

建造業安全周2022
Construction Safety Week
SAFETY 2.0

Rotational Bridge
Launching at
YOHO Hub

29 Aug 2022

YLTL
元朗 510



新輝建築有限公司
Sanfield Building Contractors Ltd.

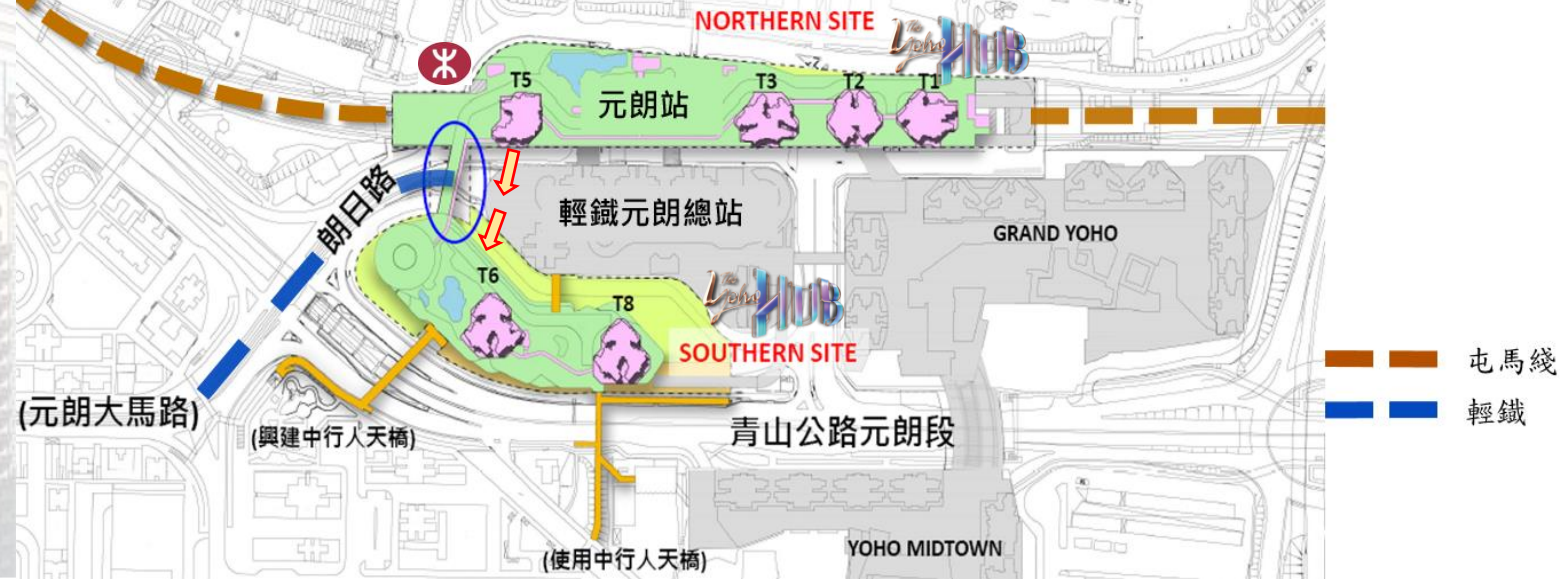


FREYSSINET



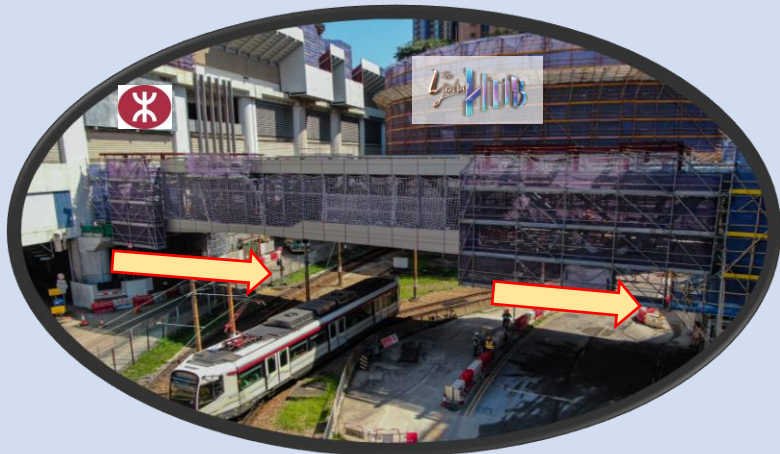
GOLDWAVE
Steel Structure Engineering

Introduction



FB - Footbridge

- **TOD** (Transit-oriented Development)
- Carry the flow of people at Yuen Long West Rail Station to YOHO Hub



