Contract No. 7/WSD/21

Construction of Siu Ho Wan Water Treatment Works Extension and Siu Ho Wan Raw Water Booster Pumping Station

Visit by HKICA on 23 Nov 2024

Rundown

- Introduction of the Project (by WSD/CM or RSS)
- Site Safety Management and the Implementation of 4S (by RSS)
- Quality Control in Construction Works (by RSS)
- Introduction of Testing and Quality Assurance Procedures from Raw Water to Treated Water (by WSD/WSc)
- Site Visit to Laboratory Facilities and Construction Site

Project Background

Contract No.	7/WSD/21
Contract Title	Construction of Siu Ho Wan Water Treatment Works Extension and Siu Ho Wan Raw Water Booster Pumping Station
Contract Sum	HK$2,065.73M (tendered total of the prices: HK$1,542M)
Commencement Date	21 March 2022
Target Completion Date	Q1 2026
PMD / Supervisor	Binnies Hong Kong Limited
Contractor	China Road and Bridge Corporation
Form of Contract	NEC4 ECC Option C: Target Contract with Activity Schedule

Project Background

- Siu Ho Wan Water Treatment Works (SHW WTW) is located at **North Lantau.**
- Mainly supplies water to the **HKIA, the HK Disneyland** and **the Tung Chung New Town Development.**

Scope of Contract

- Construction of new water treatment facilities & laboratory building within the existing SHW WTW compound.
- Construction of a new raw water booster pumping station at Siu Ho Wan.

Increase the Water Treatment Capacity from 150 000 m^3/day to 300 000 m^3/day

Increase the Raw Water Transfer Capacity from Tai Lam Chung Reservoir to SHW WTW

Zero Accident – Everyone's Effort

Contract No. : 7/WSD/21

Contract Title : Construction of Siu Ho Wan Water Treatment Works Extension and Siu Ho Wan Raw Water Booster Pumping Station

Contract Start Date: 21/3/2022

		B/F from Previous Year	2024											
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
No. of Visits by Labour Dept.	Monthly	0	0	0	0	0	0	0	0	0	0	0	0	0
No. of Dangerous Occurrence	Monthly	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cumulative	0	0	0	0	0	0	0	0	0	0	0	0	0
No. of Fatal Accidents	Monthly	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cumulative	0	0	0	0	0	0	0	0	0	0	0	0	0
No. of Non-Fatal Accidents	Monthly	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cumulative	0	0	0	0	0	0	0	0	0	0	0	0	0
Man-hours Worked	Monthly	40550	44320	31400	44090	44834	53702	55409	56558	62461	63246	69034	0	0
	Cumulative	524120	568440	599840	643930	688764	742466	797875	854433	916894	980140	1049174	0	0
Man-days Worked	Monthly	2153	2237	1326	2390	2269	2942	2958	2872	3219	3068	3418	0	0
	Cumulative	22271	24508	25834	28224	30493	33435	36393	39265	42484	45552	48970	0	0
Man-days Lost due to Accident	Monthly	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cumulative	0	0	0	0	0	0	0	0	0	0	0	0	0
Accident Frequency Rate (AFR) of the Month			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cumulative Accident Frequency Rate (CAFR)			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Zero Accident – Everyone's Effort

Morning Safety Briefing

Evening Safety Briefing

Safety Inspection

- Regular and surprise inspections
- Effective communication channels

VR training to frontline workers

Safety Meeting

Proper Access and Alert Notices

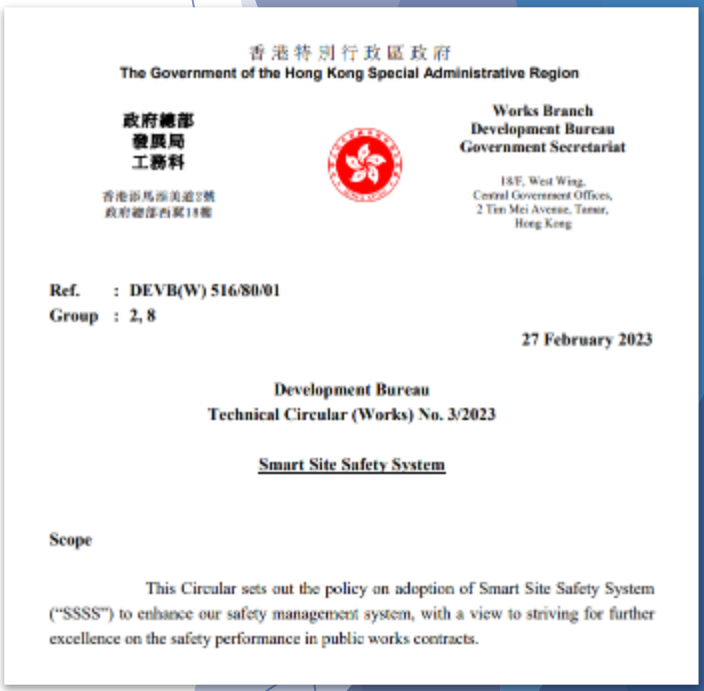
Always, Safety First!

Be Proactive, Stay Vigilant, Practice Due Diligence.

