CHAPTER 1

CONSTRUCTION AND BIM TECHNOLOGIES

Chapter reviews construction management practices on IBS construction projects. Then, this chapter presents the work process of BIM technology in construction management, and reviews the implementation of BIM technology in construction as well as other sectors. Finally, it describes the Level of Development (LOD) and Level of Detail (LOd) adopted throughout the BIM model.

1.1 Construction Management on IBS Construction Projects

An IBS is the new construction technology involving the use of on site and off-site (factory producing) prefabrications for installation to improve the construction efficiency (e.g. components keeping and sustainable building projects) (Badir & Kadir, 2002; Ismail *et al.* 2013). Presently, the methods that are most widely used in the construction industry are defined as a conventional construction, hybrid IBS and IBS. The conventional construction consists of extensive cast in situ activities while a hybrid IBS is the combination of certain elements that are standardised and cast in situ at the construction sites (Din *et al.* 2012; Lachimpadi *et al.* 2012). The adoption of IBS construction (IBS or a hybrid IBS) can be considered as an alternative option in maintaining sustainability in construction using pre-fabricated components that are systematically done using machine, formwork and other forms of mechanical equipment. The IBS construction provides the most advantageous solutions in terms of better control maintenance cost, shorten construction period and increase the quality of buildings (Blismas, 2005; Luo *et al.* 2006; Rahman & Omar, 2006).

In the IBS construction, the site planning process can be perceived as a significant potential to improve the building projects performance which includes management, work team, safety, material and equipment. The management factor is comprises success integration of construction parties as well as workplace

factor involves site preparation and components keeping. Work team factor contains experienced and skilled worker (e.g. project manager) while safety factor covers the procedures and accidents occur. The material and equipment factor is embraces deliver on time by components and erecting method (Ismail *et al.* 2013). The site planning for IBS implementation is also includes the integration of IBS contractor, supplier, project manager, engineer and architect for sharing knowledge, learning and building consensus on IBS construction maintenance stages, mostly in the new methods of procurement of buildings (Design-and-Build (DB), Design-Build-Finance-Operate (DBFO), Private Finance Initiative (PFI) and Public/ Private Partnerships (PPP)) (Yunus & Yang, 2011; Wood, 2012). Meanwhile, the various elements involved in the IBS construction site planning projects is inadequately considered which cause some impacts to the maintenance management method selections on the throughout building structure component especially for managing the complex and high-rise buildings.

1.2 Technologies in Construction Management

The recent advance in construction industry can optimise the information transfer, communication and collaboration among the stakeholders along the project life cycle by introducing advanced ICT that can be considered faster and much more efficient than in the case of traditional methods (manual practices). ICT applications and tools, including the ones that stimulate a more standardised communication between different parties in construction (e.g. document management applications, workflow management applications, and product modelling applications), help construction projects to provide their opportunities for real time access of information and improves coordination and collaboration between the project team members, which ultimately strengthen their inter-organisational cooperation in rapidly changing construction industry. Inter-organisational cooperation is defined as a coordination and collaboration activity used for communicating and sharing project information between participating organisations in a construction project (Ahuja *et al*. 2009; Adriaanse *et al.* 2010).