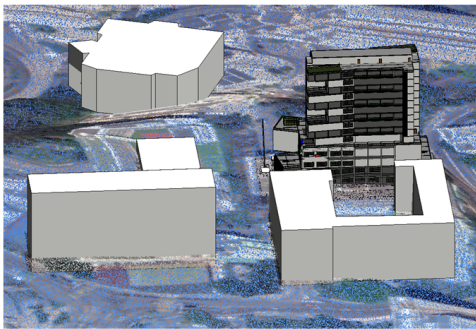


CIC BIM Competition 2020 – Deadline Fighters 2.0

Location Plan 1:2000 ←



Location Plan: No. 7-11, Kwai Hop Street, Kwai Chung, Kowloon

About the New Development of the Student Hostel

Design Concept:

We aim to design a comfortable, sustainable and smart hostel.

Building Form:

The building form is mostly rectangular to fit the general shape of the surrounding building. The dormitory areas are located above the surrounding buildings to ensure the residents can enjoy the hill view and parkview from their rooms.

Spatial Arrangement:

The Dormitory areas are located above the car park, canteen, shops and sports facilities to avoid being impacted by noise generated from these facilities. Common room and pantry are placed on each dormitory floors.

Connectivity:

2 passenger lifts and 1 cargo/accessibility lift are connecting the whole building. 2 stairs are placed on every floor to ensure smooth evacuation of occupants.

BIM Uses in Design, Collaboration, Engineering, Analysis and Optimisation:

BIM contains geometric, semantic, location and weather information. The information can be transferred to different programs for multidisciplinary design, sustainability analysis and design optimisation.

BIM Collaboration approach:

Everyone was on board from the beginning to discuss how to fulfill the requirements together. We coordinated our model using linked model. We facilitated team collaboration using BIM 360 and IM apps.

Quality of Design:

BIM provides 3D object-based building model design. This makes teammates from different disciplines easier to understand the design produced by each other as the building elements are visualized with information.

Sustainability: How are the considerations of sustainability aspect and passive building design being achieved?

Passive building design is achieved by adopting natural ventilation, daylighting, green roofs and thermal and acoustic insulation. Solar panels with battery energy system and electric car charging station to further improve building sustainability.

MiC/ DfMA:

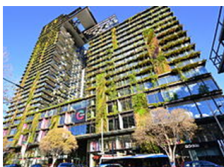
4D modelling is utilised to demonstrate the manufacture of one MiC module and the whole building construction.

Constructability:

Due to the problem of double slabs exist in each floor for MiC stacking construction, it is important to optimised the slab design. Parametric modelling and optimisation are applied to design slab for single student room module.

Summary:

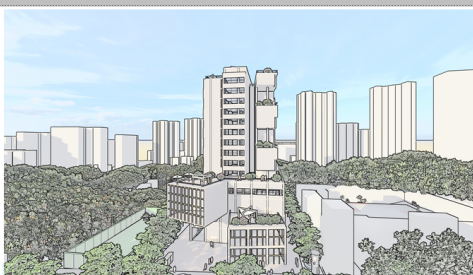
Object based BIM design promotes easy design modifications. Interoperability between software enables multiple simulations and analysis using the very same BIM model. BIM also facilitates multidisciplinary design collaboration using cloud technology.



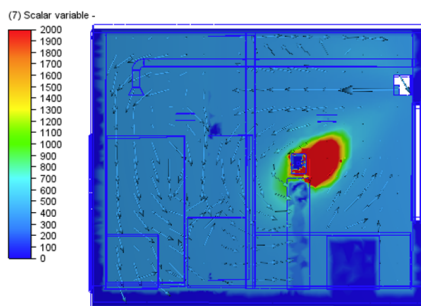
Conceptual Diagram: The concept of the design building (below) is based on the green building (above). Including plants in our design can promote sustainability to the neighbourhood.



