

Research Trends and Results

Investigation for damage to civil engineering structures on existing roads

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1. Introduction

It is desirable for civil engineering structures on roads to maintain their functions and performance to ensure safe and smooth road traffic. Therefore, we need to properly grasp the state and any deformation of civil engineering structures on roads and take appropriate measures if necessary to prevent disasters from occurring. We will examine the damage conditions and effect of reinforcement and clarify any issue that needs to be resolved, by considering the results of inspections, such as an overhaul, of civil engineering structures on existing roads.

2. Characteristics of damage to civil engineering structures on existing roads

We organized various parameters such as the types of damage and conditions of structures based on the results of inspections of civil engineering structures on roads (retaining walls, culverts, and sheds). We then analyzed the tendency for the occurrence of damage.

We confirmed that there is a large amount of damage in the main parts (the pile cap, side walls, and bottom slab) of culverts (709 places) by extracting them from the nationwide inspection results for civil engineering structures on roads. Cracks, crevices, and fissures account for approximately 40% of the damage (Figure 1).

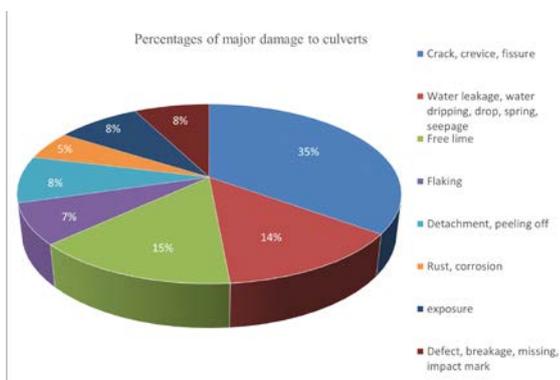


Figure 1 Percentages of major damage to culverts
Organizing the relationship between the types of damage and degrees of damage (classified using five ranks from a to e, where the most severe damage is classified as e) to sheds (62 places), we found that the

percentages for corrosion, cracks, and reinforcing bar exposure were high, with degree of damage levels of d and e (Figure 2).

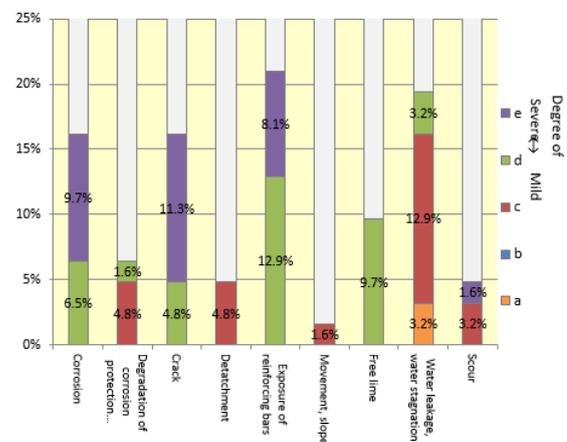


Figure 2 Breakdown of types of damage and degrees of damage to sheds

In addition, we organized and wrote explanations of the damage conditions categorized by the types of damage as case examples of the damage to various civil engineering structures on roads.

We organized the results of the 2014 inspection of structures under the direct control of the Ministry of Land, Infrastructure, Transport and Tourism. This was conducted based on the “Manual for periodic inspections for sheds, large culverts, etc.,” which was established in June 2014.

In relation to the soundness of structures, structures meeting criterion III (the early measures stage) accounted for more than 40% of the sheds, whereas structures meeting criterion III for large culverts only accounted for

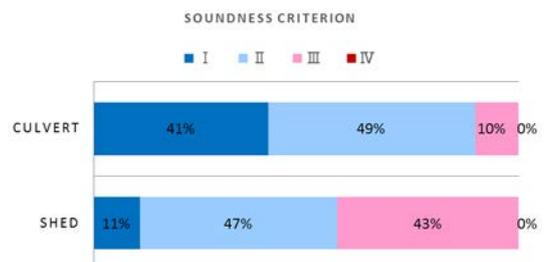


Figure 3 Breakdown of soundness criteria

10%. We found that the damage conditions varied depending on the type of structure (Figure 3).

3. Concluding remarks

There are many unknown points, including the material degradation, degree of damage to existing structures, and residual strength. We plan to organize the repair and reinforcement work done in the past, and examine the reinforcement priority and repair and reinforcement methods.