



# MTR SHATIN TO CENTRAL LINK CONTRACT 1128 SOUTH VENTILATION BUILDING TO ADMIRALTY TUNNELS

# Site Description

Building

Civil





# MTR SHATIN TO CENTRAL LINK CONTRACT 1128 SOUTH VENTILATION BUILDING TO ADMIRALTY TUNNELS





# Site Description

The main scope of the project:

- Shatin to Central Link Tunnels by TBM
- the Fenwick Pier Emergency Egress Point (FPP)
- the South Ventilation Building (SOV)
- Re-provisioning of POC

TBM Tunnels & FPP



SOV & POC

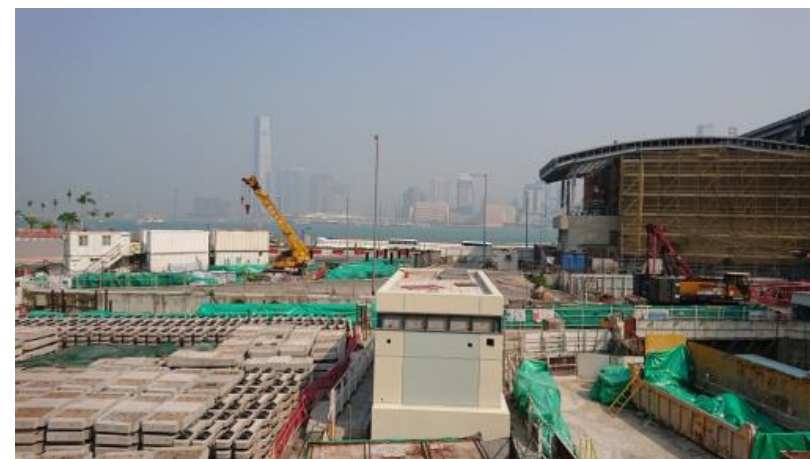


# Site Progress

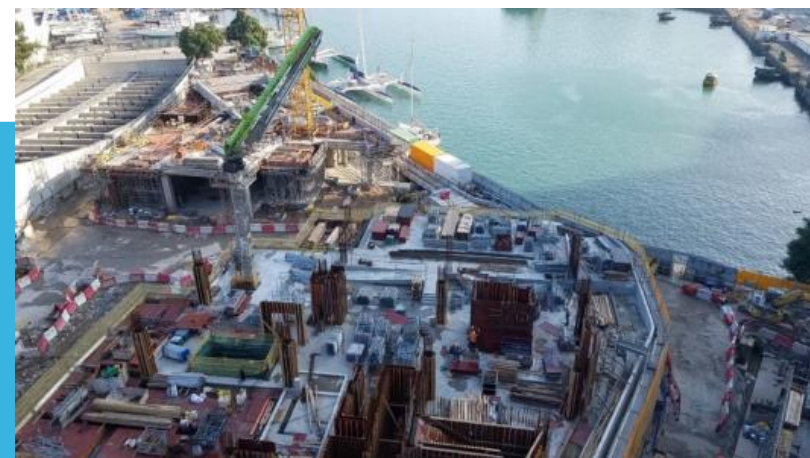
Eastern & Western SCL  
Tunnels (Finished)



Fenwick Pier Emergency Egress  
Point (ABWF Works)



South Ventilation Building &  
Re-provisioning of POC  
(Under Construction)



