



Request for Proposals

Development of Fire Engineering Practitioner Tools

Background

Fire researchers and fire research institutions have devoted a significant effort to deepening our understanding of fire dynamics. This has enabled the development of fire models used to support performance-based design, fire forensics, fire forecasting, and other applications. These advances have led to the development of many tools for analyzing and predicting various phenomena associated with fire. However, many of these tools are outdated and may not be aligned with the current best practices of the profession or may not operate on stable or maintained platforms. In addition there are likely new areas of research in which practical tools have yet to be developed.

Problem Statement

Fire protection engineers require practical tools to support the analysis of real world fire scenarios and their interaction with buildings and fire protection systems. While there have been significant efforts expended over the past 60 years in research and the development of various approaches and models, there remains a need to develop and maintain a comprehensive set of practical tools with well-defined ranges of applicability that may be applied to the fire safety profession. Additionally the common tasks, practices, and needs of those in the field have changed in the past 20 years, This has not been documented well quantitatively amongst the profession and the needs may not currently be met by the existing set of maintained tools.

While many tools exist (CFAST, Contam, FDS, etc.) and are still utilized by the profession, many others are outdated and no longer supported or operational (LAVENT, DETECT, SAFIR, etc). Furthermore new or revised tools may be needed based on new fundamental knowledge. For example, the Nuclear Regulatory Commission Fire Dynamics Toolset (NRC FDT), a valuable model set for the profession, was created in 2013 and has not been publically updated since. While much of the core science has not changed significantly, there has been additional work on detector activation, pool fires, and other topics documented in the SFPE handbook that could be included and the interface, user functionality, and output could be improved.

Goals & Objectives

The overall goal of this research is to develop a comprehensive set of practical tools that may be used by engineers aligned with the state of the practice as described in the 5th edition of the SFPE Handbook of Fire Protection Engineering. The specific objective of this project is the first step toward this goal: to understand the common tasks and workflow of practicing fire protection engineers, to identify the tools needed to support engineers in the practice of fire protection engineering, and to identify gaps between the common practices and available practical tools.



Proposed Tasks

Task 1: Conduct an international survey and/or similar information collection approach of fire protection engineers and practitioners from the government, private and public sectors to identify common tasks and practices. The intent of the survey should be to determine common calculations performed, how often they are done, how complicated they are perceived to be, what application they are for (tunnels, buildings, etc.), and the type of tools applied such that the results can be sorted and analyzed.

Task 2: Based on the results of the Task 1 Survey and other resources (firemodelsurvey.com and other reviews and compilations) identify:

- The tools necessary to support the profession
- A list of currently available tools and level of complexity vs detail/output/practicality for the available tools. Identify whether the tool is Up to date, Maintained, and Readily Usable.¹
- Document the fundamental features of these models and their user interfaces.

Task 3: Based on Task 1 and 2 identify what current maintained existing set of tools match up with common practice and where the gaps exist between common practice and useful tools to generate a Gaps Analysis and Needs List. Based on the needs list and with input from the project advisory panel, develop and prioritize a project plan to create a suite of fire tools to meet the needs of today's engineering practitioners. The NRC FDT model set should be considered as a baseline/benchmark.

Deliverables

1. Detailed work plan
2. Survey Results
3. Fire Model/Tool literature review, Gaps Analysis and Needs List
4. Work plan for prioritized tool development based on Gaps Analysis
5. Draft final and final report summarizing findings
6. Presentation at a future SFPE conference or webinar

¹ Up to date, maintained, and readily usable for these purposes means that the tool utilizes up to date approaches for solving the problem, has a guide/guidance that is updated as needed, and can be readily installed/utilized on modern computers.



Intellectual Property

The Foundation will retain the rights to the final report and any tools developed in conjunction with the scope of this research project. The final deliverables from this project are anticipated to be posted on the Foundation/SFPE website.

Price and Schedule

This project will be complete four months after initiation. The cost of the project will not exceed \$20,000 USD.

How to Respond

Proponents should submit a six page letter proposal outlining:

1. Qualifications and experience
2. Proposed approach
3. Requested award amount

Deadline for Submittals: 5:00 pm, EDT, June 15, 2020

Direct submissions and inquiries to Ryan Tunkel, SFPE Foundation coordinator, at rtunkel@sfpe.org.

Contractor Selection

Proposals will be evaluated by the Project Technical Panel, based on the three proposal elements listed above. *The project will proceed only on receipt of a proposal deemed acceptable to the Foundation.*