

Hsin Chong Construction Group Limited

Project:

28 Hennessy Road Commercial
Development Project

Location:

28 Hennessy Road, Hong Kong

Type:

Grade A Office

Scheduled Time of**Completion:**
End June 2012

3D Designs All Can See



The BIM model for a Swire Properties development shows all project members the 3D appearance that would otherwise be only a mental image in the minds of one or two engineers. The model has helped to finalise the design, avoid clashes, and ensure smooth progress with construction in a small space accessed from a narrow, busy road.

PROJECT OVERVIEW



THIS PROJECT IS A 28-STORY COMMERCIAL TOWER FEATURING 24 LEVELS OF GRADE A OFFICE SPACE. BUILDING IS IN OCTAGONAL SHAPE, WITH CURTAIN WALL TO CREATE A CONTEMPORARY LOOK, THE PROJECT ALSO OFFERS A UNIQUELY DESIGNED 'SKY' GARDEN ON THE SECOND FLOOR, WHICH IS AN INSPIRING, RARE-TO-BE-SEEN FACILITY IN THE HUSTLE-AND-BUSTLE OF HONG KONG.

From 2D to 3D

Swire Properties is developing 28 Hennessy Road, an octagonal 28-storey commercial tower, with a curtain wall plus a “sky” garden on the second floor. Though the architect’s initial design was entered in a BIM model, the major use of BIM was by contractor Hsin Chong Construction Group Limited, as the project entered the construction stage.

“We developed a detailed Revit BIM model based on 2D coordinated drawings, to help with coordination and construction planning,” says C.M. Kwok, Chief Building Services Engineer, Hsin Chong. “We focused on items where there was high risk of problems, mainly for engineering, E&M services and spatial coordination.”

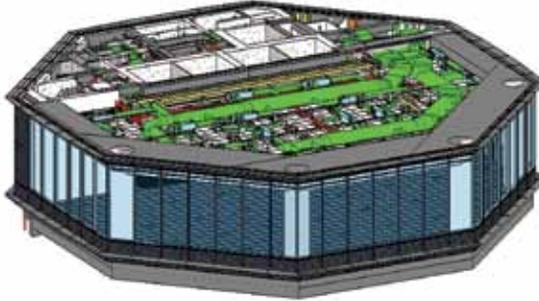
Kwok and P.S. Lau, Building Services Manager, Hsin Chong, were confident that with their experience, most of clashes will be resolved

after work on the 2D CSID. Yet combined services drawings are highly complex in 2D, with many lines representing walls, pipes, ducts and so forth – and maybe only experienced engineers have a 3D mental image of how everything will look once built. “BIM is helpful,” says Lau. “It’s easier to demonstrate what will happen to the client, so they can understand spatial information. When using AutoCAD for coordination, it can be difficult to convince the client that there will be minimal clashes.”

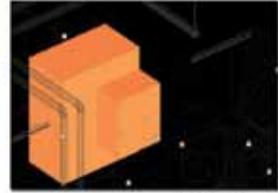
Curtain wall and plant room

One part of the building where BIM proved especially useful was the curtain wall, partly as there were concerns that rainwater might leak into the building through the mullions and transoms. “We used the BIM model to explain the system, and show that the curtain wall would discharge water to outside whilst

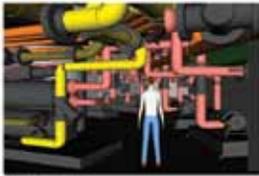
APPLICATION OF BIM



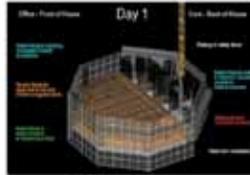
E&M, ARCHITECTURE, STRUCTURE COMBINED MODEL



CLASH ANALYSIS



WALKTHROUGH



4D SIMULATION



FIT-OUT

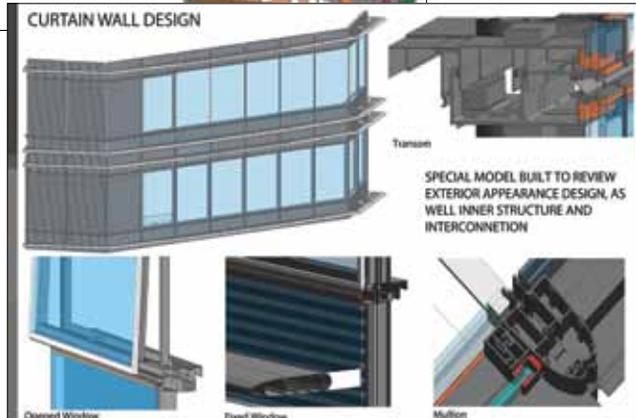
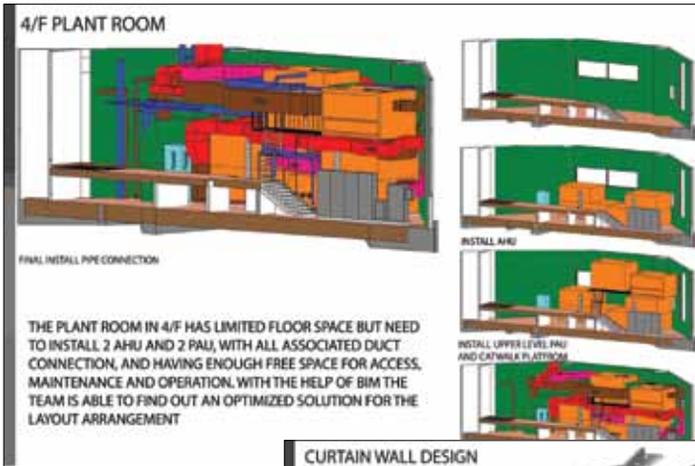
preventing leaks,” says Lau.

