

AECOM

Projects:

- Proposed Commercial Development at No. 135-137, Hoi Bun Road
- Proposed Residential Development at 55-57 Bisney Road, Pokfulam

Location:

- Kwun Tong
- Pokfulam

Types:

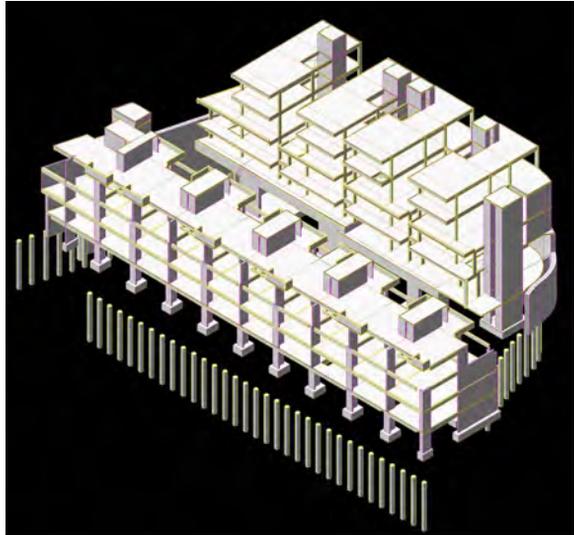
- Commercial Development
- Residential Redevelopment

Scheduled Time of

Completion:

- Hoi Bun Road - March 2013
- Bisney Road - September 2013

Faster Design; Enhanced Coordination



When Vital Success Development asked AECOM to work on the geotechnical and structural engineering for a new building in Kwun Tong, the architectural plans did not in themselves present a great challenge. The 26-storey, reinforced concrete building would be around 100 metres high, with four storeys for car parking, and 21 floors of office space.

Yet Vital Success Development did have one challenging criterion: they wanted the building designed and built quickly. AECOM structural engineers recommended using BIM as a way to fast track the design process.

“The client had heard of BIM, but hadn’t applied it in a project. They were impressed by an AECOM presentation.” says Alan C H Yuen, Principal Engineer, Building Engineering (Structural), AECOM – and a member of AECOM’s BIM & CADD Working Group Committee.

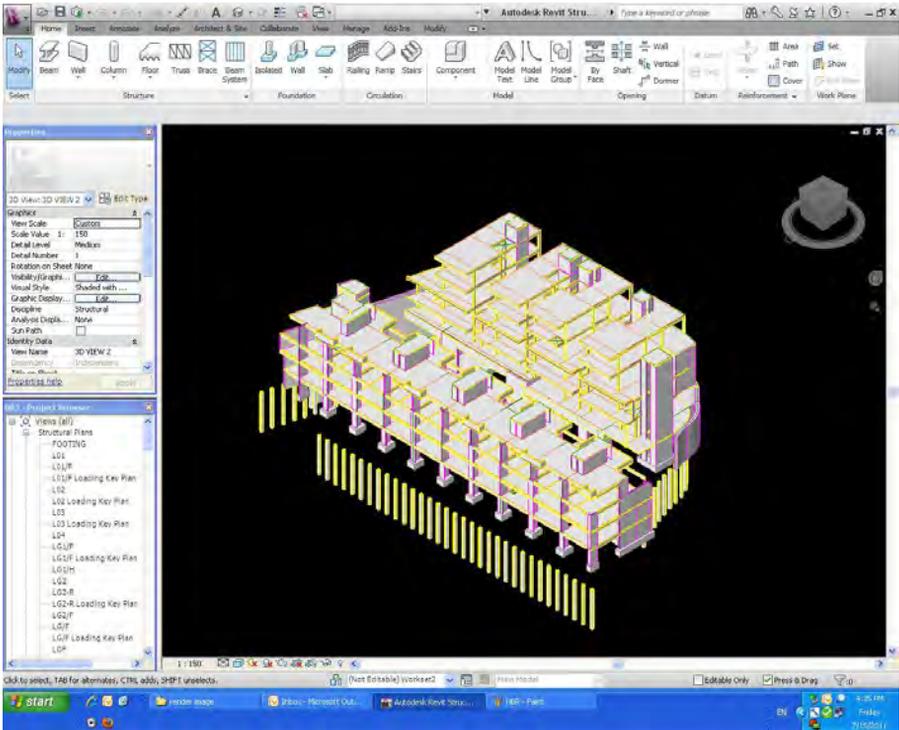


Accelerating design and drawing production

To accelerate the design and drawing production process, the AECOM team integrated a Revit BIM model with the structural computational programme that covered mainly structural elements. Construction details were included in Revit, such as installation details, and materials.

