

**Project Title: Blast Wave Modeling****Principal Investigator:**

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**Student Involvement:** One graduate student

**Project Objective:** The effect of detonation-initiated blast waves in a multi-vehicle garage is a key concern and will be addressed.

**Project Abstract:** Existing safety codes do not directly address explosions involving hydrogen vehicles that might occur in a parking garage. A good understanding of the wave propagation characteristics and how the wave will be attenuated by obstacles in the wave path will lead to improved structural design. Explosions in highway tunnels pose a similar danger involving multiple vehicles. Technically, these two topics can and will be addressed in a unified manner.

An extensive literature review will be conducted. Software will be purchased, and the project researchers will be trained on the software. Existing codes and standards for explosions in the transportation context will be extensively reviewed. Two-dimensional and three-dimensional case studies will be conducted. Additions/modifications to codes and standards will be proposed. Detailed plans for Phase II experiments will be developed and documented. Quotations for site acquisition and preparation will be completed.

**Anticipated Benefits:** Safety will be a key issued in developing hydrogen vehicles. The danger from explosions needs to be considered in the design and construction of the test bed. It is anticipated that the results will be useful for planning, policy making and prioritizing goals.

**Modal Orientation:** Hydrogen transportation systems

**Relationship to other Research/Projects:** The proposed project is related to the development of a rural hydrogen transportation test bed that will demonstrate, evaluate and promote hydrogen-based technologies in a real-world environment.

**Technology Transfer Activities:**

1. Technical reports showing findings, conclusions and recommendations;
2. Technical papers for publication in conference proceedings and journals; and
3. Development of consensus codes and standards.

**Transportation Research Board Keywords:** Blast Wave Modeling, Detonation, Codes and Standards, Parking Garages, Highway Tunnels