Site Safety Seminar for Capital Works New Works Contract (16 January 2024)
新工程合約工地安全講座

Enhanced Control of Temporary Works in HA
房委會對臨時工程優化監控

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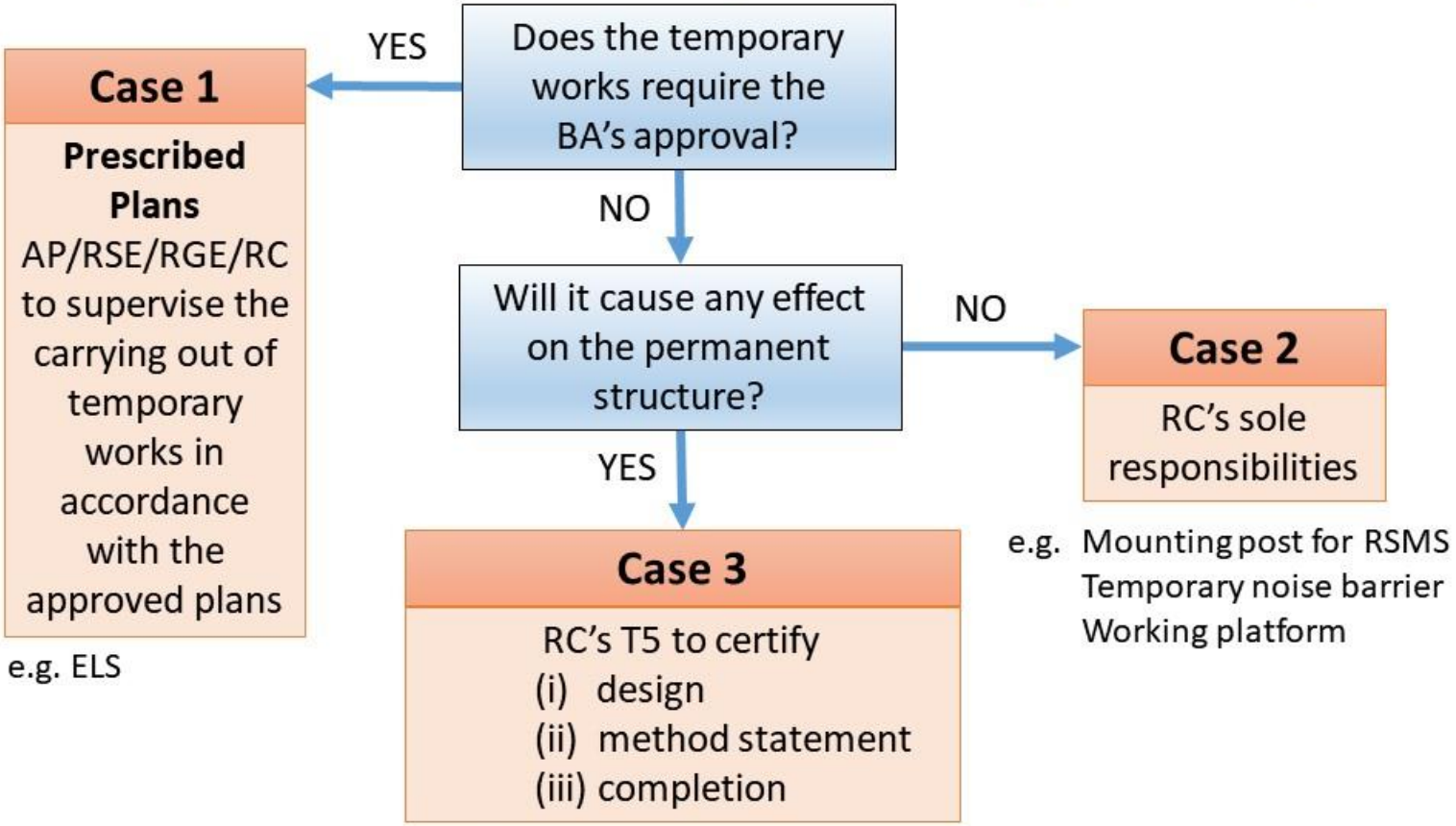
Background

- On **7 September 2022**, a fatal accident occurred at the "Construction of Subsidised Sale Flats Development at Anderson Road Quarry Site R2-2" of the Hong Kong Housing Society, of which a **tower crane collapsed** onto the container site offices tragically killing three people.

- In response, the Housing Authority (HA) formed a **Working Group** for the **enhanced control of temporary works** via the enhancement of the contract specifications, internal HA inspection guides and manuals**.**

- The presentation today will focus on the proposed updates of the **contract specification** that will promulgate shortly.

