

Route- based winter road weather forecasting method by using GIS

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ABSTRACT

Traffic accidents due to weather happen more frequently in winter time than in other seasons, and this is caused by the severe road condition. Winter road maintenance engineers always need to decide when and where to plough or spread salt on the roads. Proper road maintenance performance could not only save money and time, but also decrease the amounts of accidents. However, these decisions are difficult to make due to the complex and fast weather changes. To help winter road maintenance engineers with effective road maintenance, many researches that focus on forecasting of road surface conditions have been carried out. Here, a case study of route-based road surface temperature and condition forecasting by using geographical information system (GIS) techniques in Borås, Sweden will be presented. In this study, different geographical parameters, such as altitude, landuse etc., will be obtained from Digital elevation model and landuse data. Together with meteorological data (i.e. solar radiation), road weather information system (RWIS) station data, the influence of geographical parameters on road surface temperature and road surface condition will be analyzed. In this study, different road segmentations based on topographical dataset will be calculated in GIS. After field validation, all the segmentation results will be imported into road surface condition forecasting model- Support System for Winter Maintenance (SSWM) and spatial distribution of road surface temperature will be predicted. By comparing the forecasting results with thermal mapping and RWIS station data in the coming winter, the performance of the forecast techniques will be evaluated, and the segmentation technique will be improved and finally used for predicting road surface temperature and road surface condition. The study result will be used for helping winter road maintenance engineers in decision making and thereby save both lives and money.