



A Risk-Based Approach to Corrosion Protection and Maintenance of Steel Bridges

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Summary

A computer-based decision making tool used to minimize the cost of coating maintenance for steel bridges is presented. Variations of the model, adapted for specific usage, are presented. A maintenance approach with the lowest equivalent uniform annual cost is recommended for each analysis using the model. The analysis may be performed for a single bridge structure using deterministic or probabilistic input values, or for many bridge structures of a certain inventory using deterministic input values. Using the model to analyze the entire bridge inventory provides an estimation of the annual budgetary requirements for the coating maintenance in a region and will facilitate the prioritization of these coating maintenance projects. The paper focuses on state-of-the-art practices in corrosion protection coating maintenance in the Province of British Columbia, Canada.

Keywords: steel bridges, corrosion protection, maintenance, cost minimization, deterministic & probabilistic methods

1. Introduction

Uncertainty and the risk associated with it are present in all phases of engineering and decision making. Accounting for uncertainties is a key skill that an engineer must hone in his or her role as a decision maker. Though uncertainty is present in all stages of engineering, the degree of uncertainty varies from one stage to another. The uncertainty associated with the earlier stages of a project is much higher than in the later stages as the concepts of design begin to take shape and become more deep-rooted. Additionally, the economic benefits of making decisions early in a project have far more impact than those made in the later stages when changes are more difficult and expensive to make.

When faced with the task of making decisions in uncertain circumstances, an engineer relies on experience and refers to previous cases where similar situations were encountered. Some engineers make use of tables which use weight factors to compare different options. Though the use of such tables is a quick and easy way for engineers to justify their choice of one option over another, the