

CIC Webinar

Work Safety of Temporary Works and
Tower Cranes

Temporary Works Management

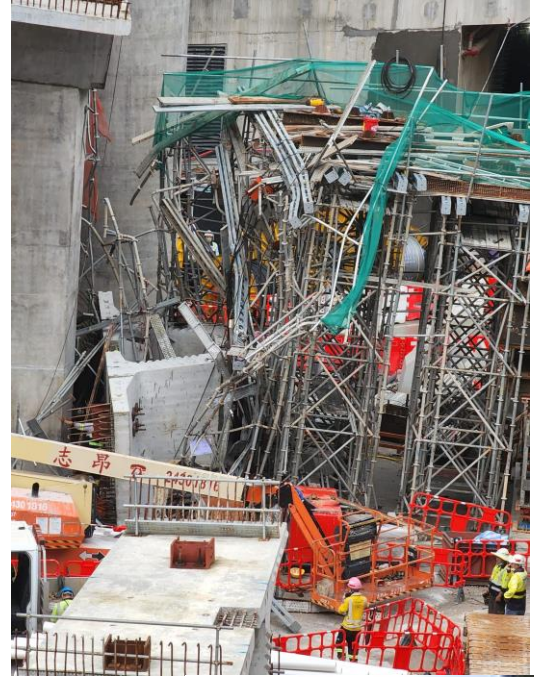
Chris Cheng

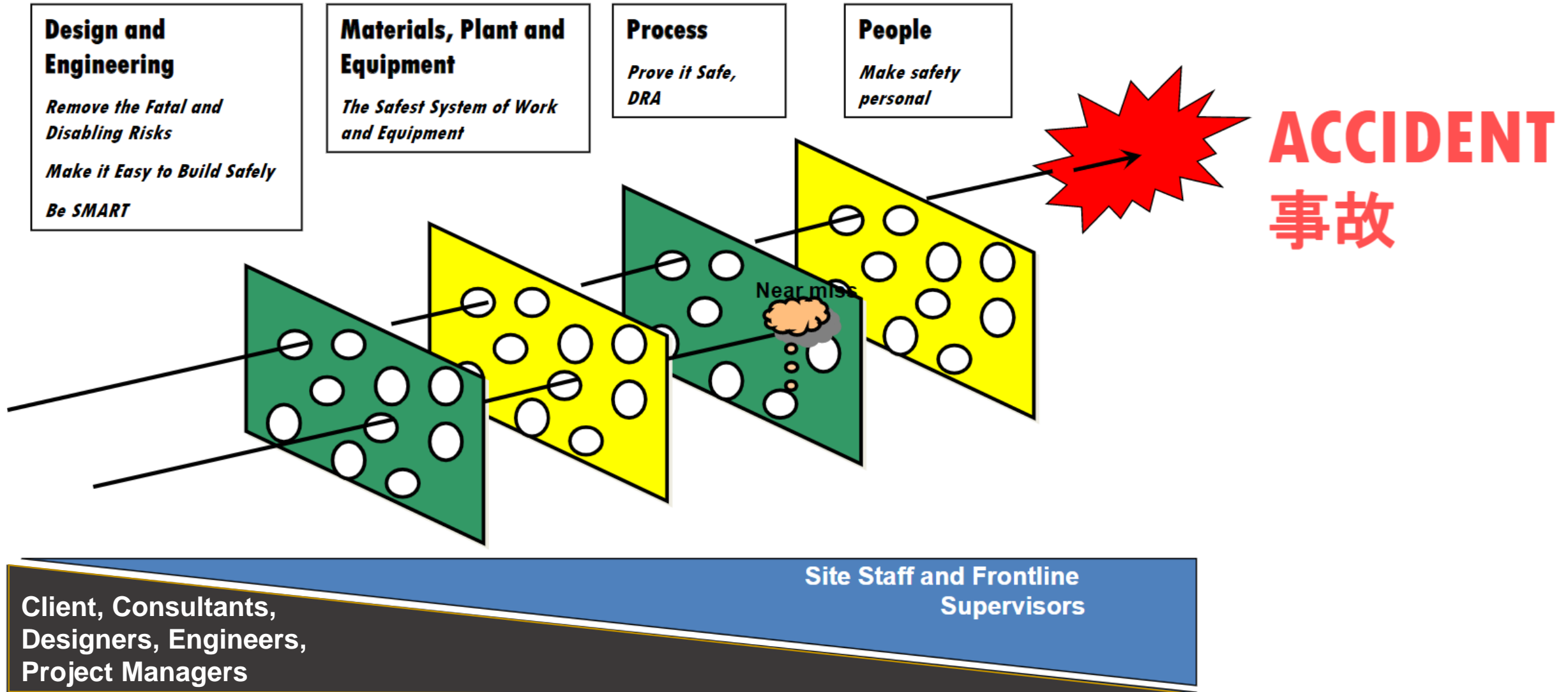
Chairman, HK Temporary Works Forum
General Manager, Lambeth - Gammon