Smart Site Safety System (4S)

Technical Circular (Works) No.3/2023 listed the following SSSS components on Site Safety Management to be provided: -

- (a) Centralized Management Platform (CMP)
- (b) Digitized tracking system for site plants, powered tools and ladders
- (c) Digitalized permit-to-work system for high risk activities
- (d) Hazardous areas access control by electronic lock and key system
- (e) Unsafe acts / dangerous situation alert
- (f) Smart monitoring devices for workers and frontline site personnel
- (g) Safety Monitoring System using Artificial Intelligence
- (h) Confined Spaces Monitoring System



香港特別行政區政府
The Government of the Hong Kong Special Administrative Region

政府總部
發展局
工務科

Works Branch
Development Bureau
Government Secretariat

Ref. : DEVB(W) 516/80/01
Group : 2, 8

27 February 2023

Development Bureau
Technical Circular (Works) No. 3/2023

Smart Site Safety System

Scope

This Circular sets out the policy on adoption of Smart Site Safety System ("SSSS") to enhance our safety management system, with a view to striving for further excellence on the safety performance in public works contracts.

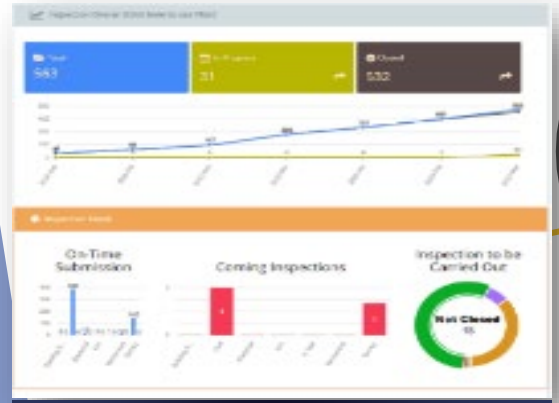
安全智慧工地系統標籤計劃
SMART SITE SAFETY SYSTEM
LABELLING SCHEME

Smart Site Safety Management Centralized Management Platform (CMP)

Surface and Building Instrumentation Monitoring

4D Construction Method Statement(CMS)

Ariel Construction Progress video



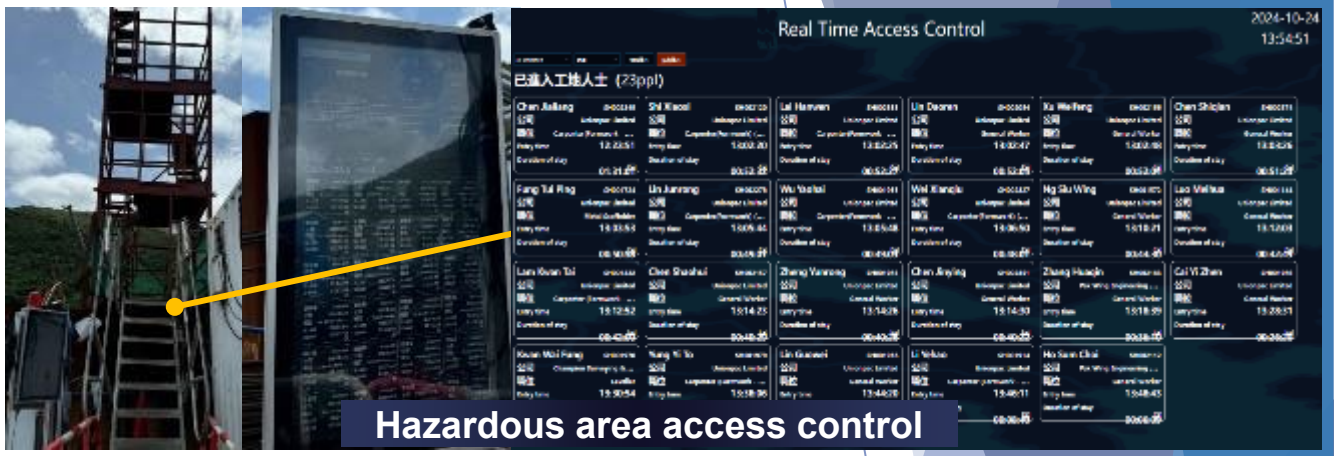
Digital Works Supervision System

Centralized Management Platform

360 Camera

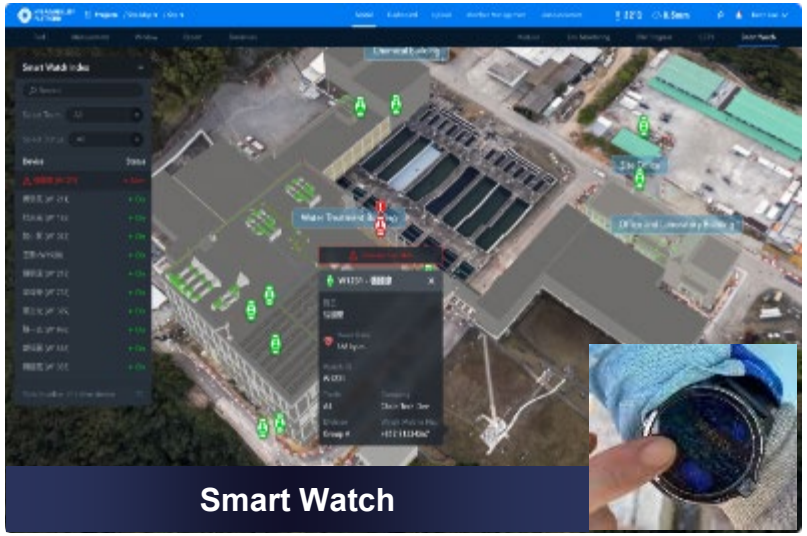
Smart Site Safety Management

360 Camera and RFID Anti-Collision System



Hazardous area access control

Confined Space Robotic Gas Detection



Smart Watch

AI Cam (Tower Crane + PPE) & CCTV

Quality Control in Construction Works

- General Specifications for Civil Engineering Works (2006 Edition)
  - https://www.cedd.gov.hk/filemanager/eng/content_72/GS%202006%20Vol%201%20Rev%2028_210610.pdf
  - Lays down the quality of materials, the standards of workmanship, the testing methods and the acceptance criteria for civil engineering works
    - e.g. concrete, reinforcement bars, soil, steelworks, water pipes and etc.