# Working at Height Control Hierarchy



Design for  
Safety

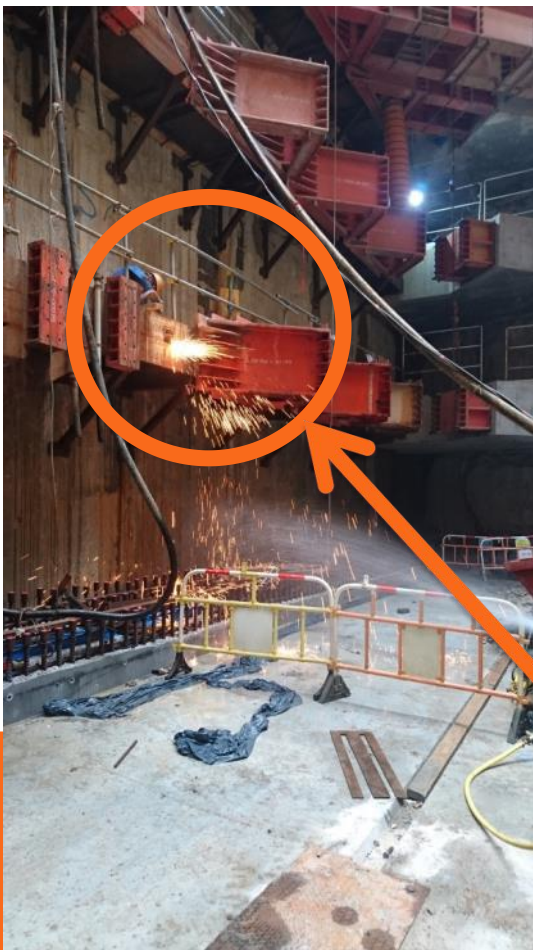
Engineering  
Control

Safety  
Promotion



# Strut Free TBM Launching Shaft

Traditional Launching Shaft



Welding at Height



# Strut Free TBM Launching Shaft

Construct First Dual Circular Shaft in Hong Kong



2 Concrete Beams to support



# Remote machinery for D-Wall Opening

Using

Concrete Breaker

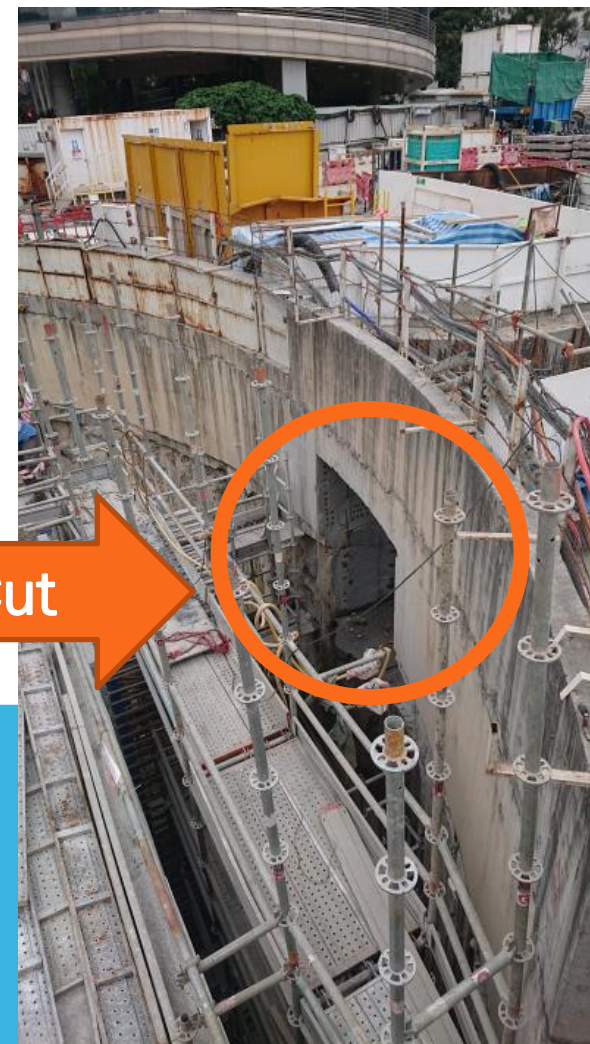


Coring & Wire  
Cutting

Before



Open by Wire Cut

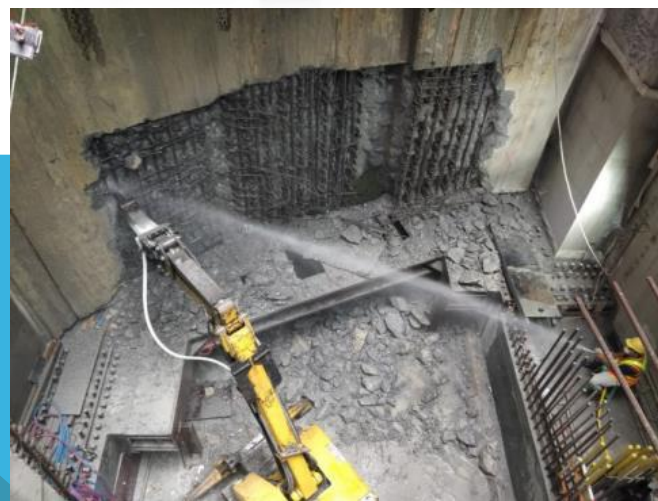




# Remote machinery for D-Wall Opening

Review method for large opening

Using Brokk





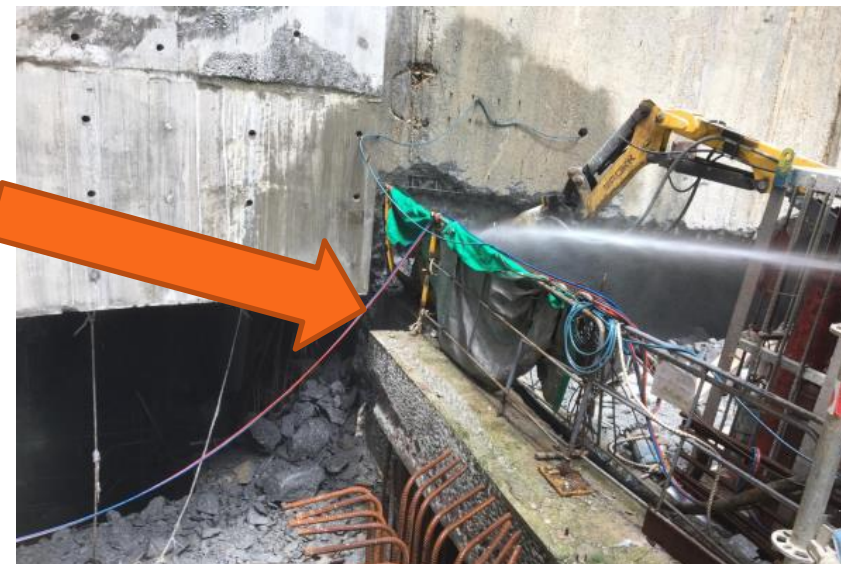