16 September 2022

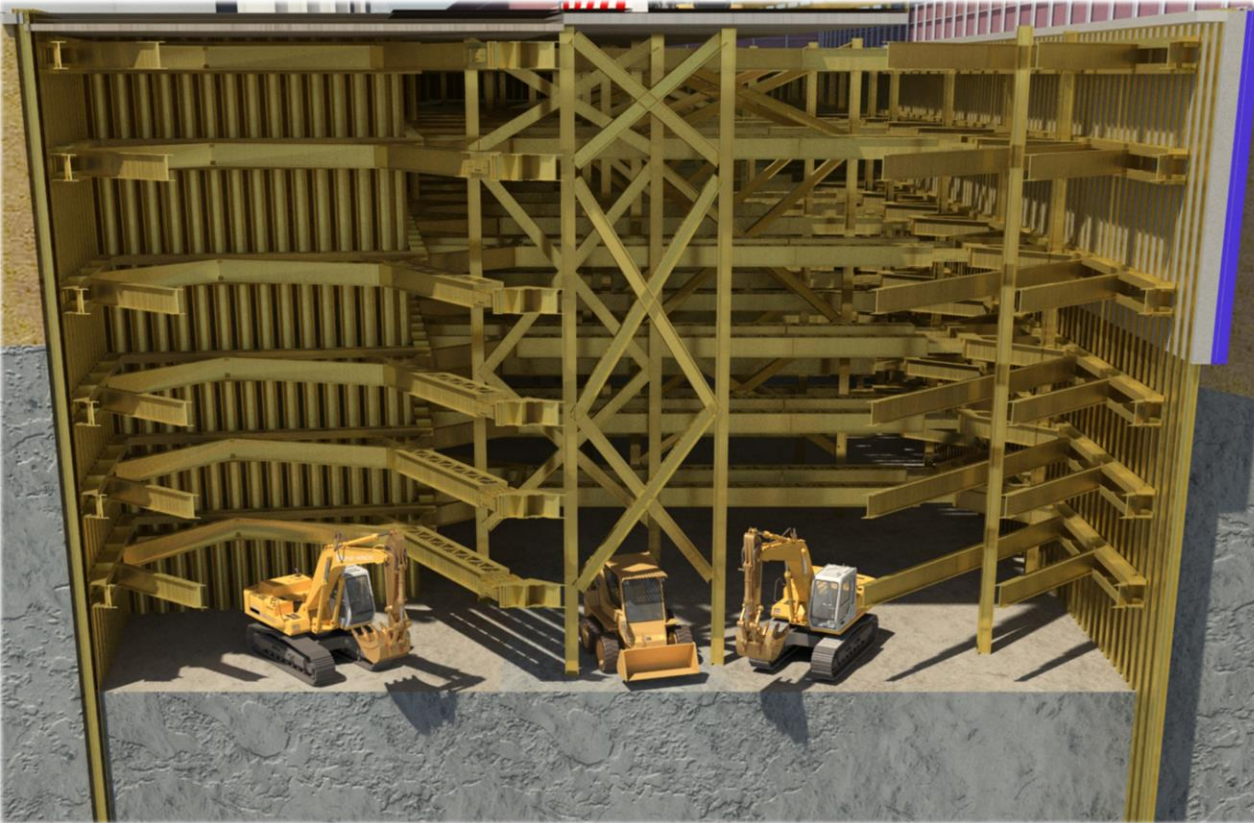


TW Failure

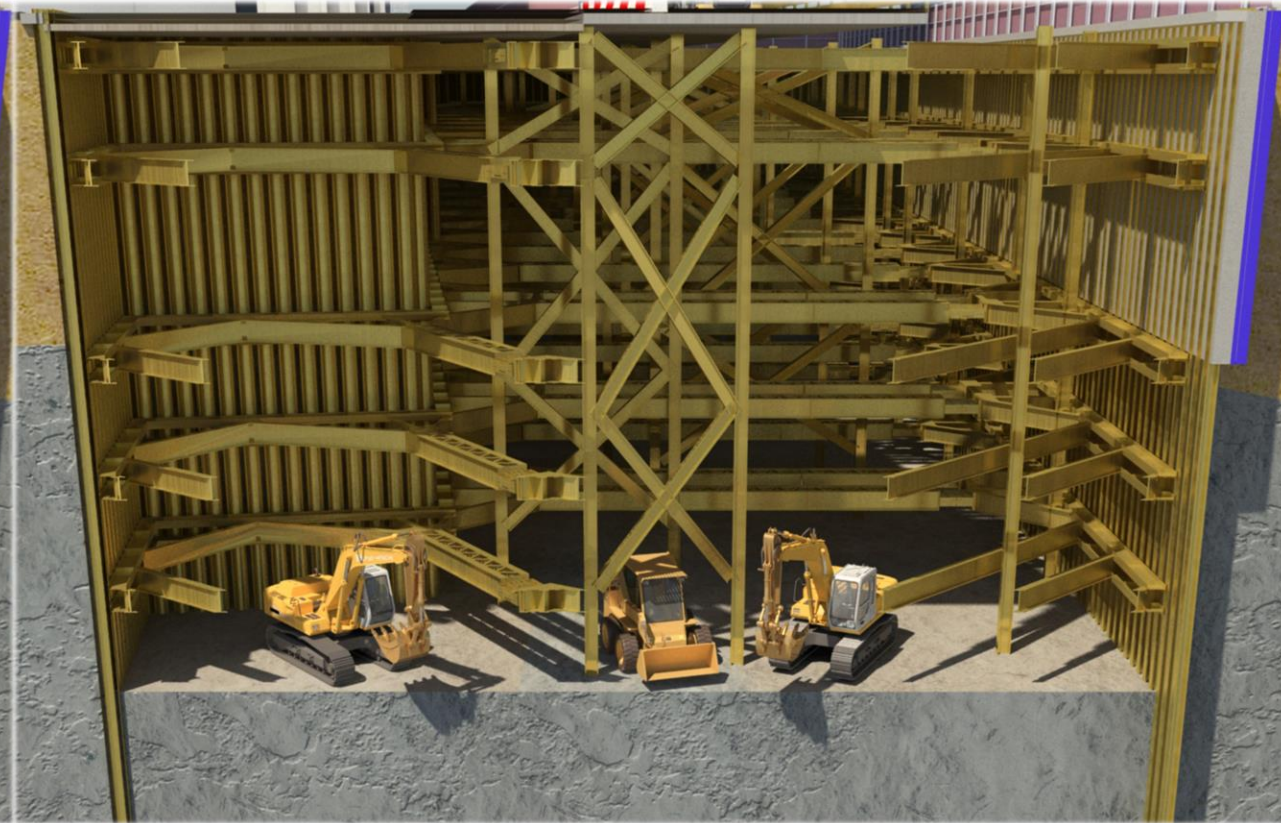




Which is Safer?



6 Support Layers

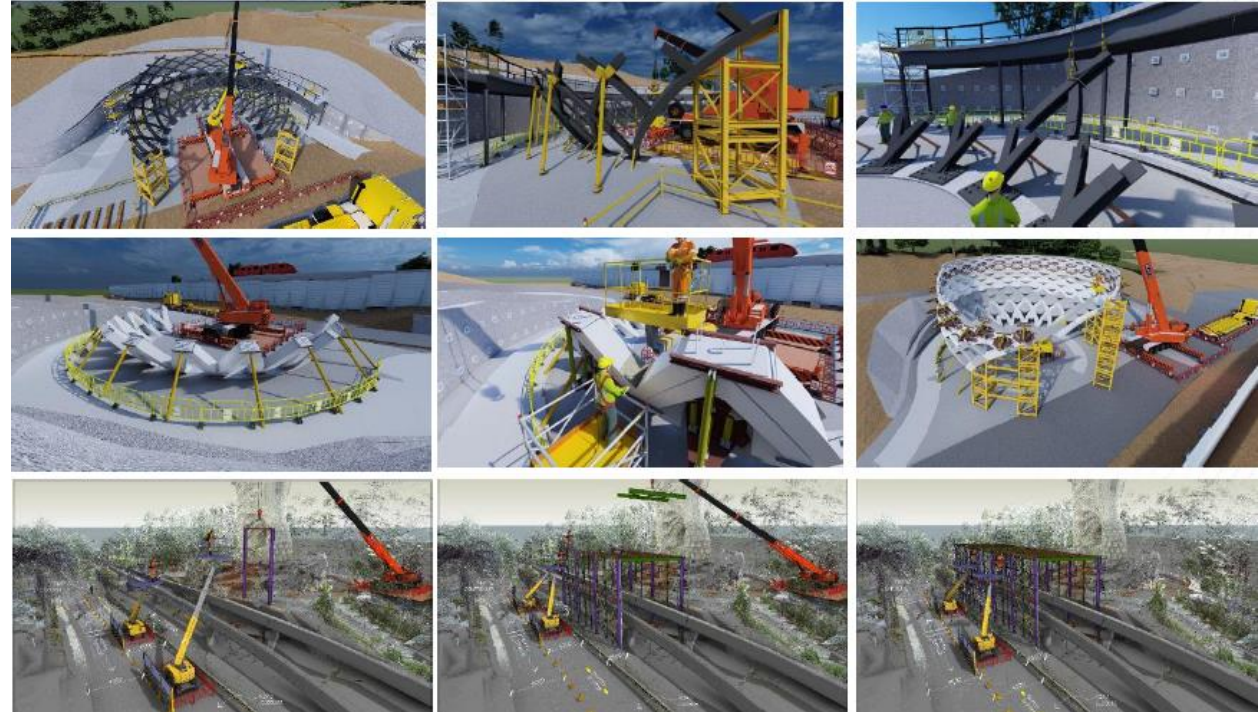
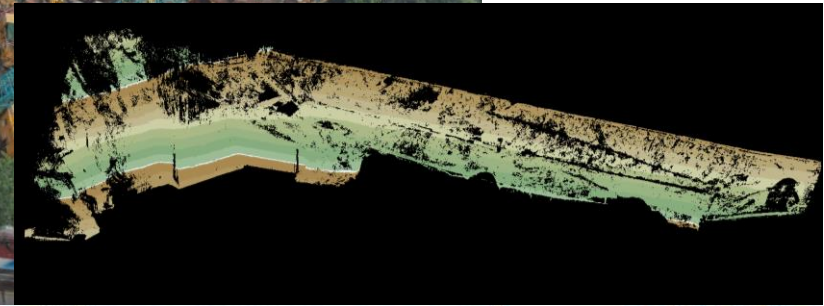
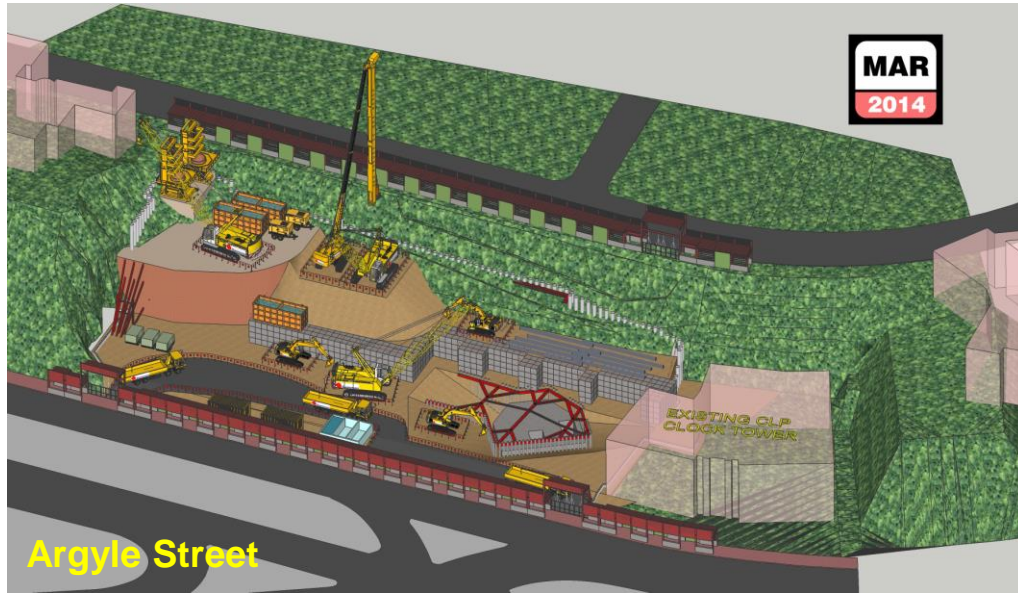


