

Abstract:

Our society needs to continuously perform transports of people and goods to ensure that business is kept going. Every disturbance in the transportation of people or goods affects the commerce and may result in economical losses for companies and society. Severe traffic accidents cause personal tragedies for people involved as well as huge costs for the society. Therefore the road authorities continuously try to improve the traffic safety. Traffic safety may be improved by reduced speeds, crash safe cars, tires with better road grip and improved road maintenance. The environmental effects from road maintenance when spreading de-icing chemicals need to be considered, i.e. how much chemicals should be used to maximize traffic safety and minimize the environmental effects. Knowledge about the current and upcoming road condition can improve the road maintenance and hence improve traffic safety. This thesis deals with sensors and models that give information about the road condition.

The performance and reliability of existing surface mounted sensors were examined by laboratory experiments. Further research involved field studies to collect data used to develop surface status models based on road weather data and camera images. Field studies have also been performed to find best usage of non intrusive IR technology.

The research presented here showed that no single sensor give enough information by itself to safely describe the road condition. However, the results indicated that among the traditional road surface mounted sensors only the active freezing point sensor gave reliable freezing point results. Further research aimed to find a model that could classify the road condition in different road classes from existing road weather sensor data and road images. The result was a model that accurately could distinguish between the road conditions dry, wet, snowy and icy. These road conditions are clearly dissimilar and are therefore used as the definition of the road classes used in this thesis. Finally, results from research regarding remote sensing IR technology showed that it significantly improves knowledge of the road temperature and status compared to data from surface mounted sensors.