



Advanced Manufacturing Centre

**Partnering for a Safety Culture (Sharing)
- Gammon Safety Culture Journey**

14 July 2021



Agenda

Safety Culture in Gammon



Safety Culture in Gammon

Leadership

- Directors safety workshop – It will take place each month to review performance with bold commitments, challenges, share lessons and exchange good practice;
- Director site walk – Top management and safety managers will be invited to attend the director site walk
- Director incident review – Director will lead the on-site management review of all reportable accidents
- Manager Leadership enhancement programme – Improvement actions will be put in place and monitored monthly for Project-in-charge for those who require support to be a mindful leader of safety;
- Annual safety conference – The annual safety conference will be held in April to promote internally and externally Gammon safety programme.

Safety Culture in Gammon

Planning

- Project Zero Harm Plan will be reviewed within 6 months by Divisional Directors
- Director will interview first tier subcontractor's person-in-charge, Construction Manager will interview second tier subcontractor's person-in-charge, and Project-in-charge will interview subcontractor's supervisor, anytime in need.
- All projects shall produce a traffic and vehicles logistics plan to assess People-Plant-Interface to eliminate all possible risks, such as reversing vehicles and separate pedestrians from moving plants or vehicles. Review will be addressed during the Zero Harm Plan Review at least every 6 months;

Safety Culture in Gammon

Operate

- Real Risk Meeting will be held every 2 weeks to look ahead and identify issues related to programme, method, resources and changes to work plans that will impact safety;
- Dynamic Risk Assessment will be used to identify “what might go wrong” on a daily basis and increase mindfulness at frontline staff level;
- Field Control Briefing will be delivered by site supervisor and engineer to all workers every 2 weeks on how to undertake the task safely at the actual work location followed by designated method statement;

Safety Culture in Gammon

System Assurance

- Assurance implementation and monitoring – Systems Assurance will be held every 6 months. Red items will be noted and action followed by Executive Director.
- Systems Assurance will be held every 6 months.



Safety Culture in Gammon

Innovation & Traditional Change

- Design by Safety (e.g.:)
 - **Precast Double Tee** (eliminate falsework and formwork erection and dismantling work on the platform)
 - **E&M Module Type** (reduce E&M containment, piping work, air duct installation work at height and welding work)
 - **MiMEP** (reduce the frequency of work at height during plant & equipment installation)



Construction 2.0



INDUSTRY 4.0



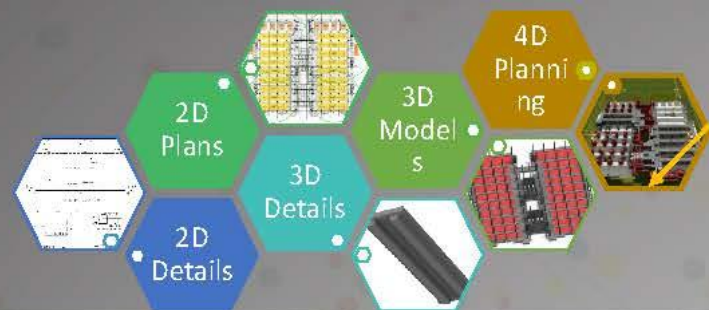
Pillar 1: Innovation

Pillar 2: Professionalisation

Pillar 3: Revitalisation



Precast Double Tee



26.6%
% DfMA Adopted

40,000 m³
Qty of DfMA Adopted

150,000 m³
Total Qty

2052 Nos.

4 Types

Typical

**8400(L) x 1980(W)
x 400 (H)**

8.0 ton



Conforming Scheme Flat Slab



Alternative Scheme Double Tee



Precast Double Tee

DESIGN by
SAFETY



Streamline Logistic Planning

- Validating truck swept paths to all unloading zones



GAMBOT A.I. Algorithms Sequencing

- A.I. optimizes the construction sequence of installing precast double tee with the use of tower crane



Provisions for temp. works and safety

- Using BIM 4D to analysis temp. works and floor cycle sequencing.