5 Support Layers

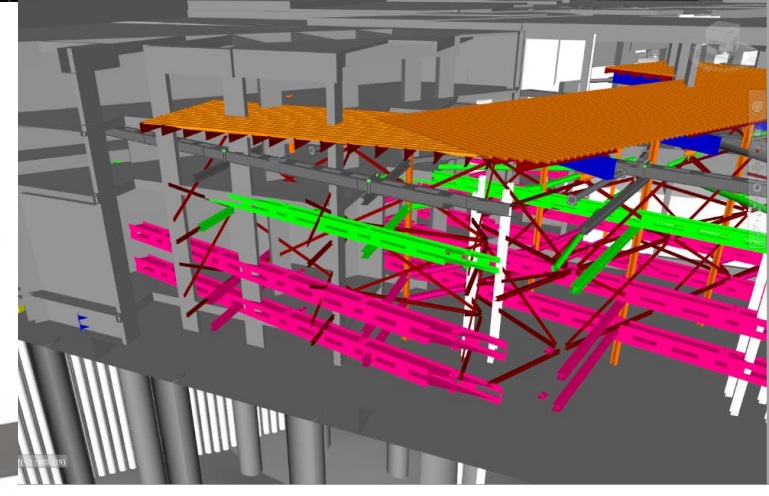
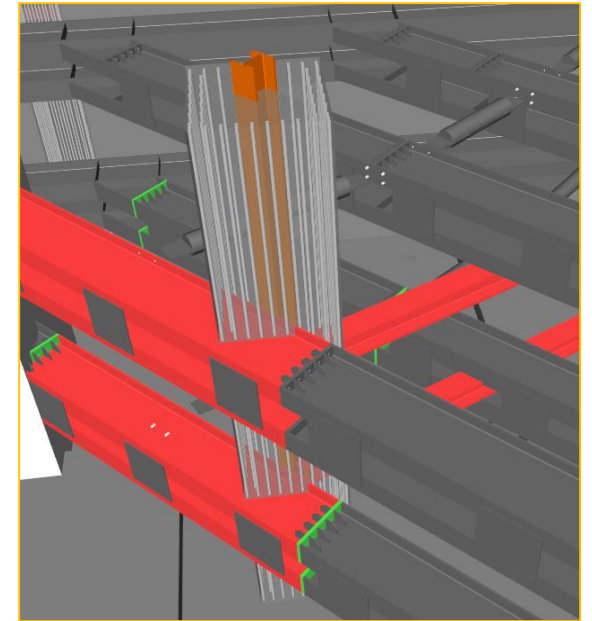
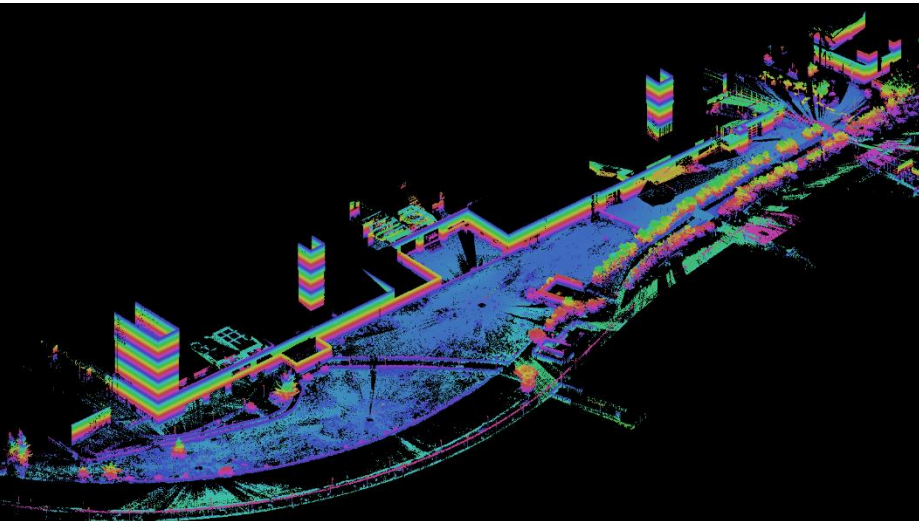


Buildability – Digital Visualization [Plan Ahead]

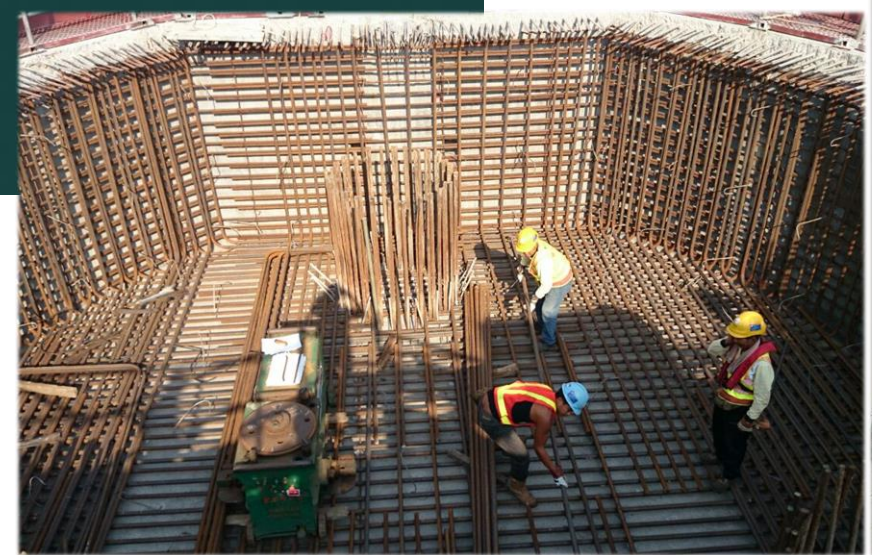
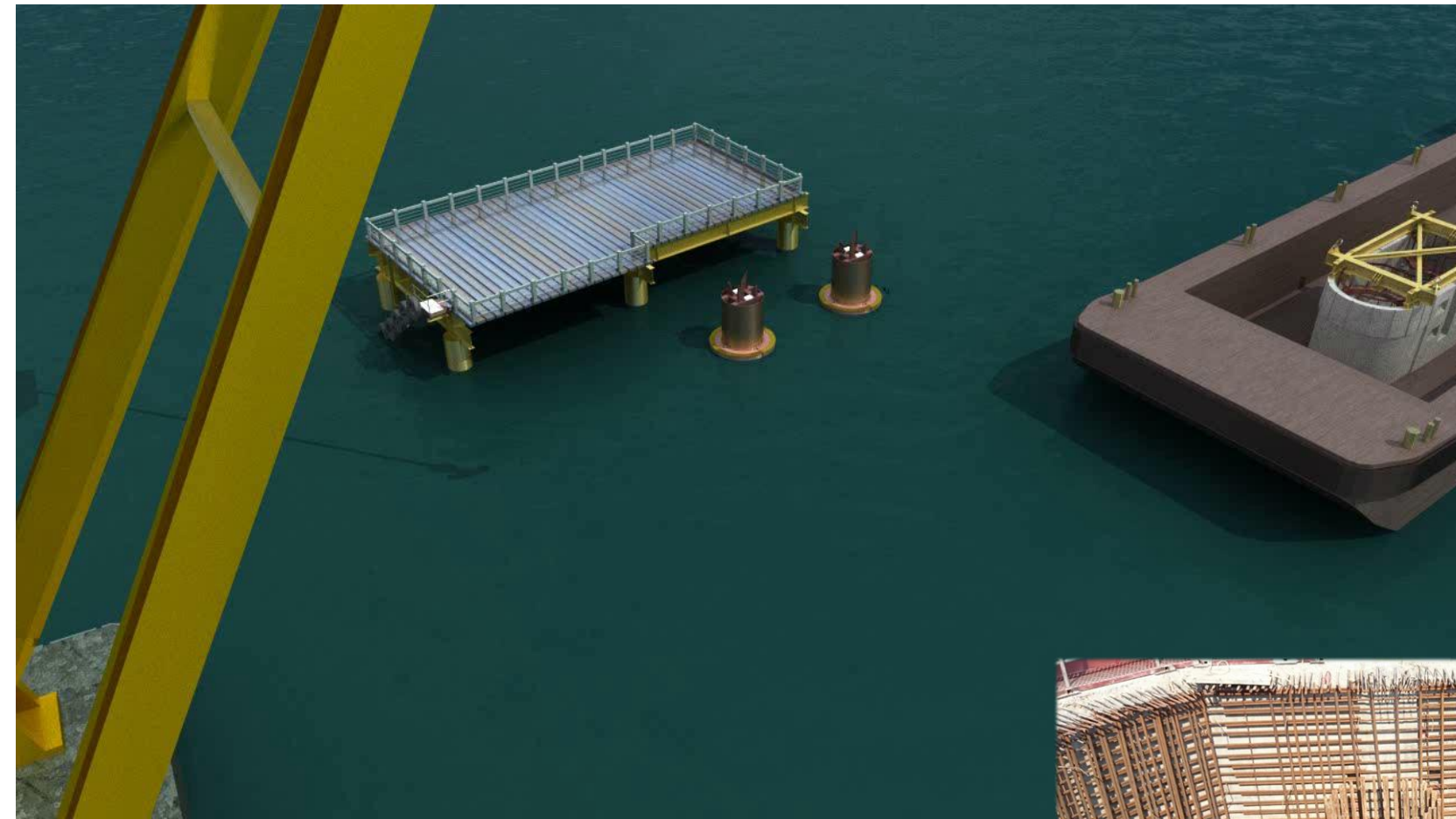
Plan on logistic & phased construction



