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On the Historic/Heritage Building Information Modeling (HBIM). Modern trends, applications and developments

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ABSTRACT

This thesis discusses on the method of Historic Building Information Modelling (HBIM), the research of contemporary technological tools for validation, designing and management of historical buildings and contents and finally, the evolution in this field through a broader scope of the architectural culture. At being the basis of this HBIM research, basic concepts of cultural inheritance are investigated. The value of the preservation and protection of former cultures is massive but it also comprises one of the pillars dealing with sustainable development. Furthermore, it can contribute both, in the identity setup of a society as well as its financial flourish. In particular, the concepts of both cultural and architectural heritage are formulated and a theoretical tool is developed in order to define the values that each historical building gathers. Moreover, documentation methods of monuments and structural wholes are discussed. These methods are blooming and allow the documentation of complex historical contents in a short time and great detail. Ultimately, these methods make up the basis, upon the building information modelling (BIM) is in the process of develop. BIM is a philosophy of complete designing that gains ascendancy in the field of building construction. It entails all stages of the life of a building facility that starts with the project planning; it turns next to the designing and construction and ends up at the stage of management and preservation which lasts until the end of its operation. Major points of BIM are the incorporation of information in the 7D building model, the information distribution and the potential for the cooperation of the members involved in a project. These are also its main differences from CAD.Architectural heritage comprises the total of building facilities, monuments and historical land and all these, are in need of constant care and works for preservation and observation of their function, while in many cases it is vital to immediately document, validate and restore it. HBIM is a methodology that evolves in recent years and attends the needs of the buildings under its scope. In particular, HBIM starts its contribution at an interim point in the life cycle of a facility. So, as the basic principles of BIM indicate, the complete digital view of the building requires data collection regarding its history, the construction method, the materials used and its pathology. However, the inclusion of data in the HBIM model conforms to the principles of validation, preservation, restoration and re-usage of historical buildings. BIM seems to be the appropriate tool to meet these principles. In the final part of this research, three hands-on examples of HBIM application at a research level are chosen, in order to gain a better understanding of its methodology. Through the studying of these cases, common features in the HBIM implementation stages are pointed out, even though no formal guidelines exist yet capable to

direct and systematize the whole process. Additionally, prospects of HBIM in the management of architectural culture are probed. These prospects appear to extend further than its cooperation with other systems like GIS. The choice of these examples was made in an effort to adequately cover different cases in which HBIM can be applied to as a tool in order to ensure that the best use of its potential and to end up in conclusions for its future.

KEYWORDS

BIM, HBIM, Building Heritage, GIS, Parametric Modeling, Monument Documentation, Laser Scanning