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APPLICATION OF A DECISION SUPPORT SYSTEM TO THE TRANSPORT OF HAZARDOUS MATERIALS

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Abstract

The transport of hazardous substances is an essential economic activity because it represents a quite relevant percentage of the total goods transportation. The risk associated to such an activity is fundamentally related to the possibility of an accident triggering that may cause negative environmental and public health consequences. A recent example is the Viareggio accident (2009), which involved the blast of tank wagons containing liquefied petroleum gas (LPG) and caused more than thirty deaths. In this paper, a modified algorithm for risk evaluation and a decision support system, called TrHaM (TRansport of HAZardous Materials), are proposed in order to both quantify the overall risk due to the transport of hazardous materials via road, railroad, waterway and pipeline and help in planning transport activities. The algorithm evaluates and shows the risk distribution using a stand-alone GIS software, which also considers sensitive targets with high crowding (such as schools, hospitals, shopping malls, stadiums and camping areas). Moreover, it allows for finding the transport solution and its logistics which minimize risk distribution, including intermodal shipping.

TrHaM reliability has been tested onto the circulation of hazardous materials in the Varese district (Northern Italy). The area is characterized by a high level of both population and industrial density combined with heavy road traffic. TrHaM has been used with the aim of comparing the current scenario with a potential one that introduces some mitigating interventions which may reduce risk, such as a partial conversion of haulage from road to railway.

Key words: DSS, intermodal platforms, risk assessment, territorial planning, transport of hazardous materials

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