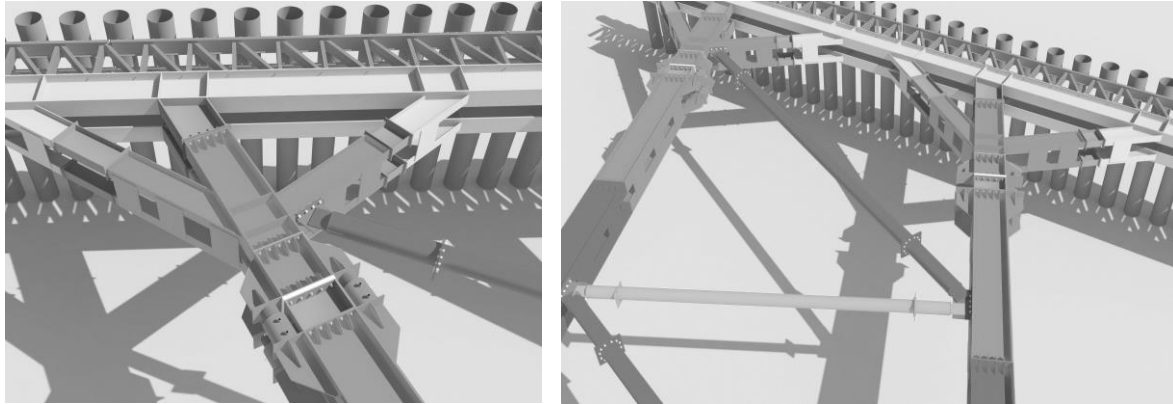
Buildability – Digital Visualization



Buildability – Making it Easier to Build

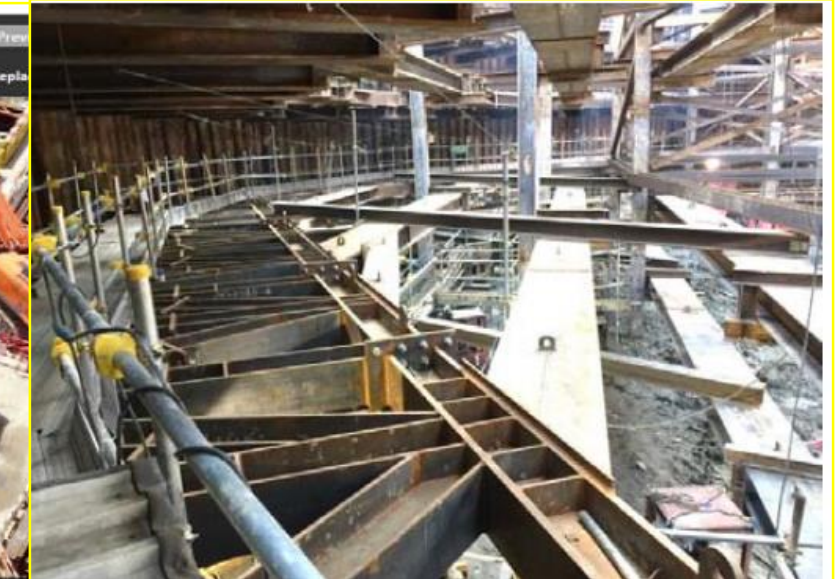
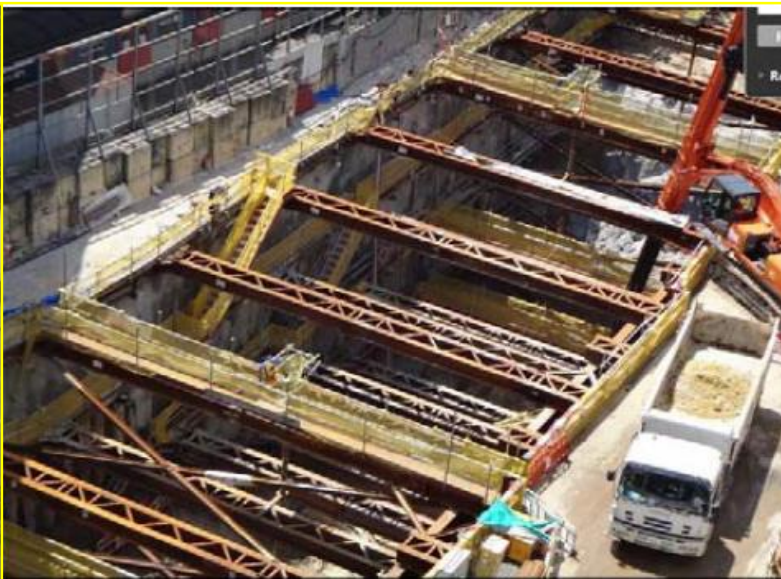


Standardisation – Making it Easier to Build



Standardisation – Making it Easier to Build

Factory fabrication with provision of bolting, preloading, lifting and edge protection for safety



