SFPE STANDARDS-MAKING COMMITTEE ON CALCULATING FIRE EXPOSURES

Local Fire Exposures Working Group

Meeting Report – September 21, 2016

Present: Ulf Wickström (Working Group Leader), Jonathan Barnett, Sean Hunt, Craig Beyler (Committee Chair) and Chris Jelenewicz (Staff).

Apologies: Venkatesh Kodur

The following was discussed:

1. **Report from previous meeting on June 29, 2016** — The report from the Working Group meeting that was held on June 29 was approved.

2. **Sub-Task 1 – Expressing boundary conditions --** Ulf drafted a paper (Measuring Incident Heat Flux and Adiabatic Surface Temperature with Plate Thermometers in Ambient and High Temperatures). It recommended how measurements should be defined in the standard. This paper is attached to this meeting report.

   In the last meeting, it was noted that heat transfer should be expressed as:

   $$q=\varepsilon_s \dot{q}_{inc} - \varepsilon_s \sigma T_s^4 + h(T_g - T_s) = \varepsilon_s \, \varepsilon_{fl} \, F \, \sigma \, T_{fl}^4 - \varepsilon_s \sigma T_s^4 + h(T_g - T_s)$$

   It was noted in Ulf's report that water cooled heat flux meters are OK to measure incident radiation in ambient air but when used in heated air, the cooling sensor takes away the convection component and is not reliable. On the other hand, the plate thermometer (PT) is more reliable because of its ability to record a temperature that is representable to the heating conditions by convection and radiation of the fire exposed test objects. The PT records an effective temperature which is a weighted average between radiant and convective heat exposures resembling those of test objects. For example, the experiments referenced in Ulf's paper shows results of measurements with a plate thermometer and a heat flux meter at nearby positions in a façade test carried out at SP Fire Research. The report shows that the heat flux recorded in this test by the heat flux meter in the stationary period is almost 50 % higher than the radiation heat flux obtained from the PT measurements.

It was also noted that most heat flux meter data does not use plate thermometers. As such, the committee needs to develop a strategy on how to interpret heat flux data (i.e. water cooled heat flux meters used in hot air). It was also noted that the Lattimer Chapter looks at what heat flux meters are actually doing. As such, the committee will review the content in the Lattimer Chapter.

3. **Sub-Task 2 – Local fires – available formulas –** Sean indicated that he will report back at the next meeting.

4. **Sub-Task 3 – Façade fires – available formulas** – Jonathan indicated that he will report back at the next meeting.

5. **Timeline/Next meeting** – The next working group meeting will be held in early November. CJ will schedule the next meeting via a Doodle Poll.

End of Report