Silver Award for
AMC Double Tee
Rigger Team

 **Gammon**

Precast Double Tee

DESIGN by
SAFETY



Saving in Wastage

Concrete 309m³



Rebar 61,484 kg

Formwork 216m³



Water 155m³



Energy & Carbon Saving

Reduced
8,500 kWh Electricity

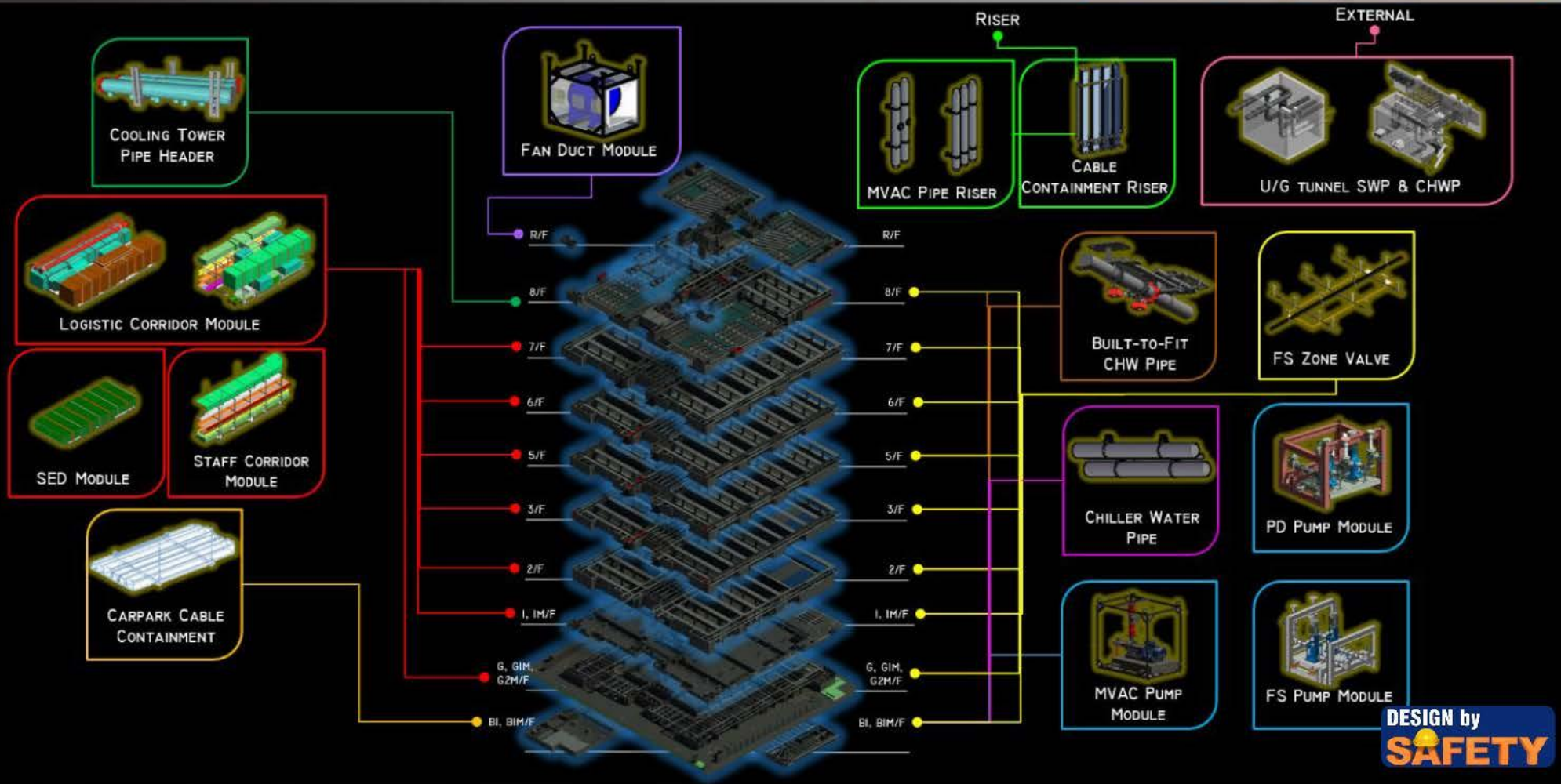


Reduced
5,300 kg CO² Emission

E&M Module Type

DfMA Adopted Percentage: **75%**

Module Quantity: **5226**



E&M Module Type

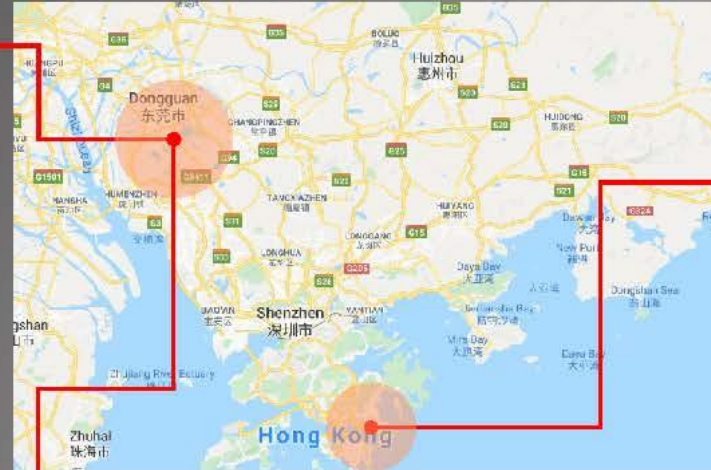


Hoi Ko Factory

Location: Dongguan (PRC)

Total Modules Production: 3623 nos.

- Staff Corridor Module
- Logistics Corridor Module
- Production Area Module



Flying Factory

Location: Tseung Kwan O Site C9 (Hong Kong)

Total Modules Production: 539 nos.