Rotation and lowering completed on **August 2021**

VB - Vehicular Bridge

- Emergency Vehicle Access (EVA)
- Connect Southern and Northern sides of YOHO Hub



Rotation and lowering completed on **October 2021**

Inspiration from...



Balanced Cantilever Construction by Counter-weight

Snapshot – Rotational Launching & Seamless Lowering for VB and FB



Partnering with Mutual Trust



Project Supervision



Client



Designers



Main Contractor



Specialist Structural Steel Contractor



Specialist Heavy Lifting Contractor

Design for Safety - Principal Risks

- **Falling from Height**

- working at lower elevation
- reduce duration working at height



- **Electric Shocks**

- avoid exposures to electrically-live overhead cables



- **Falling Objects**

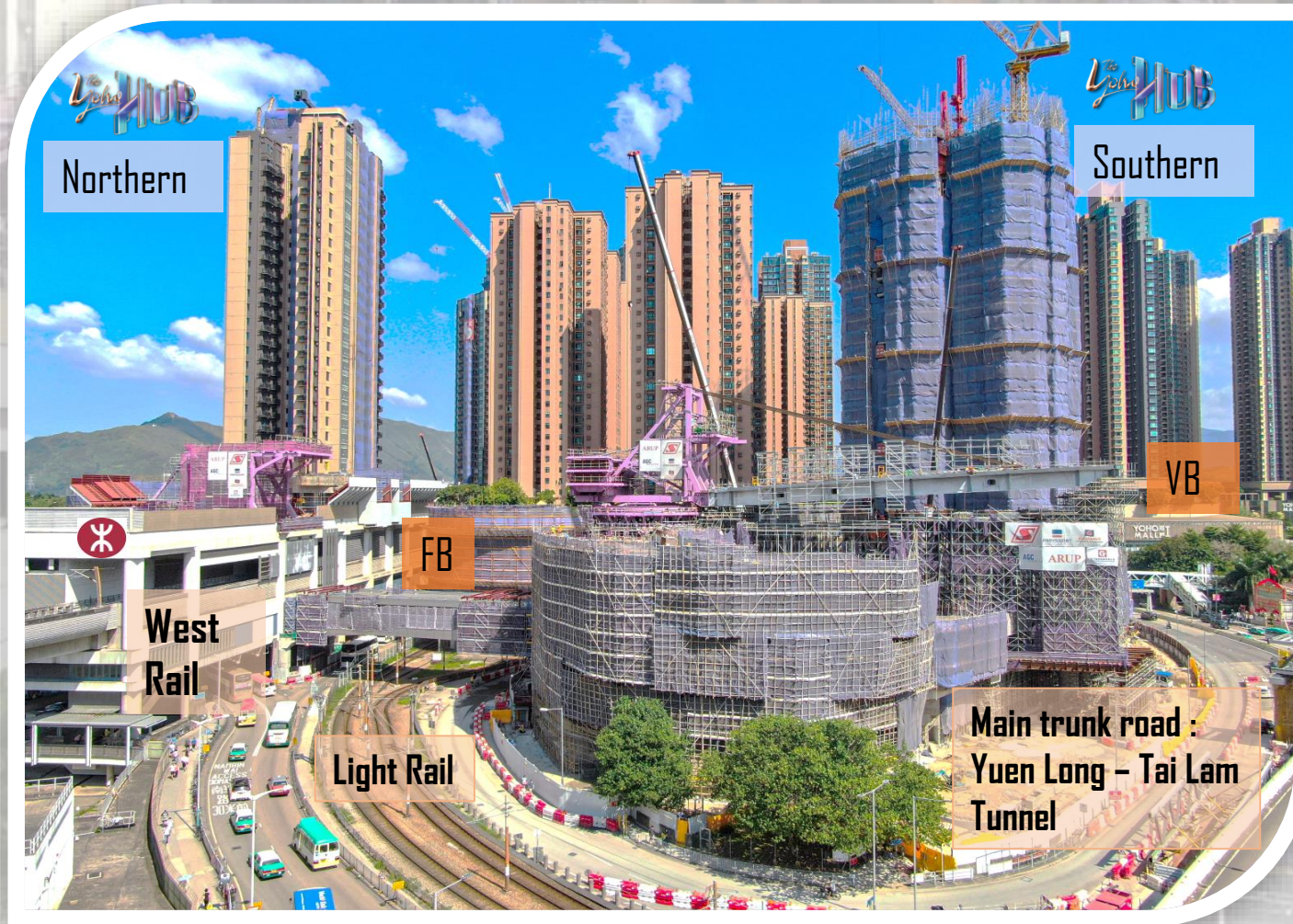
- avoid assembling work directly over railway tracks
- minimize hand-held tools