# Remote machinery for D-Wall Opening

Foresee potential fall from height risk

Potential fall from height risk if break by hand

Down Track Tunnel Opening

Up Track Tunnel Opening

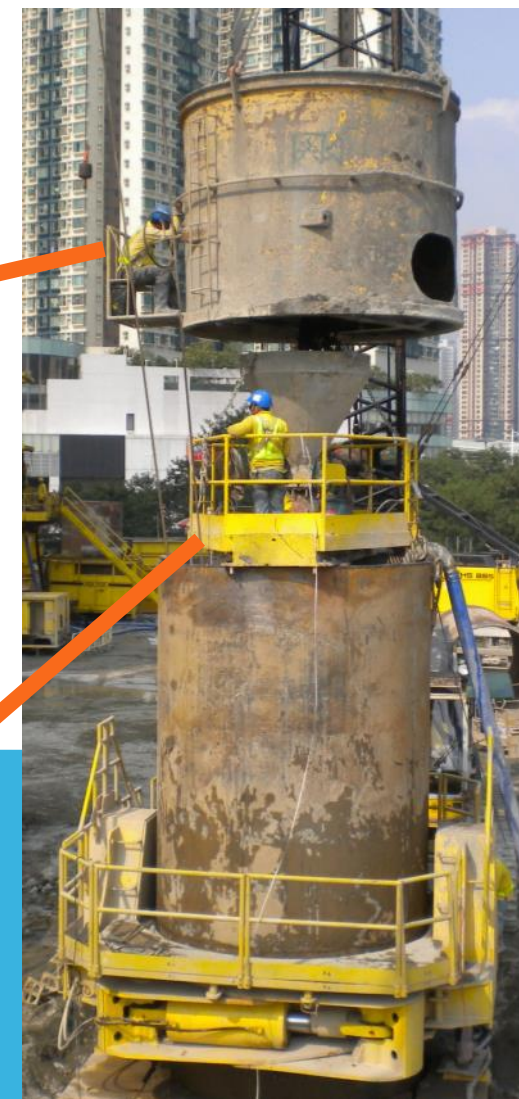


Utilize small size Brokk to break



# Remote Bucket for Bored Pile Concreting

Traditional Bored Pile Concreting method





# Remote Bucket for Bored Pile Concreting

Bored Pile Concreting Alternative Method



Control



Real time  
monitoring



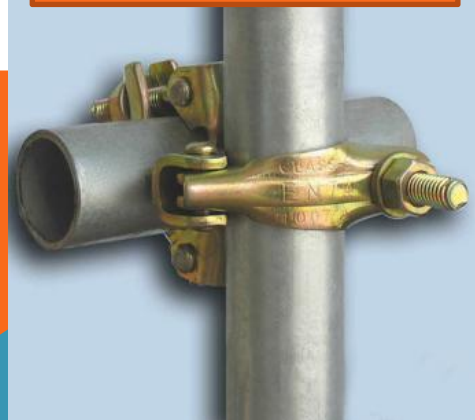


# Using PERI UP Formwork & Scaffolding System

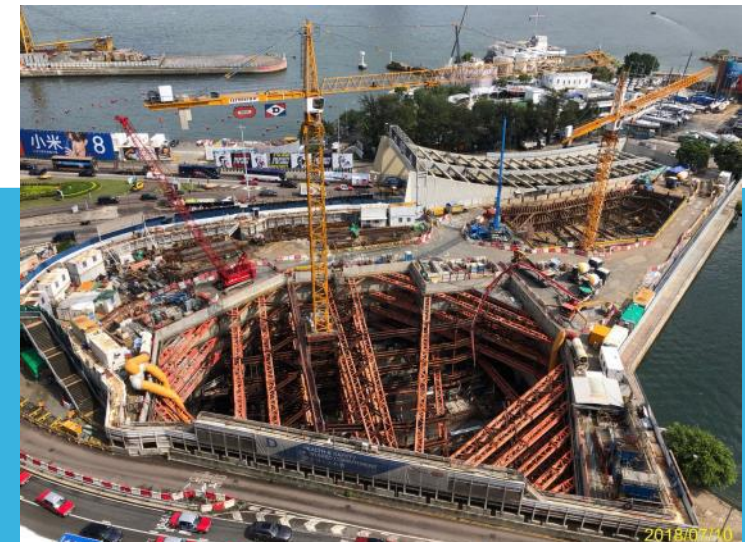
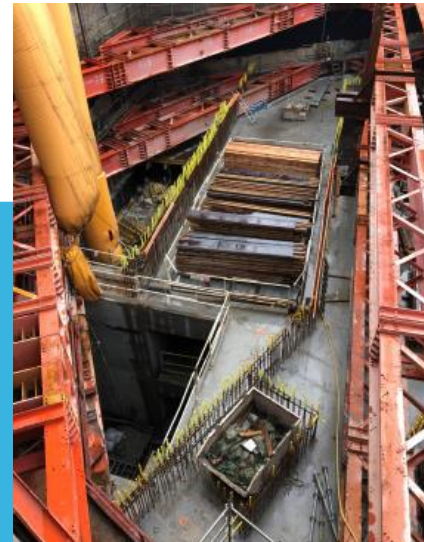
Traditional formwork cannot fulfill our requirement



