

COMPANY

Electrical and Mechanical Services
Department, HKSAR

PROJECT

Chiller Plant Replacement at Tai Lung Veterinary
Laboratory

LOCATION

Tai Lung Veterinary Laboratory, Lin Tong Mei,
Sheung Shui

TYPE

Repair, Maintenance, Alteration and Addition
(RMAA)

SCHEDULED TIME OF COMPLETION

09/2021-09/2022

The First MiMEP Pilot Project in EMSTF - Chiller Plant Replacement at Tai Lung Veterinary Laboratory



About Electrical and Mechanical Services Department, HKSAR

EMSD has two functional arms - Regulatory Services and Trading Services - to provide E&M services for enhancing the safety and quality of life of Hong Kong.

Our Regulatory Services arm operates a number of divisions each specialising in different areas of mechanical safety, gas safety, electrical safety, railway safety, energy efficiency and utilities monitoring.

The Electrical and Mechanical Services Trading Fund (EMSTF) provides a wide range of E&M engineering services pertaining to airport services, schools, environmental hygiene, government buildings and facilities, hospitals and clinics, leisure and cultural venues, ports and harbour, postal services, project management and consultancy. The EMSTF operates under international certification systems to provide quality services to her customers while sustaining green operation and maintaining occupational health and safe working environment.

BIM PARTNERS

REC Engineering Company Limited
Global Virtual Design and Construction Limited

AUTODESK PRODUCTS USED

Autodesk® 3ds Max®
Autodesk Forge®
Autodesk® Navisworks®
Autodesk® ReCap®
Autodesk® Revit®

Project Description

The chiller replacement project essentially leverages the benefits brought by BIM in wider aspects such as 3D laser scanning, Augmented Reality (AR), MultiTrade Integrated MEP (MiMEP), asset management and project management with the adoption of various digitalization features. Incorporating the advanced technologies not only provides clients with more efficient services, a shorter construction period, better quality control, enhanced work safety and site management, and minimise the impact on clients' daily operation, but also reduces materials consumption and boosts productivity.

Project Challenges

In order to maintain an uninterrupted air-conditioning service for the laboratory's daily operation during replacement works, the installation works were arranged in two phases. The new chilled water headers with branch pipes prefabricated modules were designed to install on the top of the existing headers within a narrow space.

Moreover, the lifting space of the premises and width of the public road (a single lane of less than 3 meters) for equipment delivery is very limited.

Solutions for Challenges

In view of the congested area with new and existing services, clash detection analysis in BIM Model was essentially performed to facilitate the design of new chilled water pipework routing to avoid any hard or soft clashes with existing pipework, and supporting framework.

The 4D BIM simulation is of paramount importance to effectively simulate and ascertain holistic logistic arrangement and swap path analysis of each MiMEP module all the way through to the site, particularly at the main entrance where the existing nearby planters were of significant spatial concern.

How does BIM benefit the project?

With the aid of the BIM Model, the project team carefully planned and designed the modules for manufacturing and assembly on site.

