



Scattering of Deicing Salt and Corrosion of Steel Bridges

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Abstract

Deicing salts have spread in a large amount and more frequently after the prohibition on the usage of spiked tires. There is some damage in steel bridges due to spreading of deicing salts. Adhesion of deicing salts to girder is divided into two types. The first one is the water leak including deicing salts. The second one is scattering of deicing salts by wind and traffic passage. Steel is rapidly corroded by water leak. However, it is not evident that there is an adverse effect of scattered deicing salts in steel bridges. Therefore, in this paper, the relation between the adhered salts and corrosion of test pieces made of weathering steel is observed. Also, the applicability of weathering steel to cold and snowy districts is discussed.

Keywords: deicing salt; corrosion; steel bridges.

1 Introduction

The amount of deicing salts has increased every year since the use of studded tires was prohibited from 1990 in Japan in order to reduce the wear of the road surface and the health damage. Since then, it is necessary to spread deicing salts for winter road management. The effect of deicing salt given to the vegetation, has been investigated by Kimura et al[1]. According to the results of this study, it has become clear that there is no significant effect to the vegetation. However, there are many corrosion damaged bridges in cold or snowy districts. Adhesion of deicing salts to bridge girder is divided into two types. The first one is the water leak including deicing salts. The other one is scattering of deicing salts by wind and traffic passage. Corrosion due to water leakage from the drain pipe or expansion joint are the majority. On the other hand, corrosion due to scatter of deicing salts is reported on parallel bridges with different height of road surface and bridges close to the ground. However, the

influence of scattered deicing salts on corrosion of steel bridges it is still not clear enough. In this paper, the relation between adhered salt and corrosion of test pieces using weathering steel is observed. Also the applicability of weathering steel to cold and snowy districts is discussed.

2 Research District and Bridges

Not only deicing salts but also airborne salts from sea corrode steel. To observe the relationship between the deicing salts and corrosion of steel, the research target district must be away from seashore. Therefore, cold district that is 60 km away from Sea of Japan is selected in this study. This area is colder than other districts in Japan, and will spread more deicing salts than other districts in winter. Steel corrosion product is observed in exposed test pieces made of weathering steel, and scattered salts are observed in airborne salt accumulator. These test pieces and airborne salt accumulators are set in the bridges. In generally, more deicing salts are spread in highways than normal roadways. Therefore,