Inspection Results and Accuracy of Probabilistic Structural Condition Forecasting for Highway Bridges

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1. Introduction

The road network in Japan was developed rapidly during the rapid economic growth of the 1970s, and the number of road bridges has now reached approximately 680,000 (bridge length ≥ 2 m). If the current situation continues, the number of bridges that have been in use for over 50 years will account for almost half of the total bridges in 15 years. A strategy to lower maintenance costs for each bridge while maintaining adequate maintenance standards is essential. In 2004, Japan implemented a policy whereby, out of the 160,000 bridges in the country, the 21,635 bridges under central government management are inspected once every 5 years. In these inspections, the types and units of data collected were determined taking into account the application in BMS (Bridge Maintenance System).

2. BMS based on periodic inspection

The periodic inspection records all conditions on a micro-component level of all bridges, and from a unified perspective with the aim of applying BMS. The calculated corrosion deterioration curves are shown in Fig. 1 for the bridge at the location of each bridge component. From these curves, we can see a difference in the progression of corrosion according to the location.

3. Utilization of BMS

From inspection results, trends in the location of the damage can also be ascertained.

- We can determine whether the coating is in a sound condition as a whole, but not overlook cases, such as in Fig. 2, where considerable corrosion has occurred at the end.

- By statistically understanding the tendency of the deterioration which was affected by the construction period, initial quality or bridge building environment, it will be possible to reflect on the establishment of more durable design standards and construction techniques.

4. Conclusion

NILIM will continuously proceed with the study for development for more efficient maintenance and management based on the national highways of Japan.

[References]: Bridge and Structures Division HP
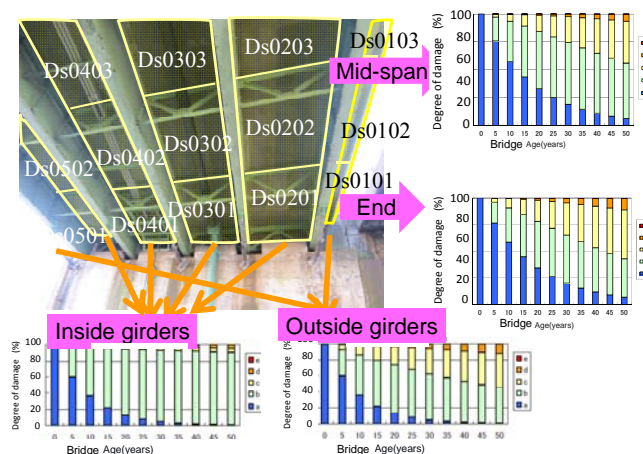
http://www.nilim.go.jp/lab/gcg/index.htm

Fig. 1. Creation of deterioration curves for each element.

Fig. 2. An example of a bridge with considerable corrosion at the ends only.