

# **Study on effective maintenance management strategy for bridges in salt damage environment**

Tomoaki NAKANO

## **1. Introduction**

Many structures constructed during the period of high economic growth are about to renew due to aging. Until now, reinforced concrete structures have been said to be highly durable. In the future, however, grasping and improving durability will be an important issue in the maintenance plan.

In this research, author will identify and sort out the issues of a series of processes in the current maintenance strategy for the bridge group under salt damage environment. In addition, a new method is proposed at each stage for planning a maintenance management strategy based on the results of demonstration tests on environmental external forces and degradation mechanisms.

## **2. Analysis and experiment methods and results**

Chapter 1, clarified the background and purpose of this study and outlined the structure of the paper.

Chapter 2, based on the actual situation of the maintenance for present situation and that of infrastructure structure in our country, we identified and sort out the issue in the maintenance.

Chapter 3, the evaluation method of environmental external force was examined based on the results of investigation on the deterioration of bridge groups caused by the difference in meso environment in Amami Oshima.

Chapter 4, a simulation experiment was conducted to confirm the effect of local water splashing on the moisture movement and rebar corrosion behavior inside the concrete, and the influence and extent of the effect on the progress of deterioration of the structure were examined.

Chapter 5, focuses on the Markov chain model as a method for efficient maintenance of bridge groups, and examines a method for calculating transition probabilities based on the degradation process, and a method for predicting deterioration of bridge group health.

Chapter 6, examines specific measures to improve the efficiency and efficiency of maintenance management strategy, including "measures" for selecting construction methods based on the evaluation of environmental external forces, and "records" using ICT and GIS. This led to the proposal of a method for planning a maintenance plan.

Chapter 7, presents a conclusion based on the results gathered in each chapter.

## **3. Conclusions**

Author proposed new methods at each stage of maintenance management strategy for bridges in salt damage environments, such as "effective inspection" based on the results of demonstration tests on environmental external forces and degradation mechanisms, "exquisite diagnosis" which utilized analysis based on degradation processes and numerical simulations, "Precise prediction" using probabilistic methods and "Recording that can be spiral-up" using ICT and GIS. Author believe that the results obtained will greatly contribute to the effective maintenance strategy for bridge groups, which is an urgent issue in Japan.