The team created a special BIM model for the curtain wall, to also assess the exterior design, as well the inner structure and interconnections. This was used for finalising the design of the curtain wall – and ensuring it would fit with the building structure.

BIM also proved invaluable for coordinating the plant room, which will be densely packed with equipment. A colour coded BIM model helped Kwok and his team discuss the plant room arrangement with Swire Properties and consultants. In regular BIM review meetings, they viewed walkthroughs, and shared their point of view on equipment arrangement so it will be more efficient to carry out operation and maintenance. All available space was fully utilised, with the layout separated into upper and lower zones, and access routes with sufficient room for operators and maintenance staff.

Max headroom in mechanical plant rooms and the sky garden

Though different MEP systems were coordinated once in 2D, the 3D BIM model did reveal issues with the combined services within the roof level. Working with the BIM model, the project team optimised the layout of building service elements, such as by reducing sizes of some ducts, and rerouting pipes. Clashes were eliminated, and headroom was increased from 1.5 metres to 2.2 metres, which exceeded the 2.1 metres access requirement. Lower in the building, the sky garden above the lobby did not present challenges regarding service elements, as the space is relatively open. But BIM did deliver a benefit, as all project team members could see how the garden will look, and finalise the design.



Modelling into the fourth dimension

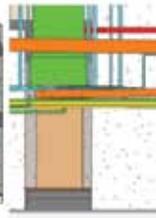
The project site has only one access, from a narrow, busy one-way street. “We were concerned about access and truck parking that would hinder the construction program, so we used a 4D BIM model to demonstrate the time related traffic flow and construction sequence from the basement to typical floors,” says Kwok.

The model revealed ways for creating a temporary platform where trucks could park, as well as construction of the basement, and then

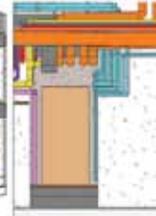
building the ground floor and taking down the platform. It included material and equipment storage, and changed over time – the fourth dimension.

The 4D model was built up to the 5th floor, to help with devising the four-day construction cycle for typical floors. “We showed construction works sequencing and how to fill the concrete areas portion by portion, and presented the model to the client,” says Kwok. Once work was underway, Kwok found it satisfying to see that actual construction was perhaps 80% as in to the model. Also, the scheduling for vehicle access devised in

BUILDING SERVICE LAYOUT OPTIMIZATION IN ROOF LEVEL



HEAD ROOM 1.5M



HEAD ROOM 2.2M

THE TEAM MADE USE OF THE BIM MODEL IN OPTIMIZING THE BUILDING SERVICE LAYOUT ARRANGEMENT IN ROOF LEVEL, GREATLY IMPROVED THE HEAD ROOM FROM 1.5M TO 2.2M.

the BIM model worked well in practice, with no traffic jams due to material loading and unloading, and space requirements fulfilled.

Changes in design stage not after building

Reflecting on using BIM for the project, Kwok says it was especially important for giving the client an understanding of the actual situation, so changes such as moving an exhaust outlet or a length of piping could be made in the design stage – rather than after construction as typical when using 2D drawings.

Though creating the BIM model initially demanded manpower – together with assistance from BIM consultant Forida Limited – it did help reduce clashes; and overall, manpower needed was reduced by perhaps 10%. The experience gained through the project will help with using BIM in future, with sufficient time at the project commencement

stage, when Hsin Chong may first create 3D models, and then output coordinated 2D drawings for front line people use.

“You can have a lot of engineering data in a BIM model, which everyone can read,” says Lau. “This is also good for facilities management, with data on equipment that can be used for maintenance.” Swire will indeed incorporate the BIM model for 28 Hennessy Road within the facilities management software, which should mean the model remains useful for years to come.

** All images in this article are provided by Hsin Chong Construction Group Limited*



ABOUT HSIN CHONG CONSTRUCTION GROUP LIMITED

Founded in 1939, Hsin Chong Construction Group (Hsin Chong) (Stock Code: 0404.HK) is one of the leading construction groups in Asia. Hsin Chong's scope of services has grown to cover the entire spectrum of building construction, civil engineering, electrical and mechanical engineering, project and construction management, interiors and special projects, property development and asset management services. Hsin Chong is on the HKSAR Government – approved list of contractor for public works (Group C - for contracts of any value).

Hsin Chong has also expanded its territorial coverage. From its firm foundation in Hong Kong, Hsin Chong has successfully applied its proven expertise to Macau, Chinese Mainland and overseas regions with solid results.

In Hsin Chong, we promise to do our utmost to ensure total customer satisfaction. In face of today's challenging economic situation and intensely competitive market, we are constantly in search of ways to improve our work efficiency and quality. At the same time, we are allocating more resources towards promoting the use of new technology to enhance industrial safety and environmental protection.