Review of IFC Compatibility for the Management of BIM-based Construction Information

Jin-Seok Moon*, Choong-Han Han**
*,**Korea Institute of Construction Technology, Korea
E-mail : jsmoon@kict.re.kr, chhan@kict.re.kr

1. Research Background and Objective

Since the introduction of the BIM (Building Information Modeling) technology in Korea, it has been applied actively not only in the construction field but also in the civil engineering field. In the civil engineering field, researches on the application of BIM in road and railroad construction projects are being actively conducted, and IFC is being used as a method of exchanging, managing, and sharing information based on BIM. For BIM-based information management targeting port areas, this study uses the object classification system and models port facilities, including objects' attribute information. Also, using the software used for writing objects, relevant files are converted into IFC, and their shape information and attribute information are compared and reviewed with the IFC Viewer.

2. Object Modeling Methods in the Port Category

In this study, BIM was used to manage information in a port area, and a block-type seawall was chosen as the construction target. The target facilities are as follows.

-Target facility: Seawall (concrete block type), 115 m
- Major structural members: Ripraps, armor stone, cell blocks, and top-placed concrete blocks

Based on the work classification system developed for the port area modeling, an object classification system was constructed, and the details were numbered to define common attributes such as measures and to calculate the quantity. An object model was also designed. Figure 1 shows a schematic diagram of the modeling of the port area, by classifying into facilities, spaces, areas, types, and models with a view to creating the work classification system and the object classification system, as well and by using the existing design information.Figure 2 shows a seawall modeled in with Autodesk Revit Structure 2013. What was modeled was not simply a seawall but also a seawall based on objects that included the material attribute and quantity calculation information.

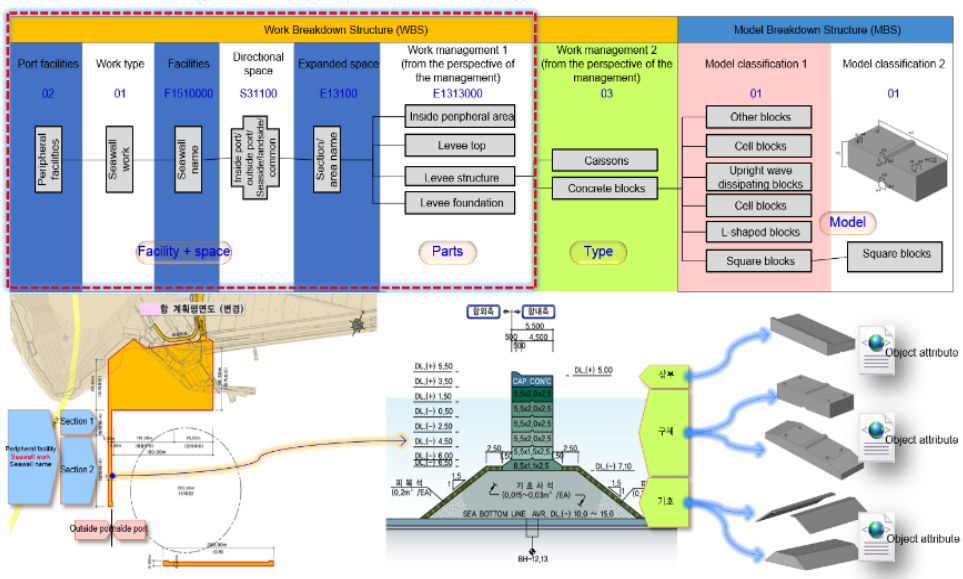

Figure 1. Schematic diagram of the modeling

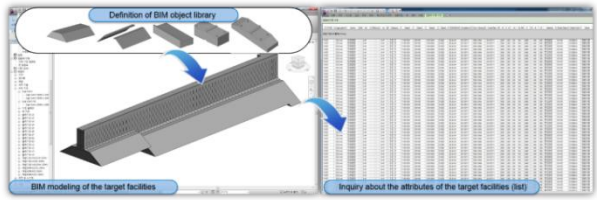

Figure 2. Outline of the construction BIM-based object model information

3. Review of IFC Compatibility for the Application of BIM

The seawall modeling data were converted into IFC, so they were reviewed via the Solibri Model Viewer as to whether or not the model and attributes were properly constructed and utilized. The modeling designed as an Autodesk Revit Structure, and the attribute information such as the design quantity and the detail classification system codes, were compared to see if they were properly applied. Figure 3 shows the realization of the attribute information on the seawall IFC, viewed with the Solibri Model Viewer. Figure 4 shows the results of the IFC files reviewed at Tekla BIMsight besides with the Solibri Model Viewer. The review revealed that the shape model was properly expressed without being lost or deformed.

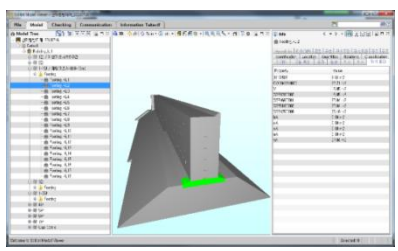

Figure 3. Confirmation of the object shapes through Solibri

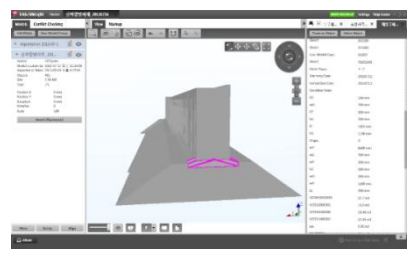

Figure 4. Confirmation of the objects through Tekla BIMsight

Figure 5 shows the results of the conversion of the model designed as an Autodesk Revit Structure into an IFC file and the review of its attributes through the Solibri Model Viewer. The attributes, which were entered to calculate the general attributes such as the model code and name, as well as the classification code, shape information measurement, and quantity, maintained the created object attributes and confirmed that the information was not damaged or lost.

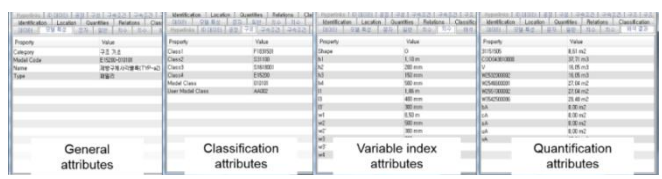

Figure 5. Confirmation of the object attributes throughSolibri

4. Conclusion

In this study, based on the object classification system in a port area, the port area was modeled, and the IFC files were compared and reviewed to manage the BIM information. Through the Solibri Model Viewer and Tekla BIMsight, the shape information and the attribute information were compared, which revealed no information omission or change. However, in the case of Revit, when the files converted into IFC were read again in Revit, data were partially missing, Korean characters were broken, and shapes were not seen, which posed significant problems. Thus, the IFC operability of universal viewers that handle only the genuine IFC grammar, and the BIM software that handles diverse application data, must be significantly verified.

5. References

[1] In-han Kim, Hyun-jae Yoo and Jung-sik Choi, "A Study on the Interoperability Improvement of IFC Property Information for Energy Performance Assessment in the Early Design Phase", *Transactions of the Society of CAD/CAM Engineers*, Vol. 17, No. 6, 2012, pp. 456-465

[2] Chul-Woo Lim, Jung-Ho Yu, and Chang-Duk Kim, *Analysis of BIM Object Information Compatibility Problem Classification among BIM Software*, Korea Institute of Building Construction , Vol. 10, No. 1, 2012, pp. 257-260