Proceedings of the 7th International Conference on Mechanics and Materials in Design,
Albufeira/Portugal 11-15 June 2017. Editors J.F. Silva Gomes and S.A. Meguid.
Publ. INEGI/FEUP (2017)

PAPER REF: 6987

INTEROPERABILITY BETWEEN BIM MODELS AND PRONIC APPLICATION: A PUBLIC BUILDING REHABILITATION

Rodrigo Giollo[1(*)], Maria João Falcão Silva[1,2], Paula Couto[2]

[1]Faculdade de Engenharia, Universidade Lusófona de Humanidades e Tecnologias (ULHT), Lisbon, Portugal
[2]Núcleo de Economia, Gestão e Tecnologia da Construção (NEG), Departamento de Edifícios (DED), Laboratório Nacional de Engenharia Civil (LNEC), Lisbon, Portugal
[(*)]*Email :* rbgiollo@gmail.com

ABSTRACT

This paper aims to propose a method to link the objects, generated by Building Information Modelling (BIM), to the construction works and technical regulations associated with them, generated and standardized by the Protocol for Standardization of Technical Construction Information (ProNIC - Portuguese abbreviation), in a semantic approach of the required information, however, without exploring the informatics component of this association. Then the link will be applied to the case study of a public building rehabilitation, located in the metropolitan area of Lisbon. The paper is based on the master's dissertation of the first author, with the same theme and same title, developed under the existing protocol between LNEC and ULHT.

Keywords: BIM, ProNIC, interoperability, rehabilitation, AECO sector.

INTRODUCTION

Collaborative processes of information creation and management updated in real time, that provide to users an early errors detection, constraints, overlapping elements, constructive solutions testing and even assessments of energy efficiency of buildings, such as BIM (Giollo, 2016a), both in the scope of new construction as in rehabilitation, are essential for the development of the Architecture, Engineering, Construction and Operation (AECO) sector where competitiveness is increasing.

The development of a methodology that takes advantage of modelling in BIM will bring significant gains to the AECO sector, filling their eventual gaps with standard technical and economic contents. Facing on the Portuguese national scenery, withdrawn from ProNIC, a research project developed in Portugal that aims to facilitate, organize and standardize all the production of technical information required in different projects and also to aggregate for each specific construction work, the best construction practices and technical standards applicable to each situation (Giollo, 2016b).

STUDY ORGANIZATION

The adopted procedure was directed to meet the following objectives:

1. Characterization of the construction sector in economic and social terms, framing it in national and international reality;
2. Identification of some of the problems inherent in the AECO sector that justify the study of new approaches and a survey of the solutions made available for this purpose;

3. Individual bibliographic research of each of the information management systems (BIM and ProNIC), including a study of the development of technologies, definition of concepts and an analysis of the benefits and limitations of its implementations;
4. Survey of the use of information management technologies worldwide and analysis of constraints and their applicability to the Portuguese national scenario;
5. Elaboration of a model, both in the BIM environment and in the ProNIC platform, of the same case study, characterized by the rehabilitation of a public building, for the semantic comparison of the data required by the two information management systems;
6. Characterization of interoperability and study of an information exchange mechanism between systems that is effective in exchanging data formats supported by BIM and ProNIC, namely the Industry Foundation Classes (IFC), a universal format for representation of construction products and exchange of data between systems (SIGABIM, 2011);
7. Analyze the viability of a connection methodology between BIM and ProNIC;
8. Proposal and description of a method of connection between BIM and ProNIC.

CONCLUSION

The conclusion reached is that a link capable of associating ProNIC application with BIM models makes it possible to use all the individual benefits of the two methodologies for the information management, with the advantage of being contained in the same basis rich in information. It is the possibility of having, automatically and standardized, all technical and economic information, written and drawn, generated in a collaborative environment, among all stakeholders and covering the entire life cycle of the construction, from design to operation or demolition.

ACKNOWLEDGMENTS

The first author thanks Laboratório Nacional de Engenharia Civil (LNEC) and PROMAN for all assistance, materials and means made available to assist in the development of this work.

REFERENCES

[1]-Giollo, R., Silva, M.J.F., Couto, P. (2016a). Reabilitação De Um Edifício Público: Contributo Para a Interoperabilidade Entre BIM e ProNIC. In: 1º PTBIM - Congresso Português de Building Information Modelling. 24 e 25 de novembro, Universidade do Minho, Guimarães.

[2]-Giollo, R., Silva, M.J.F., Couto, P. (2016b). Interoperability Between BIM Models and ProNIC Application: Rehabilitation of a Public Building. In: 6th REHABEND Euro-American Congress - Construction Pathology, Rehabilitation Technology and Heritage Management. May 24th-27th, Burgos, Espain.

[3]-SIGABIM (2011). Souza, H., Martins, J.P., Monteiro, A. Secção de Construções Civis. Departamento de Engenharia Civil. Faculdade de Engenharia da Universidade do Porto. Porto.