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## **INTEROPERABILITY BETWEEN BIM OBJECTS AND THE PRONIC APPLICATION IN THE SPECIALTY OF BUILDING FACILITIES: THE PORTUGUESE REALITY**

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### **ABSTRACT**

This paper is based on the master's dissertation of the first author, developed under the existing protocol between LNEC and FCT-UNL, whose subject is "Structuring Interoperability between BIM objects and the application ProNIC in the specialty of installations" and aims to develop a methodology for linking Building Information Modeling (BIM) with a Portuguese application, Protocolo para a Normalização da Informação Técnica da Construção (ProNIC) (Consórcio ProNIC, 2015), in the specialty of building installations, without exploiting the computing component of the connection, only based on the semantic link. This methodology will be applied to a case study that concerns an underground parking in a commercial building located in Portugal.

**Keywords:** BIM, ProNIC, interoperability, IFC, commercial building.

### **INTRODUCTION**

Over the last decades, the construction sector did not follow the technological evolution observed in other sectors. Although there have been technological innovations, which include BIM and ProNIC, they are not implemented, resulting in a lack of quality in the sector (Monteiro & Martins, 2011).

The BIM methodologies allow to work with specific objects adapting them to the space and the surroundings, through the modeling and parametric relations. Its functionality, which goes beyond the spatial 3D, helps to minimize problems with costs, deadlines and information exchanges. BIM is already being implemented in several European Union countries, particularly in those that are investing more in technology. In other countries throughout the world, its implementation has contributed significantly to the success of projects and construction works. In Portugal, although the evolution is notorious, there is still a path that must be taken, so that this sector of the economy can also play an important role in the European Union (Gonçalves, 2014).

ProNIC is a computing platform that has in its constitution a system with the capacity to describe all the construction works with all the specifications, technical and standardized information regarding the legislation. This system also allows for the immediate creation of the bill of quantities, the map of detailed measurements and the budgets as well as the specifications of all the works that are the object of buildings (Henriques, 2012).

## RESULTS AND CONCLUSIONS

The work developed aims to analyze the potential of the interconnection between the BIM methodologies and the standardization software ProNIC, applying it to a case study about an underground parking of a commercial building. This connection will be made through Industry Foundation Classes (IFC), which allows the transaction of standardized data to be exchanged between information systems, with the least possible loss of information. This symbiosis leads to gains in both new and rehabilitated construction and will allow the information produced to be compiled and organized automatically.

Applied to a parking of an existing commercial building, the present work will be divided into three phases: i) the first one is about modeling in BIM using Revit software; ii) the second, aims to insert the construction work of the previous phase in the ProNIC platform; iii) in the third stage, a linking methodology will be established between BIM and ProNIC. This methodology consists in:

- i. Evaluate the standardized information contained in both the software used for BIM modeling and the ProNIC application;
- ii. This evaluation will allow to identify the information that is common in both systems and the designation used for it in each system;
- iii. The common information may have a direct link between BIM and ProNIC and it is sufficient to introduce it only once in one of them, assuming that there is an effective link;
- iv. The application ProNIC complements the BIM model and uses the entire information to generate all the written information needed to execute a project.

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