Low Stability,  
non Standardize



Cannot Deploy  
Precast Structure



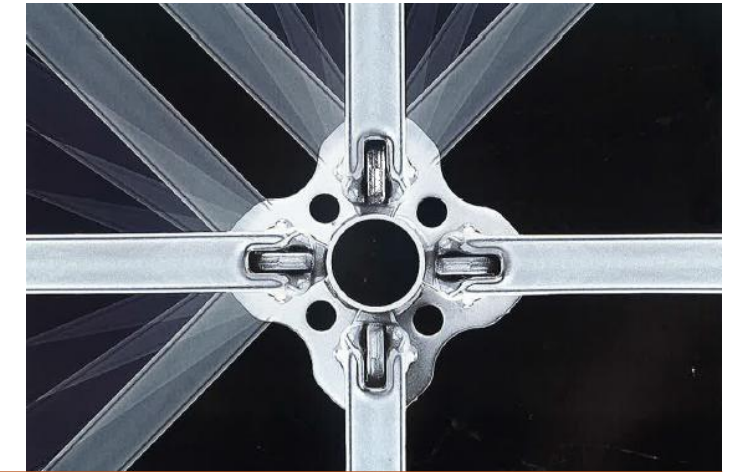


# Using PERI UP Formwork & Scaffolding System

Advantages of using PERI Up Formwork & Scaffold



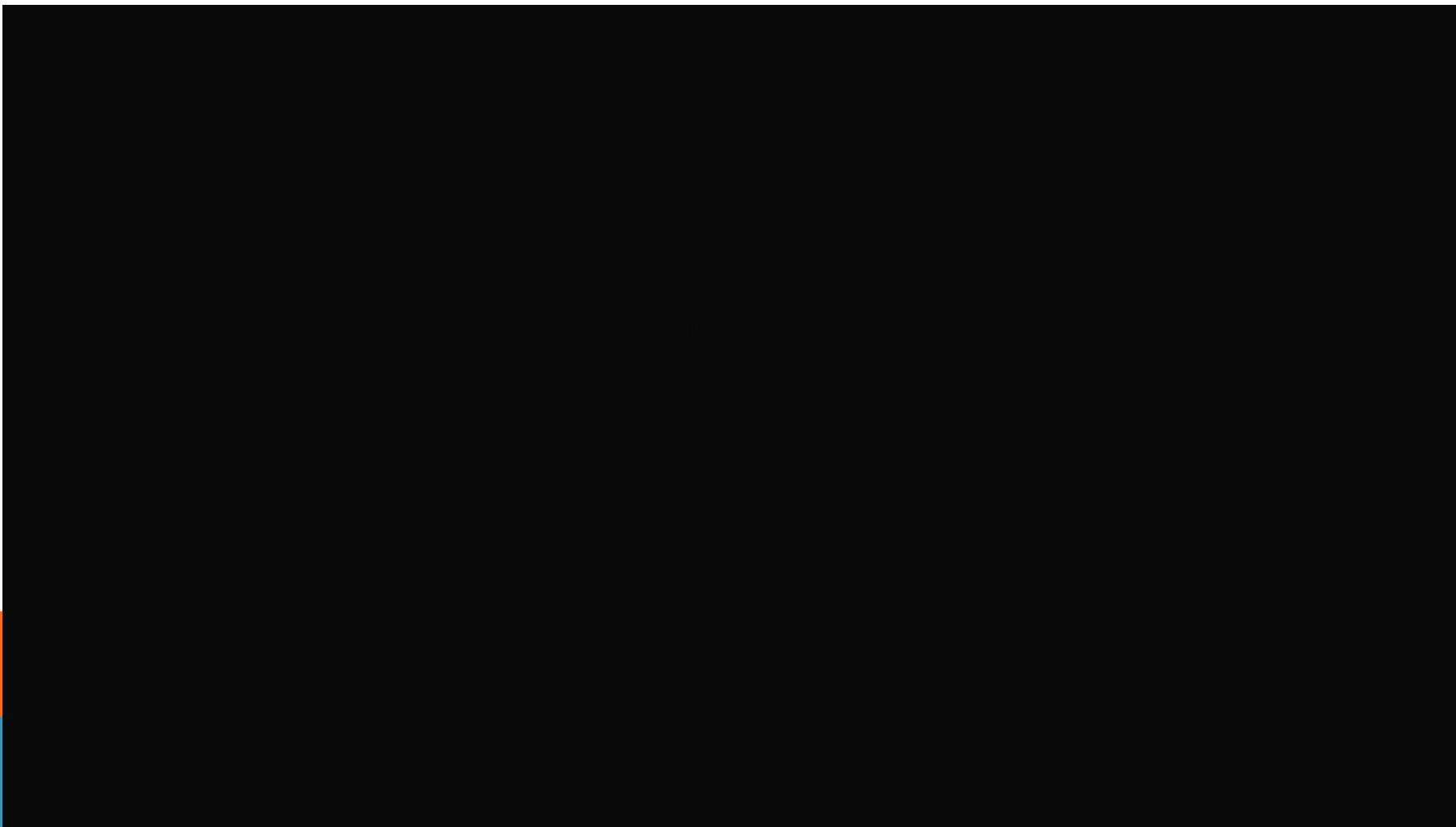
Universally Applicable



Self securing ledger  
connection



# Extension pole for face marking in tunnel





# Extension pole for face marking in tunnel



Challenging - Restricted environment

Highly commended in client's innovation award

**MTR** Projects Division  
**創新安全設計比賽 2016-17**  
**Safety Innovation Awards 2016-17**

**宗旨 Purpose**  
 旨在提高人員安全意識，鼓勵創設新穎、實用、具成本效益的安全設計方案，以改善工程現場的安全狀況。

**宗旨 Purpose**  
 To encourage innovative solutions to 1st party construction safety issues by creating a safe working environment.

**參賽資格 Eligibility**  
 歡迎所有在港從事工程建設的僱主及專業人士參加。

**參賽資格 Eligibility**  
 Open to all construction professionals and companies working in Hong Kong.

**截止日期 Deadline**  
 2016年3月18日 (星期五)  
 Deadline: 18 March 2016 (Thu) 11:59pm

**查詢電話**  
 2342 2222 (中文) / 2342 2222 (英文)

**查詢電話**  
 2342 2222 (Chinese) / 2342 2222 (English)





### Elevated Guardrail



Pre-installed  
guardrail



早裝早享受 · 防墮唔駛愁!

Good planning, no falling!

相片來源: 1128  
如你有好嘅相片, 請電郵俾高級建造安全顧問黃勝浩  
電郵地址: ericwsh@mtr.com.hk

Source: Contract : 1128  
Please contact Mr. Eric Wong, SCSA via e-mail if you have any good photo  
E-mail address : ericwsh@mtr.com.hk



小創意, 更安全



Little innovation,  
make safer



Commended by  
Client



# Develop Simplified Safe Working Procedure

Standardize Working Procedure

MTR Shatin to Central Link Contract 1128  
South Ventilation Building to Admiralty Tunnels

**Simplified Safe Working Procedure for Anchorage Point and Lifeline Usage**  
簡單施工程序 - 橫掛點和救生繩使用

**Control measures 控制措施**

1. Check Anchor Point Requirement  
檢查橫掛點
2. Check the Maximum deflection  
檢查最高偏位
3. Make sure that worker should wear the safety harness and anchor it on the horizontal lifeline  