- Particular Specification
  - Substitution / amplification / addition to the above General Specifications

Quality Control in Construction Works

- Testing of Concrete (GS Section 16)
  - Workability
    - One sample of concrete shall be provided from each batch of concrete to determine the workability of the concrete.
  - Compressive Strength
    - Two test cubes shall be made from each sample of concrete taken. Each pair of test cubes shall be tested to determine the compressive strength at 28 days.

- Testing of Steel Reinforcement (GS Section 15)
  - Mass per metre
  - Chemical composition (product analysis)
  - Tensile properties
  - Bend performance
  - Bond property

Quality Control in Construction Works

- Testing of Completed Water Pipe (GS Section 22)
  - Hydrostatic pressure testing
    - 1.5 times the maximum working pressure of the pipelines
  - Water Sterilization
    -

Test Parameter	Acceptance Criteria
Turbidity (NTU)	≤ 3.0
Colour (HU)	≤ 5
pH at 25°C	6.5 – 9.2
Free Residual Chlorine (mg/L)	> 0 and ≤ 1.5
Conductivity at 25°C (µS/cm)	≤ 300
Total Coliforms (cfu/100mL)	0
E.coli (cfu/100mL)	0
Heterotrophic Plate Count (cfu/mL)	≤ 20
Lead (µg/l)	≤ 10
Cadmium (µg/l)	≤ 3
Chromium (µg/l)	≤ 50
Nickel (µg/l)	≤ 70

Quality Control in Construction Works

- Material (compliance) testing to be carried out by:
  - Public Works Laboratories (PWL) or
  - Approved Hong Kong Laboratory Accreditation Scheme (HOKLAS) laboratories
    - only if the required tests cannot be undertaken by PWL as advised by CGE/S&T

- Sampling and Reporting
  - RSS to select samples for laboratory tests; or
  - Laboratory staff to select test locations for in-situ tests
  - In any case, RSS must supervise the sampling, transport and delivery of samples to the laboratories
  - All test reports must be supplied directly to RSS, not via the Contractor

Quality Control in Construction Works

Public Works Laboratories (PWL)

- Public Works Central Laboratory (PWCL) at Kowloon Bay
- Five Public Works Regional Laboratories (PWRL) at Tsz Wan Shan, Tai Po, Sham Shui Kok, Tin Shui Wai and North Lantau
- Laboratory Information Management System (LIMS) e-Portal launched on 18 November 2024
  - https://lims.cedd.gov.hk/
  - Make test requests, arrange sample collection, trace test progress and download electronic test reports online round-the-clock.
  - Starting from 1 April 2025 onwards, all test requests shall be made via LIMS e-Portal.

Quality Control in Construction Works

- Mechanical & Electrical Standard Specifications
  - WSD Mechanical & Electrical Standard Specifications
    - https://www.wsd.gov.hk/en/publications-and-statistics/guidelines-reports-drawings-specifications/mechanical-electrical-standard-specification/index.html
  - General Specification for Fire Services Installation in Government Buildings of the HKSAR
  - General Specification for Electrical Installation in Government Buildings of the HKSAR
  - General Specification for Mechanical Installations Installation in Government Buildings of the HKSAR

- General Specification for Building, 2017 Edition
  - https://www.archsd.gov.hk/media/publications-publicity/general-specification-for-building/GS2017_20190220.pdf
  - This General Specification is applicable to all building works in connection with the construction, alteration and maintenance of buildings

Adoption of DWSS in Construction Works

- Technical Circular (Works) No. 2/2023 - Digital Works Supervision System (DWSS)
  - a web-based centralized portal that facilitates digital submission and approval of construction works information
  - uplift the capacity and sustainability of the industry, increase productivity, enhance regulation and quality assurance, improve site safety and reduce environmental impact.
  - all capital works contracts with pre-tender estimate exceeding $30 million