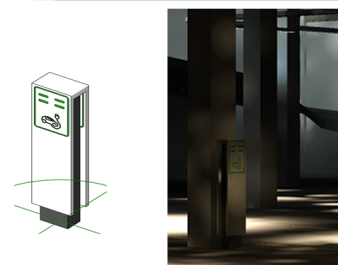
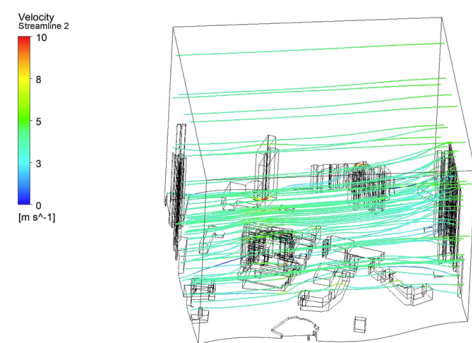
Overall Bird Eye view: Designed building and its surroundings using point cloud technology



Building Form and Space: The upper figure shows the overall building form. MiC is implemented in our student room design such that they are placed in the building as modules as shown in the lower figure.



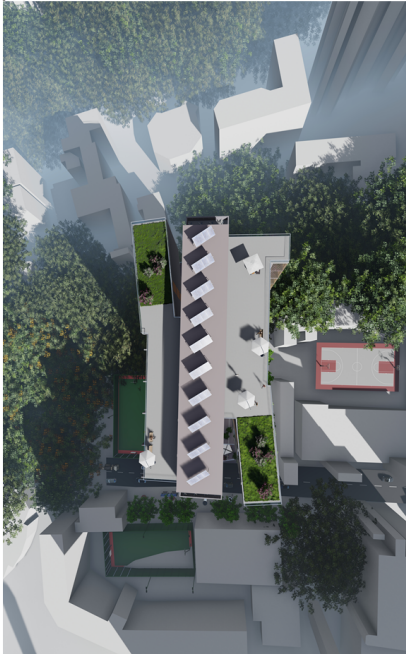
Quality: By exporting the geometry of the student room BIM model, CFD simulation helps us to visualize how carbon dioxide disperse and assess corresponding ventilation efficiency and indoor air quality based on HKIAQ objectives.



Sustainability: CFD simulation for ventilation analysis was conducted for natural ventilation and Solar study was performed for solar panel placement. Battery was installed for renewable energy storage. Charging station in carport support electric car adoption in HK.

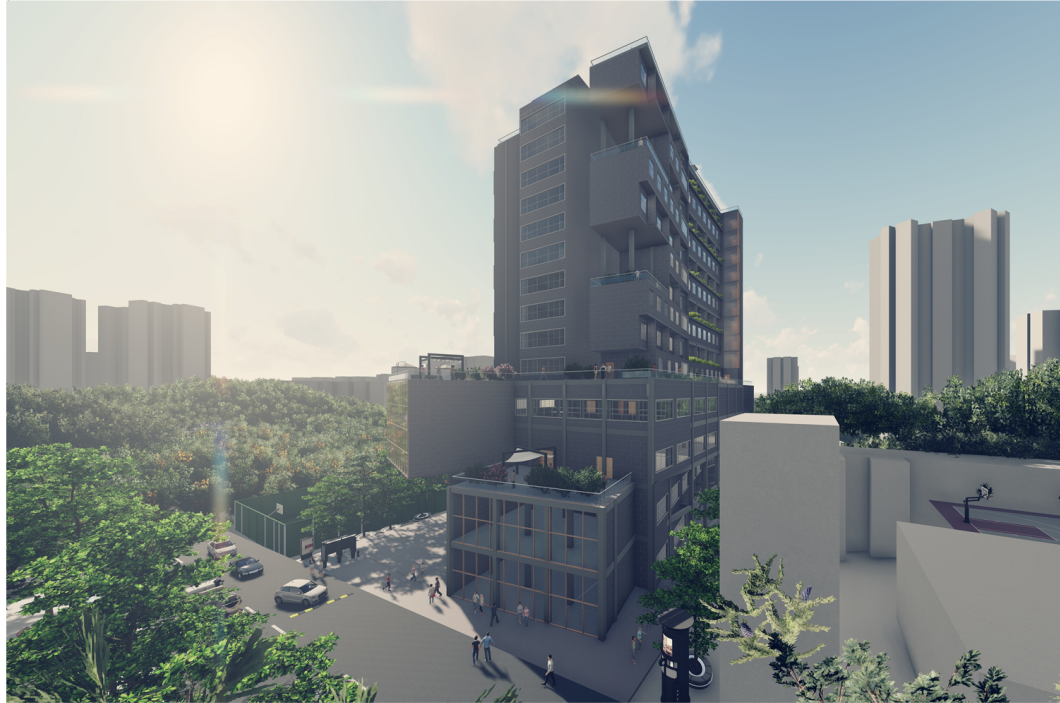
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Site Layout Plan 1:1000