確保工人佩帶安全帶並將其固定在救生繩上

1.5m	2.0m	2.5m	3.0m	3.5m	4.0m
1.5m	1.5m	1.5m	1.5m	1.5m	1.5m

**SIMPLIFIED SAFE WORKING PROCEDURE FOR - Using Safety Harness As Last Resort**

**SAFETY WORKING SEQUENCE - STEP BY STEP**

**SEQUENCE 1 - Selection of the suitable anchorage system (By Management Team)**  
工作1 - (管理層) 選擇合適的繫繩 錨固點系統

**Management Team**  
• Selection of the suitable anchorage system

- **Fixed anchorage**  
Provide continuous protection throughout the period  
e.g. Built-in eye bolt, rigid beam, strong column of a building etc.)  
[e.g. Any member of a temporary scaffolding, bamboo scaffolding, section of pipes, window frame etc.]
- **Anchorage with minimum pull-out force of 5kN.**
- **Anchorage points** - Eye bolts, anchorage line, fittings and embedded material should be checked by Professional Engineer of the structural discipline (e.g. TWC)
- **Horizontal Lifeline**  
Horizontal Lifeline tighten up to tensile force of 0.75 - 1.0 kN  
Horizontal lifeline should be used by one person at one time between supports. (Use of double lanyard safety harness)

**Vertical Independent Lifeline**  
It can be of Fibre rope (dia. 15.5mm fit to fall arrester) or metal cables. (min. 5mm at 250kN breaking strength)  
One Vertical Independent Lifeline for one person only.  
Application of shock absorbers - Only apply to high level work of higher than 6.5m

**RISK**  
Fall hazard  
Failure of anchor point  
NO metal wire rope where electrical hazards are present  
CAUTION  
Electrical hazard

PREPARED BY: [Name]  
REVIEWED AND APPROVED BY: [Name]

**SIMPLIFIED SAFE WORKING PROCEDURE FOR - Using Safety Harness As Last Resort**

**WORKING SEQUENCE - STEP BY STEP**

**SEQUENCE 2a - Task Launching Meeting & PWSA (By Production Team)**  
工作 2a - (班組人員) 安全會議 任務會議 及 簡化工作程序(PWSA)

**L Team**  
Task Meeting - Identify the risk/ Highlight the control measures  
Risk assessment (PWSA) shall be conducted prior to the commencement of the task.

