

A Vehicle OverTurning (VOT) Model: How can an impact based model be verified?

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A Vehicle OverTurning (VOT) model has been developed as part of the Natural Hazards Partnership's (NHP) Hazard Impact Model (HIM). The model uses a combination of probabilistic wind hazard exceeding vehicle overturning thresholds, vulnerability data and exposure values to generate an overall risk value termed 'Risk of Disruption' which indicates the amount of road disruption expected should a vehicle overturn. The model runs four times a day and is visualised via a web map service using ArcGIS however these VOT model forecasts need to be verified and this is proving challenging and time consuming. The current ideas for ways of verifying an impact based model, like the VOT model, are outlined below.

What can we use to verify impacts?



There are a number of sources of impact data including news reports, social media reports (e.g. Twitter), police STATs19 incident reports, Highways Agency data, Met Office Weather Observation Website (WOW) Weather Impacts and the National Severe Weather Warning Service (NSWWS) warnings which use likelihood and impact to colour warnings.

So some data is available, however there are a number of pros and cons to this impact data with each data source having distinct limitations. Examples of these include:

Pros

- + Lots of sources of information available
- + Everyone approached for this study has been willing to help and contribute data
- + Weather impacts is an exciting and evolving area with new research and ideas about how to collect and report impact data

WOW (wow.metoffice.gov.uk) is a website 1 2 3 4 Colour depicts where amateur weather enthusiasts can submit weather observations. It was recently modified to allow Weather Impacts to be reported based impact categories and severity level.



In response to the title question 'How can an impact based model be verified?' the short answer is with difficulty but it can be done to a point. At the moment there are many issues associated with the impact observations themselves. When data can be found its collection, evaluation and time consuming. Standardised methods for weather impact verification such as appropriate skill scores are not widely available or adopted, neither are there any computerised systems to look at the impact reported vs. the model output. It is hoped that a more time-effective method of verification, allowing continual verification, will be developed in the near future using impact data from NHP partner agencies, the Highways Agency, the police and media reports. This will make the impact models more scientifically robust and allow the risk values to be properly calibrated based on actual events.

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Cons

- Subjective reports of impacts
- Not Standardised
- Detail required not always available e.g. time, location, vehicle type
- Data is slow to acquire and not in real time
- Large volumes of data to sort and objectively evaluate and quality control







5 December 2013 by source of impact report. Total of 103 events.

Case Study: 5 December 2013 Storm

On the 5th December 2013 a large storm was forecast to hit the UK with widespread gusts of 60-70mph up to 90mph in exposed areas. During the

ce s19 forms	News and social media VOT reports	Disruption Weather Impacts	Total
	1	2	6
	6	6	27
	13	2	42
	6	1	28
•	26	11	103

by wind

such as topography and road orientation.

