Initiatives to introduce ICT and BIM/CIM at ports

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1. Introduction

ICT dredging work was started in FY 2017 in the port sector to improve productivity. Since then, various guidelines have been prepared and revised, and situations where ICT is now used is increasing. Since the introduction of BIM/CIM into design work in FY 2018, related guidelines have been established, and the implementation of BIM/CIM into construction is progressing.

2. Examining ways to improve the productivity of ICT construction

Divers use underwater staff to measure the formation of foundation work (rubble leveling), and it is expected that the efficiency and safety of work can be improved through the utilization of ICT. During this fiscal year, field tests were carried out on three types of performance measurement methods, namely multi-beam echo sounding, underwater sonar, and construction history data of rubble leveling machines, to verify measurement accuracy and to examine performance control standards.

In addition, it is difficult to completely remove the noise contained in the measurement data automatically from multi-beam echo sounding equipment utilized in ICT dredging work, etc., making this process both time and labor consuming. For this reason, we have developed a program to efficiently reduce the noise from multi-beam survey data using AI technology, and have applied this to measure data acquired at dredging sites to study methods to create training data used by AI and to verify accuracy (Fig. -1).
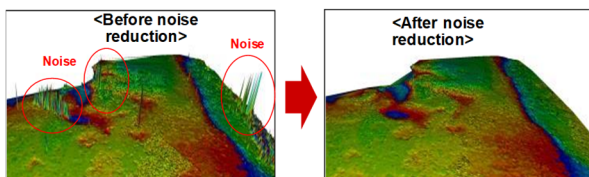

Figure -1 AI noise reduction program for multi-beam echo sounding data

3. Study on utilization of BIM/CIM at ports

In order to promote the utilization of BIM/CIM, 21 cases in which BIM/CIM were used for construction work in the port sector between FY 2018 and FY 2019 were extracted and in November 2021, we prepared and published[1] "BIM/CIM Case Studies ver.1 Ports and Harbors". In this case study, the main uses of BIM/CIM are classified into 4 types: coordinating information among related parties, calculation of quantity, construction cost, and construction periods, effective verification, and effective utilization during the construction stage. Examples are summarized for each use (Fig. -2). In addition, in order to reduce the time and labor required to create a three-dimensional model, generic objects are being examined.
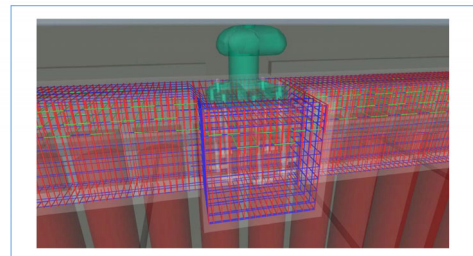

Figure -2 BIM/CIM Case Studies ver.1 Ports and Harbors (quality improvement by checking the interference of reinforcing bars)

4. Conclusion

In order to further improve the productivity at ports and harbors in the future, we will continue to consider the use of ICT construction and BIM/CIM.

See below for more detailed information.
1) BIM/CIM Case Studies ver.1 Ports and Harbors
   https://www.mlit.go.jp/kowan/content/001442768.pdf