**Control Measures 控制措施**

- Check the condition of the approved anchor point system before use. NO metal wire rope where electrical hazards are present
- 1) End users need to be trained so that they understand the limitations of their equipment and how to select the correct equipment for the task with which they're involved.
- 2) Pre-use check should be conducted by the end user.
- 3) Monthly safety harness inspection should be conducted.
- Storage of the safety harness in proper manner.
- One Vertical Independent Lifeline for one person only.  
The knot / tie of the Vertical Independent Lifeline attached to the anchorage point should be carried out by competent rigging.  
Fall arrester should be installed at high level

**Control Measures 控制措施**

- Horizontal Lifeline should be tightened up to tensile force of 0.75 - 1.0 kN. Horizontal lifeline should be used by one person at one time between supports. (Use of double lanyard safety harness)  
Anchorage line shall be secured to an upper anchorage point.
- Do not over estimate the fall distance.  
Select correct length of the lanyard, shock absorbers, retractable fall arrester  
Application of shock absorbers - Only apply to high level work of higher than 6.5m.  
Tool belt or tool lanyard should be adopted.
- A. Do not attach two or more snap hooks or carabiners to a single D-ring.  
B. Do not load a carabiner or snap hook at the gate.  
C. Ensure that connections are compatible and secure.  
D. Do not attach two snap hooks or carabiners together.  
E. Do not tie back on a lanyard unless specifically designed to do so by the manufacturer.  
F. Ensure that the snap hook is closed and locked.

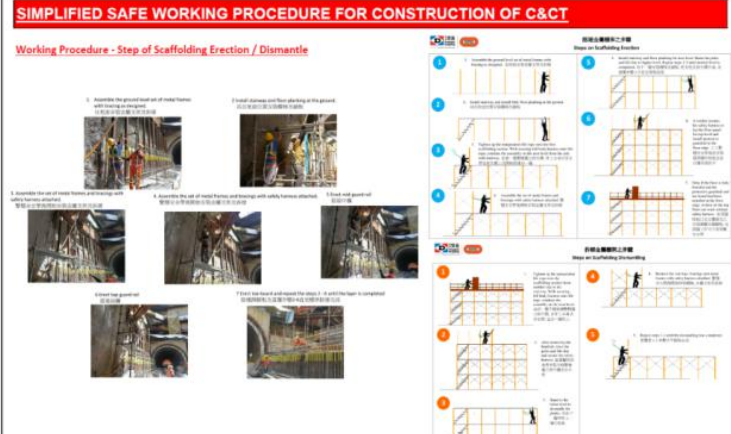
PREPARED BY: [Name]  
REVIEWED AND APPROVED BY: [Name]


## Develop Simplified Safe Working Procedure

- Scaffold Erection / Dismantle SSWP
- Half-Landing Scaffold Erection SSWP
- Using Safety Harness SSWP

**SIMPLIFIED SAFE WORKING PROCEDURE FOR CONSTRUCTION OF C&T**

Working Procedure - Step of Scaffolding Erection / Dismantle



ORIGINATOR	PROJECT	SWP NO.	PREPARED BY	REVIEWED AND APPROVED BY
	MTR SHATIN TO CENTRAL LINK (SOUTH VENTILATION BUILDING TO ADMIRALTY TUNNELS)	XXX / SWP / XXX / 001	NAME	DATE
		ISSUE REF.	DEPARTMENT	PROJ.
		DATE	POSITION	
			SIGNATURE	
			DATE	

MTRC Shatin to Central Link Contract 1128  
South Ventilation Building to Admiralty Tunnels

Alternative Scaffolding Erection Method – Half Landing Method



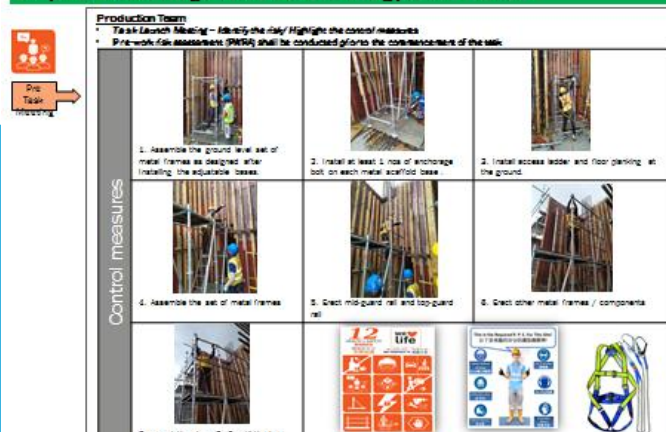
1. Provide the temporary half-landing / planking
2. Stand at the temporary half-landing to erect the protective guardrail.
2. Finish the protective guardrail for the 2<sup>nd</sup> level working platform.

MTR Shatin to Central Link Contract 1128  
South Ventilation Building to Admiralty Tunnels

Simplified Safe Working Procedure for scaffolding platform erection

**Production Team**  
 • Task Launch Meeting – Identify the role / Highlight the control measures  
 • Pre-work risk assessment (SWTA) shall be conducted prior to the commencement of the task.

