EMS Annual Meeting Abstracts
Vol. 10, EMS2013-171, 2013
13th EMS / 11th ECAM
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Vehicle Overturning Model: a conditional probability analysis to determine blow-over thresholds based on probability and risk

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A Vehicle Overturning Module had been developed as part of a Hazard Impact Model under the auspices of the Natural Hazards Partnership which is a collaboration between a number of UK agencies. The aim is to produce early warnings for severe events which allow us to generate an overall picture of the risk to society based on probability and impact. Part of this project is to make the current Vehicle Overturning thresholds more objective by analysing real accident data where a vehicle blow-over occurred. During this investigation it became apparent that a number of reported vehicle blow-overs occurred when analysed wind gust speeds were lower than the current Vehicle Overturning thresholds obtained from characteristic wind speed curve calculations and wind tunnel work. A probabilistic technique is being developed whereby observed wind speeds, at the times and locations of reported incidents, are related to wind climatology in order to generate the probability of a blow-over occurring at a given wind speed. To provide an overall probability of an incident, these conditional probabilities are being applied to probabilistic forecasts of wind gust speed from the new high resolution ensemble MOGREPS-UK. These probabilities are applied in the Vehicle Overturning Model to geospatial information on the vulnerability and exposure of the road network (e.g. traffic volumes) to provide an overall measure of risk.

Keywords: hazard, impact, wind, probability, risk, vehicle overturning