Temporary Works Classification
under Code of Practice for Site Supervision 2009 (2021 Edition)



Existing HA's Contract Specification for Temporary Works Control

Case 1 Temporary Works – PRE.B6.060

PRE.B6.060.9 GCC 5.8 - CONTRACTOR'S SUPERINTENDENCE

7. Registered Structural Engineer (RSE):
   a. Employ a RSE registered with Building Authority to comply with the requirements of the Specification;
   b. The RSE shall utilise standard forms (EPS-F1 and EPS-F2 in APPENDIX PRE.B6/I to this Worksection) when submitting all items requiring his certification, approval and calculation as detailed in the relevant sections of the Specification and including the following:
      i. All temporary works classified as Case 1 under the CoPSS clause 4.7;
      ii. All substantial temporary works stipulated in PRE.B10.010, as directed by the CM;
      iii. Temporary works erected on slopes or retaining walls, as directed by the CM;
      iv. Design and calculation for metal scaffolding in lift well for lift installation;

Contractor RSE's certification

Case 1	design	method statement	completion
	✓	✓	✗

Case 2 Temporary Works – PRE.B6.060

PRE.B6.060.9 GCC 5.8 - CONTRACTOR'S SUPERINTENDENCE

14. Qualified Engineer (QE):

(Guidance Note: Sub-clause (14)(g) - insert items of Temporary Works to be checked and certified by the QE for design only. Suggested Temporary Works under this category include Case 2 Temporary Works in CoPSS clause 4.5. The CM may specify items as appropriate for the avoidance of doubt.)

g. Checking and certification by QE are required for design only on the following Temporary Works:

i. .....;

Contractor QE's certification

Case 2	design	method statement	completion
	✓	✗	✗

Case 3 Temporary Works – PRE.B6.060

PRE.B6.060.9 GCC 5.8 - CONTRACTOR'S SUPERINTENDENCE

14. Qualified Engineer (QE):

(Guidance Note: Sub-clause (14)(d) - insert below only when necessary, items of Temporary Works to be certified by the QE for design and construction. Suggested Temporary Works under this category include Case 3 Temporary Works defined in CoPSS clause 4.5, erection of temporary protective canopy at F1 of domestic buildings and erection of temporary wall-supported platform inside lift well. The CM may specify items as appropriate for the avoidance of doubt.)

d. Certification by the QE is required for the design and construction of the following Temporary Works:

i. Erection of temporary protective canopy at F1 of Blocks …….. and Carport …….. as specified in PRE.B10.860;

ii. Erection of movable noise barrier as specified in PRE.B8.856;

iii. ……

Contractor QE's certification

Case 3	design	method statement	completion
	✓	✗	✓

Existing HA's Contract Specification for Temporary Works Control

PRE.B6 INFORMATION REQUIRED BY CONDITIONS OF CONTRACT

GENERAL CONDITIONS OF CONTRACT

PRE.B6.010.9	STATUS
PRE.B6.020.9	LOCATION OF INFORMATION PROVIDED
PRE.B6.030.9	GCC 3.1 - ASSIGNMENT
PRE.B6.035.9	GCC 3.2 - SUB-CONTRACTING
PRE.B6.040.9	GCC 5.3 - ON-DEMAND BOND
PRE.B6.050.9	GCC 5.7 - PROGRAMME TO BE FURNISHED
PRE.B6.060.9	GCC 5.8 - CONTRACTOR'S SUPERINTENDENCE
PRE.B6.065.9	GCC 5.9 - CONTRACTOR'S EMPLOYEES
PRE.B6.070.9	GCC 5.11 - SAFETY, SECURITY AND ENVIRONMENTAL MANAGEMENT OF THE WORKS

PRE.B8 CONTRACTOR'S OBLIGATIONS

SAFETY

PRE.B8.210.9	COMPLIANCE WITH SAFETY REGULATIONS AND CONTRACT REQUIREMENTS
PRE.B8.242.9	USE OF TOWER CRANES
PRE.B8.262.9	REQUIREMENTS FOR LARGE PANEL FORMWORK AND WORKING PLATFORMS TO DOMESTIC BLOCKS
PRE.B8.265.9	INSTALLATIONS TO REDUCE RISK OF MANUAL HANDLING AND WORKING AT HEIGHT

DISPOSAL OF CONSTRUCTION AND DEMOLITION (C&D) MATERIAL

PRE.B8.1835.9	SITE VIDEO RECORDING SYSTEM
PRE.B8.1836.9	MONITORING OF WEIGHT OF TRUCKS WITH C&D MATERIALS

PRE.B10 TEMPORARY WORKS AND FACILITIES

TEMPORARY WORKS

PRE.B10.010.9	TEMPORARY WORKS
PRE.B10.020.9	ACCESS AND ROADS
PRE.B10.030.9	TEMPORARY PASSENGER LIFTS
PRE.B10.040.9	OTHER LIFTING APPLIANCES

CON5 PRECAST FACADE UNITS (CONTRACTOR'S DESIGN)