This process proved much faster than the traditional design process, in which the structural engineers would produce a detailed design based on architectural plans, and then sketches from which draftsmen prepare drawings. “The concept took around two months to develop, compared to perhaps three to six months with the traditional approach,” says Ir Yuen. “And we completed the structural design in under two months – when we would



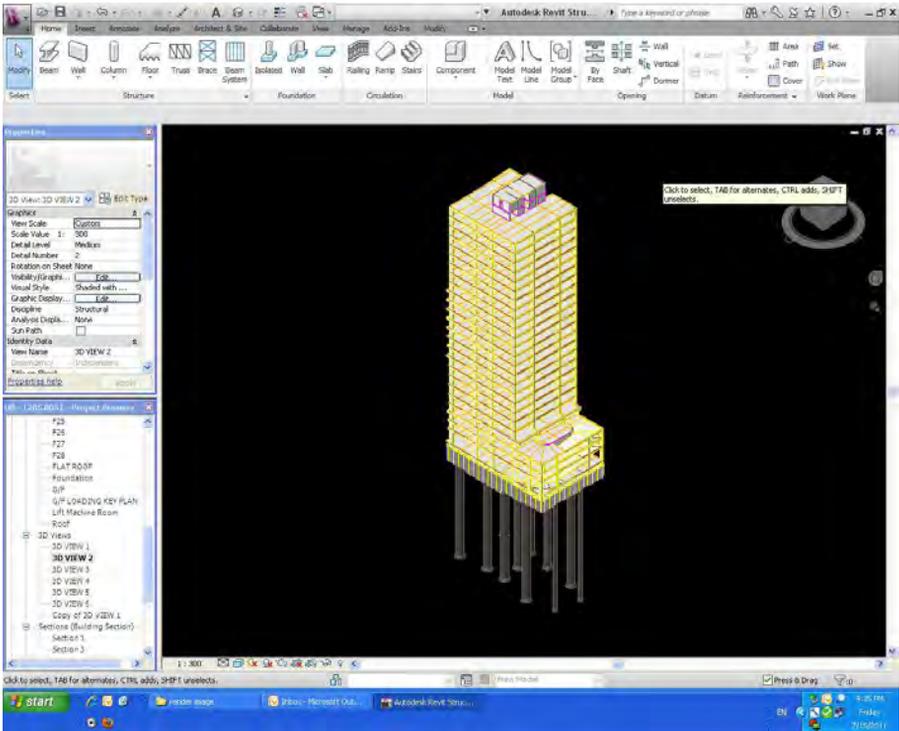


usually expect this to take three to four months for a building like this.”

The main time saving was in drawing production. AECOM's working group used the project as a case study of the extent to which using BIM much faster this is with BIM. Based on experience with similar buildings, they estimated that 404 working hours would have been needed for delivering a set of structural drawings with a traditional approach. Yet by adopting BIM, they reduced the working hours

to 252 – saving 152 hours, or 37% less time than for the traditional approach. This is mainly due to the information contained inside the BIM, which generated drawings automatically, and could include the building information into the drawing annotations.

With the BIM model, the number of structural RFI was reduced by 25% to 35%, and structural construction costs and time were reduced by perhaps 5% to 10%.



BIM Model Images Help Confirm Layout

During the schematic design stage, the team provided the client with a variety of potential structural schemes for consideration, aiming to achieve an efficient and economic structural design. The Revit model helped create the schemes, through re-arranging the elements, and produced consistent plans, sections, and 2D and 3D images.

With images from the BIM model, including a walkthrough, the client and architect readily understood the structural system, and ensured there was sufficient headroom – helping them confirm the building layout.

From estimating quantities to helping maintenance

The project also required an early assessment of quantities of materials required for the structure, for forecasting costs. Usually, a quantity surveyor would take two to three weeks to prepare a preliminary quantity measurement, yet with BIM, the team immediately and easily generated information on the amounts of concrete and steel needed.

The AECOM team also built a 4D construction simulation, presenting 3D “snapshots” of different stages of construction. This will help companies bidding for tenders to understand the construction sequences.

Once the office building is completed, the Revit models may also help the client with building maintenance.

Modelling site constraints to optimise building plans

AECOM is also working on a contrasting project in which BIM is playing an important role. This involves construction of five- and six-storey housing blocks in Pokfulam, for Chinachem Group. AECOM was appointed as structural, geotechnical and building service engineers, to carry out site formation, foundation, superstructure, and building services design.

“We face site constraints, such as existing buildings surrounding the site, along with retaining walls, roads, and paths,” says Vito C Y Tso, Engineer, Building Engineering (Structural), AECOM. “Also, the land has a

10-metre level difference with difficult soil conditions. We need to explain these to other consultants.”

The AECOM team created a BIM model with the site survey, architecture, and proposed structural design including socket piles for helping stabilise the site. Like the office building, the model helped speed up the design and drawing production process. Importantly, too, the 3D images helped make the client and architect clearer regarding the issues. “The architect could see places where the structure wouldn’t work, and adjust the general building plans to suit our model,” says Mr Tso.

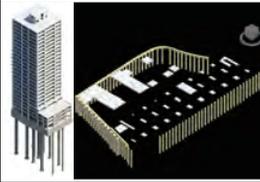
In 10 years BIM will be akin to CAD

Ir Yuen and Mr Tso are key members of AECOM’s BIM & CADD Working Group Committee, which was established in 2008. The group trains staff to use BIM, and researches more effective ways of using BIM – which senior managers believe will be used as widely in 10 years as CAD is at present.

“Our engineers are impressed by the functionality of BIM, and it’s not difficult to learn it,” says Mr. Tso. Echoing the management team, he predicts that Revit structure will become like AutoCAD today, and always used in projects.

** All images in this article provided by AECOM*





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