Chapter 9
Asset Management for Buildings within the Framework of Building Information Modeling Development

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ABSTRACT

Buildings lifecycle management is an area of great interest. Due this, the R&D is being promoting worldwide looking for new effective maintenance tools and methodologies. In this scenario there are two development lines whose convergence can bring great advances in this area: Asset Management (AM) and Building Information Modeling (BIM). BIM models are transforming the way buildings are conceived, designed, constructed and managed. But current use of BIM concentrates on preplanning, design, construction and integrated project delivery of buildings and facilities, rather than maintenance and building operation management. Asset Management tools, including Facilities Management (FM), and application frameworks provide the approach and required elements to get more efficiency and efficacy in the building lifecycle management. This chapter introduces the application of AM for building and how the development of BIM models is the key element to allow its effective implementation.

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INTRODUCTION

Nowadays, buildings are generally required to operate efficiently. A building that operates efficiently is that one that most of its characteristics can be measured, monitored and recorded in reference to a relevant actuation. However, operation and maintenance productivity is decreasing due to the current complexity of buildings. In addition, it is estimated that operation and maintenance phase constitutes approximately 60% of the total lifecycle cost of a facility or building. Within the components of this cost is interesting to highlight those related to inadequate interoperability between different roles and stakeholders involved in the building lifecycle. A study by the US National Institute of Standards and Technology (NIST) showed that the annual costs associated to inadequate interoperability among software systems was $15.8 billion (Gallaher et al. 2004). Two thirds of this cost was incurred as a result of on going facility operation and maintenance activities (Shen et al. 2010). The sector has realized that information management is one of the main reasons of this over cost. BIM (Building Information Modelling) is a holistic approach to the design, construction and management of those facilities used in the built environment. The introduction of BIM can addressed this challenge. If appropriate operational information can be incorporated into this model, all the stakeholders will have all the information needed to take decisions.

Facilities Management may cover a wide range of activities, from ordinary maintenance task and operation control to performance monitoring (both views: operation and sustainability), or outsourcing service management and financial asset management. Facilities Management (FM) tasks require gathering and sharing large amounts of information related to facilities components. This information covers historical inspection data and operation information. Despite the availability of Computerized Maintenance Management Systems (CMMSs) or Computerized Aided Facilities Management (CAFM), these systems focus on the data management aspects (i.e. work orders, resource management and asset inventory), the lack of functions required to facilitate data collection and data entry, as well as the data retrieval and visualization when and where needed. Building Information Modelling (BIM) provides opportunities to improve the efficiency of FM software by sharing building information between different applications/ users throughout the facility lifecycle. Moreover, maintainability issues are poorly treated at the design and construction stages (Liu, 2013), such as accessibility of elements for maintenance purpose, lack of maintainability information and lack of communication between stakeholders and particularly with the FM team. Many studies intent to define the data needed for FM team, as well as the way they are provided and delivered. Nevertheless, there are lacks of guidelines and tools for capturing BIM models of existing facilities, coping with non-consistent terminologies and taxonomies, requirements specification in BIM applications, and identifying which information and what levels of detail are desired by the FM teams (Parsanezhad et al., 2014).

Therefore, buildings maintenance management has become a research area of great interest. One of the main aims is to eliminate delays, confusion, and inaccuracy generated by traditional O&M documents namely as-built drawings, O&M manuals, maintenance schedules, room datasheets, asset performance data documents, and cost datasheets in either paper format or static digital formats such as Portable Document Format (PDF) and scattered spreadsheets (Schevers et al., 2007). This drives to the information system application development, where BIM models and Asset Management information system (AIM, Asset Information Model) are the main references.

In the past decades, there had been a growing interest in the use of Building Information Models (BIM) by the construction sector due to many benefits and resource savings during design, planning, and construction of new buildings (Eastman et al 2013). Ashworth et al. (2015) highlight the values added