- **Incomplete Bridge Structures Collapse due to Extreme Events**

- Typhoon attacks; heavy-lifting machine malfunction; accidental collision by traveling vehicles, i.e. total collapse onto public road and railway tracks

Design for Safety - Innovation Approach for Zero Accident



No. of night for track possession per week = 2 nights

Estimated assembly time for bridge structure (by traditional launching)
= $108/2 = 54$ weeks (1 year)

Zero Accident !

This innovative construction method can reduce the public disturbance and minimize the risk to West Rail , Light Rail and Main Trunk Road



No. of Night for	Traditional Launching	Launching by Rotation and Lowering
Main Bridge Structure (Track Possession : 2 hours / night)	108 Night	8 Night ↓ 92 %
Cladding & Finishing (non-Track Possession)	280 Night	113 Night ↓ 60 %

Design for Safety – Falling from Height



Rigid steel scaffold platform for bridge assembly



Flat and large working platform for workers

- Large and flat working platform where FB and VB were assembled as if workers work on solid ground.
- Reduce the risk of “**Falling from Height**” by working a much lower elevation.

Design for Safety – Falling from Height & Falling Objects



Much smaller
crane
required



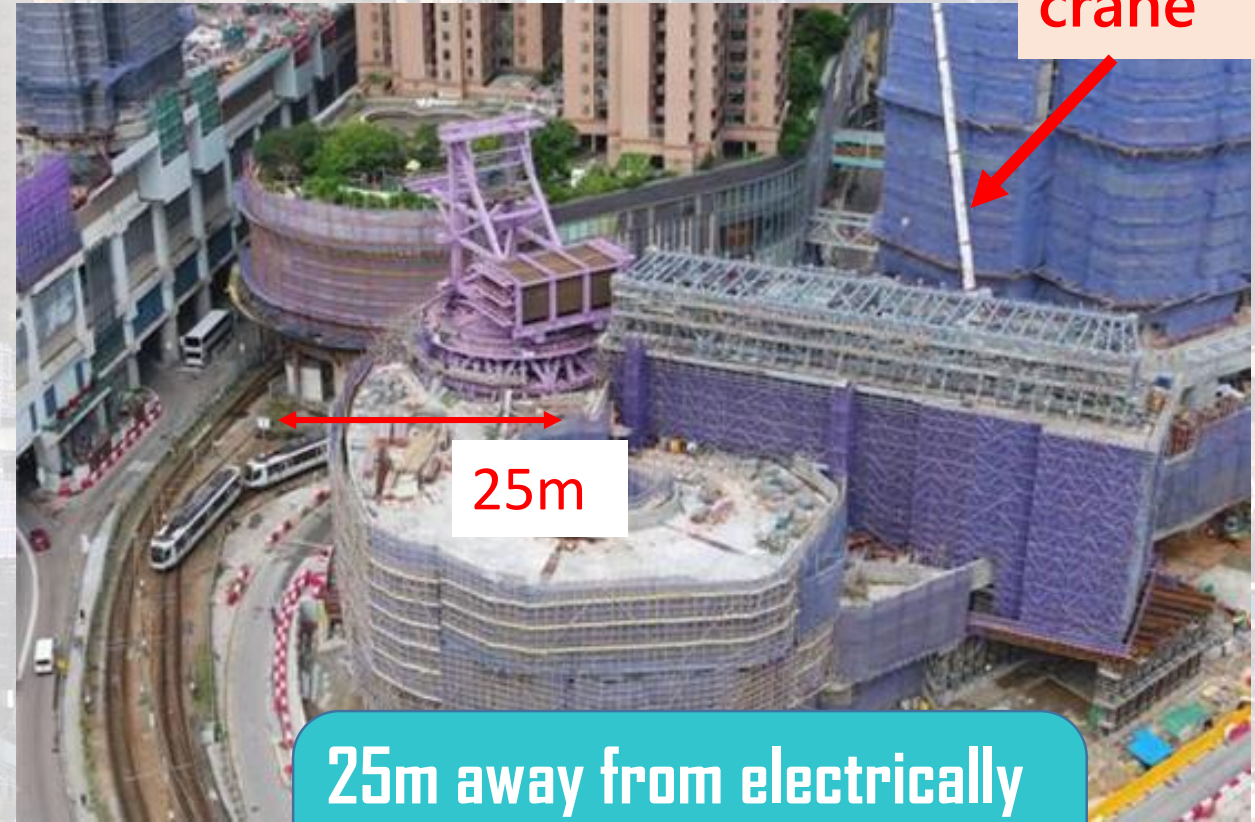
Bolts & nuts connection
and larger steel
components to reduce
time for working at height.