Buildability – Making it Easier to Build



3 Segments for Linkbridge Installation



GCL - ASR - 1st Forward Launch
Tom Chandler



對兩地工程人員溝通的影響
between the Hong Kong team and Pristine, Gammon's workshop in China

Buildability – Making it Easier to Build



All the modules are pre-fabricated at our Pristine yard



THE HEAVIEST
MiC THERMAL TANK IN HONG KONG

WEIGHT : 50 TONNES

Standardisation – Making it Easier to Build



This time we further enhanced the MIC design to not only covers internal fit-out

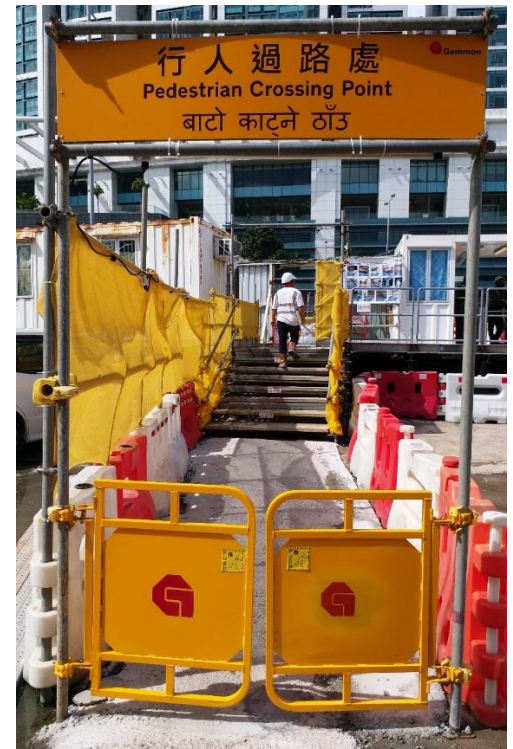
Modular Catch Fan

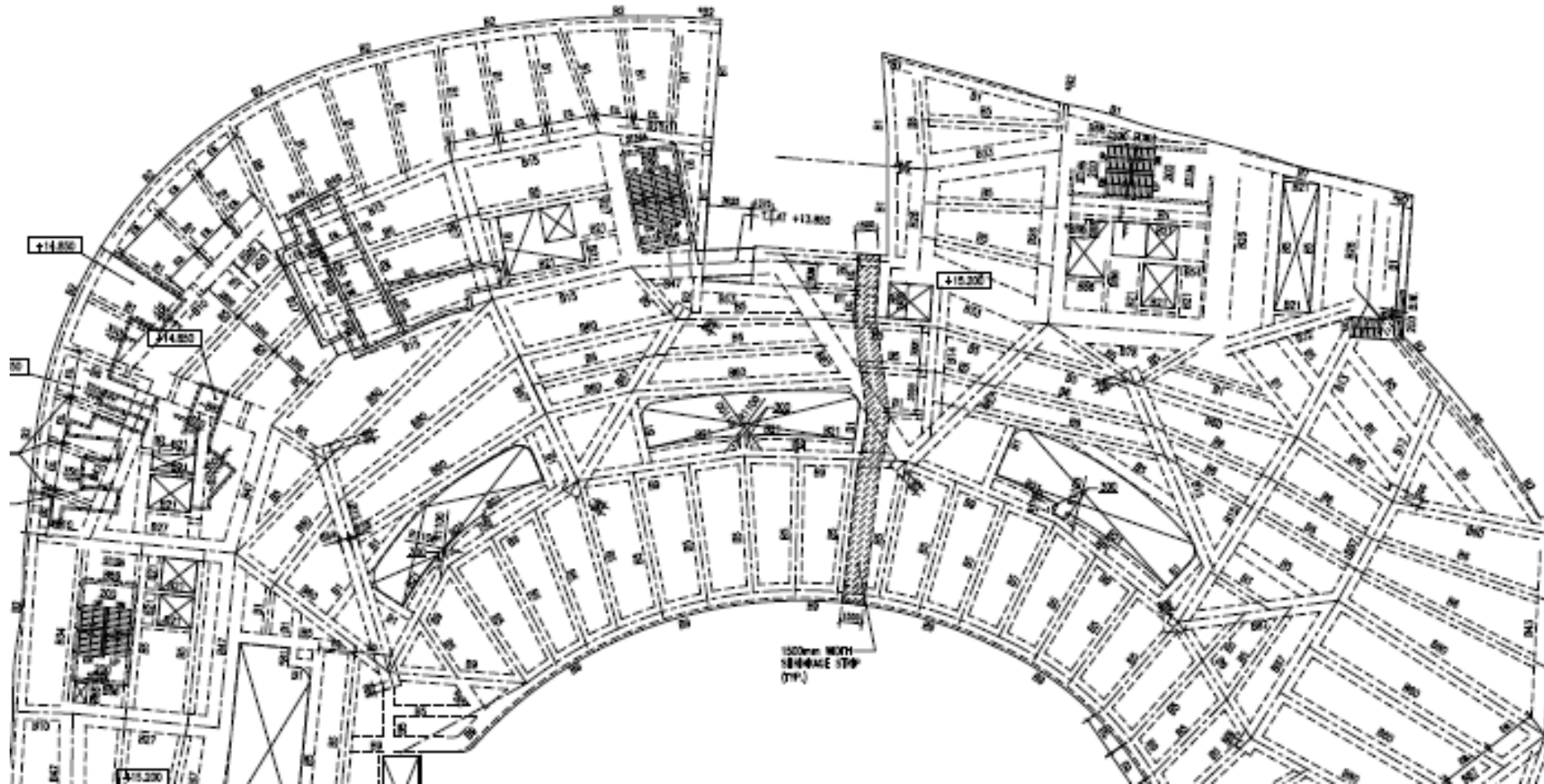
- Features:**
- Modular and Reusable
 - Safe, easy and fast installation and dismantling

This section compares two methods of installing safety fans. On the left, a traditional method is shown where blue fans are attached to a complex scaffolding structure. A large red 'X' is overlaid on this image, with the text 'Installation at risk' below it. On the right, the modular catch fan system is shown. It consists of a metal frame with a mesh fan. A worker is seen installing it on a concrete structure. Three callout boxes highlight its benefits: 'Light weight and easy to handle', 'Safe installation and removal', 'Integral connection avoiding working beyond the scaffold', and 'Simply connection for fast installation and dismantling'.

- Light weight and easy to handle
- Safe installation and removal
- Integral connection avoiding working beyond the scaffold
- Simply connection for fast installation and dismantling

Installation at risk





We Can Only Systemize if Permanent Works Allow (Standard Beam Sizes and Symmetry in Framing Layouts)

Visualising construction sequence

Legend:

- MB1: MAIN BEAM (MB1) FOR PLATFORM LEVEL AT +6.40
- SB1: SECONDARY BEAM (SB1) FOR PLATFORM LEVEL AT +6.40
- MB2: MAIN BEAM (MB2) FOR PLATFORM LEVEL AT +5.84
- SB2: SECONDARY BEAM (SB2) FOR PLATFORM LEVEL AT +5.84
- KP1, KP1B: KING POST (KP1, KP1B)
- HT: HORIZONTAL TIE
- B: BRACING
- D: DECKING
- G: GUSSET PLATE, STIFFENER, BEARING PLATE

Notes:

- MAX. SOIL FILL SLOPE
- TOP LEVEL OF STEEL PLATFORM: +6.40
- EXISTING LEVEL: -4.65

Stage 1: Initial excavation and foundation preparation.

Stage 2: Installation of main beams and secondary beams.

Stage 3: Completion of the steel framework.

Stage 4: Final construction with decking and bracing.

Clear design loading

MEMBER	MEMBER SIZE	GRADE
MAIN BEAM (MB1) FOR PLATFORM LEVEL AT +6.40	TWIN 610x305x238 UC	S355
SECONDARY BEAM (SB1) FOR PLATFORM LEVEL AT +6.40	TWIN 610x305x149 UC @2500 c/c MAX.	S355
MAIN BEAM (MB2) FOR PLATFORM LEVEL AT +5.84	TWIN 305x305x223 UC	S355
SECONDARY BEAM (SB2) FOR PLATFORM LEVEL AT +5.84	TWIN 305x305x223 UC @2500 c/c MAX.	S355
KING POST (KP1, KP1B)	305x305x223 UB (EXCEPT OTHERWISE STATED ON PLAN)	S450J0
HORIZONTAL TIE	203x203x60 UC	S355
BRACING	102x51x10.42 CHANNEL	S275
DECKING	FSP III SHEET PILE (EXCEPT OTHERWISE STATED ON PLAN)	S275
GUSSET PLATE, STIFFENER, BEARING PLATE	VARIOUS SIZE & THICKNESS	S355

ERECT CLEAR SIGNAGE IN ENGLISH & CHINESE OF ALLOWABLE LOADING AT PLANT EGRESS AND ACCESS POINTS

LOADING LIMITED TO 150kg/m² - EQUIVALENT TO:

- 2 PERSONS PER m²
- SPILL / ROCK
- REBAR & OTHER MATERIALS
- PLANT

NOT PERMITTED IN ZONES C & D

NOT PERMITTED ON MAIN PLATFORM (ZONES A & B) WITHOUT DESIGN VERIFICATION:

- CRANE CRANE
- CONCRETE PUMP TRUCK
- SOIL / ROCK EXCEEDING LIMITS SHOWN FOR ALLOWABLE LOADING

MAIN PLATFORM (ZONES A & B) LOADING LIMITED TO:

EQUIVALENT TO:

- 1 NO 20T EXCAVATOR (CAP 3300 L OR SIMILAR) + MAX. 5T BUCKET LOAD
- 1 NO 30T DUMP TRUCK
- MAX. 200Pa IN REMAINING AREA
- MAX. 1.5m MESH LOGS 100
- OR
- MAX. 1.0m MESH ROCK / BOLLERS

