

A Maintenance Management Model. Upgrading and Experimentation

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1 Introduction

The paper deals with the first results of the activities of B.I.G. Building Innovative Governance srl, Academic Spin-Off and Innovative Start Up. It operates in the field of technological innovation exploiting, in line with the operational trend of Industry 4.0, the potential of Information Communication Technology, ICT. It provides Innovative Integrated Services oriented to the construction market and in particular to the Facility Management, FM.

The contribution introduces some actions in progress geared to upgrading the Maintenance Management Model, M3, specifically aimed at managing the life cycle of buildings.

M3 answers for a primary need of the construction sector as well as of the research one: to increase the effectiveness, efficiency, circulation of information and communication between the operators involved in the management and operation & maintenance practices whose activities presuppose multidisciplinary approaches and large availability of structured data.

2 Background

The FM involves a relevant field of interest, presupposes multidisciplinary approaches and requires numerous data and information that are in general not sufficient nor well-structured to be effectively used in the O&M activities. In the recent past, and even today they are organized and managed by Computerized Maintenance Management System and Computer Aided Facility Management (CMMS and CAFM), Electronic Document Management Systems (EDMS), Building Automation Systems (BAS), etc. Actually, in the face of still limited use of open standards for structuring and transfer of information, the specific need for open systems and standardized data libraries, specifically declined is added (BIFM, 2012). The availability of open standards, Industrial Foundation Classes (IFC) and data specifications, Construction Operations Building information exchange (COBie), the diffusion of Building Information Modeling (BIM) and the adaptation of legacy systems represent the new frontier of the research and standardization challenges. IFC and COBie are also employed in the standardization actions relating to Service Life Planning with particular reference to ISO 15686-4:2014.

In short, OpenBIM for FM, the interactions between IFC and COBie and their applications for the management of FM processes and the service life planning, (Kassem *et al.*, 2015) configure the assumptions from which the R&D actions of BIG srl and the Upgrading of M3 start thanks to a public financing from the Calabria Region.

3 Upgrading M3

M3 is an ICT infrastructure which objective is to support the decision-making process relating to the building management phase through an Information Modeling Asset (AIM). The current stage of development corresponds to a TRL 4. TRL 8 is that expected by the end of 2020.

Characterized by interconnectivity and scalability, the Maintenance Management Model is a dynamic, collaborative and implementable system, whose architecture consists of three separate but strongly interconnected devices: an information interface system, a collaborative platform, a remote cloud. On a technical level, the availability of all the documentation, information and administrative management relating to the building/s appropriately collected and systematized in digital dossiers will allow, through an integrated system of alphanumeric and graphic databases (IFC and COBie format), the management of complex data concerning localization, use, security, accessibility, employment conditions, usability of spaces.

The structuring of the requirements that allow the definition of the AIM is based on the use of the ISO methodology, Information Delivery Manual (IDM) in ISO 29481-1:2016.

The use of BIM models and the possibility of collecting and managing a large amount of data will be oriented to the structuring of information feedback databases according to ISO 15686-7:2017. Available information can be usefully transferred in life cycle assessments.

The partner ACCA spa has made the usBIM platform collaborative platform technology available for implementation and managing of OpenBIM models in a Common Data Environment (CDE). The related plug-in is being tested through a pilot application to the case study identified in a portion of building asset of *Mediterranean* University of Reggio Calabria.

4 Conclusions

Employment of IFC and COBie support the creation of the management activity register and proposing ways to implement and extract maintenance requirements respectively in and from BIM models. The actions undertaken also promote shared lexicons and the circulation of knowledge within an interdisciplinary process of managing information from and for Maintenance. The use of BIM models and the possibility of collecting and managing a large amount of data will be in fact usefully used as a source of information for service life planning.

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