

THE MALAYSIAN GOVERNMENT'S INITIATIVE IN USING BUILDING INFORMATION MODELING (BIM) IN CONSTRUCTION PROJECTS

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Building Information Modeling (BIM) is increasingly being implemented in the construction industry to produce data-rich models of buildings and structures. BIM was introduced to the Malaysian construction industry by the Public Works Department (PWD) in 2007. Since then, the Malaysian government has taken initiatives to promote BIM in construction projects. This paper aims to explore those initiatives in promoting and encouraging construction players to use BIM. A semi-structured interview was conducted with the Head of BIM Unit Projects, PWD, to explore BIM initiatives made by PWD. It revealed several initiatives have been carried out by PWD, which could increase the use of BIM in the construction projects.

Keywords: Building Information Modeling (BIM), Initiatives, Malaysian Government, Construction Projects.

1 INTRODUCTION

Building Information Modeling (BIM) is a digital representation of physical and functional characteristics of a facility that link with a database of project information (PWD 2011). It is a collaborative tool used in the Architecture, Engineering and Construction (AEC) industry to improve visualization and constructability of design, and to avoid project delay, cost overrun and conflict among construction players (PWD 2011, Ahmad Latiffi *et al.* 2013, CREAM 2014).

BIM has been used widely in the USA, Australia, Hong Kong, Finland, and Singapore (Ahmad Latiffi *et al.* 2013), but is relatively new to the Malaysian construction industry (Zakaria *et al.* 2013). The development of BIM in the AEC industry is in line with the vision stated in the Construction Industry Master Plan (CIMP), which is to make Malaysia into a world-class construction industry, innovative and knowledgeable about global solutions (Sundaraj 2007, Ali and Enegbuma 2013, CREAM 2014). Moreover, BIM has been regarded by construction players as a potential solution for current issues pertaining to costs, quality, and time of completion (CREAM 2014). Some initiatives encouraging BIM in Malaysian construction projects made by government bodies include PWD, Construction Industry Development Board

(CIDB), Multimedia Super Corridor (MSC) and the Construction Research Institute of Malaysia (CREAM).

2 BIM INITIATIVES MADE BY THE MALAYSIAN GOVERNMENT

The Malaysian government plays the biggest role as a driving force to promote the successful implementation of BIM in the AEC industry, with initiatives in Table 1:

Table 1. Initiatives made by the government.

BODY	INITIATIVE
Public Works Department (PWD)	<ul style="list-style-type: none"> • BIM Committee • BIM Unit Projects by PROKOM • Training in BIM • BIM Standard Manual and Guidelines • BIM Roadmap • Pilot Projects
Construction Industry Development Board (CIDB)	<ul style="list-style-type: none"> • BIM Portal • BIM Steering Committee • Seminars and Workshops
Multimedia Super Corridor (MSC)	<ul style="list-style-type: none"> • Training in BIM
Construction Research Institute of Malaysia (CREAM)	<ul style="list-style-type: none"> • Seminars and Workshops • Training in BIM

2.1 Public Works Department (PWD)

PWD is a federal government department responsible for the construction and maintenance of public infrastructure in Malaysia (PWD 2011). In early 2007, PWD introduced BIM in the construction industry (PWD 2011, Ahmad Latiffi *et al.* 2013, PWD 2013), establishing a BIM committee to identify BIM platforms suitable for construction projects, and providing training-related BIM tools (PWD 2011, PWD 2013). PWD has also formed BIM Unit Projects through the Complex Management Division, or PROKOM (PWD 2013), responsible for preparing BIM Standard Manual and Guidelines as standard practice for construction players to implement BIM in construction projects. Moreover, PWD established a BIM Roadmap to make BIM compulsory for design-and-build and conventional projects based on contract values (Keat 2013). It has also conducted several pilot projects.

2.2 Construction Industry Development Board (CIDB)

The CIDB was established to build the capacity and capability of the Malaysian construction industry throughout the rise of quality in construction projects (CIDB 2013). CIDB developed a BIM Portal to provide information related to BIM on products, training, and consultancy (CIDB 2013, CREAM 2014).

Furthermore, CIDB formed and facilitated the first BIM Steering Committee in July 2013 at the headquarters of CIDB Malaysia in Kuala Lumpur. The committee is comprised of members from the public and private sectors, professionals, and academics (CIDB 2013, Keat 2013). It is responsible to guide construction players by providing strategic direction to the adoption and implementation of BIM in construction projects (CIDB 2013, Keat 2013, RICS 2013). CIDB has also organized seminars and workshops; for example, CIDB with CREAM established a seminar and workshop on “Issues and Challenges in Implementation of Building Information Modeling (BIM) by Small and Medium Enterprises (SME) in the Construction Industry” (CIDB 2013, CREAM 2014), held on 19 June 2013 in Shah Alam, Selangor. One objective was to get knowledge on BIM implementation strategies for SME.