Design for Safety – Electric Shocks



200ton
mobile
crane



25m

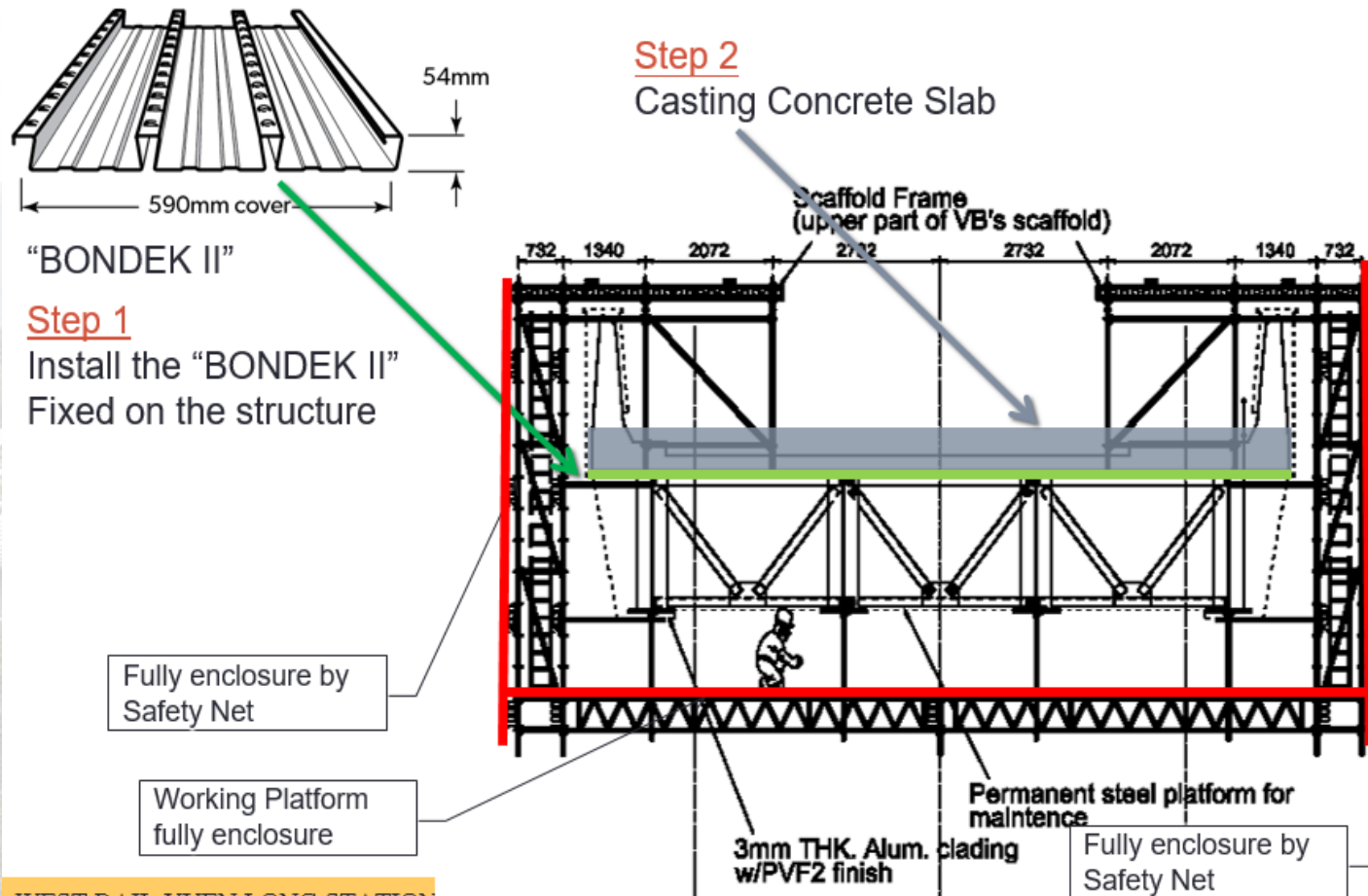
25m away from electrically
live Light Rail cables

