OSAC RESEARCH NEEDS ASSESSMENT FORM

Title of research need: Room Size Impacts on Fire Patterns

Describe the need: In the last forty years or so, the trend in single family home construction has been to move away from small rooms low in height to larger open areas with high ceilings. A home today may have the living area on the ground floor constructed as one large open area without walls separating functional spaces. Sleeping areas may be large suites rather than individual bedrooms and bathrooms. Most of the research on patterns has been conducted in "typical" size rooms; for example, ten feet by twelve feet by eight feet in height. Research is needed in larger spaces with modern furnishings to identify this impact on patterns.

Keyword(s): Room size, fire size, ventilation patterns, fire patterns, fire pattern creation, fire origin

Submitting subcommittee(s): Fire & Explosion Investigation **Date Approved:** March 10, 2021

(If SAC review identifies additional subcommittees, add them to the box above.)

Background Information:

1. Does this research need address a gap(s) in a current or planned standard? (ex.: Field identification system for on scene opioid detection and confirmation)

Yes. NFPA 921, Chapter 6, Fire Patterns is ever evolving to address enhanced understanding of the effects of fire and the patterns resulting from those effects. It is currently under review for the next edition of the standard.

2. Are you aware of any ongoing research that may address this research need that has not yet been published (e.g., research presented in conference proceedings, studies that you or a colleague have participated in but have yet to be published)?

No.

3. Key bibliographic references relating to this research need: (ex.: Toll, L., Standifer, K. M., Massotte, D., eds. (2019). Current Topics in Opioid Research. Lausanne: Frontiers Media SA. doi: 10.3389/978-2-88963-180-3)

Gorbett, G., Meacham, B., Wood, C., and Dembsey, N. *Use of Damage in Fire Investigation: A review of fire patterns analysis, research and future direction.* Fire Science Reviews, **4**:4, doi 10.1186/s40038-015-0008-4
Kerber, S. (2010) Impact of Ventilation on Fire Behavior in Legacy and Contemporary Residential Construction. Underwriters Laboratories, Illinois.
Kerber, S. (2012) Analysis of Changing Residential Fire Dynamics and Its Implications on Firefighter Operational Timeframes. Fire Technology, 48, 865–891, 2012
Mealy, C., Wolfe, A., Gottuk, D. (2013). Forensic Analysis of Ignitable Liquid Fuel Fires in Buildings. NIJ Grant No. 2009-DN-BX-K232. National Institute of Justice.
Wolfe, A., Mealy, C., Gottuk, D. (2009). Fire Dynamics and Forensic Analysis of Limited Ventilation Compartment Fires, Volume 1: Experimental, NIJ Sponsored. NCJ 230164.

Wolfe, A., Mealy, C., Gottuk, D. (2009). Fire Dynamics and Forensic Analysis of Limited Ventilation Compartment Fires, Volume 2: Modeling, NIJ Sponsored. NCJ230165.

4. Review the annual operational/research needs published by the National Institute of Justice (NIJ) at https://nij.ojp.gov/topics/articles/forensic-science-research-and-development-technology-working-group-operational#latest? Is your research need identified by NIJ?

No.

5. In what ways would the research results improve current laboratory capabilities?

This research need is targeted to improve current fire investigation field work rather than laboratory analyses. This research will serve to better inform fire investigators as to how to approach the interpretation of fire patterns as well as the training they receive in this area.

6. In what ways would the research results improve understanding of the scientific basis for the subcommittee(s)?

See Number 5.

7. In what ways would the research results improve services to the criminal justice system?

This research will help the fire investigation community to apply a more systematic approach to fire pattern analysis. This more systematic approach will improve expert opinions and testimony relating to fire pattern analysis.

8. Status assessment (I, II, III, or IV): II

	Major gap in current knowledge	Minor gap in current knowledge
No or limited current research is being conducted	I	III
Existing current research is being conducted	II	IV

This research need has been identified by one or more subcommittees of OSAC and is being provided as an informational resource to the community.