Adoption of DWSS in Construction Works

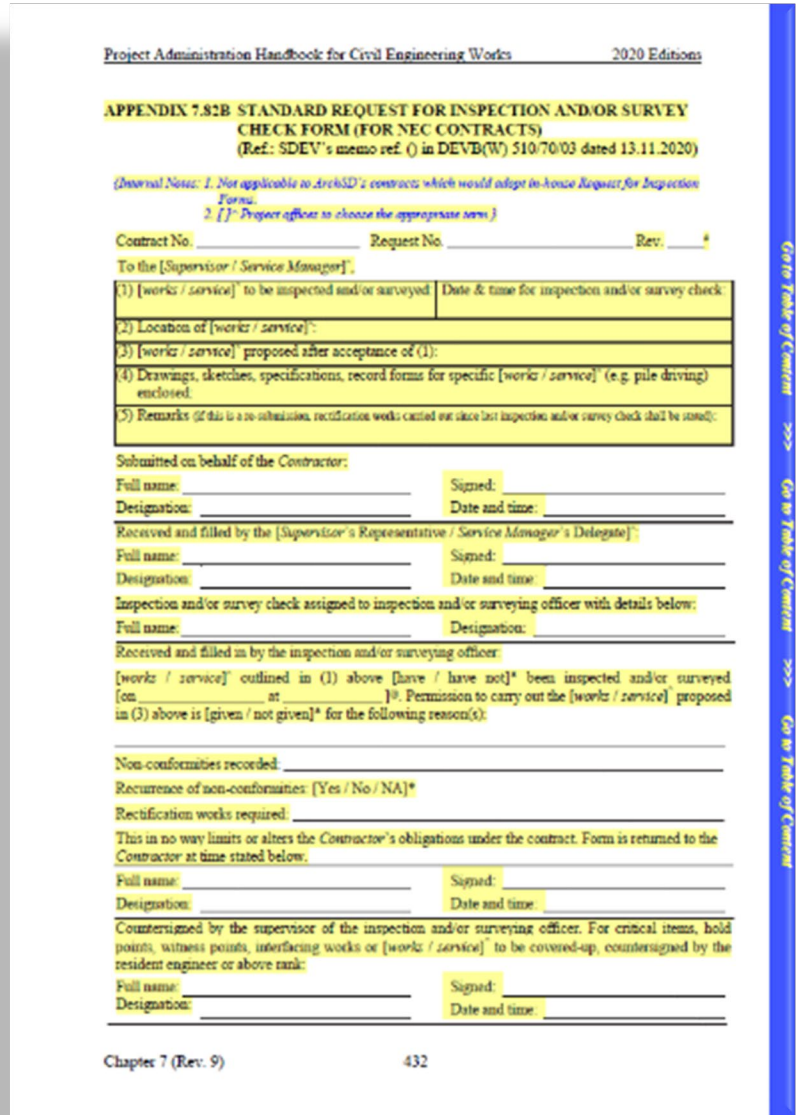
- Six mandatory modules
  - Request for Inspection/Survey Check (RISC) Form
  - Site Diary/Site Record Book
  - Site Safety Inspection Records
  - Cleansing Inspection Checklists
  - Labour Return Record
  - Contract Management

Adoption of DWSS in Construction Works

- **Request for Inspection/Survey Check (RISC) Form**
  - The Contractor shall present a completed Request for Inspection form at least 24 hours before the time shown for inspection
  - When the time for inspection or any revised time falls on a General Holiday the Contractor shall give at least 48 hours notice for inspection

Adoption of DWSS in Construction Works

- Request for Inspection/Survey Check (RISC) Form



Project Administration Handbook for Civil Engineering Works 2020 Editions

APPENDIX 7.82B STANDARD REQUEST FOR INSPECTION AND/OR SURVEY CHECK FORM (FOR NEC CONTRACTS)
(Ref.: SDEV's memo ref. () in DEVB(W) 510/70/03 dated 13.11.2020)

(Journal Notes: 1. Not applicable to ArchSD's contracts which would adopt in-house Request for Inspection Forms.
2. [ ] Project offices to choose the appropriate term.)*

Contract No. _____ Request No. _____ Rev. ____*

To the [*Supervisor / Service Manager*]*,

(1) [*works / service*]* to be inspected and/or surveyed:	Date & time for inspection and/or survey check:
(2) Location of [*works / service*]*:	
(3) [*works / service*]* proposed after acceptance of (1):	
(4) Drawings, sketches, specifications, record forms for specific [*works / service*]* (e.g. pile driving) enclosed:	
(5) Remarks (if this is a re-submission, rectification works carried out since last inspection and/or survey check shall be stated):	

Submitted on behalf of the *Contractor*:
Full name: _____ Signed: _____
Designation: _____ Date and time: _____

Received and filled by the [*Supervisor's Representative / Service Manager's Delegate*]*:
Full name: _____ Signed: _____
Designation: _____ Date and time: _____

Inspection and/or survey check assigned to inspection and/or surveying officer with details below:
Full name: _____ Designation: _____

Received and filled in by the inspection and/or surveying officer:

[*works / service*]* outlined in (1) above [have / have not]* been inspected and/or surveyed [on _____ at _____]@. Permission to carry out the [*works / service*]* proposed in (3) above is [given / not given]* for the following reason(s):

Non-conformities recorded: _____

Recurrence of non-conformities: [Yes / No / NA]*

Rectification works required: _____

This in no way limits or alters the *Contractor*'s obligations under the contract. Form is returned to the *Contractor* at time stated below.

Full name: _____ Signed: _____
Designation: _____ Date and time: _____

Countersigned by the supervisor of the inspection and/or surveying officer. For critical items, hold points, witness points, interfacing works or [*works / service*]* to be covered-up, countersigned by the resident engineer or above rank:

Full name: _____ Signed: _____
Designation: _____ Date and time: _____

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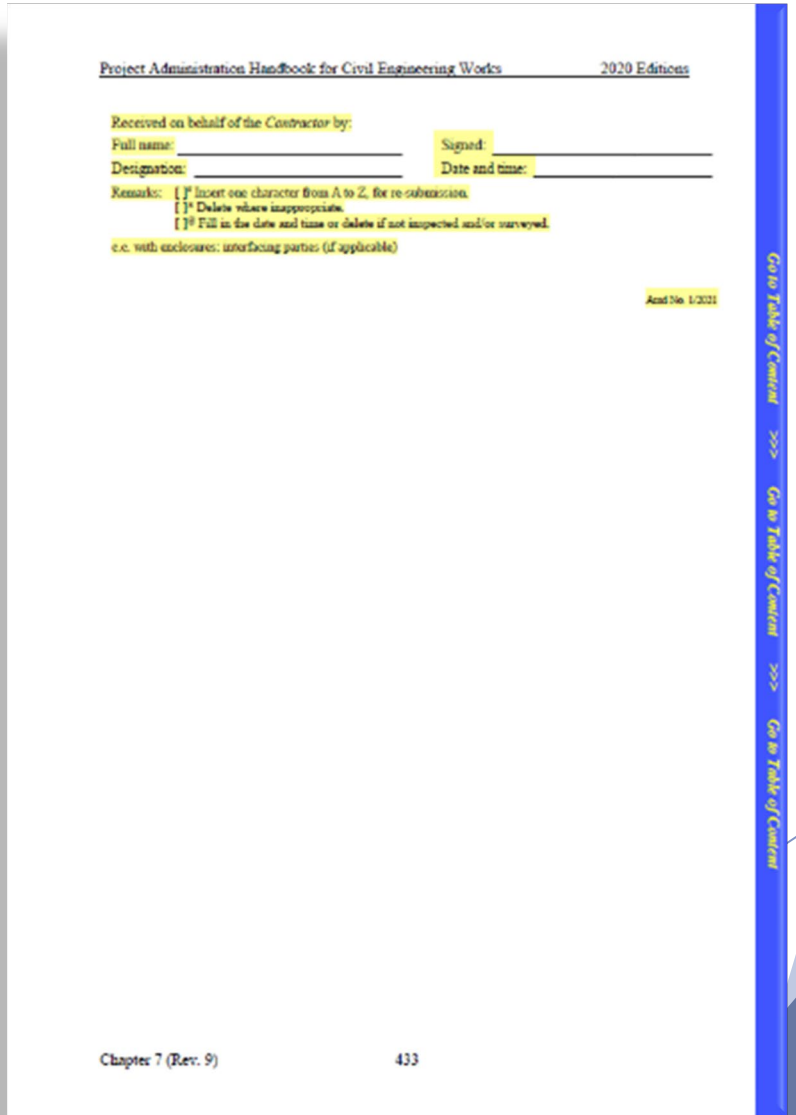

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Received on behalf of the *Contractor* by:
Full name: _____ Signed: _____
Designation: _____ Date and time: _____

Remarks: [ ]* Insert one character from A to Z, for re-submission.
[ ]* Delete where inappropriate.
[ ]@ Fill in the date and time or delete if not inspected and/or surveyed.

c.c. with enclosures: interfacing parties (if applicable)

Amd No. 1/2021

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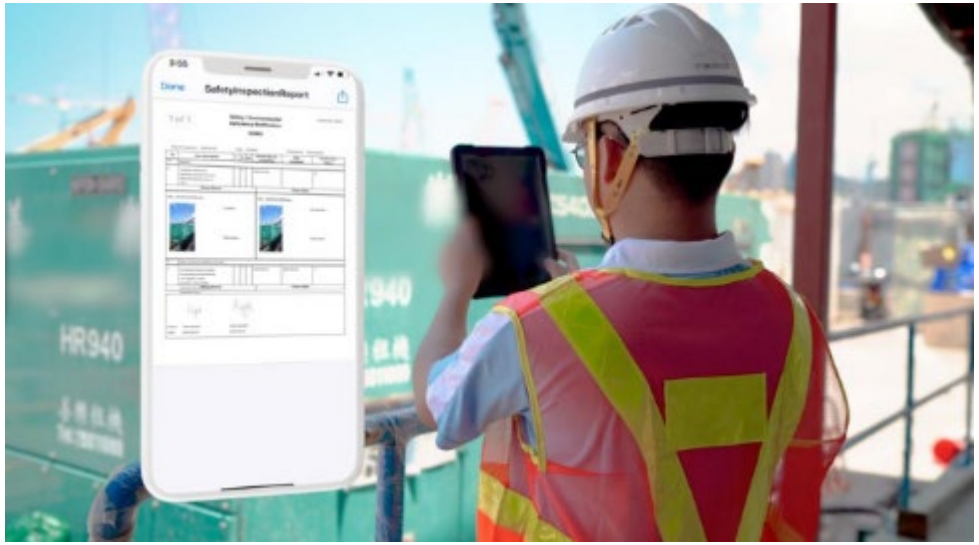
Adoption of DWSS in Construction Works

- Request for Inspection/Survey Check (RISC) Form
  - Immediate photos capture, documents and comments uploading
    - Time saving for workflow process
    - Efficient inspection and rectification



Adoption of DWSS in Construction Works

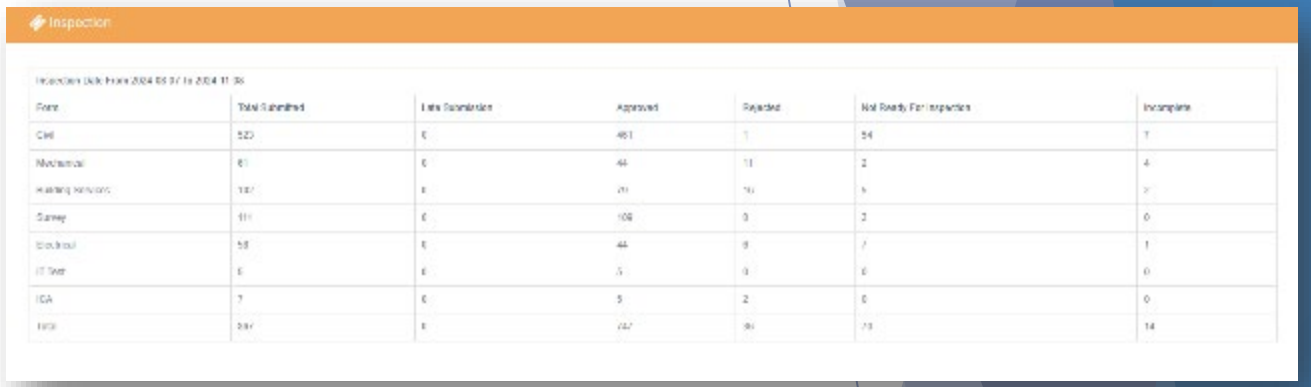
- Request for Inspection/Survey Check (RISC) Form
  - E-signature Control
    - Secured access path
    - Simplified verification process

