

Analysis of inspection outcomes of civil engineering structures (large culvert and jets)

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1. Introduction

Among civil engineering structures on roads, the regular inspection procedures for large culverts and sheds were reported in 2014, and these structures are being inspected based on the procedures.

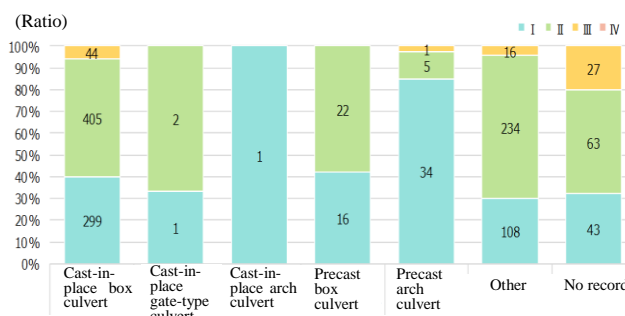
NILIM is analyzing the outcomes of the regular inspections to identify the tendency for damage on already constructed structures to improve the reliability and efficiency of regular inspections.

2. Characteristics of damage on already constructed civil engineering structures on roads

The authors organized the outcomes of regular inspections conducted in 2014 and 2015 at 646 large culverts and 289 sheds on national roads managed by the national government.

Among the large culverts, about 40% were categorized as robustness I (robust), about 50% robustness II (preventive maintenance phase), and about 10% robustness III (early implementation of measures phase). No facility was categorized as robustness IV (urgent measures phase). The relationship between structural styles and robustness was organized to improve the efficiency of inspections based on structural styles (figure 1). Some structural styles were not categorized in robustness III, but such structures were available in small numbers, and the ratio of robustness may vary depending on the outcomes of future inspection outcomes. Thus, the accumulation of more inspection outcomes is needed.

Meanwhile, about 10% of the sheds were evaluated as robustness I, about 40% as robustness II, and about 50% as robustness III. No shed facility was evaluated as robustness IV. The relationship between structural styles and the diagnosis of the robustness of materials, including RC, PC, and steel (figure 2), shows that the ratio of robustness III is not high with RC in any of the structural styles, while the ratio of robustness III is high in the upper structure and valley-side structure of simple bridges made with PC. Among structures made with steel, the ratio of robustness III is high in the upper structure and bearing



Note) Other: Facilities with no indication of cast-in-place or precast)
No record: Facilities with no indication of structural style in inspection reports

Figure 1. Robustness by structural styles (large culvert)

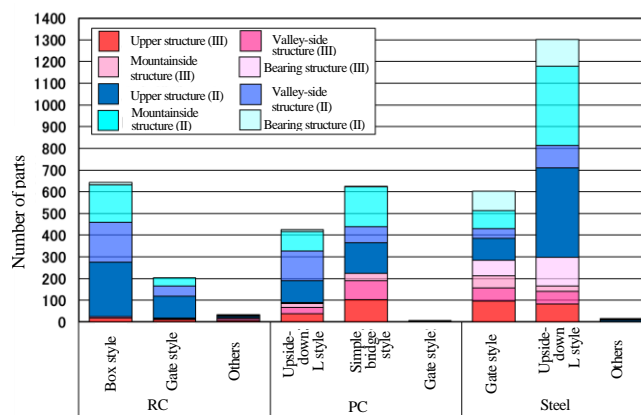


Figure 2. Robustness by structural styles (shed)

structure of gate-type structures and upside-down L-shaped structures. The ratio of robustness III tends to increase in relatively older facilities indicating that parts with damage differ depending on structural styles. Additional analysis of the tendency is needed.

3. Conclusion

Researchers are going to continue accumulating the outcomes of regular inspections and conduct analyses with higher precision to pursue the improvement of the reliability and efficiency of regular inspections for civil engineering structures.