**Control measures**



1. Assemble the ground level set of metal frames as designed after installing the equidistant bases.
2. Install at least 1 row of anchorage bolt on each metal scaffold base.
2. Install access ladder and floor planking at the ground.
4. Assemble the set of metal frames.
5. Erect mid-guard rail and top-guard rail.
6. Erect other metal frames / components.
7. Repeat the steps 2-6 until the layer is completed.



# Develop Simplified Safe Working Procedure

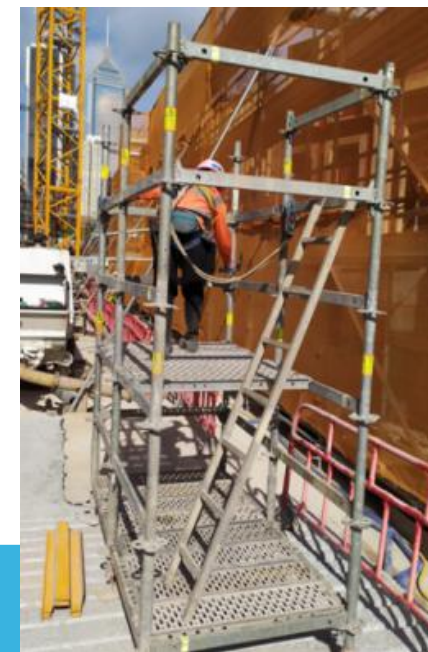
## Half Landing Erection Method



Provide temporary half-landing



Stand on half-landing to erect guardrail



Remove the temporary - landing and erect the 2<sup>nd</sup> level planking



Provide toe-board



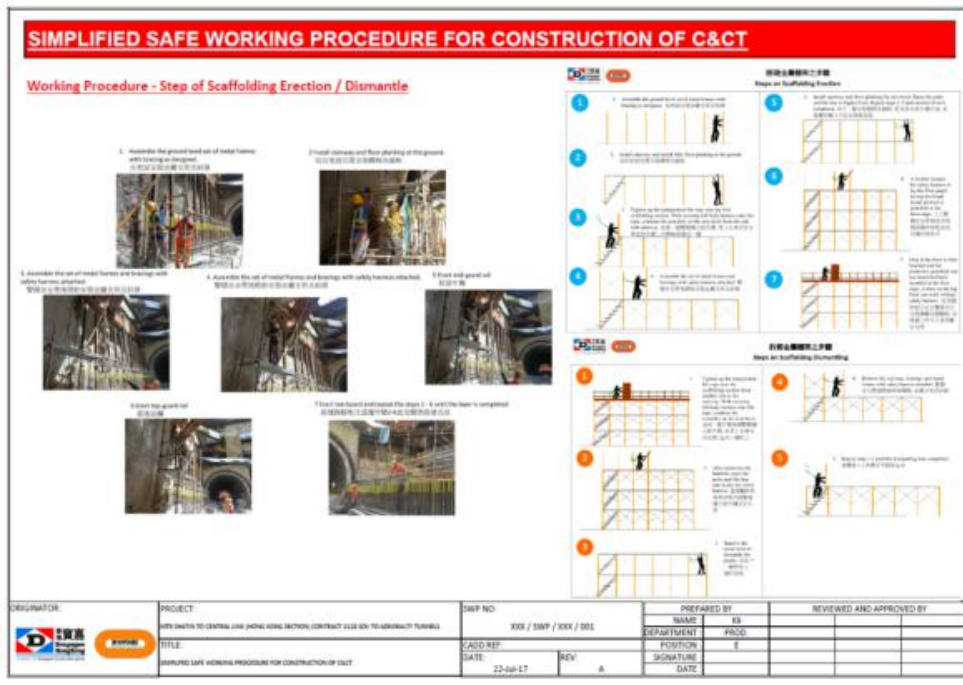
# Develop Simplified Safe Working Procedure

Briefing to related parties



**SIMPLIFIED SAFE WORKING PROCEDURE FOR CONSTRUCTION OF C&T**

**Working Procedure - Step of Scaffolding Erection / Dismantle**



REVISION NO.	REVISION DESCRIPTION	DATE	REVISED BY	APPROVED BY
1	Initial Issue	23-Sep-17	A	





# Work at Height VR Training

## VR Work at Height Training Sessions

- Induction Training
- Worker Safety Meeting





# Safety Day



Safety Day On 21 Nov 2019  
Focus on major risk: including WAH



# Safety Information Day

Sharing safety Innovative measures



# WAH Promotion Slogan

 香港寶嘉  
Dragages  
HongKong  
A member of the Bouygues Construction group

 BOUYGUES  
TRAVAUX PUBLICS

MTRC Shatin to Central Link Contract 1128  
South Ventilation Building to Admiralty Tunnels















