BIM/CIM Generating Methods for the Efficient Maintenance and Management of Existing Port Facilities

(Research period: FY 2022 to FY 2024)

Port Advanced Information Technology Division

Support Center for Port and Harbor Advanced Information Technology

Head (PhD (Engineering)) TATSUMI Daisuke Senior Researcher SATOMURA Daiki

(Keyword) Productivity improvement, BIM/CIM, maintenance and management

1. Introduction

BIM/CIM (Building/Construction Information Modeling/Management) is expected to be useful for improving the efficiency of maintenance and management, such as visualization of inspection and diagnosis records, unified management of maintenance and management-related data, and an information platform function linked with measurement equipment. On the other hand, the current guidelines for BIM/CIM are mainly for new port facilities, and are not necessarily optimized for 3D models of existing port facilities for maintenance and management. The purpose of this study is to examine the requirements of shape and attribute information for 3D models of existing port facilities for maintenance and management, and to propose an efficient creation method.

2. Creation of attribute information input/output simplification tool

By FY 2023, we had examined the requirements of shape and attribute information for 3D models of existing port facilities for maintenance and management, and proposed a creation method for 3D models (**Fig.-1**). As for the 3D shape data, we read the structural dimensions from the standard cross section and plan in the maintenance and management plan, and create the data to the extent that we can understand the structural form (level of detail (LoD) of shape information is equivalent to 200). As it is useful to visualize the degree of deterioration by color coding, information such as the degree of deterioration of main components from the general periodic inspection and diagnosis report is directly added to Tier 3 (inspection and diagnosis block unit).

In FY 2024, as shown in red in **Fig. 1**, we created an "attribute information input/output simplification tool" to improve the efficiency of adding attribute information, and to extract attribute information from the 3D model to generate useful information such as life cycle cost. The attribute information input/output simplification tool can read the 3D model and the inspection and diagnosis sheet and transfer them to the attribute information of the 3D model. It is also possible to extract necessary attribute information from the 3D model and write it to the input data of the life cycle cost calculation program developed and released by the National Institute for Land and Infrastructure Management.

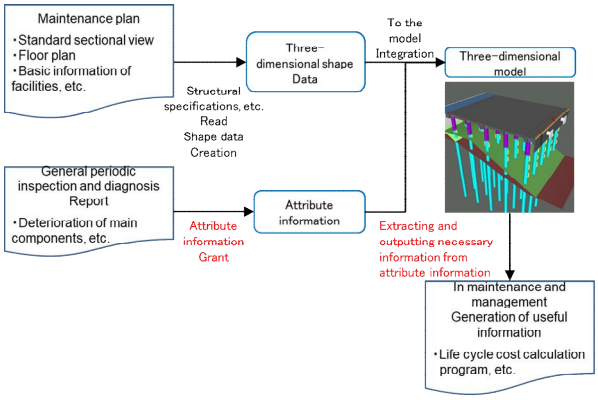

Fig. 1 Method of creating a 3D model of existing port facilities

3. Conclusion

In the future, an efficient creation method similar to the attribute information input/output simplification tool is required for the 3D shape data created manually. In addition, it is necessary to examine further utilization of BIM/CIM by testing 3D models of existing port facilities in the field of inspection diagnosis and maintenance.

☞ For more information

1) Proceedings of the Japan Society of Civil Engineers Vol. 80, No. 18, No. 24-18118
https://www.jstage.jst.go.jp/article/jscejj/80/18/80_24-18118/_article/-char/ja
2) Life Cycle Cost Calculation Program
https://www.ysk.nilim.go.jp/kakubu/kouwan/sekou/lcc.htm