- MiMEP (SES Fan Room)
- MVAC Pump Module
- FS Pump Module
- PD Pump Module
- PD Pipe Module
- FS Sprinkler Pipe & Subsidiary Valves Sets
- FS Sprinkler Pipe & Alarm Control Valves Sets
- FS Sprinkler Pipe



Shun Cheong Factory (Supplier)

Location: Dongguan (PRC)

Total Modules Production: 419 nos.

- Carpark Cable Containment Module
- Cable Containment Riser Module



Patwin Factory

Location: Dongguan (PRC)

Total Modules Production: 645 nos.

- MVAC Pipe Header Module
- MVAC Pipe Riser Module
- Beam Steel Support



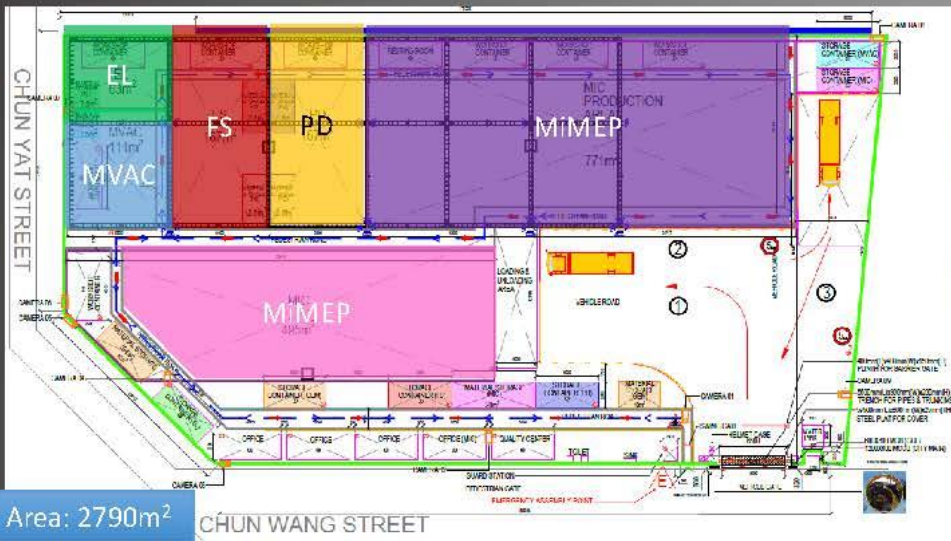
Flying Factory

DESIGN by
SAFETY



Location: Tseung Kwan O Site C9 (Hong Kong)
Total Modules Production: 539 nos.