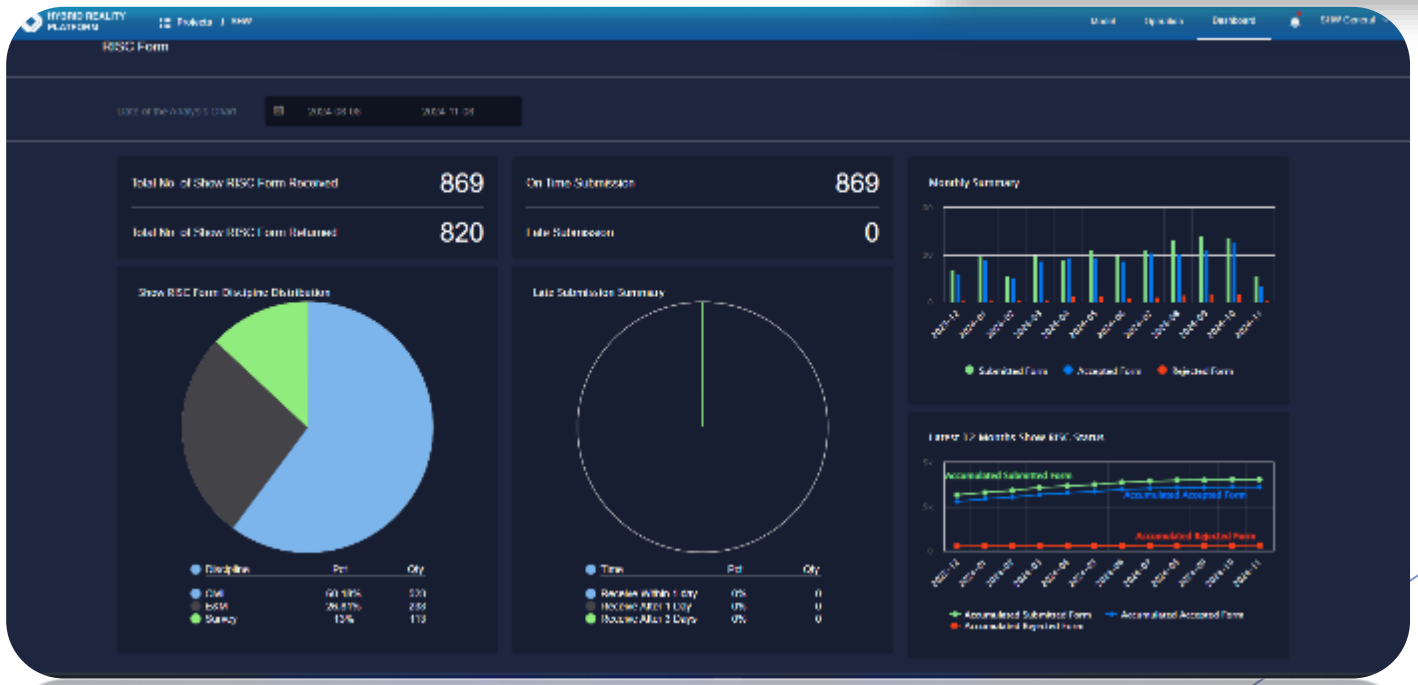
Adoption of DWSS in Construction Works

- Request for Inspection/Survey Check (RISC) Form
  - Push-Notification and Daily Reminder
    - Applying to desktop & mobile devices
    - Smart and human-based management

Adoption of DWSS in Construction Works

- Request for Inspection/Survey Check (RISC) Form
  - Analytical summary of RISC form:
    - overdue actions
    - completed/incomplete/outstanding inspections
    - passing/failing rate
    - process time analytics





Pipe Material Inspection by IIB

The manufacture and testing of the pipe materials shall be subject to inspection by an Independent Inspection Body (IIB)

- assist the Project Manager in the inspection of the manufacture and testing prior to delivery.
- IIB is a company or firm accredited by HKAS or its MRA partners under the Hong Kong Inspection Body Accreditation Scheme (HKIAS) as Type A inspection body for the relevant inspection scope of accreditation.
- The IIB shall carry out inspection in accordance with the Inspection Specification and the accreditation requirement laid down by HKAS under HKIAS.
- The IIB shall be authorized to reject any of the articles at any stage during production.

Pipe Material Inspection by IIB

- The Contractor shall not deliver any of the articles or report the articles as ready for shipment until the IIB issues his acceptance note.
- The Contractor shall submit the inspection report and certificate endorsed by the IIB to the Project Manager for acceptance before the delivery of any water supply pipeworks materials to site.
- All articles inspected by the IIB are subject to random checks by the Project Manager. Articles delivered may also be subject to additional test by the Project Manager or his authorized representative before acceptance for use in the contract.

