

# A Study on Method of Using Work Management Records in Maintenance Stage Obtained from Construction Process of Earthquake Restriction Work

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## 1. Introduction

The Ministry of Land, Infrastructure, Transport and Tourism ("MLIT") has been promoting "i-Bridge" to improve productivity and safety of bridge construction projects using ICT and applied it on a trial basis to part of the restoration work related to the Kumamoto Earthquake.

This paper introduces a study on the method of using data for maintenance, which is obtained from the earthquake restoration work for a road bridge proceeding in relation to this trial use.

## 2. Maintenance of data obtained from earthquake restoration work Need for utilization in stages

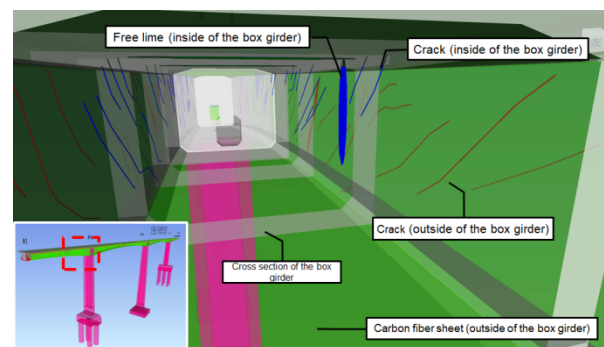
In earthquake restoration work, there is uncertainty in design stage which is not found in new construction work, such as determination of residual stress. For such uncertainty, it is important to check whether there is any difference from the determination in design stage by monitoring changes in the structure system in construction stage.

On the other hand, there are also matters of concern in maintenance stage, such as possibility of damage growth and secular change in repaired part. For such uncertainties, it is required to identify properly, from the information obtained from the earthquake restoration work, damage caused by the earthquake to members, repair method for the damage, and data required to secure the durable performance of the repair method applied, and to keep records and store the data by clarifying the mutual relationship of the data.

## 3. Example for utilization of CIM model in maintenance stage

Based on the aforementioned viewpoints, this study focuses on three-dimensional visualization of data using CIM. As a specific method, a CIM model was created for the bridge in which cracks were caused to the PC box girder by the Kumamoto Earthquake and repaired with carbon fiber sheet and data required for maintenance is input as attribute information.

Maintenance in this paper has viewpoints specific to repairing members, such as "Isn't there any progress in cracking that may affect load-bearing performance?" or "Isn't there adhesion peeling in the carbon fiber



**Fig. 1 View from the inside of PC box girder in CIM model**

sheet?" Accordingly, for such viewpoints, it is necessary to keep records so that maintenance can be properly conducted.

For existing bridges, 3D CIM models are created from existing 2D drawing information and the level of detail required for CIM models need to be set individually according to the purpose of use. CIM model creation in this paper focused on reproduction of the shapes of members illustrated on general drawings based on the aforementioned viewpoints and enabled three-dimensional display of interrelation of information on damage inside members and repair work information as shown in Fig. 1.

## 4. Conclusion

We intend to further study on utilization of CIM models that contribute to maintenance through careful examination of information to be recorded in CIM models according to repair work methods considering the points of attention in maintenance of repaired members.

☞ See the following for details.

1) NISHIDA Hideaki, SUZUKI Shinya, TAKIMOTO Kodai, HOSHIKUMA Jun-ichi: Civil Engineering Journal, No.10, Vol. 60, 2018, pp.24-27