Module
Construction



MIMEP (SES
Fan Room)



Gammon

Module Lifting by Machinery

Simulation of Module Delivery and Lifting



Tailor Made Lifting Platform
Capacity: 454kg



Synchronized Tailor Made Lifting Platform
Capacity: 908kg



Pipe Header Module Delivery and Installation



Benefit

Reduce high level work exposure time

Reduce Manual Labour Force

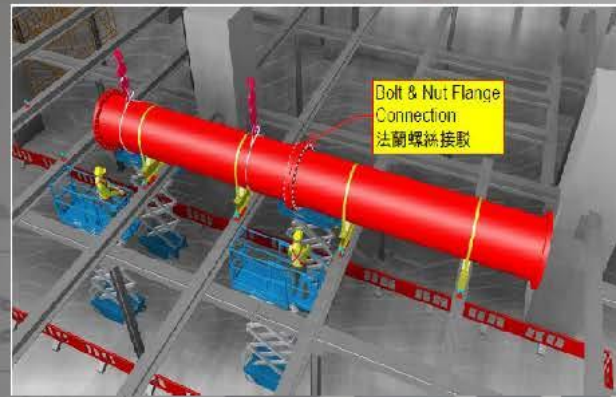


Patent Applied

- Protection of self-innovated high level installation method
- Exclusive development of Synchronized Lifting Platforms



Module – Sea Water Cooling System



5800 m of Pipework

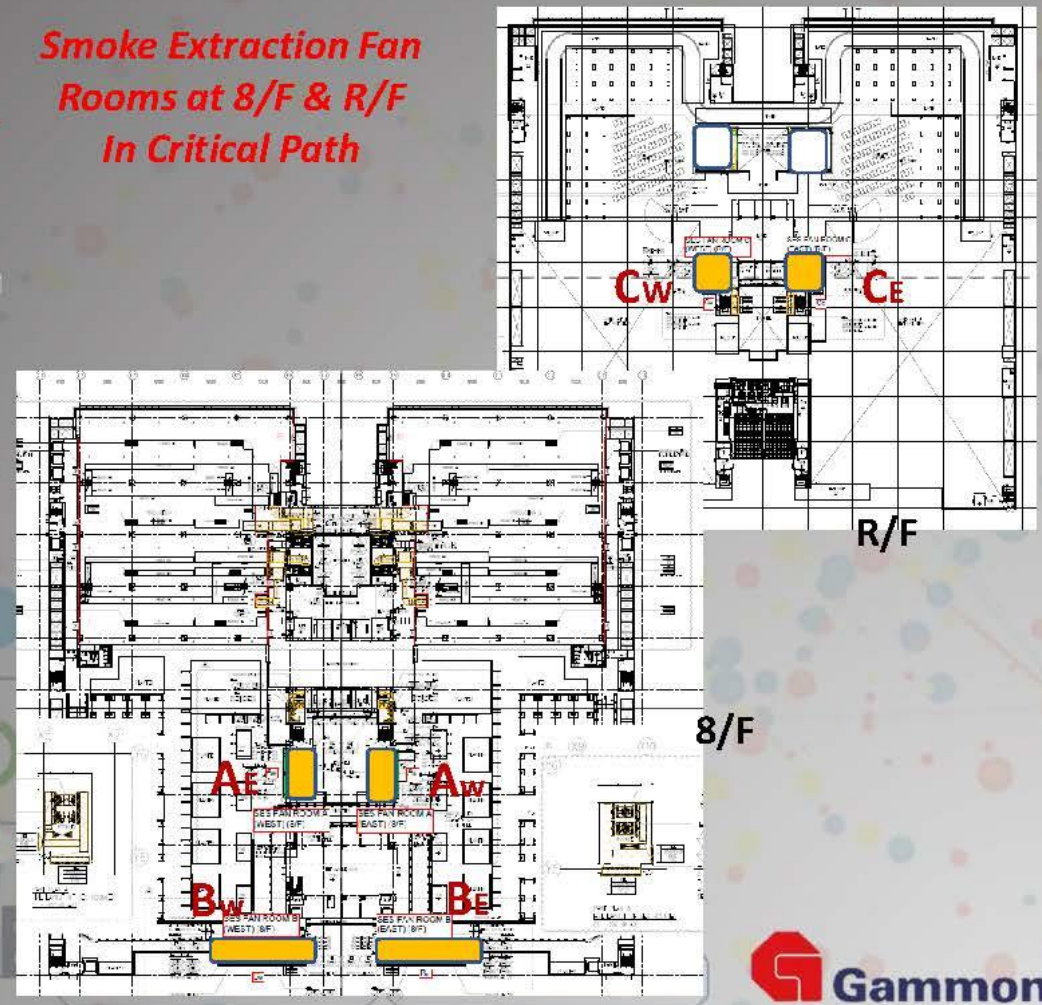
3000 Nos of Welding Joints

- Use DfMA approach and BIM to design connection detail for water pipe
- Mechanical Joints – Bolt and nut connection for seawater pipe to reduce welding
- Reduce toxic gas emission from welding

