Utilization of accident databases and fuzzy sets to estimate frequency of HazMat transport accidents.

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ABSTRACT

Risk assessment and management of transportation of hazardous materials (HazMat) require the estimation of accident frequency. This paper presents a methodology to estimate hazardous materials transportation accident frequency by utilizing publicly available databases and expert knowledge. The estimation process addresses route-dependent and route-independent variables. Negative binomial regression is applied to an analysis of the Department of Public Safety (DPS) accident database to derive basic accident frequency as a function of route-dependent variables, while the effects of route-independent variables are modeled by fuzzy logic. The integrated methodology provides the basis for an overall transportation risk analysis, which can be used later to develop a decision support system.