

COMPANY

Architectural Services Department,
HKSAR Government

PROJECT

Seamless Conversion from Revit Structural
Model to CSWP Drawings and Bridging BIM
throughout the Project Cycle

TYPE

Government Building Projects

Futuristic BIM Can Seamlessly Generate 2D Drawings



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Architectural Services Department

About Architectural Services Department, HKSAR Government

The Architectural Services Department is a department of Hong Kong Special Administrative Region Government, which performs functions in relation to Government-owned and Government-funded facilities in the areas of facilities development, facilities upkeep, monitoring and advisory services.

AUTODESK PRODUCTS USED

AutoCAD

Navisworks

Revit

Project Description

The Structural Engineering Branch of the Architectural Services Department is adopting BIM throughout projects' design and construction stages. To reap the benefits of this new technology while upholding the quality of 2D AutoCAD drawings, the Structural Engineering Branch has developed a seamless bridging operation to convert Revit Structural Models to CSWP-compliant drawings. In the Tsui Ping River Garden project, BIM also assisted the Project Structural Engineer with streamlining his work in design, drawing preparation and construction supervision.

Project Challenges

Although a BIM 3D model can greatly enhance the effectiveness of building structural design, 2D drawings are still the most commonly adopted and essential media in the local construction industry. With implementation of BIM throughout the project cycle, it is inevitable that 2D drawings will be generated from BIM models; but generating drawings that can comply with existing requirements (the Development Bureau's CAD Standard for Works Projects-CSWP) is a challenging process. In addition, the structural design process in a building life cycle involves many participants that it is difficult to transfer the necessary information from one party to another without information loss.

Solutions for challenges

In order to bridge the Revit BIM 3D models and AutoCAD 2D drawings, the Structural Engineering Branch of ArchSD has developed a customised export setup in Revit, which transforms Revit categories to match CSWP layers in AutoCAD. In-house Autolisp programs in AutoCAD have also been developed, for conversion to drawing content that complies with CSWP.

In addition to generating CSWP-compliant 2D drawings, BIM also enhances the effectiveness of the structural design process, particularly for complicated structural forms. BIM allows the Project Structural Engineer to obtain precise setting out and dimensions of steel members for his analysis and design.

How does BIM benefit the project?

2D drawings are generated from the BIM model, which means they are synchronised with any updates throughout project development, and human drafting errors can be eliminated. The CSWP-compliant drawings can also facilitate a smooth e-tender process and suit the operational needs of contractors and sub-contractors.

Various BIM applications—such as generation of steel member schedules for cost estimates; 3D printing of complicated steel connections; and VR walkthroughs—allow the project team to resolve many problems during the design stage, so that errors and abortive works during construction can be minimised.

Better with BIM

The steel canopy structure of Tsui Ping River Garden involves complicated connection details, with joints between members in different alignments, on all 3D planes. Furthermore, it has a tension fabric cover that is designed and fabricated by the specialist sub-contractor.

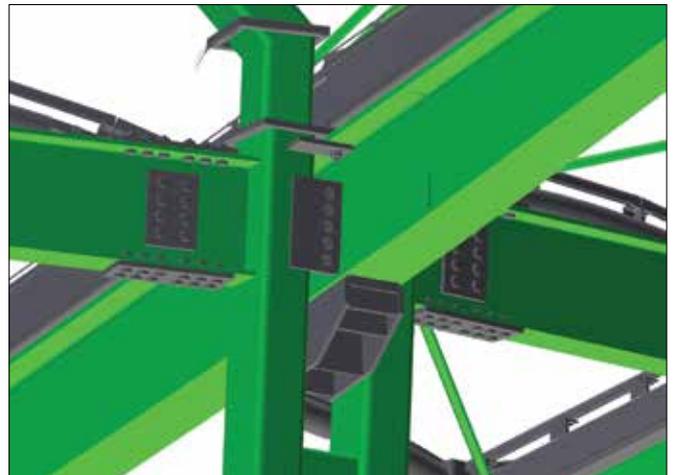
BIM has proved its capabilities to be a very effective medium, helping the Project Structural Engineer in his design and communication with project team members including the architect, BS engineer, contractor and site supervisory staff. During construction, BIM models viewed using mobile devices and 3D printouts also allow site staff and frontline workers to understand the construction sequence and minimise abortive works.



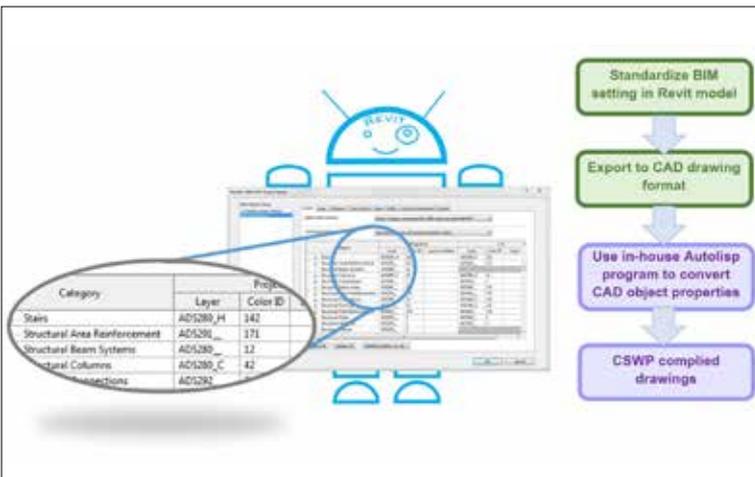
Collaboration with tension fabric specialist contractor using BIM model
Image courtesy of Architectural Services Department, HKSAR Government



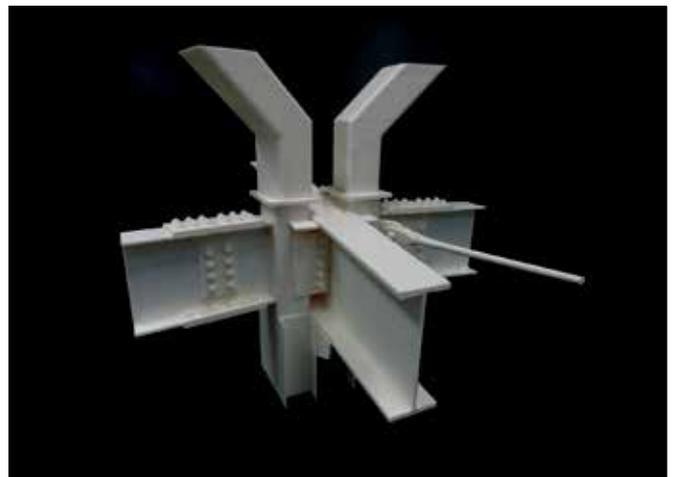
Structural Engineering Branch's in-house developed Autolisp to convert layers, lines, colours, etc. to tally with CSWP requirements
Image courtesy of Architectural Services Department, HKSAR Government



BIM assists the Project Structural Engineer to present the structural steel connection details in a precise manner
Image courtesy of Architectural Services Department, HKSAR Government



Customized export setup in Revit developed by the Structural Engineering Branch, ArchSD
Image courtesy of Architectural Services Department, HKSAR Government



3D printing is adopted to physically demonstrate the "as-built" details during design stage
Image courtesy of Architectural Services Department, HKSAR Government