Differentiation of Target Reliability and Design Life in Design of Long-span Cable-supported Bridges

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Summary

The basic design concepts for the limit state design code under development in Korea for the long-span cable-supported bridge (LSCSB) are presented. Considering the importance of the structure, higher target reliability level is defined compared to that of the ordinary bridges. Regardless of design life, the target reliability index is only defined by importance class. But the difference in design life makes the difference in the 1-year probability of failure when the target reliability index with respect to the corresponding design life is fixed. For the repairable or replaceable components, the target reliability of them could be guaranteed during their service life even if the target reliability is applied relatively low with respect to the design life of the bridge. The target reliability indices for cable elements are determined with reference to the results of reliability assessment.

Keywords: long-span cable-supported bridge; limit state design; importance class; design life; probability of failure; reliability index; target reliability

1. Introduction

In recent years, the design codes for bridges, such as Eurocode EN 1990 [1] and AASHTO LRFD [2], are adopting the limit state design method instead of the allowable stress design method. In Korea, extensive researches have been conducted by Korea Bridge Design Research Center in order to introduce the limit state design method to the bridge design code. As a result, *Highway Bridge Design Code (Limit State Design Method)* [3] is enacted and it is in the stage to be applied to the actual design of bridge nationwide.

In the ongoing project by the Super Long Span Bridge R&D Center in Korea, it is decided that the safety level needs to be determined in terms of probabilistic and statistical manner and various researches are performed for the writing of the draft of the design manual for LSCSB.

In this paper, the target reliabilities of the structures are differentiated by the importance and the design life. And the differential application of target reliability is shown for the repairable or replaceable components. In addition, the reliability assessment for cable element is shown for three cable-supported bridges in Korea and the target reliability indices for cable elements are presented with reference to the results.

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