WORKMANSHIP

HANDLING, TRANSPORTATION AND STORAGE

CON5.W510.9	LIFTING FRAME

ERECTING UNITS

CON5.W650.9	LIFTING UNITS INTO POSITION
CON5.W660.9	TEMPORARY SUPPORT

CON2 FORMWORK

DESIGN

FORMWORK DESIGN GENERALLY

CON2.D050.9	BRIDGE AND TRANSFER STRUCTURE CONSTRUCTION

FALSEWORK SPANNING PUBLIC HIGHWAYS

CON2.D110.9	DESIGN RESPONSIBILITY

SUBMISSIONS

CON2.D240.9	LARGE PANEL FORMWORK AND SMALL PANEL METAL FORMWORK FOR DOMESTIC BLOCK
CON2.D250.9	BRIDGE AND TRANSFER STRUCTURE CONSTRUCTION

DESIGN OF LARGE PANEL FORMWORK FOR DOMESTIC BLOCK

CON2.D440.9	PATENT WALLFORM SYSTEMS

CON7 PRECAST CONCRETE COMPONENTS (ENGINEER'S DESIGN)

WORKMANSHIP

HANDLING, TRANSPORTATION AND STORAGE

CON7.W510.9	LIFTING FRAME

ERECTING UNITS

CON7.W650.9	LIFTING UNITS INTO POSITION

PRODUCING PRECAST FAÇADE / PRECAST BALCONY UNITS

CON7.W940.9	TEMPORARY SUPPORT

PRODUCING AND ERECTING PRECAST STRUCTURAL WALL / PRECAST PARTITION WALL

CON7.W1330.9	TEMPORARY SUPPORT

CON8 VOLUMETRIC PRECAST CONCRETE COMPONENTS FOR DOMESTIC BLOCKS

DESIGN

LIFTING OF VOLUMETRIC PRECAST CONCRETE COMPONENTS

CON8.D820.9	STEEL LIFTING FRAMES

WORKMANSHIP

ERECTING VOLUMETRIC PRECAST CONCRETE COMPONENTS

CON8.W530.9	LIFTING UNITS INTO POSITION

- Design and certification requirements of temporary works are already extensive, but scattered throughout the whole contract specification

Proposed Updates of HA's Contract Specification

Proposed Updates of PRE.B10.010

PRE.B10 TEMPORARY WORKS AND FACILITIES

TEMPORARY WORKS

PRE.B10.010.9	TEMPORARY WORKS
PRE.B10.020.9	ACCESS AND ROADS
PRE.B10.030.9	TEMPORARY PASSENGER LIFTS
PRE.B10.040.9	OTHER LIFTING APPLIANCES
PRE.B10.050.9	USE OF LIFTS
PRE.B10.060.9	TEMPORARY REFUSE CHUTES
PRE.B10.065.9	FALSEWORK
PRE.B10.070.9	MAINTENANCE OF TEMPORARY WORKS
PRE.B10.080.9	TEMPORARY STAIRCASES
PRE.B10.090.9	BUILDING SETTLEMENT AND VERTICALITY MONITORING

- Proposed to **specify centrally under PRE.B10.010 (Temporary Works)** for ease of reference.
- Proposed to specify different control requirements on certification of **design**, **method statement**, **completion**, **dismantling video**, **Independent Checking Consultant (ICC)**, and **annual safety certificate** **according to the importance level of the temporary works**.

Summary of Proposed Enhanced Control in PRE.B10.010

Temporary Works Importance Level	Case under CoPSS	Sub-clause of PRE. B10.010	Design	Method Statement	Completion	Dismantling Video	Independent Checking Consultant (ICC)	Annual Safety Certificate
Case 1 (Prescribed Plan)		Sub-clause 5	RSE	RSE	RSE	Required	Nil	RSE
I (Lowest)	**Case 2 & Case 3**	NA	Controlled by Safety Officer, SQCC, QCM, Site Agent			Nil	Nil	Nil
II		Sub-clause 6	QE	Controlled by Safety Officer, SQCC, QCM, Site Agent				
III		Sub-clause 7	QE	QE	QE			
IV		Sub-clause 8	RSE	RSE	RSE	Required		
V (Highest)		Sub-clause 9	RSE	RSE	RSE	Required	Design & Completion	RSE

Proposed Updates of PRE.B10.010(5) – Case 1 Temporary

Temporary Works Importance Level	Case under CoPSS	Sub-clause of PRE. B10.010	Design	Method Statement	Completion	Dismantling Video	Independent Checking Consultant (ICC)	Annual Safety Certificate
Case 1 (Prescribed Plan)		Sub-clause 5	RSE	RSE	RSE	Required	Nil	RSE
I (Lowest)	**Case 2 & Case 3**	NA	Controlled by Safety Officer, SQCC, QCM, Site Agent			Nil	Nil	Nil
II		Sub-clause 6	QE	Controlled by Safety Officer, SQCC, QCM, Site Agent				
III		Sub-clause 7	QE	QE	QE			
IV		Sub-clause 8	RSE	RSE	RSE	Required		
V (Highest)		Sub-clause 9	RSE	RSE	RSE	Required	Design & Completion	RSE