DI/GI Pipe Material Inspection by IIB

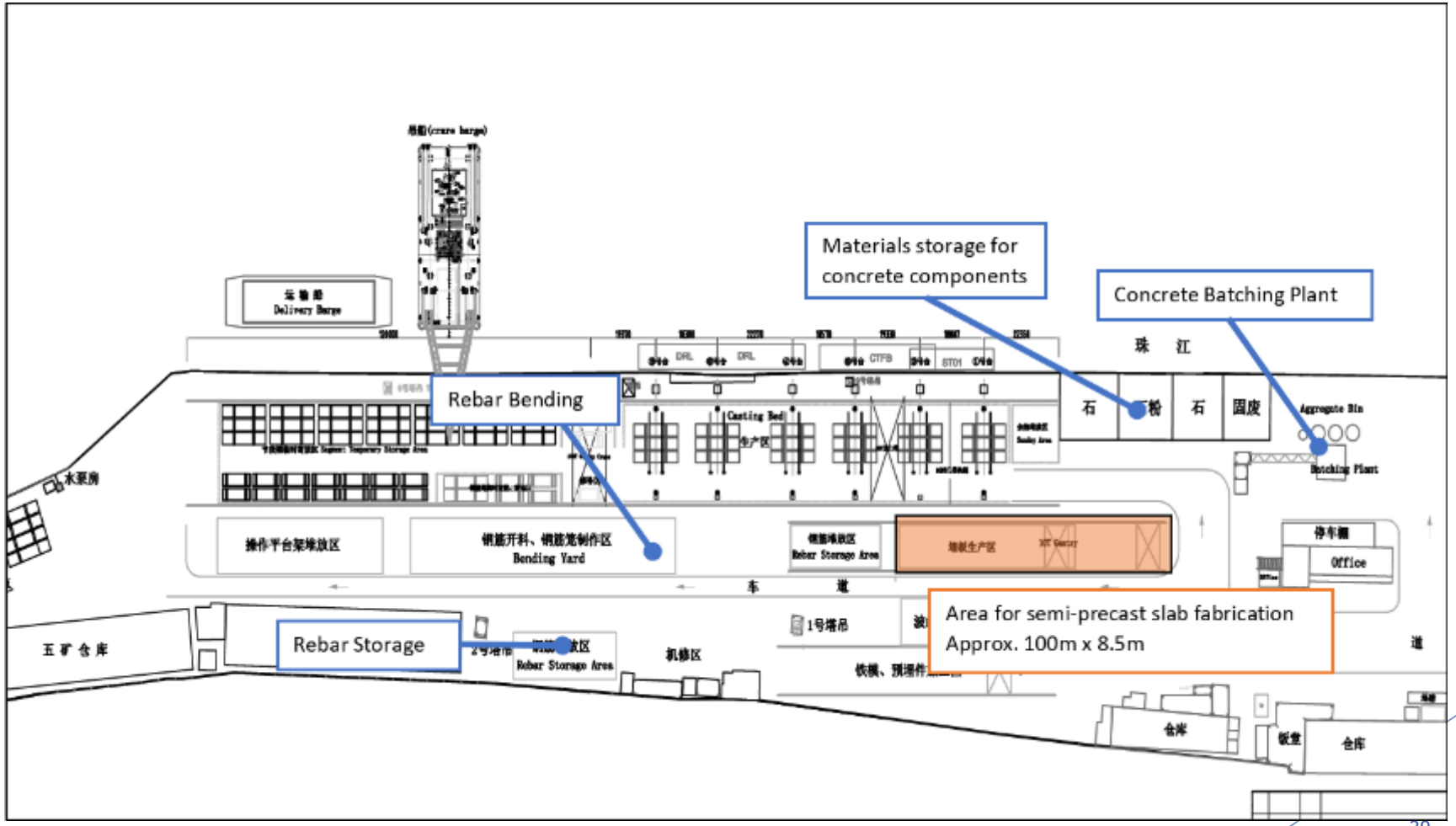
- **The scope of work to be carried out by the Independent Inspection Body (IIB) shall include the following:**
  - Witnessing water/hydrostatic pressure tests and other tests required.
  - Dimensional (including linings and coatings thickness), appearance and casting quality checks.
  - Quality and material checks including all accessories.
  - Marking checks.
  - Verification of test results including the validation/verification of certificates.
  - Issuing of acceptance note or non-acceptance note.
  - Approval of the method of export packing and protection including verification of fittings to be delivered in complete sets including accessories.
  - Submission of inspection/test reports/certificates.

RSS Inspection of DfMA units in Mainland

- **Fortress Precast Yard**
  - Panyu District, Guangzhou, Guangdong, China
  - Fabrication of all DfMA units (RC walls and slabs)