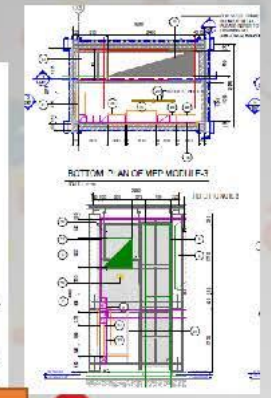
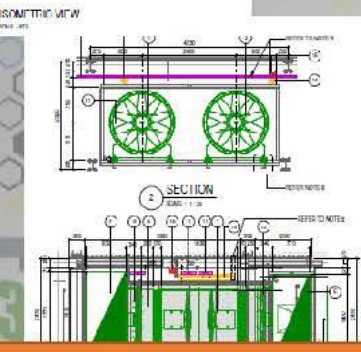
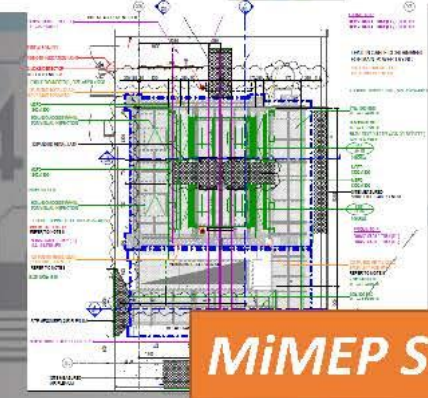
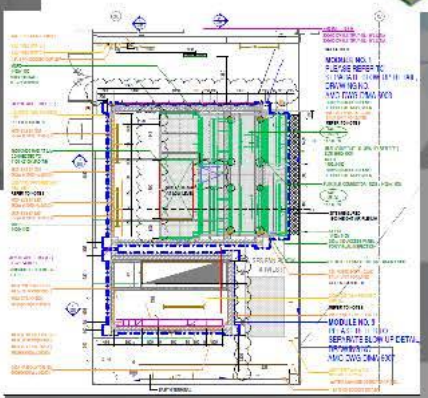
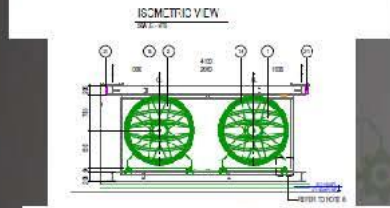
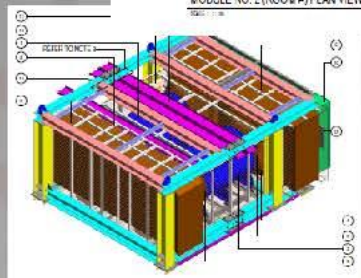
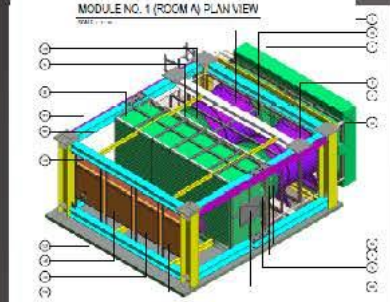
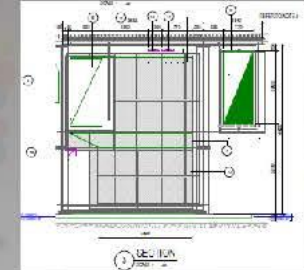
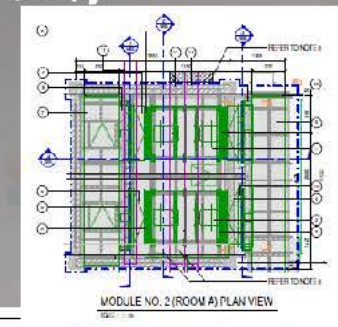
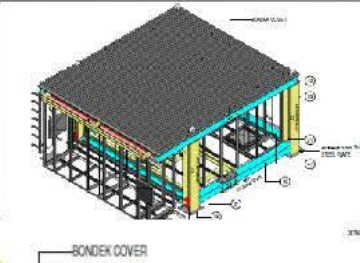
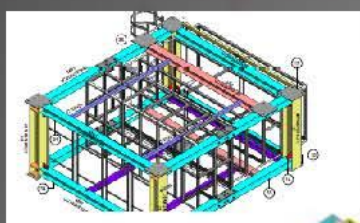
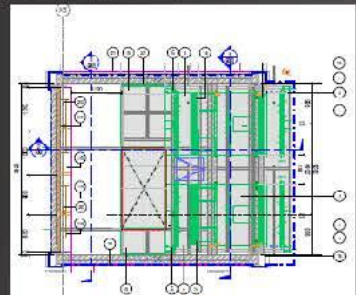
Adapting the DfMA approach for MiMEP (機電裝備合成法)