Note: Proposed enhancements are in red

Proposed Update of PRE.B10.010(5) – Case 1 Temporary Works

- Contractor's **RSE** to certify the **design**, **method statement** (including both installation and dismantling) and **completion** (together with as-built record plans and photo records)
- Submit the **annual safety certificate** certified by Contractor's **RSE** for temporary works lasting over a year
- Taking reference to APP-21 for demolition works, take **video** throughout the whole **dismantling/removal** process and keep video records for the CM's viewing for at least 14 days or other durations as directed by the CM to ensure compliance with the approved method statement

Proposed Updates of PRE.B10.010(6) – Importance Level II

Temporary Works Importance Level	Case under CoPSS	Sub-clause of PRE. B10.010	Design	Method Statement	Completion	Dismantling Video	Independent Checking Consultant (ICC)	Annual Safety Certificate
Case 1 (Prescribed Plan)		Sub-clause 5	RSE	RSE	RSE	Required	Nil	RSE
I (Lowest)		NA	Controlled by Safety Officer, SQCC, QCM, Site Agent			Nil	Nil	Nil
II	Case 2	Sub-clause 6	QE	Controlled by Safety Officer, SQCC, QCM, Site Agent				
III	&	Sub-clause 7	QE	QE	QE			
IV	Case 3	Sub-clause 8	RSE	RSE	RSE	Required		
V (Highest)		Sub-clause 9	RSE	RSE	RSE	Required	Design & Completion	RSE

Note: Proposed enhancements are in red

Proposed Update of PRE.B10.010(6) – Importance Level II

6. Submit the **design** of **Case 2 Temporary Works** certified by **QE** as listed below:
   a. Details of the designated storage yard and storage device of accessories for large panel formwork as specified in PRE.B8.262(1);
   b. Supporting frames for site video recording system as specified in PRE.B8.1835 and mounting posts for CMDTS as specified in PRE.B10.1510;
   c. Weighbridge as specified in PRE.B8.1836;
   d. Temporary refuse chutes as specified in PRE.B10.060;
   e. Falsework and scaffolding as specified in PRE.B10.065, PRE.B10.820 and STR1.W790 that do not affect the permanent structure;
   f. Temporary supporting device for strut removal as specified in PRE.B10.065(9);
   g. Accommodation as specified in PRE.B10.110, PRE.B10.140, PRE.B10.160, PRE.B10.210, PRE.B10.280 and PRE.B10.300;
   h. Mounting posts for RSMS as specified in PRE.B10.1410;
   i. Large panel formwork and small panel metal formwork for domestic block as specified in CON2.D240;
   j. Temporary support for façade and precast units as specified in CON5.W660, CON7.W940 and CON7.W1330. For temporary support requiring ICU submission and the design, drawing and installation procedures for the erection method of precast concrete components as specified in CON5.W650, CON7.W650 and CON8.W530, RSE's certification shall be required.
   k. Any other temporary works of which the design should be certified by QE (or equivalent as approved by the CM) as required under the Drawings, the Specification and/or directed by the CM.

Proposed Updates of PRE.B10.010(7) – Importance Level III

Temporary Works Importance Level	Case under CoPSS	Sub-clause of PRE. B10.010	Design	Method Statement	Completion	Dismantling Video	Independent Checking Consultant (ICC)	Annual Safety Certificate
Case 1 (Prescribed Plan)		Sub-clause 5	RSE	RSE	RSE	Required	Nil	RSE
I (Lowest)	Case 2 & Case 3	NA	Controlled by Safety Officer, SQCC, QCM, Site Agent			Nil	Nil	Nil
II		Sub-clause 6	QE	Controlled by Safety Officer, SQCC, QCM, Site Agent				
III		Sub-clause 7	QE	QE	QE			
IV		Sub-clause 8	RSE	RSE	RSE	Required		
V (Highest)		Sub-clause 9	RSE	RSE	RSE	Required	Design & Completion	RSE

Note: Proposed enhancements are in red

Proposed Update of PRE.B10.010(7) – Importance Level III

7. Submit the **design**, **method statement** and **completion certificate** of **Case 2 and Case 3 Temporary Works** certified by **QE** as listed below:
   a. Anchorage in lift wells as specified in PRE.B8.210(9)(c);
   b. Rebar lifting frames as specified in PRE.B8.265(4);
   c. Movable noise barrier as specified in PRE.B8.856;
   d. Lifting appliances as specified in PRE.B10.040;
   e. Falsework and scaffolding as specified in PRE.B10.065, PRE.B10.820 and STR1.W790 that may have effect on the permanent structure;
   f. Temporary protection net and associated structures above steel bending yard as specified in PRE.B10.1021;
   g. Steel lifting frames as specified in CON4.D030, CON5.W510, CON7.W510 and CON8.D820. For steel lifting frame design requiring ICU submission, RSE's certification on the design shall be required in accordance with PRE.B6.060;
   h. … (Cont'd)

