



Salt Gradation Analysis for Winter Road Maintenance

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Received 28 May 2020; Accepted 23 July 2020

Abstract

This research investigates the salt gradation specifications adopted by different provincial or state highway departments in Canada and the US for winter road maintenance operations. To understand the type of used salt, its quantity, grain size distribution, application method and the level of satisfaction of the user, a questionnaire was prepared and sent to selected provincial/state highway departments in Canada and the US. The survey-based comparative analysis performed on the salt gradation in different jurisdictions showed that the salt gradation does not always fit in ASTM (American Society of the International Association for Testing and Materials) and BS (British Standard) standard curves. However, it was found that the gradation of coarse and fine salt used by most Canadian provinces follows ASTM I and the Finnish standards, respectively. Although the majority of jurisdictions surveyed in this study have specific requirements for gradation of the salt used in their winter maintenance operations, no laboratory tests or field trials have been conducted to investigate the effectiveness of a particular salt gradation for road winter maintenance operations. It was also found that salt gradation standards are compromised due to factors such as local availability of the material, purity of the available material, ease of material handling, ease of application, and the preference of private contractors for certain materials.

Keywords: Winter Road Maintenance; Salt Gradation Specification; Coarse Salt Gradation; Fine Salt Gradation; Comparative Study.

1. Introduction

Winter road maintenance is a critical task of highway maintenance agencies in countries with extreme winter climatic conditions. Solid de-icing road salts are one of the most commonly adopted pavement treatment options by highway maintenance agencies (agencies) during winters [1]. Application of solid de-icing salts, to improve adhesion and smooth flow on ice-covered roadways, is an effective technique for mitigating snow from pavement surfaces, having favorable impact on vehicular flow, public safety, and substantial reduction in travel costs [2]. Different gradations of road salts can be utilized when performing anti-icing or de-icing activities. Most winter maintenance agencies including state or provincial highway departments generally use pre-defined salt gradation specifications that suit their operational requirements. Having pre-defined salt gradation specifications ensures that the de-icing material procurement process is facilitated. This also helps the maintenance agencies adhere to consistent operating and safety standards.

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 <http://dx.doi.org/10.28991/cej-2020-03091573>



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