Building Information Modeling: 
Road to 2016

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ABSTRACT

As is common knowledge now, in 2016 it will be mandatory to use BIM on all public sector projects. This has clearly spurred a lot of interest in BIM within the construction industry. However, the industry appears to be struggling to find its feet as to what it needs to have in place before BIM based projects become a reality. Uses of BIM technology and associated processes have been categorized into 3 levels and the 2016 requirement is for Level 2 implementations only. This paper outlines the requirements of level 2 BIM implementation and assesses the status of the industry as a whole as to its readiness. There are various pre-requisites that need to be in place, mostly in relation to process protocols and standards. This paper gives an understanding of the roadmap that needs to be traversed in order to be ready for BIM. This paper presents an outline of the UK Government’s requirements for 2016 before discussing and assessing the UK construction industry’s readiness. Finally, the paper gives an outline of what needs to be in place for the government’s ambitions to be achieved as well as a summary of some of the challenges along the way and possible ways of addressing some of them.

Keywords: Building Information Modeling (BIM), Construction Industry, Construction Operations Building Information Exchange (COBie), Maturity Level 2, Public Sector, United Kingdom

INTRODUCTION

Building Information Modelling (BIM) as an area of activity is probably the most topical and important in the UK construction industry at the moment. As a research topic, BIM has been around for at least a couple of decades but most of the industry has not been fully aware of its implications for their daily activities until recently. This has become even more important in light of the UK government’s decision in 2011 to make the use of BIM mandatory in all public sector projects from 2016. This paper is an overview of BIM itself as well as a description of the requirements and implications of the UK government’s decision for the construction industry.

First of all, BIM itself will be described with a view to positing it against the general understanding within large sections of the industry in the UK. There is generally a perception that BIM is a piece of software not that dissimilar to a CAD software. On the other hand, there are some sections of the industry who take BIM as an additional feature in a CAD package, e.g., 4D CAD is largely seen to be a popular example of BIM. Whilst this may be part of the story, this is certainly not the full story. A definition provided by the authors of a very popular text on BIM (Eastman et al., 2011) suggests,
“BIM is a modelling technology and associated set of processes to produce, communicate and analyse building models. These building models are characterised by:

1. Building Components that are represented with intelligent digital representations that ‘know’ what they are and can be associated with computable graphic and data attributes and parametric rules;
2. Components that include data that describe how they behave, as needed for analyses and work processes, e.g., takeoff, specification and energy analysis;
3. Consistent and non-redundant data such that changes to component data are represented in all views of the component;
4. Coordinated data such that all views of a model are represented in a coordinated way.”

Therefore, because of the way BIM dictates the modelling process and its communication, in the most generic sense it constitutes a set of processes which are facilitated by BIM software. Without the processes in place, a proper, full implementation of BIM may not take place.

1. Paul Morrell, UK Government’s Construction Advisor until recently, believes that BIM is about ‘the intelligent use of digital data to design, construct, manage and use a built facility;’
2. Royal Institute of Chartered Surveyors (RICS) describes the fundamentals of BIM as ‘... a common single and co-ordinated source of structured information...;’
3. National BIM Standards-United States definition: “A BIM is a digital representation of physical and functional characteristics of a facility. As such it serves as a shared knowledge resource for information about a facility forming a reliable basis for decisions during its lifecycle from inception onward” (BuildingSmart, 2012c).

It is, therefore, clear that for a successful BIM driven project delivery, there are essentially three elements to be in place. These are:

1. Technologies that support BIM driven modelling and collaboration;
2. Process protocols on information exchanges, i.e., what information in what formats need to be exchanged between the stakeholders at what stages. This is a key requirement and other countries, most notably USA, have developed a BIM PEP (BIM Project Execution Plan) as a guide to facilitate the adoption of BIM within the industry (BIM PEP, 2011);
3. Aligned to the second element are the appropriate procurement models which facilitate collaboration more effectively on a project.

NBS BIM SURVEY

NBS recently carried out a national survey (NBS, 2012) on various aspects of BIM adoption in the UK. Following are the key findings of this survey:

1. Nearly a third of professionals are now using BIM up from just 13% in 2010;
2. 75% of those aware of BIM predict they will start using it in 2012;
3. BIM remains poorly defined and understood with 80% agreeing that the industry is not clear on what BIM is.

Therefore, this survey clearly establishes how rapidly BIM is gaining acceptance within the UK construction industry. However, the last bullet is also quite notable in that it outlines the challenges facing the industry if BIM is to be universally used in public sector projects by 2016. In the following sections, this paper will outline the background to what are the expectations of the government for 2016 and
A Feasibility Study on Occupants' Behaviour and Energy Usage Patterns and Its Potential Integration with Building Information Modelling