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METHODOLOGY PROPOSAL FOR THE INTEGRATION OF LIFE CYCLE COSTS IN PRONIC

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ABSTRACT

Currently, the information available for an economic analysis of products in ProNIC (Protocolo para Normalização da Informação Técnica da Construção) informatics platform comprises only the design costs (architecture and engineering) and construction costs, and there is still no room for maintenance, operation and rehabilitation costs. The present paper presents a proposal for a Life Cycle Cost Analysis (LCCA) methodology, with the purpose of incorporating, in ProNIC, the operation costs, allowing carrying out a product economic analysis throughout its life cycle. The proposed methodology includes an intervention in ProNIC at the level of Articles, Material Sheets (FMAT), Works Execution Sheets (FET) and Cost Sheets. The main developments and conclusions will be also stated.

Keywords: LCCA, ProNIC, articles, FMAT, FET, cost sheets.

INTRODUCTION

Considering the ProNIC informatics platform and its functionalities about the possibility of managing the entire structure lifecycle from the design phase to its completion, it is possible to obtain a broad set of monitoring indicators, from works level to the level of the entire Architecture, Engineering, Construction and Operation (AECO) sector. However, even though it is possible to carry out a techno-economic analysis and evaluation of buildings in ProNIC, it has not yet been possible to develop an economically viable LCCA methodology based on operational work information, which includes the maintenance and the rehabilitation of buildings. In this sense, the present work, allows a first approach to be carried out that incorporates a module for the LCCA in ProNIC.

PRONIC

ProNIC refers to a research project whose essential objective is the development of a systematic and integrated set of credible technical contents, supported by a modern computer application, and which intends to build a benchmark for the entire Portuguese construction sector (INESCTEC; 2008). Its database is constituted by a Construction Work Classification Structure (WBS-CW), by Technical Specifications (Technical Specifications of Works and Technical Specifications of Materials) and by Cost Scenarios. In terms of functionalities, following are some examples of the work already developed in the ProNIC. In this sense, ProNIC (INESCTEC; 2008) comprises the production of bills of quantities by specialty or the

project overall design, with the integration of all specialties, production of the general technical conditions of specifications framed in the articles used, updating bills of quantities in the phase of errors and omissions, management of additional contracts, additional elements to the project and control of the project through work indicators.

LIFE CYCLE COST INTEGRATION IN *PRONIC*: PROPOSED METHODOLOGY

As mentioned, the information available for an economic analysis of the product, in ProNIC, comprises only the design costs (architecture and engineering) and the construction costs, and there is still no room for the operation costs, which include maintenance, exploration and rehabilitation. In this sense, the work developed intends to complement this information through the incorporation of an LCCA methodology in ProNIC. This methodology has as the main objective of inserting the product operation costs in ProNIC and contemplates three levels of intervention (Simões et. al., 2016a) (Simões et. al., 2016b):

1) *Creation of new articles related to the operation phase* - Analysis of the existing articles and subsequent proposal of new articles for the works that are not yet contemplated;
2) *Change in the structure of FET and FMAT items* - In FMAT, there is no item related to the operation of materials and, in this sense, it is proposed to create an item designated by "operation". At the FET level, it is proposed to change the item "maintenance" to "operation", since the costs to be included in the platform are related to operating costs (rehabilitation, operation and maintenance);
3) *Cost Sheets Restructuring* - Based on the existing cost sheets, it is proposed to add an item related to the operation throughout the life cycle of a building, based on the necessary information, on costs during the operation phase.

CONCLUSIONS

ProNIC is an easy-to-use computer application and as mentioned previously, it has many features that are a great benefit to the AECO industry. On the other hand, the non-generalized access of ProNIC, by companies in the AECO sector, causes ProNIC to present some weaknesses in the operational work (rehabilitation, exploration and maintenance), that is, currently ProNIC does not allow the realization of an economic analysis of a building throughout its life cycle, hence the need to develop new methodologies, such as the LCCA. LCCA is still an underused approach and deserves to be developed, so that it is widely accepted. Concerns about uncertainties in forecasts should be addressed and progressively reduced through the collection of more reliable information.

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