SEISMIC REABILITATION OF BUILDINGS: STANDARDIZATION OF INFORMATION FOR BIM

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ABSTRACT
The present communication aims to show how information management systems contribute to support the seismic rehabilitation and strengthening projects. It describes and proposes how this information, existing in ProNIC (Portuguese abbreviation - Protocol for Standardization of Technical Building Information), can be transferred to standard BIM objects, supporting the seismic rehabilitation and strengthening projects and addressing the various issues that have been identified within transmission of information to the subsequent stages of the building life cycle.

Keywords: Seismic rehabilitation and strengthening, BIM, information systems.

INTRODUCTION
The integration of BIM models with other tools to support the construction process is important to spread their use. The existence of technical and economic standardized information related to each building element is essential for supporting all projects designers. The use of information management systems maintain this information throughout all life cycle stages, improving the quality and accessibility of information and contributing to the economic development of the sector. ProNIC (2014) provides an important contribution with technical and economic structured and standardized information. In addition, ProNIC is already developed to work in a collaborative environment for all stakeholders.

INDUSTRY FOUNDATION CLASSES
The Construction Information Classification Systems (CICS) have been growing and nowadays have a major role on the organization of the information that is produced by the construction sector. Since their beginning the CICS were developed to solve specific problems on the construction sector. IFC (Industry Foundation Classes) (Monteiro, 2012) is the most internationally accepted for Architecture, Engineering and Construction (AEC) industry. IFC is a data model intended to describe building and construction industry data. It is a platform neutral, open file format specification that is not controlled by a single vendor or group of vendors. It is an object-based file format with a data model developed by buildingSMART (formerly the International Alliance for Interoperability, IAI) to facilitate interoperability in the AEC industry, and is a commonly used collaboration format in Building information modelling (BIM) based projects. The IFC model specification is open and available. It is registered by ISO (ISO 16739:2013).

STANDARDIZATION
It is essential, to establish strategies and identify challenges and steps to be taken in order to proceed to the integration. A proposed methodology to realize the link between the technical
contents of ProNIC and the objects of the BIM model is as presented in Fig. 1: i) Defining normalized procedures for the parameterization of BIM models and the type of information and level of detail in each step of construction process; ii) Implementing and defining the configuration of fundamental principles in order to obtain an evident, objective and concise information in accordance with applicable law and Portuguese reality; iii) Making correspondence between the parameterization of BIM methodology and the ProNIC classification of construction articles; iv) Associating each parameterized building BIM object with a few ProNIC articles. The engineering projects are the same in ProNIC and BIM methodology and are in accordance with the provisions of “Portaria n.° 701-H/2008” (P701H, 2008); v) Integrating the technical information available on ProNIC in each parameterized BIM object; vi) Organizing ProNIC articles associated to BIM objects with the aim to prepare the technical documents, measurement details, work quantities and budget estimates. ProNIC makes a direct connection of project information to planning and construction management modules.

**FINAL REMARKS**

The ideal integration scenario, for the information system in the construction industry, is one that all actors are interconnected and work in a collaborative mode, throughout all phases of the building life cycle and all tools communicate in order to produce the desired results. Integration of BIM models with other tools to support the construction process is essential to develop and diffuse their utilization. For this purpose, a research study is being development in LNEC for different BIM objects related to the seismic rehabilitation and strengthening projects. The example presented in this paper, though still at a preliminary stage, aims to integrate the technical and economic information already normalized for several BIM objects.

**REFERENCES**