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B.I.M. DIMENSIONS: POSTFACTUM

LE DIMENSIONI DEL B.I.M. : POSTFAZIONE

It is not questionable that the rise of BIM has produced a revolution in the architectural field. The new BIM procedure in building design presses scholars and professionals for a reflection on 'why', 'how', and 'aims' of a complex representation based on 3D models. No more the old Aided Design, according to the myth of deduction of orthogonal projections from three-dimensional models or – for the most cunning – of lines, surfaces and volumes drawing in the virtual space. In this way, it would have been only a more evolved and refined graphical technique.
BIM is an architectural born software, not derived from other fields: the constructive system, the spaces for activities, the use and the transformative processes are its core. The 3-D model is the unique and interoperable interface for a synchronical complex interdisciplinar design process, for the technical and economic management of the project and of the yard, moreover of the whole building life-cycle. Representation and design merge in a unique process of design, management and, at least, of dismantlement.
According to these ideas, we thought to propose a journal issue dedicated to BIM, intended in the wider way: "The BIM dimensions". Where the word "dimension" refers not only to the spatial dimensions but also to the new challenges and frontiers allowed by digital modeling and representation.
The proposed topics are:
- ***BIM and design of new architectures***, ie BIM as tool for the development of the project idea from the beginning to the constructive definition of the building – also thinking to the issue of building components prototyping – to the yard and life-cycle management.
- ***BIM and architectural heritage***, ie BIM studied considering the integrated digital surveying procedures and the modeling of historical and
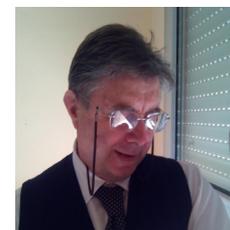
modern building's components; BIM as way to represent historical constructive systems; BIM as tool for historical-critical analysis, considering processes of modification and stratification and issues related to the realization of dedicated database; BIM as tool for restoration, maintenance and valorization design.

- ***BIM and interoperability***, ie BIM as interface between different professionals and manufacturing interested in the project and management of new and old buildings.

- ***BIM and conceptual design***, ie BIM related to the constrains of the first design concept.

- ***BIM and regulations***, ie BIM studied according to the Italian and European legislation.

The papers represent a scenario of the different research. There are some historical and theoretical reflections, and many applications to issues of new building or architectural heritage design.

The challenge becomes even more complex with the "temptation" to extend BIM to architectural heritage, with consequent operative, methodological and conceptual issues. In practice we are witnessing what could be seen as a aporia: the

BIM was born for the design of new buildings and it is rooted on current principles of production (industrialization, mechanization, prefabrication, seriality, modularity), but historical buildings (in particular pre-twentieth century) are based on antithetical formal and constructive logics, moreover with complex processes of stratification and modification over time. Follows two main matters, that is two research lines: the first one addressed to 3-D modeling; the second one dedicated to database modeling. These two lines are only apparently separated.

Considering the theme of modeling, some software houses are developing apps to favor the realization of BIM models from point clouds. Furthermore, there are numerous studies on the parametrization of architectural elements. Follows many conceptual problems.

Can we reduce architectural orders to their idealization, for example as deduced from ancient treatises, in particular considering that the author himself of the treatise often derogated from it in his realizations?

Should we define typologies for each building?

Can a craft element be typed? Or should we have to modify each typed element to re-conduct it to the surveying of the real one, also considering its degradation?

There are different operative ways, with different precision and potentialities (let's evaluate the relation between modeling work / time, quality, cost). Moreover, we have to define what LoD (Level of Detail) should be appropriate to be reached in historical building modeling. Often the surveying of some elements is very difficult and they are understand and "reconstruct" by the experience and culture of the scholar, and only in the yard step (often fortuitously) it is possible to study them.

According to the modeling procedures, we propose four points:

1. Use of the only point cloud (post-processed: noise, decimation, etc.);

2. Use of the 3-D model as mesh solid from the point cloud;

3. Automated partial recognition of objects and consequent mix-model (generic solids and objects);

4. Non-automated objects reconstruction (often very onerous). They can be:

-more or less parametrical

-more or less intelligent

How many data correlate to these objects, and how manage data for models realized according to the previous 1, 2, 3 points?

In the papers, these aspects are not systematically and completely deepened, but we believe that the transition from the survey data to the BIM model should not take for granted, and an adequate methodology for each case should be studied.

A second issue is about the database: in current software it is projected according to the design and management process of new buildings, therefore it not yet take into account, in an appropriate manner, of the numerous and heterogeneous documents useful for the knowledge and management of architectural heritage. They are non-computable documents in an analytical way, but only in a visual and critical way; often they are not relating uniquely to one constructive element. We underline that the problems related to the use of BIM for architectural heritage are important and of no easy solution. However, they are the most studied.

The framework resulting from the published papers looks important, pointing out the significance that scholars give to BIM, but it indicates that the questions posed by the journal are not solved: perhaps only touched, despite the passionate response of researchers to the challenge of BIM. To answer to the expectations of designers, public administrations and of the whole building field, the work has just begun, and it will not be useless to resume and deepen it in a future issue of the journal.