



GUIDELINES FOR USE OF BIM IN INFRASTRUCTURE FOR PORTS AND WATERWAYS

Terms of Reference

1. Historical Background

The use of BIM (Building Information Modelling) methodology has increased during last years, having started mainly in the field of design and construction of buildings, but is also now considered for projects in most civil engineering fields. This concept is now a requirement and a reality in most complex projects, in addition to being requested by public administrations and private clients.

The use of BIM for infrastructure for ports and waterways and other waterborne transport infrastructure requires a new approach to the organization of the design, construction, maintenance and operation processes.

Additional needs have been identified for this task, as there is a lack of a library of standard elements for these models, such as breakwaters, armour elements, rock materials, quay walls, navigation locks, coast defences, etc. There are elements difficult to represent in the BIM LOD (level of detail) world that should be addressed. The IFC (industry foundation class) today is not including marine infrastructure works.

At this point, PIANC has the opportunity to propose a set of rules and guidelines that will provide an unified criteria for the industry.

Due to the innovative character of BIM methodology, there are no references in PIANC or few in other publications within the maritime and port construction industry to consider in these Terms of Reference (see Section 4).

2. Objectives of the Working Group

This Working Group will provide a guide for the whole marine community on BIM implementation for their projects, including how to use the methodology, benefits, specific elements, structures, software, etc., at the time that will cover the specification of guidelines that will ensure an homogenous data interchange.

A part of the objectives will be to give guidance on the property list that is required to define typical objects in marine infrastructure works, creating an object type library.

3. Scope

The scope of the group will focus on BIM implementation for infrastructure for ports and waterways, including if possible, a case study as example.

The WG shall consider, but not limited to, the topics listed below, specifically reviewed for marine projects:

- Glossary of BIM terminology
- BIM objectives and stages
- Benefits for clients and contractors
- Employer Information Requirements (by the client)
- BIM and construction contracts (e.g. build, D&B, DBFM, ECI, ...)
- BIM applications
- Models structure
- GIS information
- Level of information needs: Level of geometry (LOG) and Level of Information (LOI)
- BIM elements classification
- Deliverables for each stage
- File management and collaborative environment
- Quality controls
- OTL (object type library), ILS (information delivery system), IFC (industry foundation class)

It will be for the WG to decide the extent to which VDC (Virtual Design and Construction) should be included in the WG report.

4. Earlier Reports to be Reviewed

No applicable PIANC reports

Other reports or standards:

- BS EN ISO 19650-1:2018 Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM). Information management using building information modelling. Concepts and principles.
- BS EN ISO 19650-2:2018 Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM). Information management using building information modelling. Delivery phase of the assets
- BS 8536-1:2015 Briefing for design and construction. Code of practice for facilities management (Buildings infrastructure).
- BS 8536-2:2016 Design and construction: Code of practice for asset management (Linear and geographical infrastructure).

- PAS 1192-5:2015. Specification for security-minded building information modelling, digital built environments and smart asset management.
- BS ISO 16739 Industry Foundation Classes (IFC) standard data format.
- The Working Group will agree the range of other national and international reports and publications to be reviewed (e.g. Guidance documents regarding the ISO19650 by the UK BIM alliance, a PWC report on the ROI of BIM, Port of Antwerp and Port of Rotterdam documents, UK's 'Governments Soft Landings' (https://ukbimframework.org/wp-content/uploads/2019/11/GSL_Report_PrintVersion.pdf)...).
- www.buildingsmart.org/ifc-maritime-project
- <https://www.neccontract.com/NEC3-Products/NEC3-Contracts/NEC3-Engineering-Construction-Contract/How-Tos/NEC3-How-to-use-BIM-with-NEC3-Contracts>
- BIM Guide for the State-Owned Port System (Puertos del Estado 2019, Spain), <http://www.puertos.es/es-es/BibliotecaV2/Guia BIM 09.pdf>

5. Suggested Final Product of the Working Group

The aim is to promote the use of BIM in projects for ports and waterways and to produce a WG Report as a guide for the implementation of BIM for waterborne transport infrastructure, identifying relevant issues and including one or more example case studies.

6. Desirable Disciplines of the Members of the Working Group

It is desirable to have a broad representation of all the actors who can be part of a BIM project, including Public clients, engineering and consulting companies, contractors, BIM experts, universities, sister associations, etc.

7. Relevance for Countries in Transition

This report will be a helpful document both for developed countries and countries in transition, to assist all the sector actors in the digital transformation of the maritime infrastructure industry.

8. Climate Change Considerations

Climate change will bring changed conditions that will affect BIM model definition and should be addressed within this report.

Due to climate change, also maintenance demands will increase. Since BIM models can be used for inspection and maintenance, it will become more beneficial in the future to use BIM in marine projects.

Added to this, any benefit of using BIM will be identified as money savings or better use of human and material resources as a result of working more efficiently.

9. Relevance to UN Sustainable Development Guidelines

This WG will be relevant to the following UN Sustainable Development Guidelines:

GOAL 9: in particular: Industry, innovation and infrastructure

GOAL 11: Sustainable cities and communities

GOAL 17: Partnerships for the goals