2.3 Multimedia Super Corridor (MSC)

MSC Malaysia is a Information and Communication Technology (ICT) initiative by the government (MSC 2013), designed to attract world-class technology companies to the local ICT industry (MSC 2013, Ahmad Latiffi *et al.* 2013). The Malaysian government has allocated grants for undergraduate students and any organization or individuals to receive BIM training from MSC Malaysia. MSC explains BIM guidelines and training in using BIM tools. MSC also awards BIM professional certificates to the participants (CIDB 2013, Ahmad Latiffi *et al.* 2013).

2.4 Construction Research Institute of Malaysia (CREAM)

CREAM focuses more on seminars and workshops as well as research and development (R&D). The contribution of CREAM is in line with the Strategic Thrust in CIMP 2005-2015, which is the innovation through R&D and new construction methods (CREAM 2014). CREAM also provides training and education on BIM to create awareness and readiness among construction players.

3 METHODOLOGY

Two methods were used to obtain information regarding initiatives on BIM by the Malaysian government. First, a literature review was conducted to explore BIM’s definition, history, benefits, and the initiatives made by PWD, CIDB, MSC, and CREAM. All information was gathered from journal articles, international conference papers and online materials.

Second, a semi-structured interview was used to gain data from the Head of BIM Unit, PWD, on their BIM initiatives in construction projects. The data obtained from the interview were recorded and transcribed, then analyzed using content analysis and representation via tables, documents and expression.

4 FINDINGS

The respondent is the Head of BIM Unit Projects under PROKOM, with ten years of knowledge on BIM and involvement in projects using BIM for 4 years. The respondent

is responsible as the head of design team, managing BIM aspects and preparing the need statements for projects using BIM.

4.1 Roles and Responsibilities

According to the respondent, PWD has taken early step to promote BIM by using it in their projects. Consequently, PWD has established a BIM Committee to identify suitable BIM tools that will be used in the construction projects. Then, in 2010 the BIM Committee upgraded their practices from 2D to 3D by using Autodesk as a BIM tool. From 2011 onwards, training in BIM tools has been provided for construction players.

Furthermore, PWD formed BIM Unit Projects in May 2012 through PROKOM. According to the respondent, BIM Unit Projects acted as a Project Management Consultant that is responsible to supervise, facilitate and give advice regarding their pilot projects. The respondent stated that BIM Unit Projects is responsible for preparing BIM Standard Manual and Guidelines for construction players in implementing BIM for projects. PWD has also established the BIM Roadmap in April 2013 as a guideline for ensuring BIM implementation. Moreover, several pilot projects have been proposed by PWD. Table 2 shows list of pilot projects fully supervised under BIM Unit Projects.

Table 2. Pilot Projects under BIM Unit Projects.

PROJECT	DESCRIPTION
National Cancer Institute (NCI), Putrajaya	<ul style="list-style-type: none"> • Design-and-build project • First government projects using BIM in Malaysia • Cost of projects RM690 Million • Roles of BIM are visualization, clash analysis, 4D simulation and planning, asset management
Healthcare Centre Type 5, Sri Jaya Maran, Pahang	<ul style="list-style-type: none"> • Design-and-build project • Status of project: tendered • Roles of BIM are site modeling, visualization, design review, clash analysis, 4D-schedule simulation, and record modeling
Administration Complex of Suruhanjaya Pencegah Rasuah Malaysia (SPRM), Shah Alam, Selangor	<ul style="list-style-type: none"> • Design-and-build project • Status of project: awarded • Roles of BIM are site modeling, visualization, design review, clash analysis, 4D-schedule simulation, and record modeling

Based on Table 2, the National Cancer Institute (NCI) is the first government project that used BIM. The project is located in Putrajaya, costing RM690 million. It is a design-and-build project complete within three years. BIM has been used in the project to visualize the project, make clash analysis, Four Dimensional (4D) simulation and planning as well as asset management.

Another design-and-build project pilot project is the Healthcare Centre Type 5 in Sri Jaya, Maran Pahang. The project is a design-and-build project still in the tendering stage. The other design-and-build project is the Administration Complex of Suruhanjaya Pencegah Rasuah Malaysia (SPRM), Shah Alam, Selangor, which has

been awarded. Roles of BIM in these projects is to make site modelling, visualization, design review, clash analysis, 4D schedule simulation, and record modeling.

There are also design-and-build project pilot projects fully supervised by PWD. The pilot projects are the Secondary School of Meru Jaya located in Ipoh, Perak, and the Secondary School of Tanjung Minyak 2, Melaka Tengah, Melaka. The role of BIM Unit Projects is only to facilitate and give advice relating to BIM. The respondent stated that the status of Secondary School of Meru Jaya is tendered while the other project has been awarded.

The respondent stated that BIM implementation in Malaysia is still in the design stage. However, BIM has shown benefits in overcoming construction problems in terms of time, cost, and quality. The respondent believes that the establishment of their pilot projects will become examples enabling experience and knowledge about using BIM to the AEC industry.

5 CONCLUSION

BIM implementation in the Malaysian construction industry is still in its infancy. The Malaysian government has taken several initiatives to encourage and promote BIM to construction players for implementing it in their projects. The initiatives provided by PWD, CIDB, MSC and CREAM shown their effort to expand BIM. Future research will identify BIM initiatives in Malaysia's private sector.

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