CONTRACT 704
SAL YING PUN STATION
ENTRANCE C AND PLATFORM OVER EXCAVATION
ALLOWABLE LOADING

MTR WEST ISLAND LINE

LAMBETH

DATE: 07/14/2024

Pictorial method statement

STEP / 步驟	CONSTRUCTION ACTIVITY / 工作程序	ILLUSTRATIONS / 示意圖	NOTE(S) / 備註
5.1	<p>利用吊機安裝工字(第1-第7支), 每截工字4m長</p> <p>7支重量為5噸 (28m長工字鐵) (305 x 305 x 180 kg/m UBP)</p>		<p>Engineering Point 工程重點:</p> <ol style="list-style-type: none"> 1. 工字上的吊眼根據設計上的圖則妥善燒好 2. 把第一條工字支撐在圓通頂上, 然後把第二條工字連接到第一條工字上焊接 (每邊工字翼要燒至少7mm方可以電路) 3. 用風煤切割工字兩邊承托用的吊眼, 並把工字降到圓通內, 重覆焊接工字鐵程序 <p>Safety Point 安全重點:</p> <ol style="list-style-type: none"> 1. 地面工作位置 / 致命區域, 必需用連續扣鎖紅色欄河圍好 2. 熱工序進行前必須檢查及填寫熱工序許可証 3. 使用設有指定型號電路開路降壓裝置的焊機, 並安裝接地 4. 工人燒焊要站在絕緣膠箱上

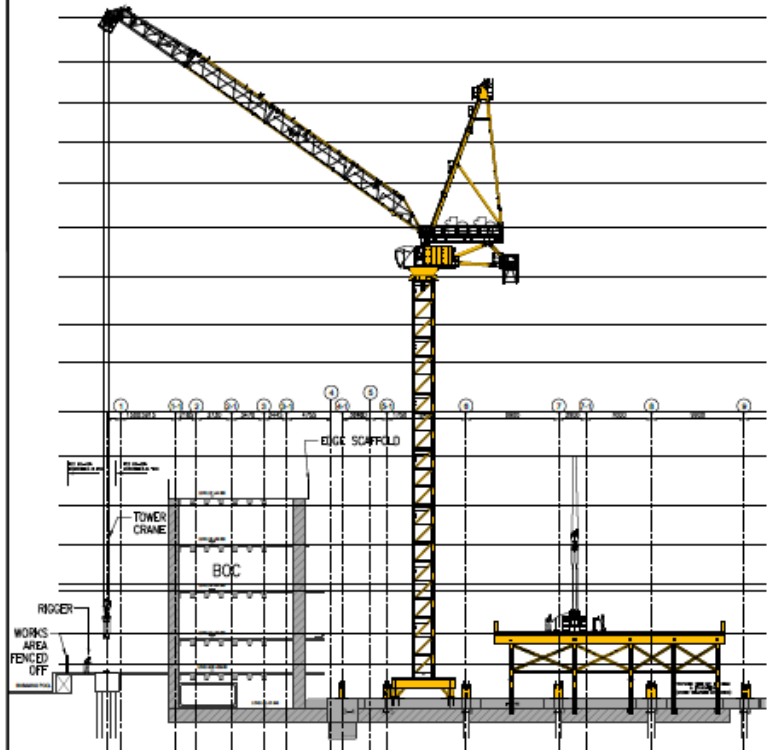
5.2	<p>焊接4m工字 (305 x 305 x 180 kg/m) 及把工字降到圓通內, 並重覆焊接工字鐵程序</p>		<p>Engineering Point 工程重點:</p> <ol style="list-style-type: none"> 1. 工字上的吊眼根據設計上的圖則妥善燒好 2. 把第一條工字支撐在圓通頂上, 然後把第二條工字連接到第一條工字上焊接 (每邊工字翼要燒至少7mm方可以電路) 3. 進行工字槽驗焊 4. 用風煤切割工字兩邊承托用的吊眼, 並把工字降到圓通內, 重覆焊接工字鐵程序 <p>Safety Point 安全重點:</p> <ol style="list-style-type: none"> 1. 地面工作位置 / 致命區域, 必需用連續扣鎖紅色欄河圍好 2. 熱工序進行前必須檢查及填寫熱工序許可証 3. 使用設有指定型號電路開路降壓裝置的焊機, 並安裝接地 4. 工人燒焊要站在絕緣膠箱上
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STEP / 步驟	CONSTRUCTION ACTIVITY / 工作程序	ILLUSTRATIONS / 示意圖	NOTE(S) / 備註
5.3	<p>焊接工字鐵的設計圖則及標準</p>		<p>Engineering Point 工程重點:</p> <ol style="list-style-type: none"> 1. 工字上的吊眼根據設計上的圖則妥善燒好 2. 把第一條工字支撐在圓通頂上, 然後把第二條工字連接到第一條工字上焊接 (每邊工字翼要燒至少7mm方可以電路) 3. 進行工字槽驗焊 4. 用風煤切割工字兩邊承托用的吊眼, 並把工字降到圓通內, 重覆焊接工字鐵程序 <p>Safety Point 安全重點:</p> <ol style="list-style-type: none"> 1. 地面工作位置 / 致命區域, 必需用連續扣鎖紅色欄河圍好 2. 熱工序進行前必須檢查及填寫熱工序許可証 3. 使用設有指定型號電路開路降壓裝置的焊機, 並安裝接地 4. 工人燒焊要站在絕緣膠箱上

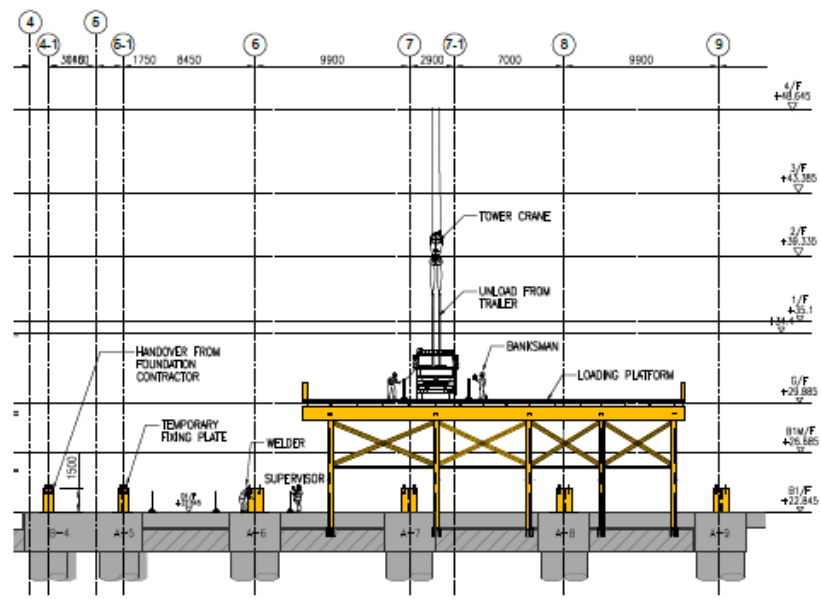
5.4	<p>利用55T吊雞車安裝最後2截工字(第8-第9支)</p> <p>最終重量為5.94T (全33m長工字鐵) (305 x 305 x 180 kg/m UBP)</p>		<p>Engineering Point 工程重點:</p> <ol style="list-style-type: none"> 1. 工字上的吊眼根據設計上的圖則妥善燒好 2. 把第一條工字支撐在圓通頂上, 然後把第二條工字連接到第一條工字上焊接 (每邊工字翼要燒至少7mm方可以電路) 3. 用風煤切割工字兩邊承托用的吊眼, 並把工字降到圓通內, 重覆焊接工字鐵程序 <p>Safety Point 安全重點:</p> <ol style="list-style-type: none"> 1. 地面工作位置 / 致命區域, 必需用連續扣鎖黃色欄河圍好 2. 熱工序進行前必須檢查及填寫熱工序許可証 3. 使用設有指定型號電路開路降壓裝置的焊機, 並安裝接地 4. 工人燒焊要站在絕緣膠箱上
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Communication - T4 Hold Point & Residual Risk

COMPOSITE COLUMN ERECTION SEQUENCE



STEP 1 - SITE PREPARATION (SHEET 1 OF 1)