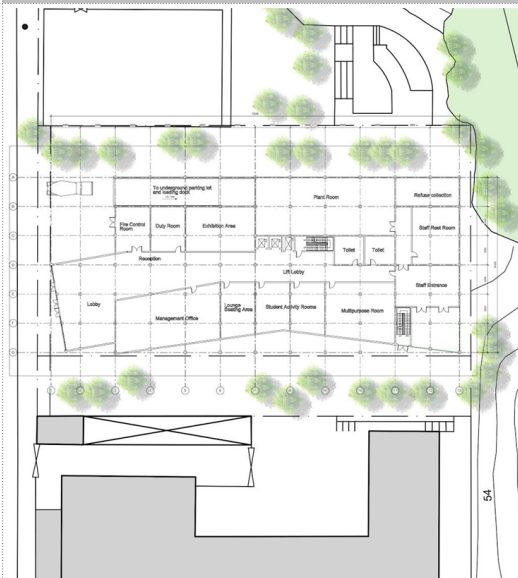


Site Layout Plan:

The building is well placed within the property boundary.



Perspective View: 3D Whole building, equipped with facade for natural ventilation, as well as green roof and vertical planting for passive cooling.



Ground Floor Plan 1:500

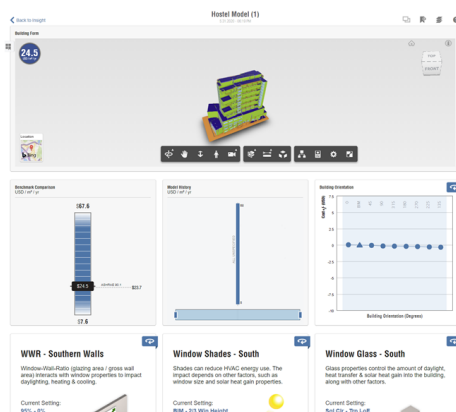
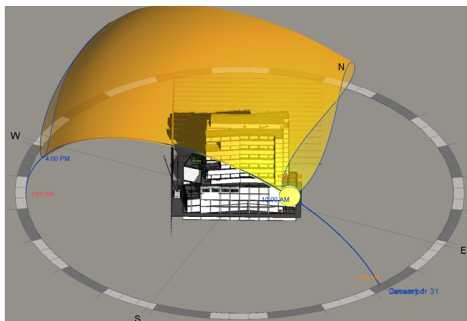


5/F Floor Plan



6/F Floor Plan

Typical Floor Plan 1:500



Computational Design: Solar study was conducted for daylighting design. Whole building energy simulation was performed for energy saving building designs.



Internal Perspective 1:500



Overall Bird Eye view (Night View)

Parametric Modeling :

Variables:

Concrete
Thickness

Rebar Size

Rebar Spacing

(Dynamo)

Optimization:

Minimising:

(Generative Design)