高空工作要留神  
無分你我任何仁 

Working at height safety Everyone duties vigilance

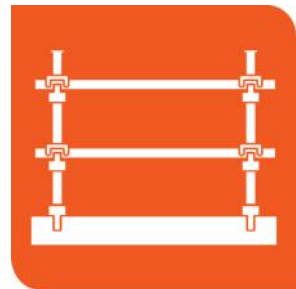


# 12 Health & Safety Basics

## 12 HEALTH & SAFETY BASICS

 <b>ALCOHOL &amp; DRUGS</b> Reasoning, distribution or being at work while under the influence of drugs and/or alcohol is forbidden.	 <b>PERSONAL PROTECTIVE EQUIPEMENT</b> All personnel, including visitors, who work on or visit our construction sites shall wear as a minimum: <ul style="list-style-type: none"> <li>■ Safety shoes</li> <li>■ A hard hat</li> <li>■ High Visibility Jacket and high-visibility PPE when required as defined by task specific risk assessment.</li> <li>■ Safety glasses</li> <li>■ Hearing protection</li> <li>■ Safety gloves</li> </ul> For activities in third party premises, specific PPE must be defined after task risk analysis.	 <b>TRAFFIC</b> Obey traffic regulations both on-road and off-road. Horizontal and vertical alignments and speed limits should be displayed to prevent slip, trips and falls. Pedestrians on roads or vehicle movements should be well signposted for pedestrian traffic and work activities. Each site must have a plan to segregate mobile equipment and vehicle roadways from pedestrian traffic.	 <b>PRE-TASK BRIEFING</b> The workers start their day with a warm-up and daily briefing. They will formally share any experience from the previous day while being allocated new tasks for the day ahead and potential risks.	 <b>RISK ANALYSIS</b> No work can commence without: <ul style="list-style-type: none"> <li>■ A clear definition of the task</li> <li>■ An assessment of safety and health risk (short or long-term) associated with method statement, the working environment and mitigation measures.</li> <li>■ Formal training for the task to be undertaken. Risk overview is to be provided.</li> </ul> Any technical or procedural changes or updates received or approved as part of the assessment of the task must be implemented in the design or the approach of training if applicable.	 <b>ERGONOMICS</b> The health and well-being of workers, tasks that generate repetitive movements must be analysed to prevent, reduce or remove the health impact. In particular, mechanical means must be introduced into the design of work to limit the effects of vertical or horizontal handling operations.
 <b>STABILITY</b> Temporary structures, equipment or plant (boom cranes, formwork, precast elements, scaffolding, etc.) must be verified and certified as per approved technical systems and method statements. Their stability must be maintained throughout all phases and differing locations of the work environment.	 <b>HAZARDOUS ENERGY CONTROL</b> Work on energized systems can only be performed after formal switching off and isolation has been proven. Do not perform any work on electrical systems without checking first that it has been rendered de-energized by the appropriate personnel and placed in a locked off condition. The appointed person and the person performing the work must check personal isolation.	 <b>TOOLS</b> No work can be carried out without appropriate tools that are designed for the task and its environment. These must be inspected regularly and maintained appropriately.	 <b>COLLECTIVE PROTECTION</b> All work at height that should be carried out from a fixed or mobile platform or from a scaffold with guard or handrails designed for the task and shall be subject to inspection before use. Access to working platforms must be built from a metallic stabilized structure designed to prevent falls. Temporary stairs or stair towers must be built as a means of access to working platforms. Use of ladders or stepladders as working platforms is prohibited.	 <b>WORK AT HEIGHT</b> On working platforms an all-around fall protection system must be used where practicable. Protection systems must be stiff and fit for purpose to protect from falls from height, falling objects or projectiles.	 <b>INTERVENTION</b> In the event of being unable to act or conditions, if a worker's duty is to intervene, they must: <ul style="list-style-type: none"> <li>■ Identify the job and report it.</li> <li>■ Advise and correct if necessary.</li> </ul>


**we love life**  
 WE LOVE LIFE, WE PROTECT IT.



### COLLECTIVE PROTECTION

All work at height that should be carried out from a fixed or mobile platform or from a scaffold with guard or handrails designed for the task and shall be subject to inspection before use.

Access to working platforms must be built from a metallic stabilized structure designed to prevent falls. Temporary stairs or stair towers must be used as a means of access to working platforms. Use of ladder or stepladders as working platforms is prohibited.



### WORK AT HEIGHT

On working platforms an all-around fall protection system must be used where practicable. Protection systems must be stiff and fit for purpose to protect from falls from height, falling objects or projectiles.

# 12 Health & Safety Basic



Display Banner on site

Briefing to all site workers  
Distribute leaflet on site





## CIC Outreach Service





**MTR SHATIN TO CENTRAL LINK CONTRACT 1128**  
**SOUTH VENTILATION BUILDING TO ADMIRALTY TUNNELS**

# Work at Height Promotion Video





## Question

建造圖中的雙圓(花生)型豎井能減少大量高空工作

而本工地的雙圓(花生)豎井為香港第幾次建造呢?

- A. 首次
- B. 第二次
- C. 第五次



# MTR SHATIN TO CENTRAL LINK CONTRACT 1128 SOUTH VENTILATION BUILDING TO ADMIRALTY TUNNELS



End