Proposed Update of PRE.B10.010(7) – Importance Level III

7. Submit the **design**, **method statement** and **completion certificate** of **Case 2 and Case 3 Temporary Works** certified by **QE** as listed below:
   h. Falsework/formwork for vehicular ramp, cantilevers exceeding 1.5m, beam with span exceeding 12m, deep beams with depth exceeding 3m, elevated water tank, space frame, prestressed structure, columns and walls with height exceeding 6m, and retaining wall higher than 4m as specified in CoPSS;
   i. Method statement of lifting operation of plant and machinery as specified in CoPSS;
   j. Temporary working platform for the operation of plant and machinery as specified in CoPSS other than that specified in sub-clause (9) below;
   k. All Case 3 Temporary Works as defined in CoPSS other than that specified in sub-clauses (8) and (9) below;
   l. Any other temporary works of which the design, method statement and completion certificate should be certified by QE (or equivalent as approved by the CM) as required under the Drawings, the Specification and/or directed by the CM.

Proposed Updates of PRE.B10.010(8) – Importance Level IV

Temporary Works Importance Level	Case under CoPSS	Sub-clause of PRE. B10.010	Design	Method Statement	Completion	Dismantling Video	Independent Checking Consultant (ICC)	Annual Safety Certificate
Case 1 (Prescribed Plan)		Sub-clause 5	RSE	RSE	RSE	Required	Nil	RSE
I (Lowest)	Case 2 & Case 3	NA	Controlled by Safety Officer, SQCC, QCM, Site Agent			Nil	Nil	Nil
II		Sub-clause 6	QE	Controlled by Safety Officer, SQCC, QCM, Site Agent				
III		Sub-clause 7	QE	QE	QE			
IV		Sub-clause 8	RSE	RSE	RSE	Required		
V (Highest)		Sub-clause 9	RSE	RSE	RSE	Required	Design & Completion	RSE

Note: Proposed enhancements are in red

Proposed Update of PRE.B10.010(8) – Importance Level IV

8. Submit the **design**, **method statement** and **completion certificate** of **Case 2 and Case 3 Temporary Works** certified by **RSE** as listed below:

   a. Derrick crane as specified in PRE.B8.242 including the siting of the crane, the assessment of maximum loads, the foundations, supporting structures, all connections between the derrick crane and permanent structure;

   b. Protective canopy as specified in PRE.B10.860;

   c. Temporary works for bridge and transfer structure construction as specified in CON2.D050, CON2.D250 and STR1.D760;

   d. Patent wallform systems as specified in CON2.D440;

   e. Metal scaffolding in lift well for lift installation and lift shaft platforms as specified in PNAP ADV-10, the latest edition of the Guidelines on Safety of Lift Shaft Works issued by CIC and PRE.B6.060(7)(b);

   f. Temporary works that may affect or be affected by slopes or retaining walls except for temporary slopes formed by the Contractor which should be certified together with the associated temporary works as specified in PRE.B6.060(7)(b);

   g. Any other temporary works of which the design, method statement and completion certificate should be certified by RSE as required under the Drawings, the Specification and/or directed by the CM.

Before dismantling/removal, submit the method statement including precautionary and protection measures certified by RSE for the CM's permission to commence. Take **video** throughout the whole **dismantling/removal process** and keep video records for the CM's viewing for at least 14 days or other durations as directed by the CM to ensure compliance with the approved method statement.

Proposed Updates of PRE.B10.010(9) – Importance Level V

Temporary Works Importance Level	Case under CoPSS	Sub-clause of PRE. B10.010	Design	Method Statement	Completion	Dismantling Video	Independent Checking Consultant (ICC)	Annual Safety Certificate
Case 1 (Prescribed Plan)		Sub-clause 5	RSE	RSE	RSE	Required	Nil	RSE
I (Lowest)	Case 2 & Case 3	NA	Controlled by Safety Officer, SQCC, QCM, Site Agent			Nil	Nil	Nil
II		Sub-clause 6	QE	Controlled by Safety Officer, SQCC, QCM, Site Agent				
III		Sub-clause 7	QE	QE	QE			
IV		Sub-clause 8	RSE	RSE	RSE	Required		
V (Highest)		Sub-clause 9	RSE	RSE	RSE	Required	Design & Completion	RSE

Note: Proposed enhancements are in red

Proposed Update of PRE.B10.010(9) – Importance Level V

- Contractor's **RSE** to certify the **design**, **method statement** and **completion**
- Submit the **annual safety certificate** certified by Contractor's RSE for temporary works lasting over a year
- Taking reference to APP-21 for demolition works, take **video** throughout the whole **dismantling/removal** process and keep video records for the CM's viewing for at least 14 days to ensure compliance with the approved method statement

