

ISSUE: 05. OPERATIONAL APPROACHES, EQUIPMENT AND PRODUCTS FOR WINTER CONDITIONS

SUB-ISSUE: Friction

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Room: D

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Presentation title:

FEASIBILITY STUDY ON FRICTION MAPPING

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Summary:

Japan is located between the latitudes of 20 and 45 degrees north, and its northern part is characterized by amounts of snowfall rarely seen at such latitudes. During winter, snowfall and ice formation are common meteorological phenomena in the region. On Japan's northernmost main island of Hokkaido, approximately 90% of winter traffic accidents are skid-related – a statistic that highlights the serious hazard posed to road users by slippery road surfaces. Against this background, icy road surface countermeasures play an important role in winter road maintenance. With tight budgets and strong public demand to keep roads clear of snow and ice, road administrators must find ways to carry out maintenance operations more efficiently. In order to appropriately carry out salting and gritting, which are common practices as measures against icy road surfaces, road administrators need to understand road surface conditions correctly. To this end, installation of the road weather information system and thermal mapping have been widely used. Thermal mapping involves measuring road surface temperature under a range of different weather conditions using infrared thermometers fitted to a vehicle. Based on the fact that the pattern of road surface temperature is reproducible under similar weather conditions, thermal mapping develops a unique surface temperature pattern for each route (known as thermal fingerprints). Another technique to clarify road surface conditions involves determining the slipperiness of road surfaces. The recent development of a practical device that allows continuous measurement of road surface friction has expanded the application of slip indicators in winter road maintenance. Although road surfaces friction is affected by climate conditions, road structures and various other factors, it is not possible to measure the road surfaces friction all the time. If the distribution of road surface friction can be reproduced as in thermal mapping, friction values at certain points on roads can be estimated without measuring friction for the entire road, and road sections where appropriate measures are needed can be identified without such large-scale measurement. The authors accumulated data on road surface friction, air temperature, climate and road structures using a continuous friction tester, which can measure road surface friction constantly. In this study, road surface friction was monitored on a limited highway to examine the feasibility of friction mapping. The results indicated that friction value distribution showed characteristics of reproducibility under certain climate conditions.