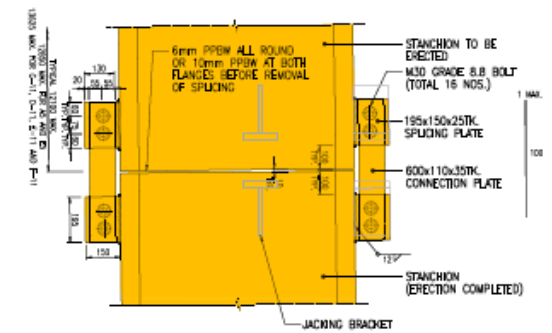


STEP 1.1

- CHECK THE GENERAL SITE SET UP FOR THE LIFTING OPERATION ENSURE LIFTING AND RECEIVING ZONES ARE BARRIRED OFF

STEP 1.2 (FOR COLUMN ERECTION ON PILE CAP ONLY)

- PREPARE AND WELD TEMPORARY FIXING ATTACHMENT TO PILE CAP STEEL PLATE. (TEMPORARY WORK DESIGN SHALL REFER TO TEMP. WORK DESIGN DRAWING J15717-TW-SJ-0001)



TEMPORARY SPlicing DETAIL
(DETAIL SEE DRAWING J15717-TW-SJ-0001)



CHECK BEFORE ERECTION

REFER TO TEMP WORK DESIGN DRAWING J15717-TW-SJ-0001

A.D. REF: 1

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No.	Description	Date	By	Chk	App
3	THIS REVISION	07/10/23	MA	MLL	JT
2	TEMP REVISION	22/06/23	MA	MLL	JT
1	REVISED DESIGN	14/04/23	MA	MLL	JT

STOP

T4 - HOLD POINT

TWC & SRP CONFIRM THE MINIMUM WELD SIZE AND STRENGTH OF TEMP CONNECTION PLATE COMPLIES WITH THE DESIGN REQUIREMENTS AND HAS BEEN CHECKED BY AN INDEPENDENT TESTING LAB. BEFORE ERECTION OF COLUMNS.

!

RESIDUAL RISK

COMPOSITE COLUMN SHALL BE LIFTED AND INSTALLED BY SPECIFIED TOWER CRANE AS SHOWN IN TABLE OF DRAWING NO. COH/GCL/MS/CC/01 CHECK THE LIFTING PATH TO VERIFY THERE IS NO OBSTRUCTION DURING OPERATION.

Prepared By: **Gannon Construction Limited - Construction Services Division - Steel Fabrication**

Working Title: **COMPOSITE COLUMN ERECTION SEQUENCE (SHEET 2)**

Author: MA	Date: 15/04/23
Checker: JT	
Reviewer: MLL	
Approver: JT	

FOR CONSTRUCTION

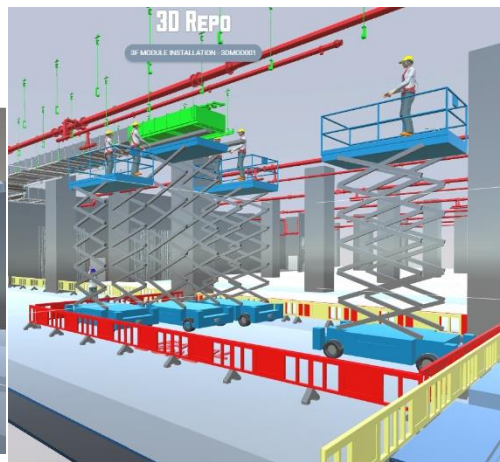
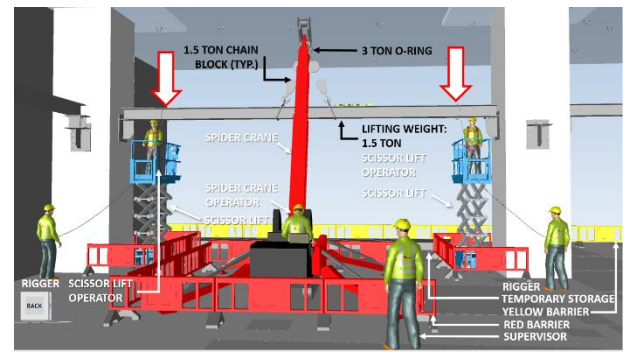
Working Title: **CSD/COH/GCL/MS/CC/02** No: **3**

Safety collaborative workshop

Method of Statement review using 3D Repo Cloud Base Platform

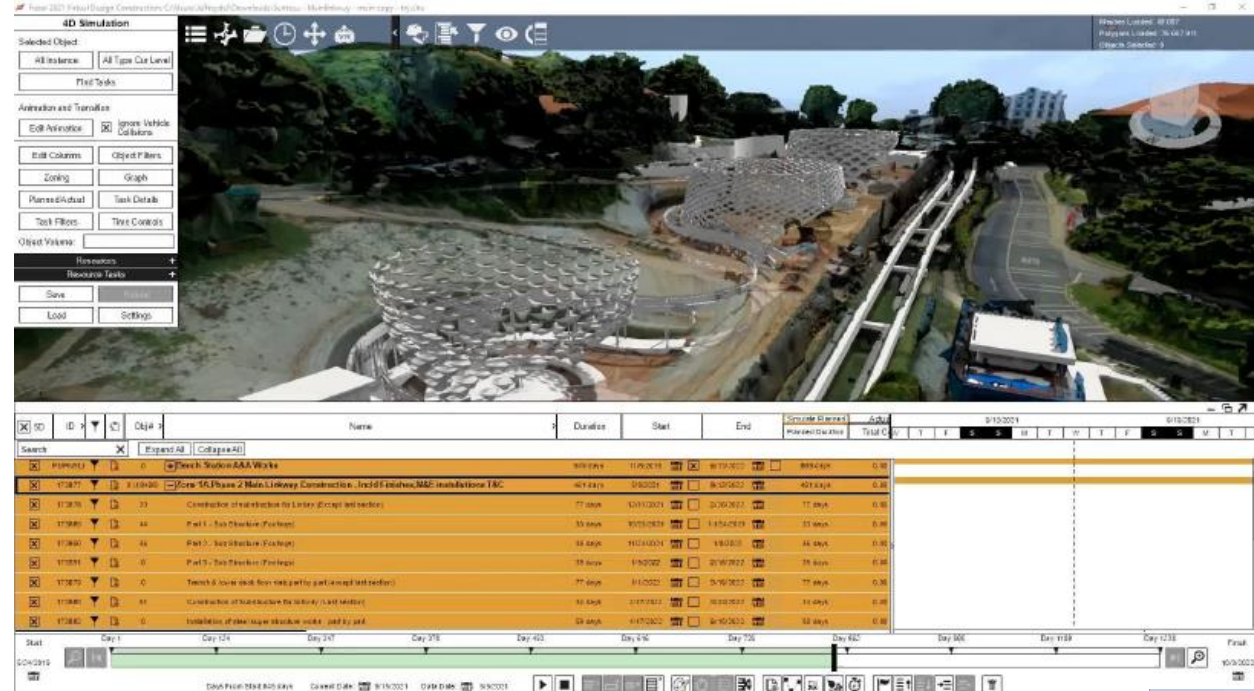


4D Workshop
AMC
28 May 2020



Module Installation Safety Model

- ### Issue Report
- Generation of Issue Report to alert frontline staff before work
 - Visualize potential risk