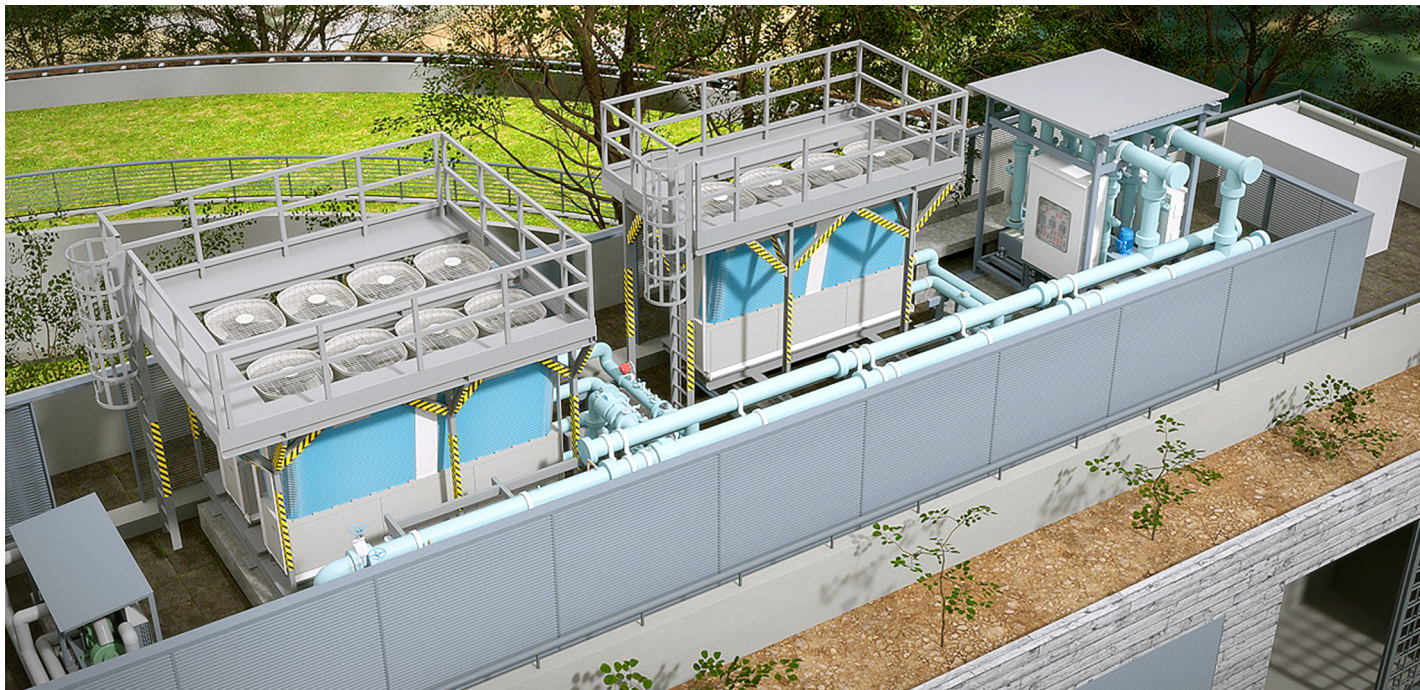
The use of AR to overlay BIM model against the existing environment was adopted to perform design verification. In the future maintenance point of view, any potential clash or hindrance to operation would cause further rectification work.

Upon completion of the project, a completed BIM model with Asset Data was successfully obtained to form an Asset Information Model (AIM) for building operation. The integration of AIM and IoT technology could achieve smart facility management.

Better with BIM

BIM has been implemented across the project life cycle from the design and construction, to asset management. The application of BIM facilitates the adoption MiMEP technology in module design, logistic arrangement.

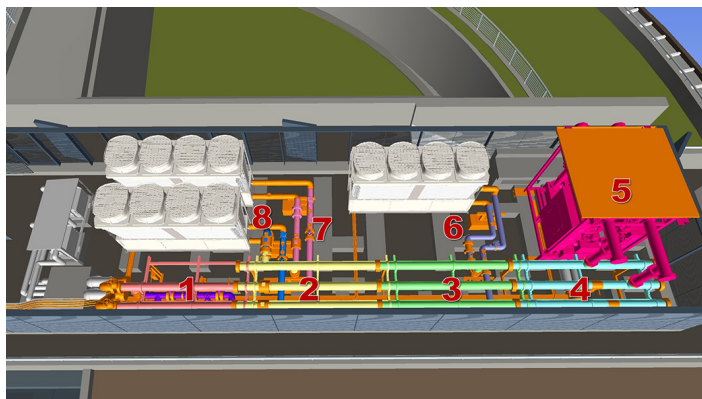
The BIM model serves as a presentation tool for the team to visualise the project apart from site via the "Big Room" Concept. Project team members can discuss and review the site issues with the use of BIM model on spatial coordination, programming and progress reporting, logistic consideration, phasing planning, modularization planning, safety consideration, maintenance feasibility, facility upkeep etc. to ensure the project development is in the right track.



Chiller Plant at Tai Lung Veterinary Laboratory
Image Courtesy of Electrical and Mechanical Services Department, HKSAR



4D Modelling
Image Courtesy of Electrical and Mechanical Services Department, HKSAR



MiMEP Modules Design
Image Courtesy of Electrical and Mechanical Services Department, HKSAR



Augmented Reality (AR) - Design Verification
Image Courtesy of Electrical and Mechanical Services Department, HKSAR



Project Completion
Image Courtesy of Electrical and Mechanical Services Department, HKSAR



MiMEP Pump Module
Image Courtesy of Electrical and Mechanical Services Department, HKSAR