RSS Inspection of DfMA units in Mainland

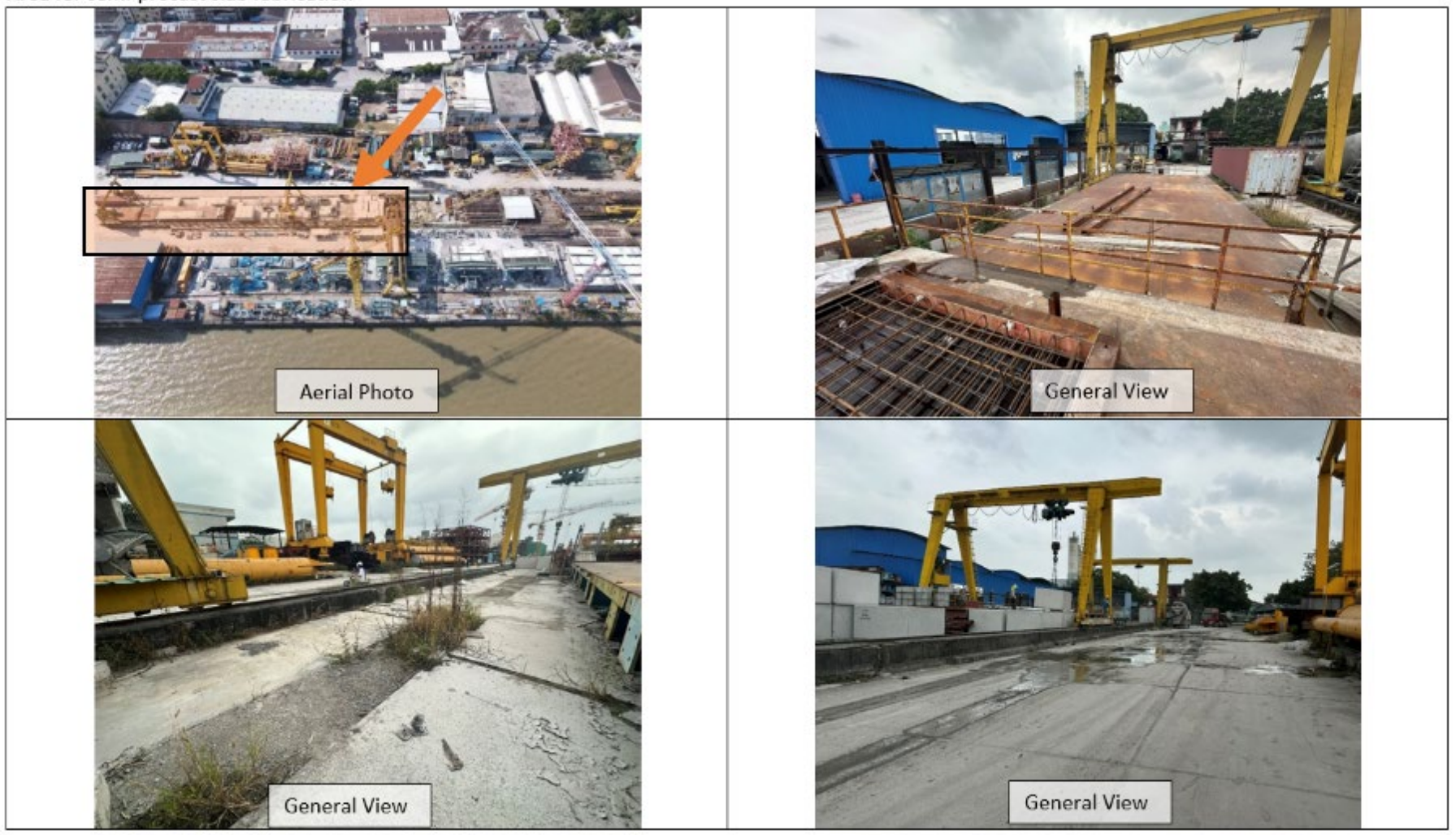
- Fortress Precast Yard



RSS Inspection of DfMA units in Mainland

- **Fortress Precast Yard**

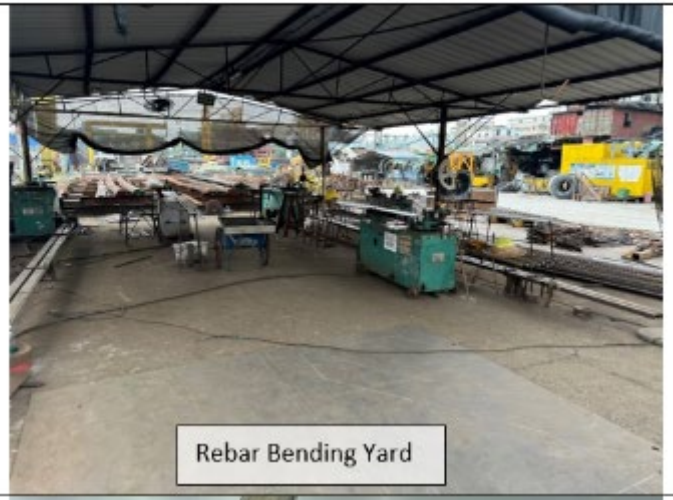
Area for semi-precast slab fabrication



RSS Inspection of DfMA units in Mainland

- **Fortress Precast Yard**

Other areas



RSS Inspection of DfMA units in Mainland

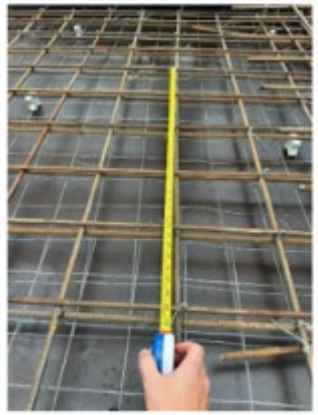
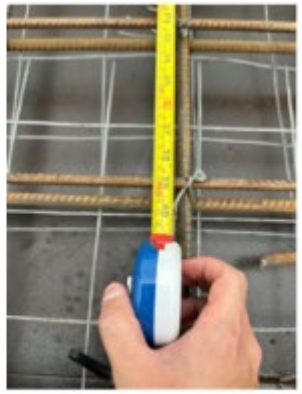
- Fortress Precast Yard

RSS Inspection of DfMA units in Mainland

- Fortress Precast Yard

Photos during rebar inspection








RSS Inspection of DfMA units in Mainland

- Fortress Precast Yard








Safety Induction

Safety Supervisor, Shan,
Phone no. : 6390 2099

Thank you