Eliminate working in close proximity to live railway overhead line cables to minimize electric shock risks

Design for Safety – Falling Objects

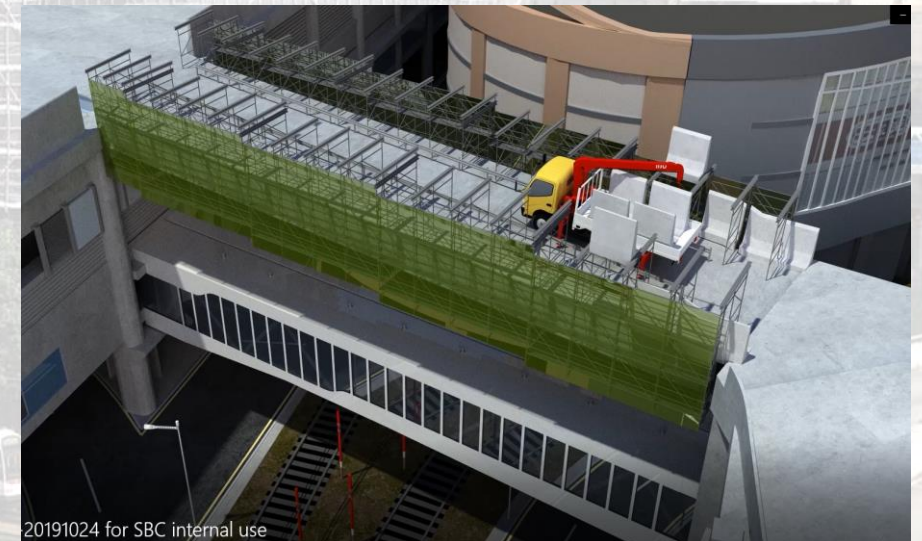
8, RC Slab & Pre-cast Parapet Wall construction of VB

VB – “Bondek II” Installation & Casting Slab (Day time)