- **Independent Checking Consultant (ICC)** to certify the **design** and **completion**
- Qualification requirements of ICC mirror the requirements of the Design Certifying Consultant (DCC) in specification

  i.e. consultant on the Architectural and Associated Consultants Selection Board's (AACSB) List of Structural Engineering Category

Proposed Update of PRE.B10.010(9) – Importance Level V

Temporary Works with the **highest Importance Level V** include :

a. Tower crane as specified in PRE.B8.242 including the siting of the crane, the assessment of maximum loads, the foundations, supporting structures, all connections between the tower crane and permanent structure;

b. Temporary passenger lift as specified in PRE.B10.030 including the siting of the temporary passenger lift, the assessment of maximum loads, the foundations, supporting structures, all connections between the temporary passenger lift and permanent structure;

c. Falsework spanning public highways as specified in CON2.D110;

d. Temporary steel working platform for the operation of plant and machinery as specified in CoPSS with the required design loading greater than 20kPa;

e. Any other temporary works of which the design, method statement and completion certificate should be certified by RSE and of which the design and completion should be independently certified by ICC as required under the Drawings, the Specification and/or directed by the CM.

Proposed Update of PRE.B10.010(13) – Site Register

- With reference to the requirements in clause 4.11 of CoPSS, the Contractor shall maintain on site a set of plans and a register of all temporary works showing the certification status on the design, method statement, completion, annual safety certificate, etc.

- Discussion at the monthly site meeting for close monitoring

Site Register of Temporary Works

No.	Description	PRE. B10.010	Design		Method Statement	Completion (Before Put in Use)		
	Example		QE/RSE/RGE (EPS Form)	ICC (EPS Form)	QE/RSE (EPS Form)	QE/RSE (EPS Form)	ICC (EPS Form)	Annual Safety Certificate
TW-01	Movable Noise Barrier	Sub-clause 7	QE certified on 1 Jan 22	NA	QE certified on 16 Jan 22	QE certified on 1 May 22 with all mill certificates and test reports available	NA	NA
TW-02	Tower Crane TC 1	Sub-clause 9	RSE certified on 2 Jan 22	15 Jan 22	RSE certified on 17 Jan 22	RSE certified on 15 Feb 22 with all mill certificates and test reports available	22 Feb 22	Annual Safety Certificate submitted on 14 Feb 23

Proposed New PRE.B10.015 - Testing for Temporary Works

- **Minimum testing requirements** (make reference to permanent works) are clearly specified for
  - Case 1 Temporary Works
  - Temporary Works with Importance Level III, IV and V

- **Parallel test** would be carried out as specified under PRE.B11.010 to ensure the testing quality

Way Forward

- Comments previously from the Hong Kong Construction Association (**HKCA**) and Hong Kong Construction Association Piling Contractors Committee (**HKCAPCC**) were received and addressed;
- The proposed enhanced control of temporary works by HA is in the same direction as the upcoming proposed *"enhancement on the control of temporary works providing support to tower cranes at construction sites"* by BD.
- **The proposed HA contract specification** for the enhanced control of temporary works will be **promulgated very shortly**.

Thank You

Backup Slides

Extract of Para. 4.9 from the Code of Practice for Site Supervision 2009 (2021 Edition)

4.9 The division of responsibility between AP/RSE/RGE and RC for temporary works and working procedures is detailed below:

Case 1 When the prescribed plans stipulate the temporary works, and the sequence of construction or method statements are also shown on prescribed plans, both the AP/RSE/RGE and the RC have their own responsibilities to supervise the carrying out of the works in accordance with the approved/prescribed plans and the BO and Regulations.

Case 2 When the temporary works, the sequence of construction or method statements are not required to be shown on prescribed plans and have no effect on the permanent structure by way of overstressing or overloading, the RC has the sole responsibility of ensuring the integrity of temporary works and that the carrying out of temporary works should be safe and should not endanger the workers on site, the public and adjoining buildings.

Case 3 When the temporary works, the sequence of construction or method statements are not required to be shown on the prescribed plans but may have effect on the permanent structure by way of overstressing or overloading, the RC should appoint a person whose qualification and experience are not inferior to a TCP of grade T5 to certify the plans, design information and/or method statement of the temporary works which are to be submitted to the RSE/RGE. The person so appointed should also certify the completion of such works. The RSE/RGE may require the RC to submit further calculations to substantiate his design of the temporary works as necessary.

