Class-2 Hazmat Transportation Consequence Assessment
On Surrounding Population

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ABSTRACT

The transportation of hazardous materials through various modes is an utmost necessity of the world for the societal benefits, but at the same time the activity is inherently dangerous. En-route accidents that result in a release can create inhalation problems or could lead to fires and explosions. Incidents involving Hazardous material (hazmat) cargo particularly the Class-2 materials can lead to severe consequences in terms of fatalities, injuries, evacuation, property damage and environmental degradation. The rationale behind considering Class-2 hazmats is that these pose greatest danger to the people and property along the transport route because of their storage condition on the transport vessel. They are stored either in pressurized vessels or in cryogenic containers. Any external impact due to collision may cause catastrophic failure of transport vessels, known as BLEVE (Boiling Liquid Expanding Vapour Explosion) with devastating consequences. Further, any continuous release from containment may cause what is known as ‘Unconfined Vapour Cloud Explosion (UCVCE)’. Historically frequency of BLEVE occurrence is of the order of $1 \times 10^{-6}$ per year or less, but other release scenarios e.g a large vapour or liquid leaks are more probable and could also have devastating effects on the surrounding population. The present study discusses various event scenarios and the consequences considering a class 2.1 material (1-3 Butadiene) and another class 2.3(Ammonia) hazmat. The impact zone study results may be utilized as inputs for identifying the potential vulnerable area on a GIS enabled map, along a designated State highway route passing through an important industrial corridor in western India.

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