Avoid works directly over railway

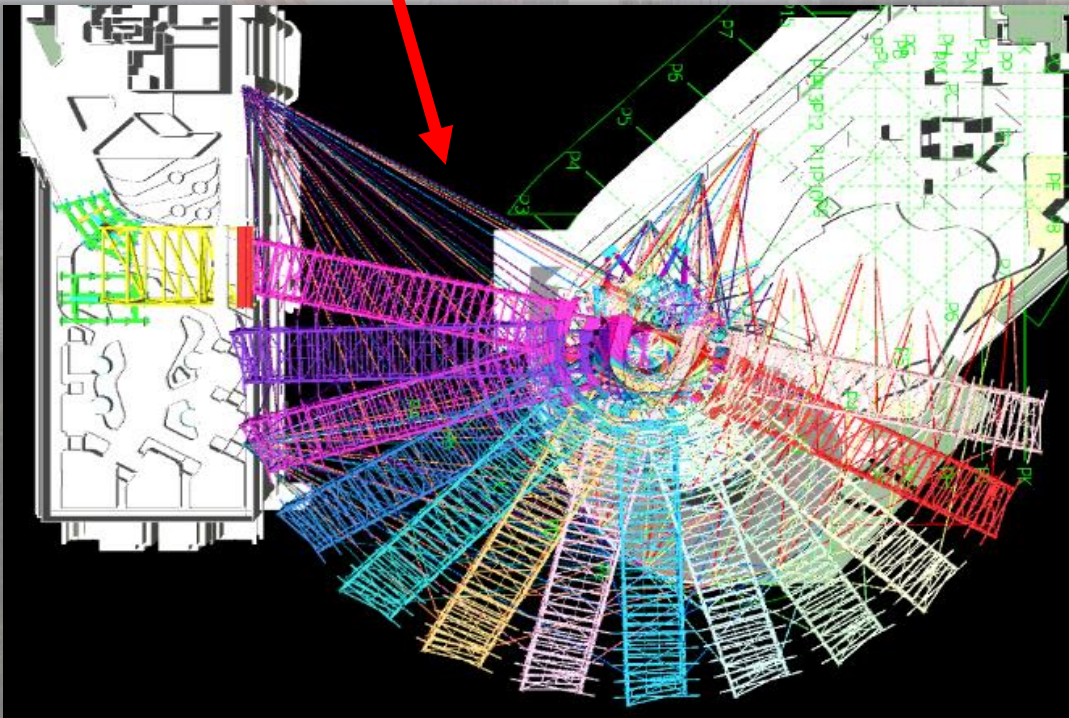
- Precast parapet wall
- Concreted bridge deck portion directly over railway before launching
- Unitized Curtain Wall
- No exterior aluminum façade directly over railway tracks
- Full scaffold enclosures



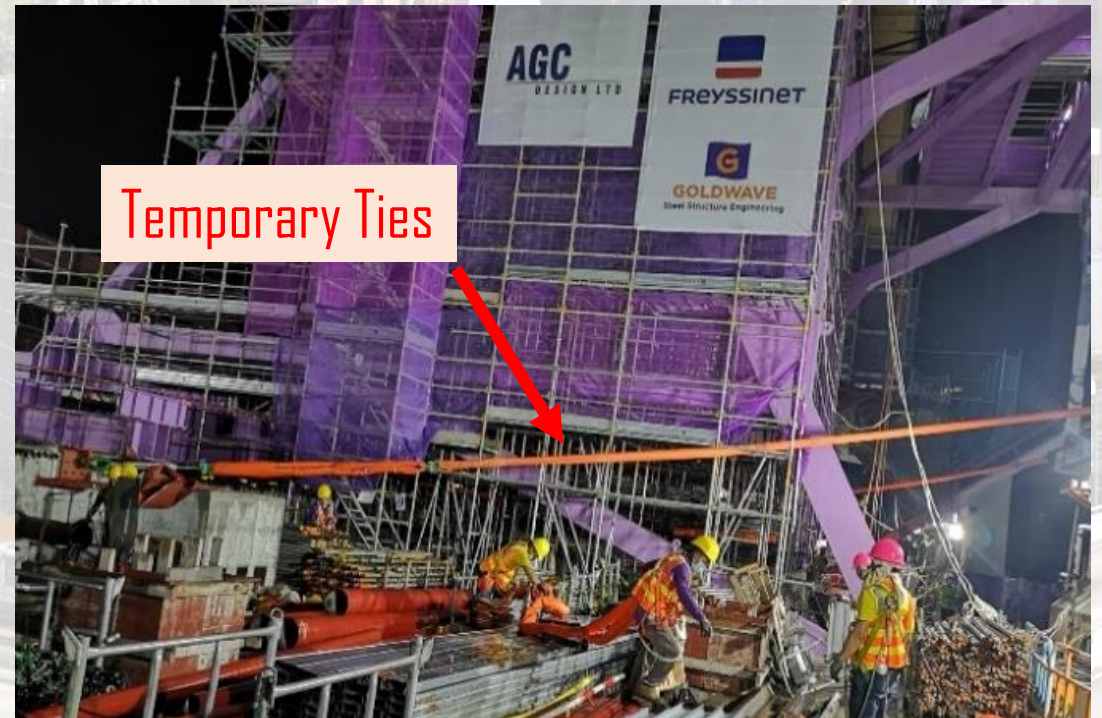
Design for Safety – Bridge Structures Collapse due to Extreme Events