Comparison amongst CoPSS, Existing HA Specification and Enhanced HA Specification

Temporary Works under CoPSS	Certification	Code of Practice	Existing HA Specification	Proposed Enhanced Control
Case 1	Design	By RSE	By RSE	-
	Method Statement	By RSE	By RSE	-
	Completion	Not specified	Not specified	By RSE
	Dismantling Video, ICC, Safety Certificate	Not specified	Not specified	Required (dismantling video & safety certificate only)
	Testing	Required	Not specified	Required
Case 2	Design	Some items specified	Some items specified	By QE/RSE
	Method Statement	Some items specified	Some items specified	By QE/RSE
	Completion	Not specified	Not specified	By QE/RSE
	Dismantling Video, ICC, Safety Certificate	Not specified	Not specified	Dismantling video - Level IV ICC, Safety Certificate - Level V
	Testing	Required	Not specified	Required for Level III-V
Case 3	Design	By T5	By QE	By QE/RSE
	Method Statement	By T5	Some items specified	By QE/RSE
	Completion	By T5	By QE	By QE/RSE
	Dismantling Video, ICC, Safety Certificate	Not specified	Not specified	Dismantling video - Level IV ICC, Safety Certificate - Level V
	Testing	Required	Not specified	Required for Level III-V

Note: Proposed enhancements are in red

Response to HKCAPCC's Comments on Revised Specification

HKCAPCC's Comment	Response
1. Clarification on the scope of PRE.B10.010(7)(i) is needed for QE's certification: *PRE.B10.010(7)(i) – Method statement of lifting operation of plant and machinery such as specified in CoPSS;*	Clarified to HKCAPCC with no further comment.
2. Clarification on the scope of PRE.B10.010(8)(f) is needed for RSE's certification: *PRE.B10.010(8)(f) – Temporary works that may affect or be affected by slopes or retaining walls;*	Scope is defined to mainly include permanent slopes only.
3. Clarification on the scope of PRE.B10.010(9)(d) is needed for RSE/ICC's certification: *PRE.B10.010(9)(d) – Temporary working platform for the operation of plant and machinery such as specified in CoPSS with the required design loading greater than 20kPa;*	Scope is defined to include steel working platform only.

Response to HKCA's Comments on Revised Specification

HKCA's Comment	Response
1. Clarifications on the need for "CM's permission before construction", "CM's permission before put in use" and "CM's permission to commence for dismantling/removal" for different temporary works concerned are required.	Clarified to HKCA with no further comment.
2. A new role "Independent Checking Consultant(ICC)" is introduced. ICC is required to certify case 2 and case 3 Temporary works which will have additional submission time and cost for the temporary design works. Furthermore, the role for ICC is also duplicated with duty of QE as well.	Clarified to HKCA with no further comment.
3. Suggest to delete "video recording throughout the whole dismantling/removal process are required". Reason is that video recording to monitor the whole dismantling/removal process is not feasible as the process of temporary work condition is quite different from demolition works.	Clarified to HKCA with no further comment.
4. The testing frequency for temporary steel works were specified too stringent which is same as permanent work, such as rebar lifting frame, movable noise barrier etc. For item iv), the testing frequency (5%) for anchors and fixing is even higher than the permanent works requirement (only 1%).	Revised to tally with the testing requirements of permanent works

Proposed Control of Tower Crane Supports under Draft BSC Paper No. 4/2023

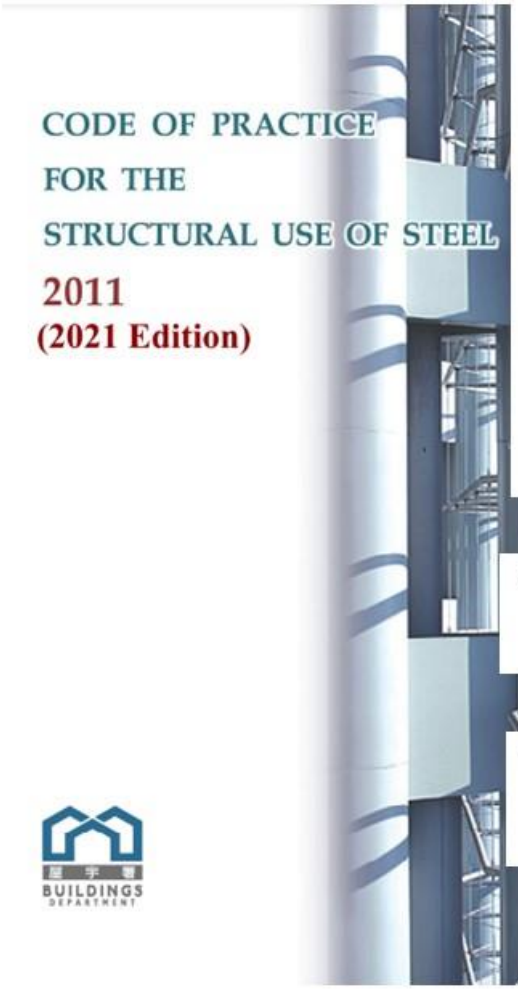
Case under CoPSS	Design	Method Statement	Completion	Independent Checking Engineer (ICE)	Dismantling Video	Annual Safety Certificate
Case 2 & Case 3	Design Engineer (DE) (RPE with 5yr experience) *(use TW1)*		RC's T4 + AS *(use TW3)*	ICE (RPE with 5yr experience) to check DE's **design only** *(use TW2)*	Nil	Nil

