

LCC-based Bridge Maintenance Strategy in Yamaguchi Prefecture

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Summary

In this paper, a strategy decision support system for bridge management is described based on both of the remaining life cycle cost (RLCC) and rebuild cost stabilization, as a joint research project between Yamaguchi University and Yamaguchi Prefecture. The proposed system that considered not only future maintenance but also rebuild action is applied to existing bridge data on about three and half thousand bridges that stored in J-BMS data base (J-BMS DB) for practical use. Then, it is found that the system helps efficiency bridge engineers related to bridge management understand easily what are the major processes in the deteriorating bridges in the future, how to improve their performance, and what kind of repair/strengthening works is most convenient for the deteriorating bridges.

Keywords: Bridge management system (J-BMS), remaining life cycle cost (RLCC), J-BMS database, cost stabilization; deterioration curve.

1. Introduction

The needs for efficient bridge management systems have been recognized all over the world. Although there are some commercial products on the global market, the national differences many times hinder the adoption of foreign bridge management systems. This is one of the main reasons why so many countries are developing their own systems. The local conditions (bridge types, macro and micro climatic peculiarities, working traditions, etc.) are best known by the local people. By trusting in local expertise also the customer needs (i.e. needs of the bridge owner) are best taken into account. However, with many new innovations, technologies and methodologies, a lot of benefits can be achieved by international cooperation in this field.

In Yamaguchi Prefecture, some studies have been made about planned maintenance jointly by administrative, academic and private sectors. Research and development has been carried out concerning maintenance systems for bridge maintenance planning in a joint research project of Yamaguchi University and the prefectural government. The requirements for future road maintenance are enhancing road functions, assuming accountability and reducing costs. A system will therefore be built in the joint research to meet the requirements and bridge maintenance plans will be developed and implemented. Many of the bridges under the management of Yamaguchi Prefecture were built in the 1950s to the 1970s. In 2025, about 63 percent of the bridges under the management of the prefecture will be 50 or more years old. The cost of the repair, strengthening and reconstruction of these aging bridges is expected to increase sharply in the coming years. Under these circumstances, many road administrators including Yamaguchi Prefecture need to manage bridges systematically. For systematic management of the bridges, it is necessary to draw up a management plan by making effective use of a wide range of information such as bridge inspection results, bridge specifications and future deterioration predictions. To do this, there is a pressing need to develop a management planning support system.

In this paper, a strategy decision support system for bridge management is described based on both of the remaining life cycle cost (RLCC) and rebuild cost stabilization, as a joint research project