

COMPANY

Hip Hing Engineering Company Limited
Architectural Services Department, HKSAR
Government

PROJECT

Provision of Temporary Facilities at Existing
Open Playground of Junior Police Call
Permanent Activity Centre and Integrated
Youth Training Camp at Pat Heung

LOCATION

123 Fan Kam Road

TYPE

Construction

SCHEDULED TIME OF COMPLETION

70 Days

Let BIM Race Against Pandemic Pace

“Amid the challenges of the COVID-19, we had been racing against time to construct the quarantine facility. BIM had been proven as an extraordinary catalyst to push boundaries. Its implementation enabled us to achieve early completion of 120 new quarantine units within 63 days. This was earlier than scheduled with site formation and building works being 7 days and 8 days ahead of schedule respectively. Heartfelt thanks go to all parties for their seamless collaboration and steadfast dedication to fighting the pandemic.”

—Derek So

Executive Director,
Hip Hing Engineering Company
Limited

BIM PARTNERS

WSP Hong Kong Limited
Leigh & Orange Architects

AUTODESK PRODUCTS USED

Autodesk A360
AutoCAD
Civil 3D
Dynamo Studio or Dynamo for Revit
Inventor
Navisworks Manage
Revit
Revit Live



Site Photo of Pat Heung Quarantine Centre
Image Courtesy of Hip Hing Engineering Company Limited and Architectural Services Department, HKSAR Government

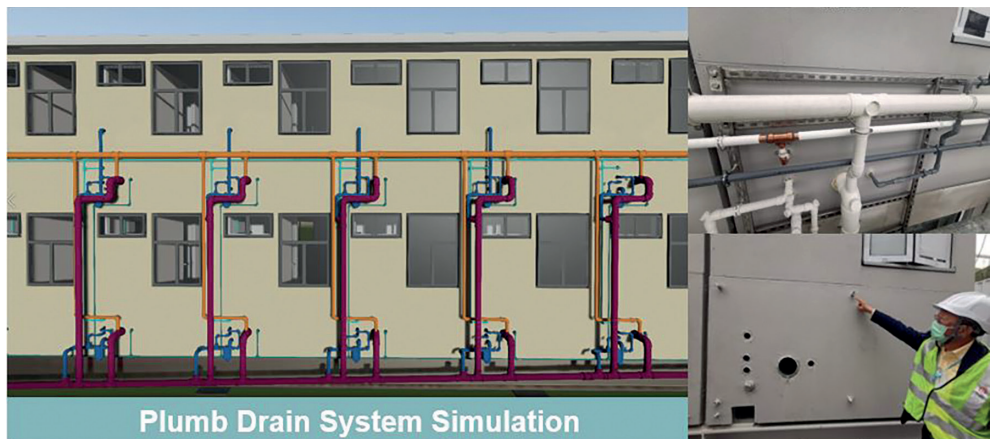
Temporary Quarantine Facilities at Pat Heung

The pandemic COVID-19 has hit hard the city. To contain its outbreak, the HKSAR Government acted swiftly and decided to build 120 units of temporary quarantine facilities at existing open playground of Junior Police Call Permanent Activity Centre and Integrated Youth Training Camp at Pat Heung. Hip Hing Engineering Co. Ltd. was responsible to complete the foundation work, design and construction of this significant project.

Time Limitation

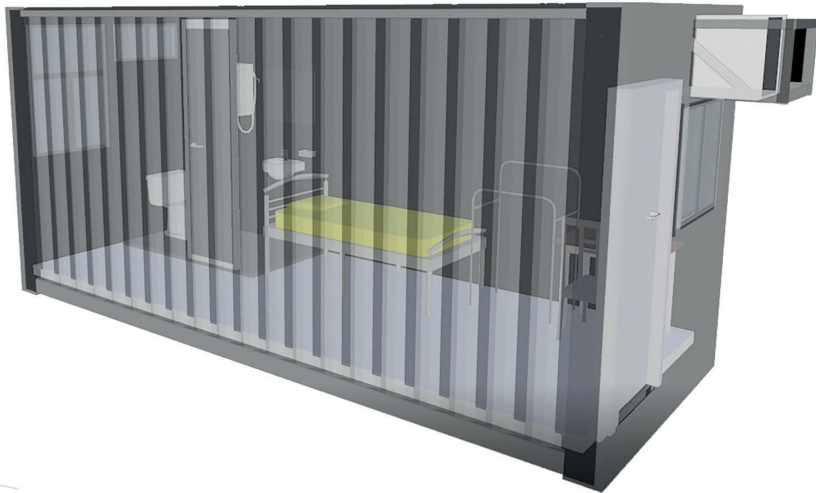
To help the community fight the pandemic, the project has an aggressive schedule for completion within 70 days. The scope of works include design, fabrication and construction.