Thickness

Cost

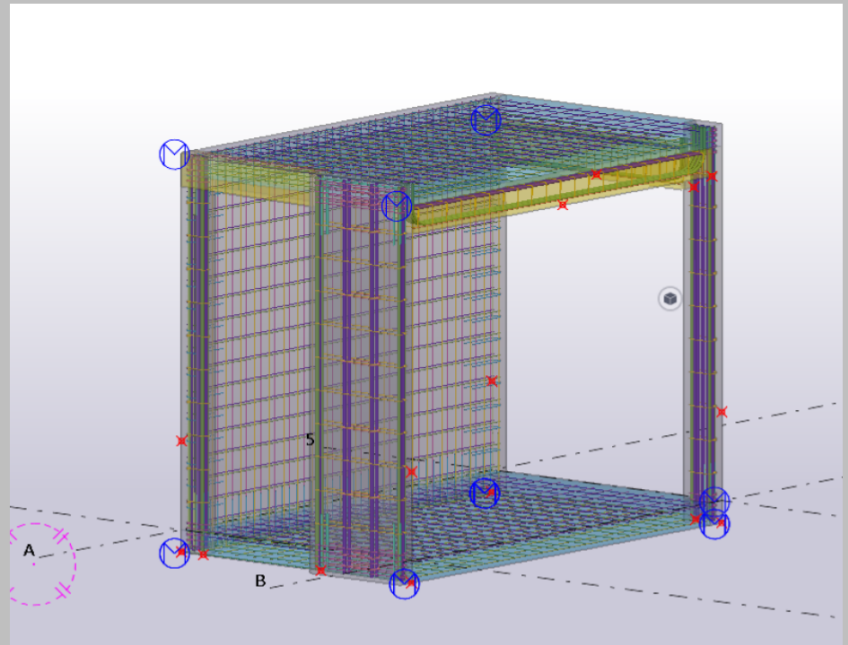
Weight

Display:

Concrete

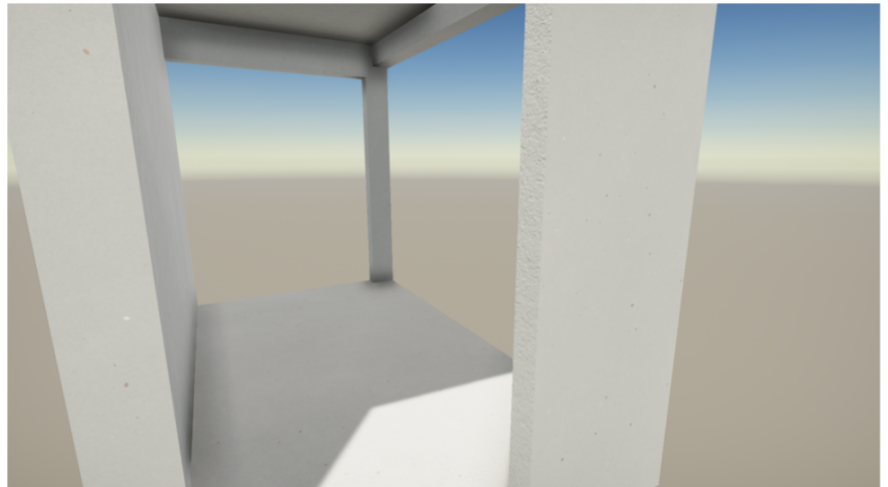
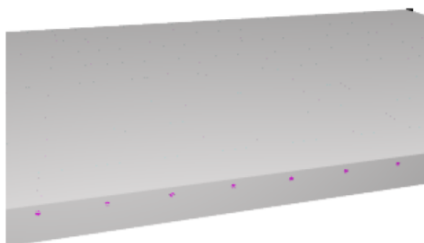
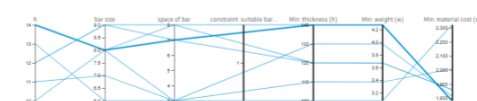
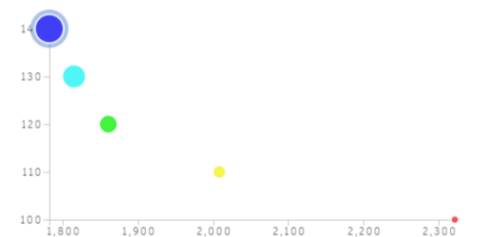
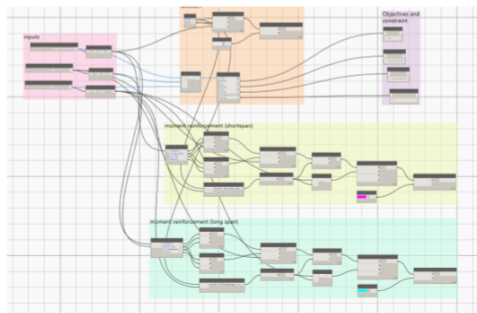
Reinforcement

