i.e. some countries don't use the risk factors and some countries apply different fuel load densities) c) it does not include ventilation effects and d) there is no agreement on fire protection system reliability. Other disadvantages were noted in a Ph.D. thesis by DeSanctis, "Generic Risk Assessment for Fire Safety – Performance Evaluation and Optimization of Design Provisions."

Draft Mission Statements (3 Options) – Moving forward, there are three possible options on a scope for this Working Group:

1. Use an approach similar to the method in the Eurocode. This would require focusing efforts on how fuel loads are calculated in NFPA 557. This would be difficult as there is no current data on how the risk factors in the Eurocode were established. It was noted that First Draft comments for NFPA 557 are due in June 2017

2. By-pass the NFPA 557 methodology and calculate fire exposure based on risk factors related to:
   a. Presence of active systems (override NFPA 557)
   b. Performance objective
   c. Occupant life safety
   d. Fire responder safety
   e. Building resiliency
   f. Release of hazardous materials
   g. Fire sprinkler system malfunction
   h. Risk for multi-compartment involvement
   i. Risk for multi-floor involvement

3. Continue with the current NFPA 557 methodology (that is already a risk-based approach) and adopt a risk approach to the methods in Standard.01. For example, estimate error in time-temp curve or what is the risk that fire will spread outside a compartment.

Moving Forward – Kevin will break-down the tasks required for each option, and a ballpark time estimate for each (to be refined once an option is chosen).. The committee will decide on the best option at its next meeting.

Kevin will also send a copy of Handbook 5 and the DeSanctis thesis to the Working Group. CJ will post to a ShareDrive.

Next Meeting – The next working group meeting will be held in late August. CJ will schedule via a Doodle Poll.

End of Report