Temporary ties to increase the structural stability of bridges as the contingency plan if rotation launching was forced to stop amid whether due to machine malfunction or typhoon attacks

Temporary Ties



Temporary Ties

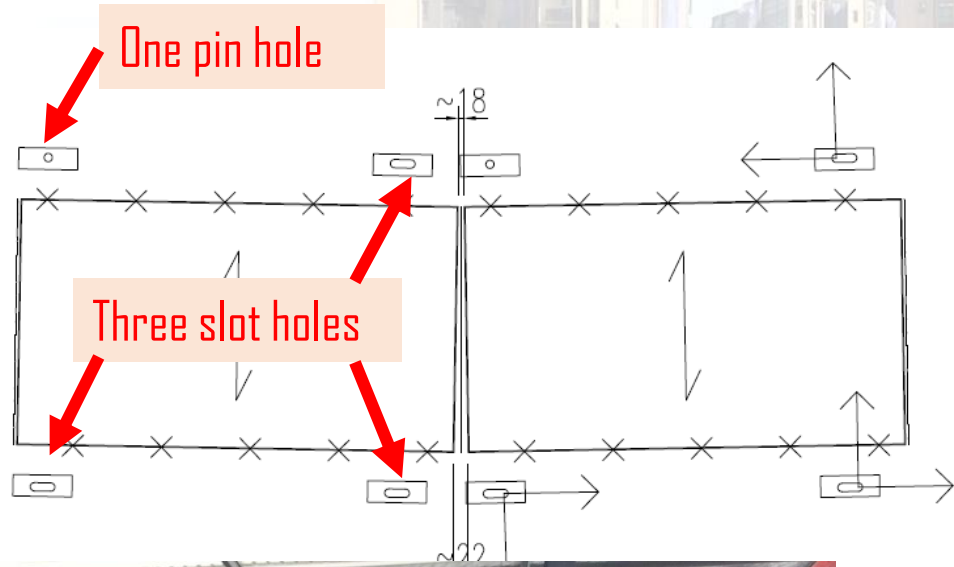


Design for Safety - Smooth Rotation by Carbon-filled PTFE



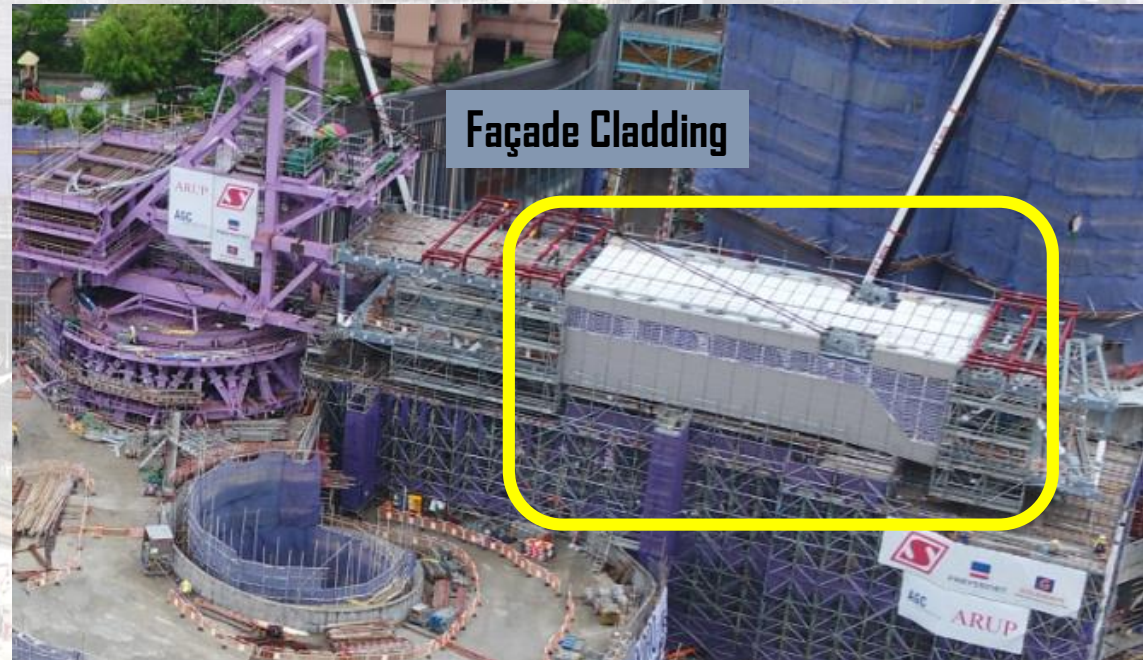
Use of Smart and Innovative Carbon-Filled PTFE, Low Friction and Anti-abrasive