(Tekla)

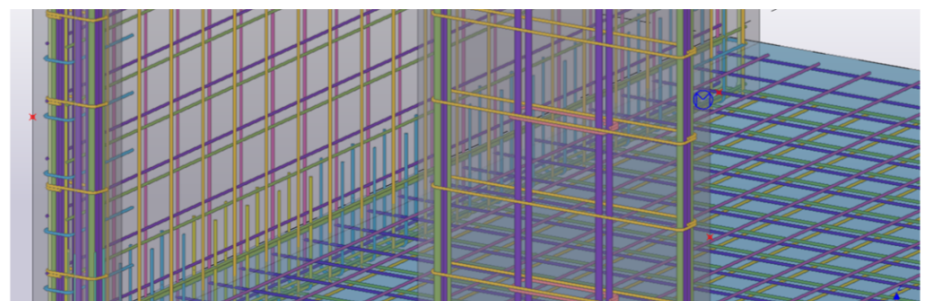


Perspective View: Structural elements of the single student room module.

MIC/DfMA: Dynamo, Generative Design and Tekla are used for the design of structural elements.



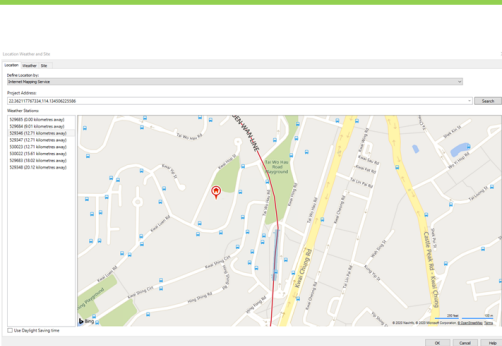
Internal Perspective 1:500



Computational Design : Parametric Modelling is applied to generate slabs by varying inputs of concrete thickness, rebar size and spacing for MIC modules. Generative design is used to obtain the optimised slab design with minimised thickness, cost and weight.

Sectional Perspective 1:500

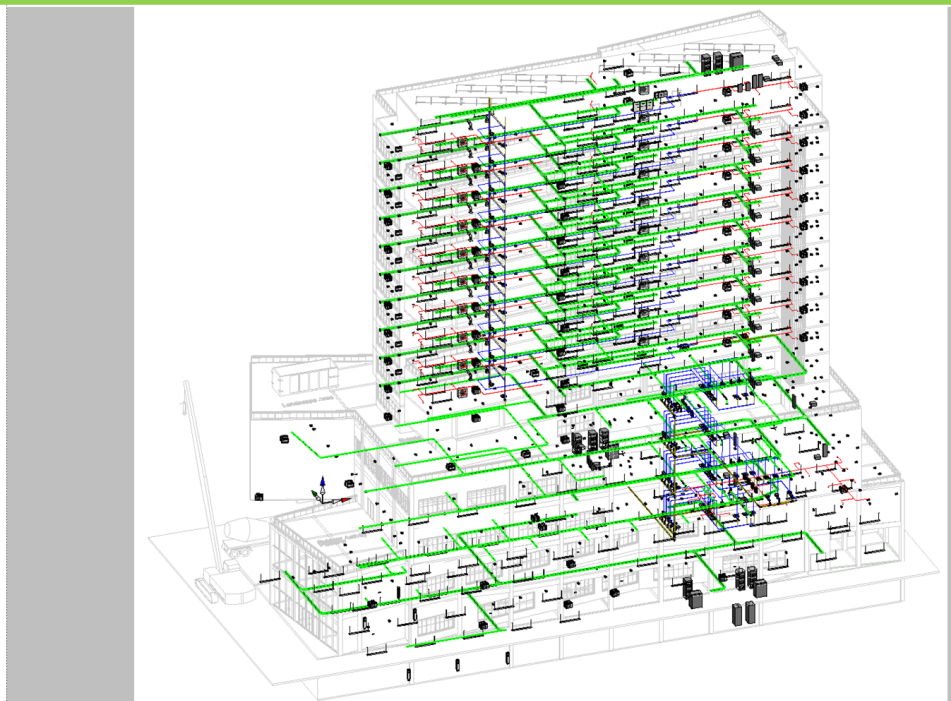
CIC BIM Competition 2020 – Deadline Fighters 2.0



