

A new way of assessing winter driving conditions and associated risks

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A new study, published today in the *Canadian Journal of Civil Engineering*, presents a risk-based approach for classifying the road surface conditions of a highway network under winter weather events. This approach includes an explicit account of the driving risk that a motorist may experience on a highway.

In countries like Canada that have severe [winter](#) seasons, transportation agencies often face challenges in meeting the safety and mobility needs of people on the road. To address these challenges, most agencies have a comprehensive winter maintenance program in place that includes policies, best practices, and guidelines for monitoring and reporting of road surface [conditions](#). Typically, road surface condition information is broadcast through a traveler information portal known as 511 system or the website of the road agency. However, there is a lack of consistency in defining and determining the winter driving conditions of a highway across different transportation agencies and jurisdictions. Additionally, different terms may represent different levels of travel risk depending on the agency and location. "The main goal of our study is to develop and propose a new [approach](#) to road surface condition classification that provides consistency in the communication of the driving risk that a motorist may experience," says Dr. Lalita Thakali, Research Associate at the University of Waterloo.

In this study, researchers from the Department of Civil & Environmental Engineering at the University of Waterloo, propose a risk-based approach for classifying road surface conditions that could be used for

monitoring winter driving conditions and directing winter road maintenance operations. The researchers propose a relative risk index on the basis of the risk estimated using a collision model calibrated using detailed hourly data of weather, road surface conditions, traffic and accidents on a large number of highway sections in Ontario over six winter seasons.

The study proposed two alternative approaches to address the challenge of determining the overall condition of a highway section or route with non-uniform driving conditions. The first approach applies a risk model to estimate the relative increase in risk under a specific winter weather and road surface conditions as compared to normal conditions. The second approach involves converting different classes of road conditions observed on any given route into a single dominant class based on the relative risk between individual classes of road conditions. This could help drivers assess the road conditions of their entire trip or route.

"An ideal classification system for the public should be one that is simple, intuitive, and consistent" continues Dr. Thakali. The risk-based approach for road condition classification introduced in this research represents one step closer towards such an ideal classification system. Further research could look into the feasibility of developing a universal risk index that is applicable across different regions in Canada.

The paper, "A [risk](#)-based approach to winter [road surface](#) condition classification" by Liping Fu, Lalita Thakali, Tae J. Kwon and Taimur Usman was published today in the *Canadian Journal of Civil Engineering*.

More information: Liping Fu et al, A risk-based approach to winter road surface condition classification, *Canadian Journal of Civil Engineering* (2017). [DOI: 10.1139/cjce-2016-0215](https://doi.org/10.1139/cjce-2016-0215)

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