Design for Safety – Smart Detail for Façade Cladding



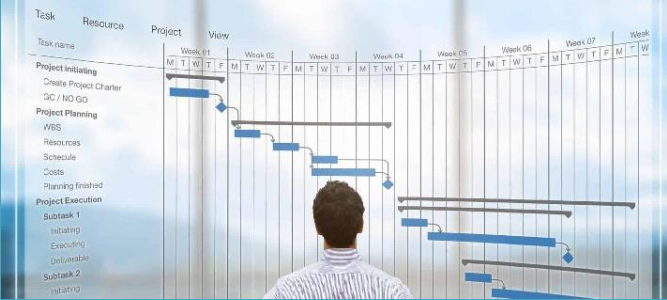
One pin hole and three slot holes in each piece of cladding panel

Smart façade cladding connection to cater for bridge oscillation during rotation launching

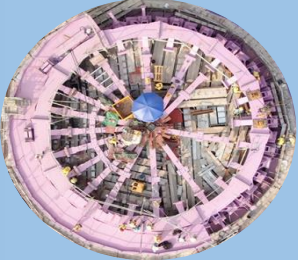


Achievements & Business Value

ENHANCE construction programme certainty



PROMOTE innovative method in construction industry



REDUCE public disturbance and minimize the risk to West Rail and Light Rail operation

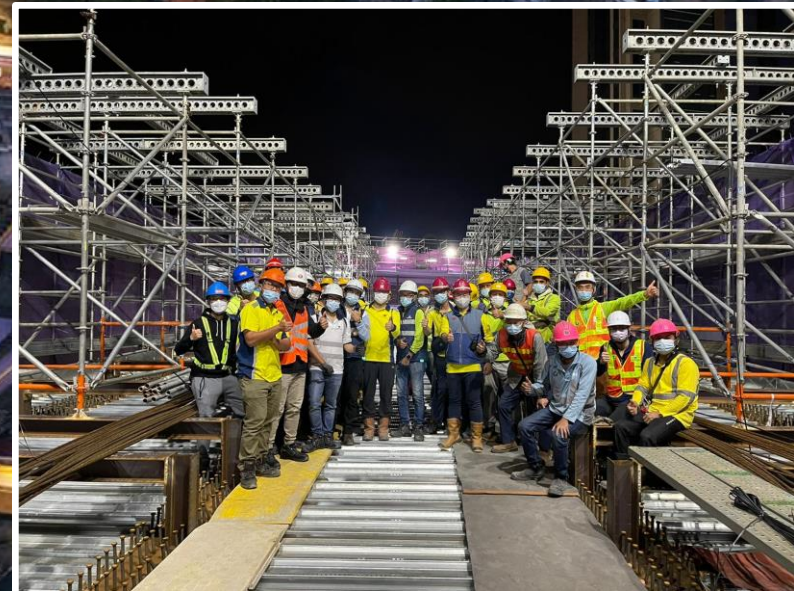


DESIGN for safety





A Real Success to All Stakeholders



The Whole Construction Industry is Inspired





Thank you!