Drone photogrammetry

Capture site progress

Plan the works to reflect dynamic actual site conditions

Augmented Reality for Construction Safety Reviews

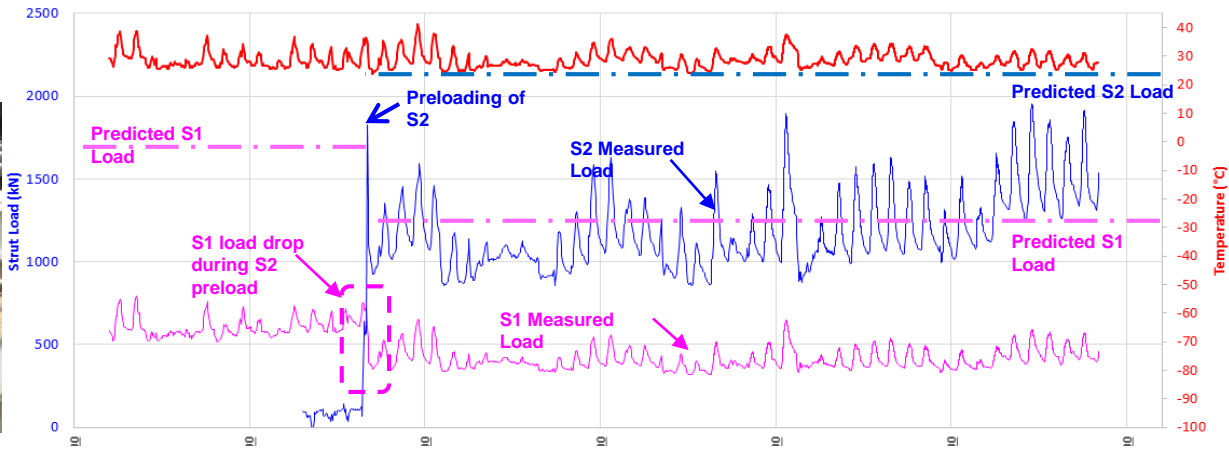
Capture site conditions reality

Interactive & engagement



Sensor instrumentation monitoring

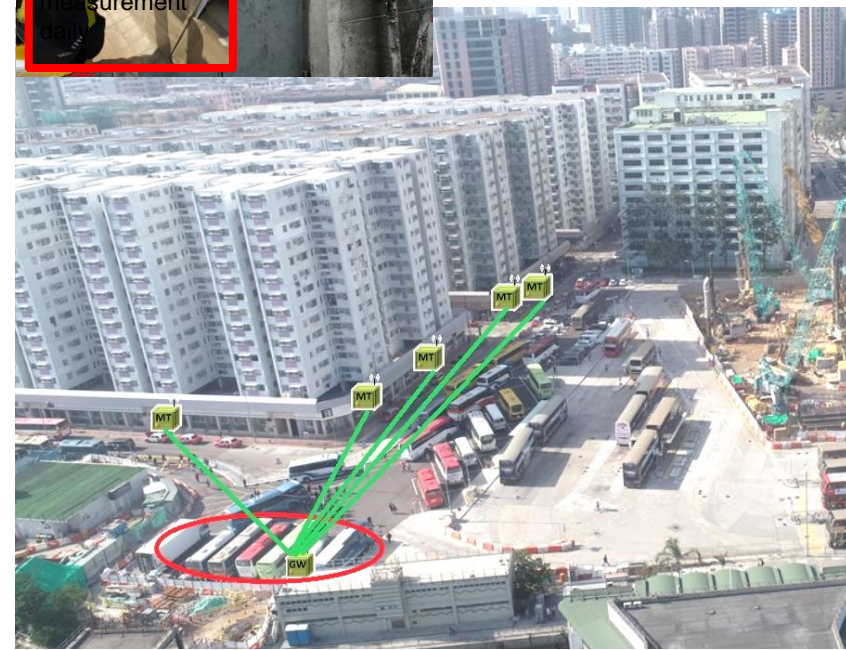
Wireless SG

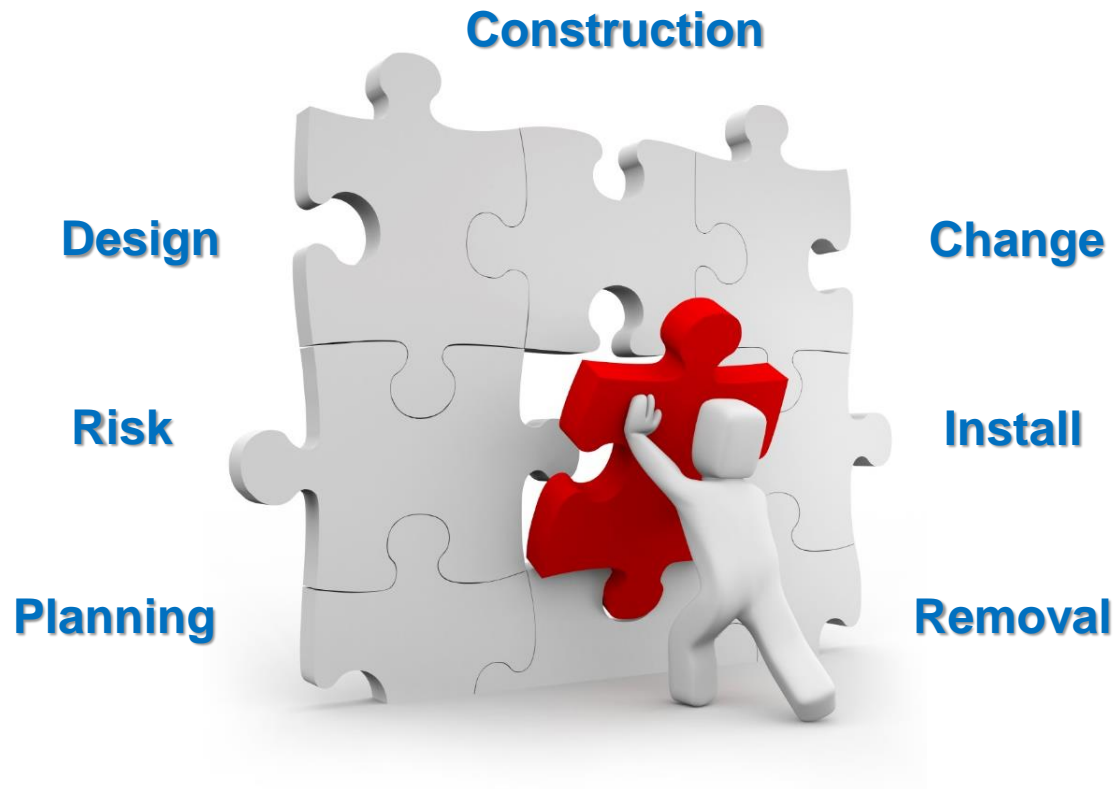


Wireless tilting sensor



Wireless displacement sensor

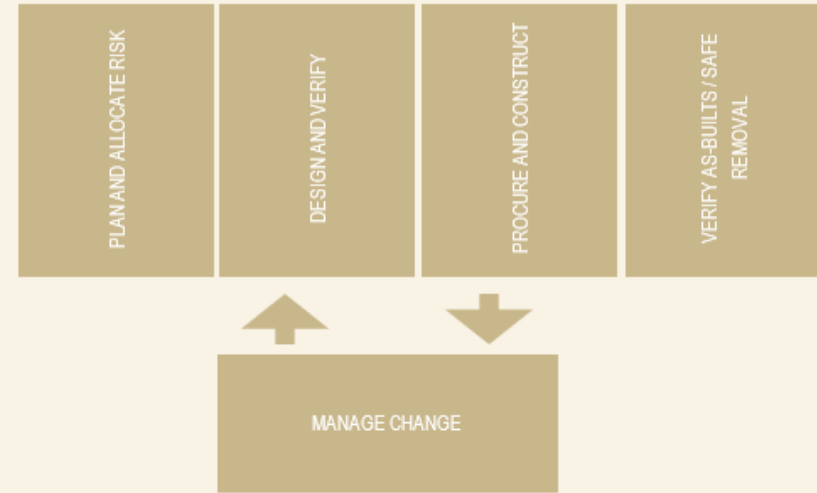




Temporary Works Management System

Control and Management of Temporary Works

A guide to good practice



Publication

Published by HK Temporary Works Forum (HK-TWF)

Published October 2018



<http://www.twforum.org.hk>



Temporary Works Forum Hong Kong
Civil Engineering • hong kong



PROPRIETARY FALSEWORK SYSTEMS



Temporary Steel Platforms

A guide to good practice



Publication

Published by HK Temporary Works Forum (HK-TWF)

2018

Proprietary Falsework Systems

A guide to good practice



Reinforcement Cage Design & Construction

A guide to good practice



Publication

Published by Hong Kong Temporary Works Forum (HK-TWF)

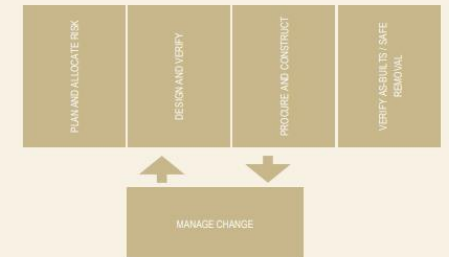
Published October 2019

Issue 1



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