



NATIONAL ASSOCIATION OF STATE FIRE MARSHALS
FIRE RESEARCH & EDUCATION FOUNDATION

RE: Request for Proposal for Research Services

RFP Submission Deadline:

Please make all submissions to Jon Narva electronically via email to jon@narvaassociates.com using **FAIL-SAFE Lit Review/Modeling RFP** in the subject line. Submissions must be received no later than 4:00PM MST Wednesday, December 30, 2015. Any submissions received after the deadline will be considered ineligible.

RFP Award Date:

The NASFM Foundation intends to select the prevailing submission by Thursday, January 7, 2016 at 4:00PM MST. The successful bidder will be notified via email. The NASFM Foundation reserves the right to reject any and all proposals at their discretion.

Contact Information:

All submissions must include the name and full contact information for the primary and secondary points of contact from the submitting entity. Failure to include this information may cause the proposal to be rejected.

Introduction:

This request for a literature review and subsequent computer modeling falls within the framework of the Project FAIL-SAFE research effort. The National Association of State Fire Marshals Fire Research and Education Foundation (NASFM Foundation) has undertaken Project FAIL-SAFE in an effort to provide quantifiable data on the integration and inter-relation of fire protection systems in modern construction techniques. The literature review is designed to determine what is currently known in this area and identify areas where additional knowledge gains are needed. The computer modeling will follow the literature review to test and provide initial answers to the identified knowledge gaps from the literature review.

Objectives:

The objective of the literature review is to research and analyze available professional, peer reviewed studies that provide data established through quantified and/or qualified research on the value of multiple layers of fire protection safety in structures.

The objective of the computer modeling is to synthesize what was learned from the literature review, performing modeling to expand the knowledge base on the topic of inter-related and integrated layers of protection.

Background:

The landmark 1973 report *America Burning* introduced the concept of tradeoffs as an incentive for installing sprinklers in occupancies; in other words, taking away requirements in the model codes for some passive safety features in exchange for the installation of automatic fire sprinklers. This concept was reinforced 15 years later in the 1987 follow-up report, *America Burning Revisited*, which stated, "Tradeoffs of current fire code requirements in return for installation of automatic detection and suppression systems may become a common approach to providing fire protection in the built environment".

This concept may well have been key to gaining the acceptance of automatic sprinkler systems 30 or 40 years ago, however, over time, changes in methods of construction and building contents have occurred and may not have been taken into account when evaluating tradeoffs, or the collective effects these tradeoffs have had on overall building safety and resiliency. Not surprisingly then, there is scant understanding of how individual tradeoffs integrate and inter-relate with one another, and which, if any, combination of tradeoffs taken still provides adequate levels of protection. As a result of these reports, and the ensuing trend toward the importance of sprinklers in the built environment, a new paradigm exists which has established automatic fire protection sprinklers as the baseline from which to evaluate building fire safety.

Yet, according to a report authored by Fire Safe North America in 2014, the 2012 International Building Code recognizes nearly 200 tradeoffs in over 100 different code sections allowed in exchange for sprinkler installation. Understanding that the NFPA report *U.S. Experience with Sprinklers* by John R. Hall Jr. in June 2013 states that automatic sprinkler systems either fail to activate, or fail to control the fire satisfactorily an average of 13 times out of 100, this has become a national issue that must be addressed. Without the sound empirical data generated by this project, future decisions will continue to be based on unsubstantiated assumptions.

Personnel Qualifications:

All parties submitting a response to this RFP must include documentation of the qualifications of proposed research participants to include the Principal Investigator (PI) and Research Assistants.

A combination of research assistants (RA) may include MS, PhD, and post-doctoral personnel. All personnel will be selected by the PI with approval by NASFM Foundation personnel.

Relevant Research History:

All parties submitting a response to this RFP must include documentation of a minimum of three relevant research efforts equivalent to that proposed in Project FAIL-SAFE, including references.

Work Plan:Literature Review:

Under the direction of a PI with extensive experience in both fire protection engineering and research, work will be accomplished to answer the following broad questions:

- a. Is there precedence for research of this specific type?
- b. What do we already know about holistic building safety, resiliency and preservation?
- c. What assumptions can be made based on what we already know?
- d. Does a knowledge gap or gaps exist in this area.
 - i. Identified gaps will be subject to further investigation through computer modeling and/or fire testing efforts.

Utilizing the results of the NASFM Code Analysis Tool which will be provided, the PI will participate in defining the list of issues to be investigated including which specific systems, assemblies, and scenarios of concern bear further investigation. The PI will also be responsible for participation in determining the “standard” or “model” building to be used as a framework in focusing the research effort. A research hypothesis will be developed with the assistance of the PI, their team, and NASFM Foundation selected industry and fire service professionals to direct the scope of the computer modeling research.

Final output of the literature review will be for the PI to provide a technical, peer reviewed report detailing the nature of the problem, findings and recommended further actions including clearly identified knowledge gaps relating to the inter-relation and integration of multiple fire protection safety systems.

Computer Modeling:

Utilizing the information gained from the NASFM Code Analysis Tool and the literature review, the PI will participate in development of the modeling research plan designed to test the previously developed modeling research hypothesis. The goal is to further answer identified knowledge gaps and, if needed, provide an educated direction and plan for full-scale fire testing.

1. Dependent upon information developed during the code analysis and literature review phases, modeling may be used to address the effects associated with one or both of the following areas;
 - a. The movement of the fire and fire by-products of a fire event (smoke and heated gas movement) as they impact detection, evacuation, compartmentation and suppression;
 - b. The consequences experienced by individual building assemblies, as well as the structure holistically, when exposed to the same type fire event;
 - c. Other areas as indicated or proposed.

Final output will be a technical, peer reviewed written report detailing the identified knowledge gaps, identified strengths and weaknesses associated with both passive and active fire protection systems, direction on the inter-related nature as it relates to tradeoffs, and recommended further actions.

Deliverables:

Deliverable #1: Final output of the literature review will be a technical, peer reviewed written report detailing the nature of the problem, findings and recommended further actions.

Deliverable #2: Following evaluation of the compiled information from the NASFM Code Analysis Tool and literature review, a research hypothesis will be developed to define the value of safety layering features in the identified building and occupancy types.

Deliverable #3: Final output of the computer modeling will be a technical, peer reviewed written report detailing the identified knowledge gaps, identified strengths and weaknesses associated with both passive and active fire protection systems, direction on the inter-related nature as it relates to tradeoffs, and recommended further actions, including the potential for full-scale fire testing.

Travel:

The successful submitting entity will be responsible for travel to not more than two coordination meetings during the project timeline. The PI will be required to attend coordination meetings and will also be responsible for selection of additional team

members to attend meetings if warranted. The submitting entity will be responsible for all travel expenses to include air fare, lodging and expenses.

Timeline:

Following acceptance of the selected RFP and the requisite contracts, work should commence in such a manner as to complete the literature review by July 1, 2016 followed by completion of the computer modeling by December 31, 2016. The NASFM Foundation will cooperate fully in the form of their project management team in facilitating all communication and meetings in a timely and efficient manner.

Additional Questions:

Requests for additional information or clarification should be directed to Jon Narva at jon@narvaassociates.com.