To push the boundary and accelerate the programme, prefabrication technology is essential. It is for this reason the game changing construction method - Modular Integrated Construction (MiC) technology - was thoroughly applied. Racing against



Plumb Drain System Simulation

BIM simulation of Plumb Drain System Simulation assembled by DfMA
Image Courtesy of Hip Hing Engineering Company Limited and Architectural Services Department, HKSAR Government



BIM model of typical unit container
Image Courtesy of Hip Hing Engineering Company Limited and Architectural Services Department, HKSAR Government

time, all 120 modules were fabricated offsite in MiC factory in Mainland China within 30 days, which were installed in Hong Kong on 7 working days within 20 days' time. Thanks to the adoption of BIM, coordination between different stakeholders had been much effective, while it helps facilitate the accuracy and precision of fabrication with its ability to generate 3D fabrication drawings; moreover, all designs had been completed in a fast speed and error-free. On the other hand, Design for Manufacture and Assembly (DfMA) method had also been adopted in MEP system. As a result, the project was completed in 63 days (14% Ahead of schedule). This was earlier than scheduled with site formation and building works being 7 days and 8 days ahead of schedule respectively.

Congested Construction Site and Limited Road Accessibility

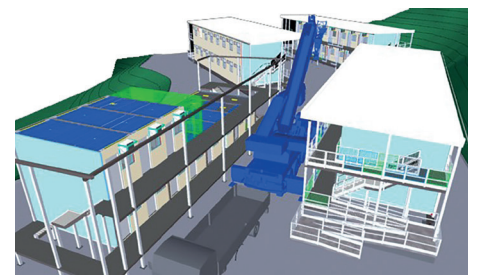
The congested construction site is another critical concern. The overall existing open playground site dimension for 120 quarantine facilities is around 5800 m². In order to place all MiC individual units and fulfill statutory requirements such as occupants' Means of Escape and 6m width EVA separation in between the 6 blocks, Autodesk's Revit model was adopted to fit different site layout options in the existing site reference, so as to confirm the most suitable overall design. Besides, fitting in with the framing plan generated from Autodesk's Revit model, Autodesk's Civil 3D vehicle path simulation tools were adopted to facilitate the site planning works at the early stage and to simulate the path of the fire truck, for the review

and approval of Fire Services Department (FSD).

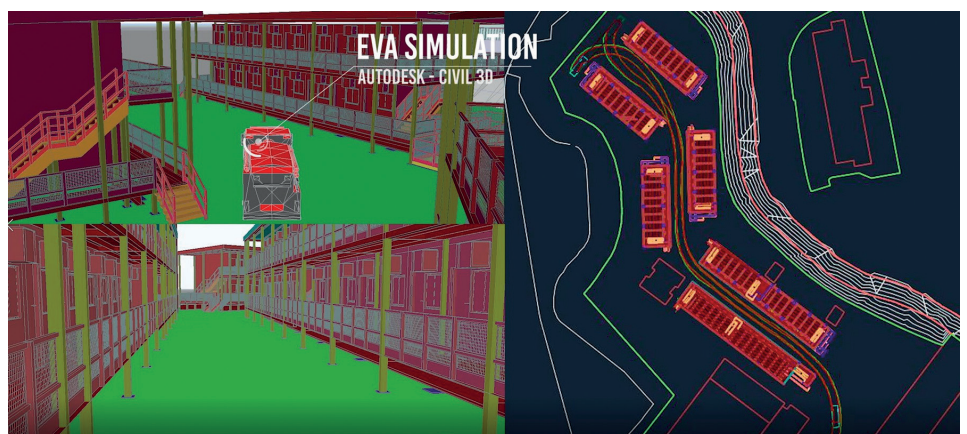
Apart from layout plan design, allocation of works is also complicated in a congested construction site. Autodesk's Navisworks had been adopted to generate the 4D simulation in view to visualize and check schedule of site activities. Since all temporary works and machines were envisioned together with the design structure and existing site conditions, vehicles flow can be carefully planned and tracked efficiently. Thus, potential issues of inadequate resources and over-deployed idling allocation in such limited site area can be resolved in advance. Project team can be given a full picture of the pros and cons of each construction method, so that the most optimum decision can be made. In fact, in collaboration with real time GPS shipment tracking, Autodesk's Navisworks can rapidly reflect the change of module quantities and its impact to the Site, and helped adjust the ad hoc issues.