Document Management

Name	Description	Version	Size	Last updated	Updated by	Markup	Owner	Status
Model								
Model Model Link		35	475 KB	May 25, 2020 10:08 AM	Chen Wei Lin			
Building Link		35	5.5 KB	May 25, 2020 10:08 AM	Chen Wei Lin			
Building Model Link		35	372 KB	May 25, 2020 10:08 AM	Chen Wei Lin			
Room and public space Link		35	63.8 KB	May 25, 2020 10:07 PM	Wen Wen Wen			
Map Model Link		35	137 KB	Apr 3, 2020 10:08 AM	Chen Wei Lin			

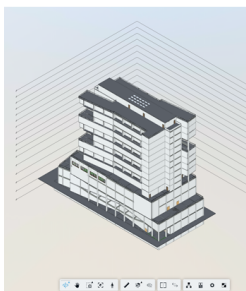
Design Coordination: BIM allows location information stored in the model as shared information for multidisciplinary design coordination. BIM 360 enable sharing of these models among the team.



Perspective View: Whole Building MEP Design

Document Management

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Map Model Link		35	137 KB	Apr 3, 2020 10:08 AM	Chen Wei Lin			



Project Team Collaboration: BIM 360 was used to share Architectural, Structural and Building Services for team collaboration.



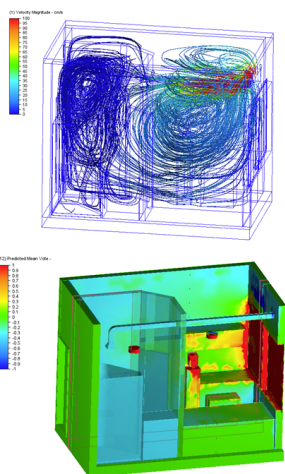
Underground car park with electric car charging station



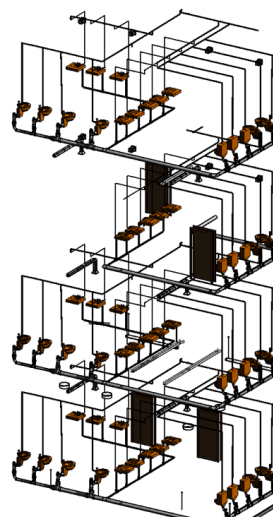
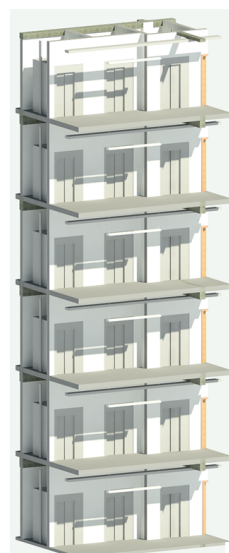
Common Room with lighting, splinter and displacement ventilation systems

Object-based design enables the charging station and air conditioners to be modelled with product and manufacturer information

Internal Perspective 1:500



Computational Design : CFD simulation conducted to optimize HVAC design of the single student room for ventilation efficiency and thermal comfort.



Elevator section view (Left) Sanitary section view (Right)
BIM allows all map components to contain geometric and semantic information such that the information can be transferred for fabrication, installation and operation via the BIM model.



Sectional Perspective 1:500