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TITLE OF DIPLOMA THESIS:

Increase of Infrastructure systems' resilience with the use of BIM

AUTHOR: Papachatzi Dimitra

ABSTRACT

Infrastructure Systems improve significantly the quality of life in modern cities. Thus, it is of top priority to enhance their resilience. Measuring resilience is an interesting and hot topic for the construction sector. In literature, there are many quantitative methods for measuring resilience, but none of them is standardized. In order to enhance resilience, the system's robustness should be maximized, while its recovery time should be minimized. In this way, the system is able to cope with natural and man-made hazards. The literature search proved that Building Information Modelling (BIM) has been recognized as a useful tool for the AECOO (Architecture, Engineering, Construction, Owner and Operator) industry and has been adopted by the construction sector around the world. Although BIM ensures the interoperability of information among different parties involved throughout the project life cycle, application of BIM in both Infrastructures and facility management phase is not widely used and has not been fully exploited. Thus, a literature gap has been identified concerning the resilience enhancement. The aim of this study is to propose a methodology for enhancing infrastructure systems' resilience with the use of BIM. Data are contained in City Information Models (CIMs), which are based on the BIM concept, could be used for the sake of resilience. So, an eight-step methodology is proposed. At the first step, the characteristics of hazard are analyzed in order to understand its mechanism, while at the second step, the region and its characteristics are analyzed in order to be able create its CIM model. Subsequently, at next steps, the hazard and infrastructures' vulnerability are assessed and after that, it is possible to estimate the level of risk, individually for every infrastructure. Finally, the way resilience is enhanced is described. At this study, resilience is neither measured nor assessed, but its enhancement is achieved by the risk assessment and management. The proposed methodology is implemented for enhancing buildings resilience at Dendropotamos region of Thessaloniki against flood hazard as a case study.

KEYWORDS

resilience, infrastructure systems, building information modelling (BIM), risk assessment, flood hazard