Minimal Physical Meet-up: Online E-Meetings and Common BIM environment

During the most severe period of COVID-19 outbreak, strict border controls between Mainland China and Hong Kong were in place, while local meetings between client, consultants and contractor were restricted to a certain degree. Despite the lack of face-to-face meeting and on-site supervision, Autodesk's A360 had been proven to secure mutual communication and understanding. It was used for an integrated cloud system which enables all stakeholders to get the exact and adequate details of the design in the simulated world. The update of the design is real-time, which helps avoid the confusion due to different versions of hard copy. Furthermore, the accessibility is considerably user-friendly as the 3D coordination model can be viewed in tablet or mobile devices, which allows the site workers to check whether the construction is consistent with the



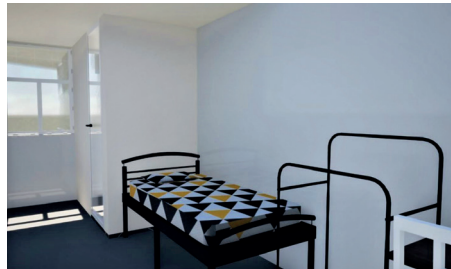
4D construction simulation
Image Courtesy of Hip Hing Engineering Company Limited and Architectural Services Department, HKSAR Government



EVA Road Swept Path Simulation
Image Courtesy of Hip Hing Engineering Company Limited and Architectural Services Department, HKSAR Government



QR code scanning and QA/QC inspection
Image Courtesy of Hip Hing Engineering Company Limited and Architectural Services Department, HKSAR Government



BIM model rendering for interior design
Image Courtesy of Hip Hing Engineering Company Limited and Architectural Services Department, HKSAR Government

Kong, an on-site audit check was held to check the reliability of the information.

Program Compatibility

With the progressive development of BIM, more BIM related software have been developed. The project utilizes Revit, Dynamo, Autodesk Civil 3D, Autodesk Navisworks, Autodesk Inventor and Autodesk AutoCAD, which are all compatible with each other. It means that the models generated by any of these software can be directly federated into one package without losing important data, which is crucial for the project's operation with tight time frame.

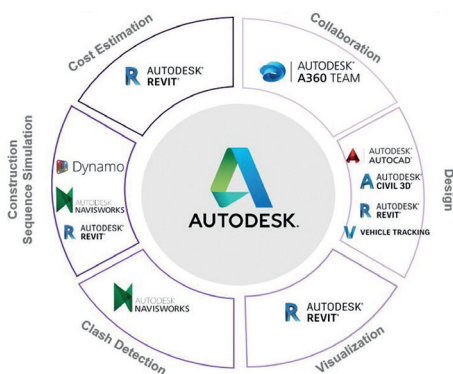


Daily construction progress record by drone
Image Courtesy of Hip Hing Engineering Company Limited and Architectural Services Department, HKSAR Government

locating the view of the simulation on the same location as the drone. Thus, all responsible parties can review and control the construction process every day without reaching the site.

Revitalize QA/QC Inspection Workflow

Inspection workflow of MiC units was divided into three parts: Firstly, self-inspection with photos, videos endorsed by Sub-Contractor representatives in Mainland China was submitted. Secondly, online livestream inspection was carried out between Hong Kong and Mainland China with video records, lastly, on-site random check by QA/QC team was conducted upon delivery. In order to trace the inspection record easily, a unique QR code was designated to every single module to record all inspection and photo records, including the inspection videos and endorsed documents. After the MiC units had been transported to Hong



All of the application applied in this project are inter-communicated with each other.
Image Courtesy of Hip Hing Engineering Company Limited and Architectural Services Department, HKSAR Government

