BIM 7D - RESEARCH ON APPLICATIONS FOR OPERATIONS & MAINTENANCE

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Abstract

Throughout the project life cycle in the built environment, the extensive employment of Building Information Modelling (BIM) and the very recent advancements of other digital technologies have provided various new insights and decision-making capabilities. As a result, a large amount of data must be conveyed, altered, coordinated, and exchanged across multiple stakeholders throughout the construction process. The potential of cost management, facility maintenance to the information sharing and monitoring of the built asset put in an environment has led to the concept of a greater level of detailing of the built asset model emerging in recent years. The digitization/computerization of various phases and processes of built environments is growing to have a broad influence on how architecture, engineering, and construction (AEC) sector's projects are planned, developed, and managed, as a result of the development of huge data in projects. The intersection of digital technologies and smart systems, along with data systems, has lately been identified as one of the most innovative and cutting-edge technological breakthroughs in the built environment.

Although the integration of digital technology into the AEC industry's practices has proven benefits throughout the lifecycle of the built asset and this incorporation has the potential to transform the construction industry, however, there exist still challenges in its intelligent implementation. For instance, one of the major problems is its precise and efficient employment for required outcomes that confirms the solid need for an intuitive framework. Therefore, the present dissertation is influentially aimed at developing a systematic guide document for the efficient implementation of digital twin technology in the built environment.

A step-by-step guide framework (termed as Digital Twin Execution Plan – DTxP) is prepared that follows the workflows and information exchange requirements in order to effectively employ

digitalization in the available built environment projects. A thorough literature review is carried out to collect the relevant scientific information and different codes of practice were also consulted to make sure the alignment of the developed framework with the regional and international standards. Industry practitioners were also consulted in order to get feedback on the real-life industry practices and how digitalization can really be implemented while solving the existing problems. The developed framework document reflects a comprehensive set of information on when, how, and who is responsible for what task(s) when a higher amount of productivity is required in a built environment project that is employing digital twin technology.

Although the guide document is targeted to employ the digitalization in reinforced concrete bridge structure for its structural performance analysis, fatigue assessment, traffic monitoring, and ground stability, among others, the developed framework could be extended by the industry professionals working in BIM to control the information throughout the built asset's life cycle. Besides, the development document could serve as a benchmark or a template document to follow when efficient employment of the digital twin technology into the built environment practices is needed.

Dissertation:
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Presentation video:
https://youtu.be/IN2paGNPLZg

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