

Events

Workshop 3D Modeling & BIM Digital Twin

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The VII edition of the *3D Modeling & BIM Workshop–Digital Twin* took place on April 14, 2021 in webinar mode, like the VI edition.

The first main consideration concerns the possibility offered by the telematic link, which has become, in the last year, the most widespread communication tool, allowing the scientific communities to easily stay in touch and effectively disseminate their research. From north to south, passing through the center, the geographical location of the participants was irrelevant: there were 220 participants in the study day. This perfectly shows how, in the future, the conferences must contemplate the possibility of allowing remote connection, enabling those who are unable to move easily to participate.

The first part of the workshop sees the greetings of several experts: prof. Carlo Bianchini, Vice Rector for Architectural Heritage and Director of the Department of History, Design and Restoration of Architecture, Sapienza, University of Rome, prof. Francesca Fatta, President of the Italian Union of Design, architect Christian Rocchi, President of the Order of Architects, Planners, Landscape Designers and Conservators of Rome and the Province, and the engineer Massimo Babudri, BIM Delegate of the Order of Engineers of Rome.

This demonstrates how the academic and professional world are strongly interested in increasingly topical issues, also considering the indications contained in the MIT 560 Decree of 2017.

The necessary connection between the world of the research and the world of the profession—or applied research—is highlighted by the interventions of the keynote speakers, particularly by prof. Francesca Fatta as Full Professor of the Mediterranean University of Reggio Calabria with her intervention entitled *The digital world and the human sciences: the role of Drawing* and that of the architect Elena Gliarelli, Director of the Institute of Cultural Heritage Sciences of the National Research Council, with her contribution entitled *Heritage BIM experiments in the CNR ISPC*.

Their interventions are in continuity with the contribution of the keynote speaker of the 6th edition, Christian Florian, BIM Manager of Permasteelisa, thanks to which it was evident how much the world of companies, operating in the BIM field, provides the possibility to pass from essential vision of the research to the operational and construction methods of the building site. Today more than ever, this concept is combined with the urgency to develop increasingly profitable methods of managing new buildings and heritage, capa-

ble of responding to the needs and the many variations that occur in the definition of the architectural project. Only thanks to the virtuous partnership between research and applied research it is possible to reach qualitatively effective processes and concrete supports.

What has been observed denotes the substantial difference between the first editions of the Workshop and the current one. The transition from speculations of a mainly theoretical nature to actual methods applied to existing or newly built artifacts, indicates an ever clearer and more profound evolution of course. This push towards the concrete use of the BIM procedure, also given by the recent updates of the legislation on public procurement (UNI 11337 standard on BIM), promote several tools that can actually be used and integrated into common intervention practices. The limit, as known, can be found in the difficulty of relating the information of digital objects with tools that operate according to different logics, due to the different supports with which they are processed. Currently, the interaction of information is entrusted to systems that are still underperforming, used in partial forms, only in some sectors and not reworkable. The intent—which seems to be pursued with the contribution of computer scientists, programmers, soft-



Fig. 1. Flyer of the event.

ware houses in close collaboration with the public administration—is to increasingly define the level of information interchange (non-geometric attributes) between digital objects and IT tools.

The approach to the problem is therefore of a semantic nature and the goal is to overcome the cumbersome exchange of information, so that the Building Information Modeling procedure is fully effective. The fundamental difference between BIM management methods and management methods applicable to historical and cultural heritage (HBIM) fits into this context. In fact, if the field of new constructions seems to have taken a clear direction,

the same does not apply for the building field. Surely the substantial difference can be found in the difficulty underlying the delicate dynamics of managing architectural assets, which totally evade the logic of the new construction and on which research is trying to give answers according to the contingencies and characteristics of each context.

In general, the last few years have been characterized by various studies relating to attempts to apply BIM processes to historical buildings, which have led the world of research to question the effectiveness and reasonableness of the forcing of the process in this direction. The doubt derives precisely from the

rigid logic that structures the BIM modelers, programmed to facilitate new construction projects. Think for example of the concept of standardization of parametric elements or of the conferment of greater efficiency or functionality of a three-dimensional model. It is evident that in this perspective the system still struggles to consider some peculiar characteristics of the heritage. In the first place, the strong geometric discontinuity of the artifacts that belong to different periods from ours and that are often in a state of neglect. Linked to this concept is the difficulty of transposing the indications into the IT tools, both of a formal geometric nature, and

relating to the state of conservation and therefore to the pathologies affecting the objects. Another aspect, not to be underestimated, is the need to find and translate within the system data relating to the study of historical and archival sources, essential for the knowledge and interpretation of a structure in a state of ruin. This type of reconnaissance involves multiple professional figures (archaeologists, art historians, restorers, geologists) who, with all the difficulties involved, tend to a common goal. In this sense, exploiting the interoperability of the BIM system becomes even more a delicate matter in the face of the huge number of aspects that must be selected, confiscated, made usable and understandable by all the professionals involved.

The challenge is precisely to propose solutions that can overcome the stringent logic of the tool and allow its use also to operators working in the field of restoration, conservation, and main-

tenance of cultural heritage (public and private). In these terms, the contributions shown in this edition of the Workshop are in line with the general trend of experiences conducted on a case-by-case basis. They propose interesting applications of methods related to the HBIM field and beyond, a symptom of a growing process maturation and a continuous refinement of the product. Specifically, the concept of the 'Digital Twin' fits well into the current debate, asserting that any object of the built heritage is susceptible to a homologous representation within the digital space which, in addition to re-proposing its geometric and formal aspect, can contain and transmit a quantity of news that tends to infinity. This last aspect is strongly current, especially in relation to two main needs: the implementing choices that contemplate interventions that are aware and respectful of the context in which one operates and, at the same time, pro-

pose supports capable of optimizing costs and times of realization. Another fundamental aspect of the seismic risk and improvement sector concerns the need to create digital archives, which can serve as a precious testimony of highly vulnerable artifacts. Finally, the topics covered come to social aspects related to 3D modeling applied to the field of inclusion, a desirable path from every point of view. The use of physical interaction systems with technological tools has opened the doors to sectors that operate in different fields, establishing an increasingly stringent connection between human needs and the automated object. Thanks to this, it was possible to conduct various reflections within contexts of public and cultural interest, in which factors of social inclusion and accessibility intervene, which differentiate services based on the user's needs and allow us to hypothesize and define customized technological infrastructures.

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