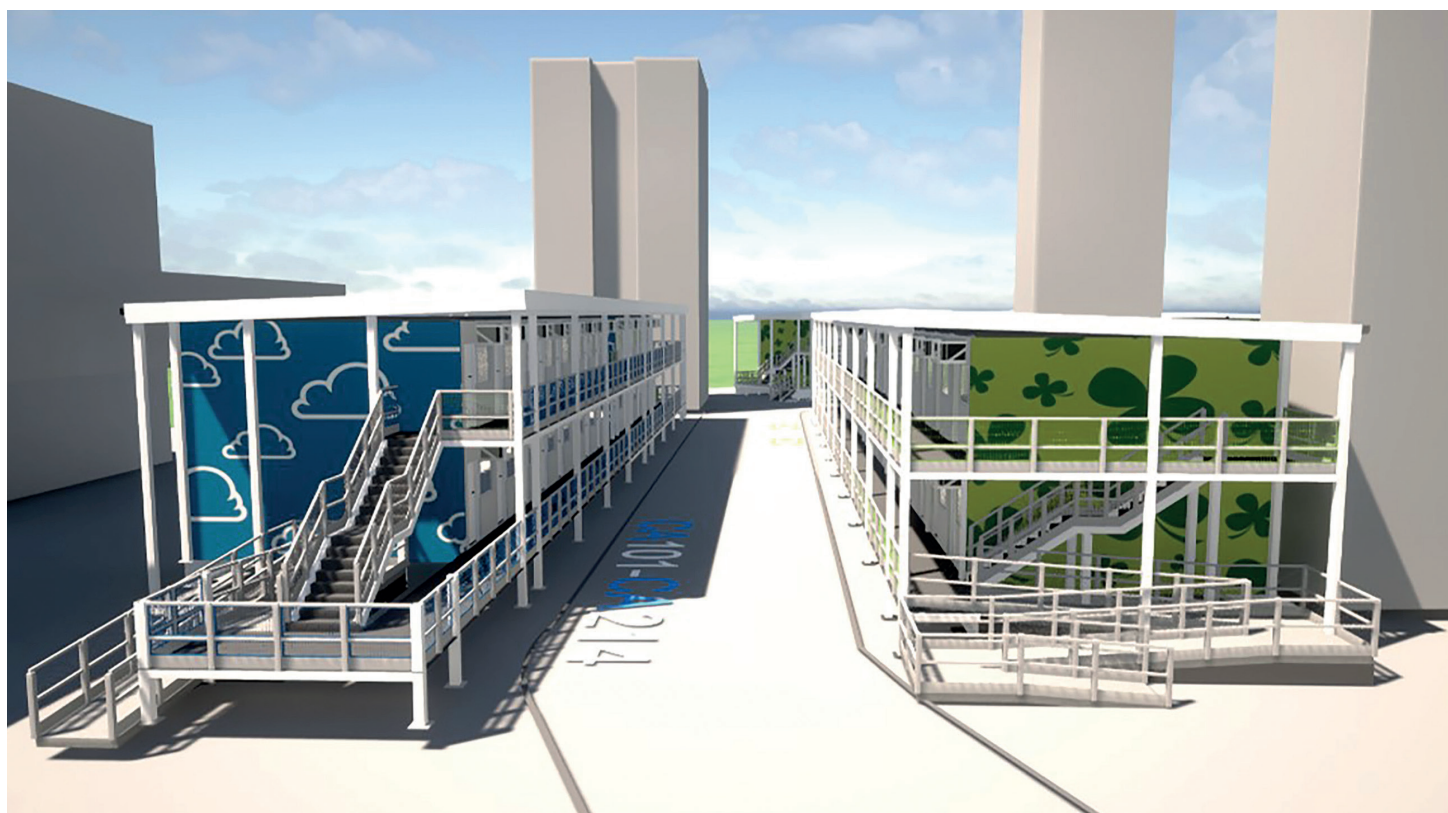
design through electronic devices instead of paper.

Add-on Tools Application: Surveillance System

The record from the drone can be compared directly with the design model and programmed simulation by



Image of BIM model rendering and site photo.
Image Courtesy of Hip Hing Engineering Company Limited and Architectural Services Department, HKSAR Government



Design and Build BIM Model: Pat Heung Quarantine Centre
Image Courtesy of Hip Hing Engineering Company Limited and Architectural Services Department, HKSAR Government

About Hip Hing Engineering Company Limited

Founded in 1964, Hip Hing Engineering Co., Ltd. undertakes the design and construction of building and civil engineering works for public sector clients, and it is one of the members of Hip Hing Construction Group (“Hip Hing”). Over the past decades, Hip Hing has grown to become one of the leading contractors in Hong Kong, and has been trusted by our clients to construct many of the landmark buildings which define Hong Kong. Our experience and expertise in the design, procurement, engineering and construction disciplines enables us to provide comprehensive project delivery services. We have also been embracing advancing technologies to take our services to the next level, so as to meet our clients’ needs.

About Architectural Services Department, HKSAR Government

The Architectural Services Department (ArchSD) serves and cares for our community by enriching the living environment through quality professional services. ArchSD ensures the quality, cost effectiveness and sustainable development and upkeeping of community facilities; provides quality professional advisory services on community facilities and related matters; and promotes best practices in the building industry.

ArchSD is also committed to collaborating with the industry partners, user departments and stakeholders in developing and maintaining the public facilities for providing a better service to the general public. It is believed that through collective wisdom, experience and talent, ArchSD will be able to bring about continuous improvement on the public works and the quality living environment for the public.