

Recently, BIM has progressed beyond 3D visual representations to 4D representations of the entire construction process. This allows it to be an incredibly useful tool not only for participants in the design process, but those involved in the building process as well. For example, by simulating the build process, risky construction methods can be identified and designed out before it becomes too late and costly, with obvious occupational health and safety benefits^[1, 2]. Costs can be reduced with the prefabrication of certain elements if the specifications are known well enough in advance, as this typically requires very long lead-times (say, up to 9 months). If requirements for materials are known far enough in advance, structural and architectural elements can be manufactured and delivered to the project using a just-on-time schedule to reduce the need for storage and delays (Figure 1).

A key feature of BIM model is that it does not lay blame; it merely identifies clashes, issues or problems which can be solved collaboratively. In essence, no one loses “face”, which is an important cultural concept in Hong Kong^[11]. Relationship management in construction has its roots in relationship marketing and strategic network competition^[12, 13]. Relational contracting is based on the concept that self-interest motivates parties to enter into contractual relations but competition between parties is necessarily bounded by acceptance of the need for cooperation^[14].

This study explores the interaction between BIM and the construction industry during its implementation, with a specific focus on the empirical impacts of BIM on the design and construction processes and professional roles during the process. Two cases were selected from recent construction projects coordinated with BIM systems: the Venetian Casino project in Macau and the Cathy Pacific Cargo Terminal project in Hong Kong.

CASE STUDIES

Case 1: The Venetian Casino, Parcel 5 & 6, Cotai, Macau

The construction of the Venetian Casino in Macau was managed by Hsin Chong Mace as Management Contractors. Following the traditional way of working, the structural engineers and the architects would work on separate sets of schematics which would need to be updated and coordinated as problems are identified, requiring a great deal of organisation and paperwork. During Phase One of the development, there were a number of complex design co-ordination issues between the architectural GRC façade panels and the in-situ structural concrete frame. The issues were causing delays on site while RFIs were issued to the engineering and architectural consultants for resolution.

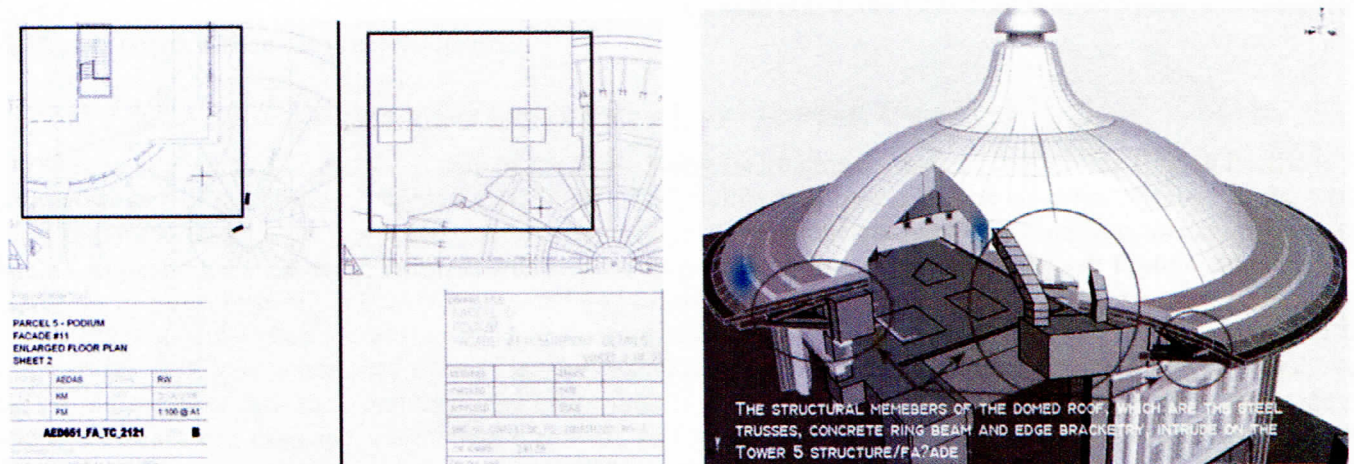


FIGURE 2. Clash and error detection on the Venetian project

The design for the development of Parcel 5&6 by The Venetian Casino involves a podium façade with a design reflecting Balinese styles. The 250m long elevation along the Cotai Strip consists of 18 different themed facades which are all inter-connected. The facades are constructed using GRC precast panels which are supported by a cast in place reinforced concrete frame structure. During the design, tender and construction of the first phase of the