

# A Case of Utilizing Results

## Reference documents concerning periodic inspections of road bridges (2013 edition) —Bridge Damage Case Photo Collection—

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### 1. Introduction

The percentage of Japan's huge stock of road bridge assets that has deteriorated is rapidly rising. We have to economically and rationally maintain these assets as we ensure safe and smooth traffic into the future. Therefore, it is important to appropriately clarify and evaluate the present state of bridges and implement systematic maintenance based on the results.

The Bridge Periodic Inspection Rules (Proposed) (March 2004) (below, "2004 Inspection Rules") have been enacted to cover road bridges operated by the national government, stipulating that periodic inspections formerly done at 10 year intervals be carried out every 5 years in the future, and that, in principle, all members be closely examined visually. At this time, in order to be able to evaluate and analyze characteristics of deterioration, in addition to the diagnosis of the soundness of members (deciding countermeasure categories), objective facts about the state of damage (evaluations of the degree of damage) are recorded. At the same time, the NILIM has published a technical report on the state of damage etc. which has been accumulated by past surveys (TECHNICAL NOTE of NILIM, No. 196, December 2004) to support technologists who perform inspections and diagnoses.

Since then, the NILIM has continued by analyzing the results of the 2004 Inspection Rules used nationwide, categorizing forms of damage, hypothesizing causes, and conducting survey research of design standards. And it has conducted studies concerning forms of damage and bridge erection environmental conditions by performing statistical analysis.

This fiscal year, based on knowledge obtained from survey research on deterioration conducted since 2004, technical consultations about defect cases, and technical support, a new collection of damage cases for management personnel to use as reference material has been prepared.

### 2. Configuration and outline of the Bridge Damage Case Photo Collection

This document organizes damage cases under items (I) to (V) shown in Table 2 for each inspection item in the Inspection Rules (26 types of damage shown in Table 1).

Damage to steel members	Damage to concrete members	Other damage	Common damage
[1] Corrosion [2] Cracking [3] Looseness, and falling [4] Breakage [5] Deterioration of corrosion protection function	[6] Cracks [7] Exfoliation and expose of rebars [8] Leakage or free lime [9] Falling [10] Damage to concrete reinforcing materials [11] Slab cracking [12] Flaking	[13] Abnormal opening [14] Irregularities on road surface [15] Defective paving [16] Obstruction of functions of bearings [17] Others	[18] Abnormal anchors [19] Discoloration and deterioration [20] Leakage and water retention [21] Abnormal noise or vibration [22] Abnormal deflection [23] Deformation or chipping [24] Soil plugging [25] Settlement, movement, leaning [26] Scouring

Table 1. Inspection Items (Types of Damage)

(I) General properties and characteristics of damage It shows photos of cases revealing general properties of damage and its characteristics
(II) Relationship with other damage It shows points which are closely correlated with other damage, and whose data must be carefully recorded.
(III) Evaluation of degree of damage It shows examples (Photo 1) of cases where degree of damage of the damage case was evaluated based on damage evaluation standards.
(IV) Deciding countermeasure category It shows characteristic damage cases and related information, so that it can be used as reference material to decide countermeasure categories
(V) Other reference information It shows information for use as references concerning past specific cases, precautionary items, causes of damage, and change of materials used.

Table 2. Characteristics of the damage cases classified

※Degree of damage is defined at 5 levels: a (no damage) and b, c, d, e (rising degree of damage)



(a) Evaluation of degree of damage [b]

(b) Evaluation of degree of damage [e]

Photo 1. Evaluation of Degrees of Damage (Example of Corrosion)

### 3. Summary

We are counting on the document being used effectively in the field and to contributing to appropriate diagnosis through inspections and to decision making concerning measures that managers take. In the future, we will continually accumulate and analyze inspection data, and develop comprehensive road bridge service-lifetime extension technologies including establishing, designing, and executing rational maintenance methods based on predictions of deterioration of road bridges.

[Source]

Web page of the Bridge and Structures Division  
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<http://www.nilim.go.jp/lab/gcg/index.htm>