

Special Issue on  
**Road Tunnel Safety: Impact of Alternative Propulsion Vehicles**

# CALL FOR PAPERS

The number of new energy carriers (NECs) aimed at reducing greenhouse gas emissions, including battery-electric and hydrogen vehicles, is expected to significantly increase on road networks in the coming years. However, the technological advantages of alternative fuels might also have negative effects in enclosed spaces, such as road tunnels, due to the occurrence of new types of incident scenarios involving these vehicles. These could have severe consequences for user safety, as well as causing damage to structures and equipment. Given the possible different risks of NEC in tunnels compared to those of conventionally fueled vehicles, in-depth investigations in this field are required.

The increasingly widespread use of NECs is destined to change the nature of tunnel safety. In this respect, in-depth research into risks due to incidents involving such vehicles represents a great challenge for researchers. Estimates of incident consequences are needed, especially with regards to the fire characteristics of electric vehicles in terms of toxic gases produced; for example, the phenomena of jet fire or vapor cloud explosion following a collision of gas vehicles should be taken into account. In addition, the release of liquid hydrogen in tunnels, which presents different risks compared to those of gaseous hydrogen, should be also investigated since it might lead to cryogenic burns and the formation of flammable hydrogen clouds that may deflagrate or even detonate. The evaluation of accident and fire rates of NECs, compared to that of conventional vehicles, should also be evaluated. The impacts of the aforementioned hazards on tunnel user safety, rescue teams, tunnel lining, and road pavement can be better understood by carrying out studies based on small and/or full-scale tests, numerical modelling, and risk analyses.

This Special Issue aims to identify, quantify, and evaluate the impact on road safety of hazards caused by the transit of NECs through road tunnels. Papers with innovative contributions that provide emerging research results and future directions of research in the risk analysis of tunnels are also welcome. This Special Issue is related to civil engineering and especially to road and structural engineering, but it is also open to a multidisciplinary approach involving fire safety engineering of tunnels. We welcome both original research and review articles.

Potential topics include but are not limited to the following:

- ▶ Impact of new energy carriers (NECs) in road tunnels
- ▶ Data analysis of accident and fire rates involving NECs in tunnels
- ▶ Fire characteristics of electric vehicles in terms of heat release rate, toxic gases, and reduction of visibility for escaping from tunnels
- ▶ Hazards following a collision of gas vehicles in tunnels
- ▶ Hazards following a collision of liquid or gaseous hydrogen vehicles in tunnels
- ▶ Fire resistance of tunnel structures in the event of incidents involving NECs
- ▶ Concrete spalling in the case of a fire involving NECs
- ▶ Fire resistance of asphalt road pavement when an incident involving NECs occurs
- ▶ User safety in the event of incidents involving NECs in tunnels
- ▶ Risks for rescue teams following incidents involving NECs in tunnels
- ▶ Safety strategies to mitigate the effects of incidents involving NECs in tunnels
- ▶ Future directions of research in the field of civil engineering related to NECs

Authors can submit their manuscripts through the Manuscript Tracking System at <https://review.wiley.com/submit?specialIssue=448676>.

Papers are published upon acceptance, regardless of the Special Issue publication date.

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