The 2025 World Congress on
Advances in Structural Engineering and Mechanics (ASEM25)
BEXCO, Busan, Korea, August 11-14, 2025

Development of a Framework for Generating Graphics-Based Digital Twin Derived from IFC Files

*Jun-Yong Lee[1] and Robin Eunju Kim[2]

[1], [2] *Department of Architectural Engineering, Seoul National University, Seoul 08826, Korea*
[1] *jylee0927@snu.ac.kr*, [2] *robinekim@snu.ac.kr*

ABSTRACT

The aging and deteriorating infrastructure in a modern society poses significant threats to public safety, leading to an increased demands on structural monitoring technologies for ensuring its reliability. With such trend, digital twin technology has gathered attention in the field of Structural Health Monitoring(SHM). This study presents a framework for constructing a Graphics-Based Digital Twin (GBDT) by integrating a finite element model and a computer graphic (CG) model. Herein CG model and associated GBDT are generated using information extracted from BIM-based IFC files. In addition, the proposed framework allows the simulation of structural deformation and damage through graphic elements that closely resemble the actual appearance of the structure, thereby enhancing the efficiency of SHM.

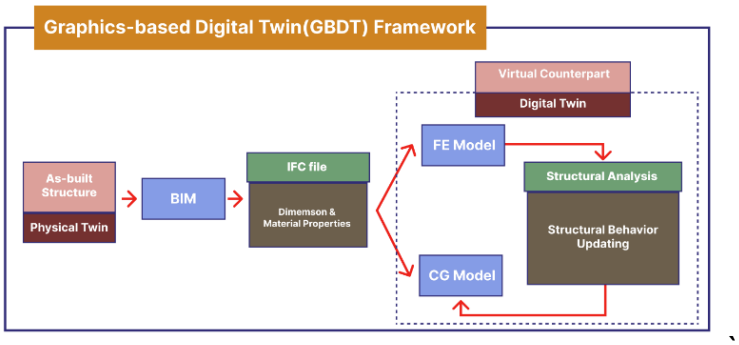

Fig. 1 Graphics-based Digital Twin(GBDT) Framework

REFERENCES

[1] Graduate Student
[2] Assistant Professor

This research was supported by the Basic Science Research Program of the National Research Foundation (NRF) funded by the Korean government (MSIT) (No. RS-2023-00217983).

Narazaki, Y., Gomez, F., Hoskere, V., Smith, M.D. and Spencer, B.F. (2020), “Efficient development of vision-based dense three-dimensional displacement measurement algorithms using physics-based graphics models”, Struct. Health Monit., 20(4), 1841–1863.