Smoke Extraction Fan Rooms at 8/F & R/F In Critical Path



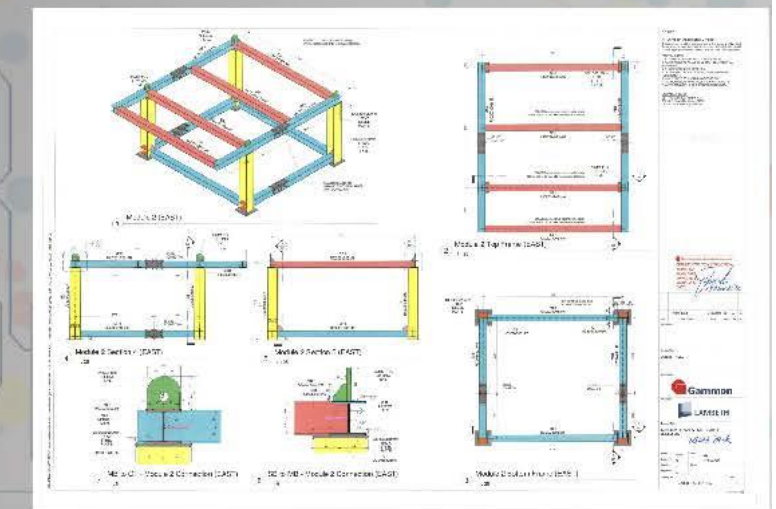
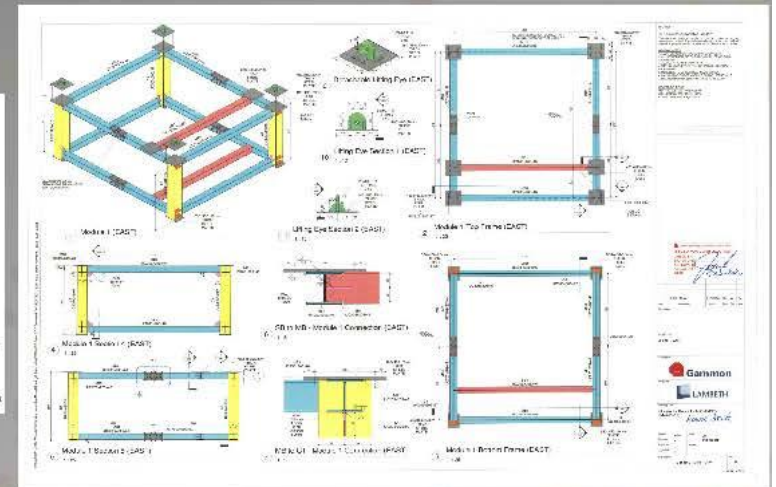
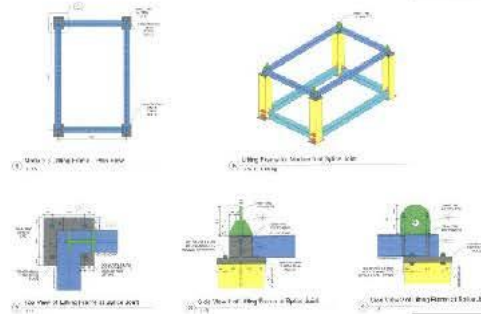
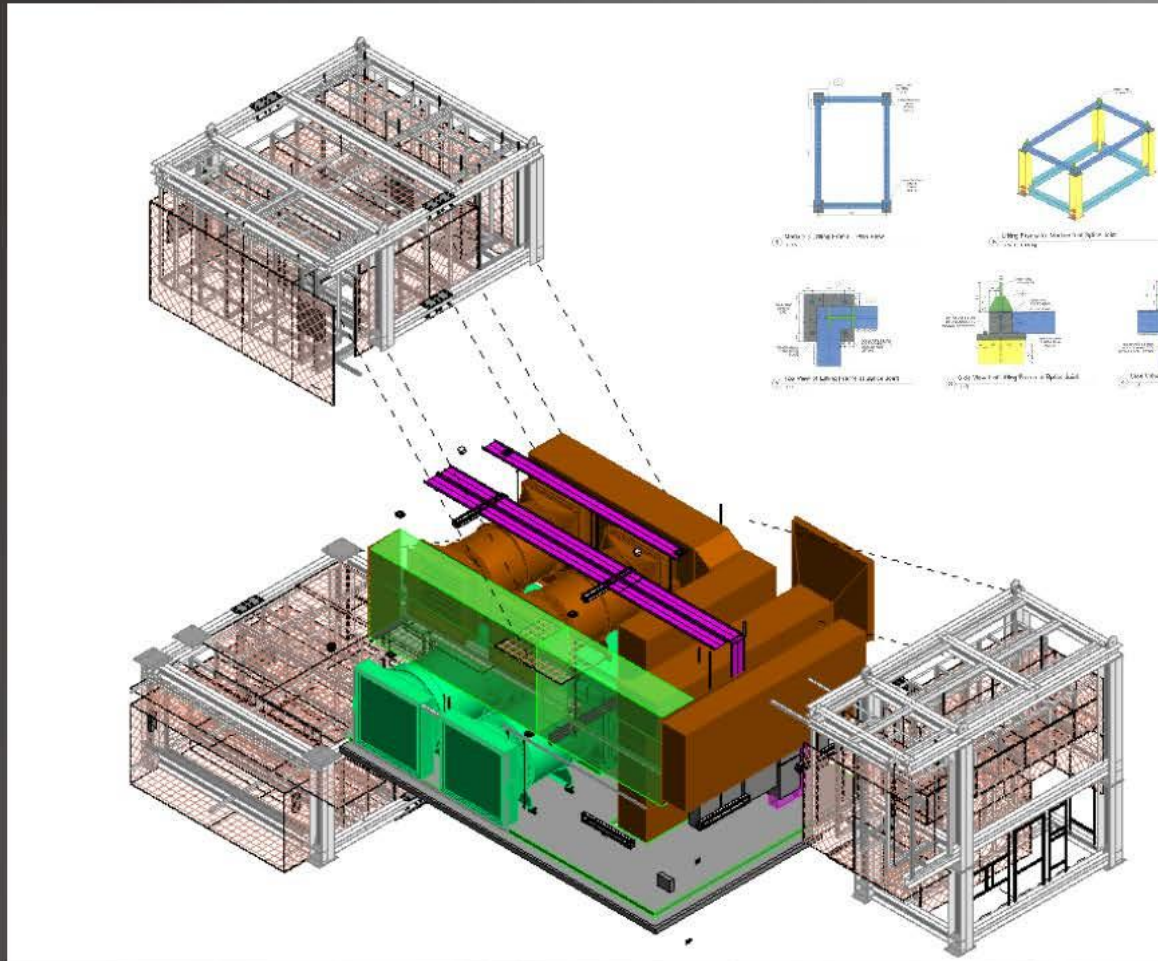
MiMEP Design (機電裝備合成法)



MiMEP SEF Fan Room A



MiMEP Design (機電裝備合成法)



MiMEP Assemble in Flying Factory



Coordinated BIM Model



Prefabricated & Assembled MiMEP in Flying Factory



MiMEP Assemble in Flying Factory

Hoisting

Site Installation (Direct Plug-In Assemble connection)



Torque Test to Bolt & Nut Fastening



Plug in the final MiMEP Module



Builder's Provision Ready



Final SEF Fan MiMEP Module Lifting Down

Adapting DfMA – MiMEP 機電裝備合成法



Downlift Installation (Direct Plug-In Assemble connection)

**6.5 hours in a Day
achieved (Room A)
> 90% Completion on site**



Adapting DfMA – MiMEP

**6.5 hours in a Day
achieved (Room A)
> 90% Completion on site**

Downlift Installation (Direct Plug-In Assemble connection)

Wastage Reducing & Carbon Saving

**Total Wastage Reduced
71 Ton**



**Reduced
36 Ton CO² Emission**

