



RESEARCH FOUNDATION

RESEARCH FOR THE NFPA MISSION

Light Gas Dispersion Screening Model

PROJECT SUMMARY

UPDATED: 30 MARCH 2021

Background: There are emerging and established technologies that require the use of lighter than air gases such as hydrogen. To perform safety evaluations for code development, code compliance, permitting, and safety analyses a simple analytical tool is required to predict the concentrations of releases of gas in various hazard scenarios. There are Computational Fluid Dynamic (CFD) models available, but they are expensive and require extensive training to run. A simple, user-friendly dispersion models are referred to as screening models because they over-predict impacts and are often used to screen out the scenarios of greater concern. The key element to simple screening models is that they will over predict impacts. Therefore, the simple model can be used to quickly compare a number of release scenarios and make relative comparisons of the impacts of the various release scenarios. This type of tool is particularly effective when performing a screening analysis, an analysis to determine the release scenarios of greatest concern. The user can always perform a more complex modeling analysis for a release scenario of concern if a more accurate concentration estimate is required.

Research Goal: The goal of this project is to develop a simple open domain dispersion screening model tool along with a basic user documentation that will predict the concentrations of unintended releases of lighter than air gases.

Project Tasks: This project is comprised of the following tasks:

- **Task 1:** Conduct a literature review of available dispersion models to evaluate the impacts of unintended releases of gases that are lighter than air (e.g., Hydrogen). Summarize the methodologies adopted in the available dispersion models. Identify the characteristic variables and parameters that affect the dispersion of lighter than air gases. Literature review will also focus on identifying any available validation data.
- **Task 2:** Use the model variables and parameters identified in Task 1 and develop a simple open domain dispersion tool in excel or similar format (e.g., NUREG 1805) that will predict the concentrations of unintended releases of lighter than air gases and can be run with a simple self-contained set of instructions.
- **Task 3:** Prepare a basic documentation for using the tool.
- **Task 4:** Prepare a final report based on the project tasks, review it with the project panel and submit a final report.

How this information will be used: This model will be useful for new requirements in NFPA Hydrogen Technologies Code for hydrogen equipment enclosures for equipment such as electrolyzers and compressors.

Implementation and Schedule: This research program will be conducted under the auspices of the Research Foundation in accordance with the [Foundation Policies](#) and will be guided by a Project Technical Panel who will provide input to the project, review periodic reports of progress and research results, and review the final project report. The Research Foundation will retain rights to all project deliverables including, the project report and dispersion model tool, which will be published on the Foundation website. The final project deliverables are anticipated to be available by the end of January 2022.