Proposed Enhanced Control of Tower Crane Supports by Housing Authority (HA)

Case under CoPSS	Design	Method Statement	Completion	Independent Checking Engineer (ICE)	Dismantling Video	Annual Safety Certificate
Case 2 & Case 3	Design Engineer (DE) shall possess RSE's qualification. *(use TW1)*		DE shall certify completion with submissions of as-built drawings and photo records. Re-certification is required for modification. *(use TW3)*	ICE shall possess RSE's qualification. ICE shall certify both design and completion. *(use TW2)*	Take video of dismantling process by RC	For tower crane erected and retained for over a year, DE shall submit the annual safety certificate.

Text in red denotes more stringent requirements proposed by HD in DCD's New Works project.

CoP for the Structural Use of Steel



FOREWORD

Codes and regulations for the design of steel structures in Hong Kong were initially derived from the London Byelaws and then BS 449. In 1987 Hong Kong published its own code based on the permissible stress design for the structural use of steel. In recognition of the stated aim of The Government of The Hong Kong Special Administrative Region to develop a technology driven and knowledge based society, the Hong Kong Buildings Department commissioned a Consultancy Study to carry out reviews of structural steel design practice in Hong Kong and overseas and to draft a limit state code for the Structural Use of Steel using Limit State Approach.

The study was carried out by a joint venture consultancy formed from The Hong Kong Polytechnic University and Ove Arup & Partners Hong Kong Limited.

As a result of the study, the Code of Practice for the Structural Use of Steel 2005 (Code 2005) was published and was intended to encourage the use of structural steel to the benefit of stakeholders, the environment and the society. It offered the potential of wider use in the region.

Code 2005 has been developed using worldwide best practice and philosophy from international codes. Particular guidance has been introduced to Code 2005 to cover high-rise building design, composite design, long span structures, stability issues, temporary works in construction, a wide range of steel grades, performance based design and structural vibration. It was intended to be easy for use by practising engineers.

2.5.11 Loads on temporary works in construction

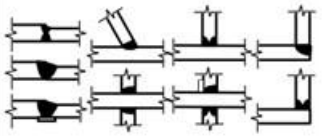
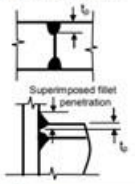
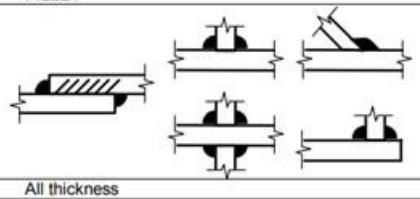
The most adverse loading situation arising from the intended construction works should be considered in the design.

4.3.4 Load combinations for temporary works in construction

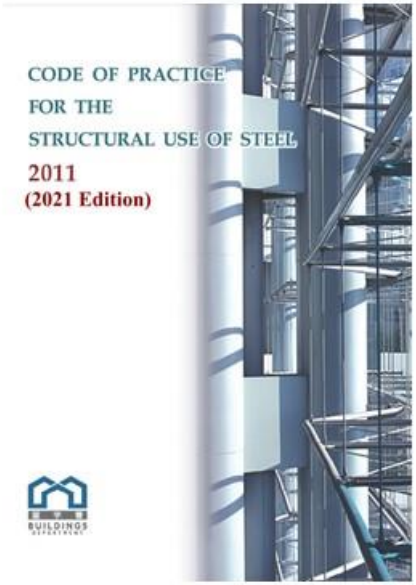
The values in Table 4.2 should be used if it is considered that the consequences of failure of a particular element are not serious enough to warrant a higher load factor. In no circumstances should any adverse load factor be less than 1.2. This includes load factors for wind loads.

CoP for the Structural Use of Steel

Table 14.3a - Scope and frequency of inspection (NDT)

PART A		VISUAL INSPECTION Prior to Non-Destructive Testing (NDT) all welds to be visually inspected by a suitably qualified person (See clause 14.3.6.3)	
PART B		THICKNESS FOR MANDATORY NDT AND FREQUENCY OF TESTING (all dimensions in mm)	
WELD TYPE		BUTT	
		FULL PENETRATION	PARTIAL PENETRATION
			
MPI	Thickness	All thickness	All thickness
	Frequency	100%	20%
U/S	Thickness	$t_{max} \geq 10$	$t_p \geq 8$
	Frequency	100%	20%
WELD TYPE		FILLET	
			
MPI	Thickness	All thickness	
	Frequency	10%	
U/S	Thickness	Leg length≥ 15	
	Frequency	10%	

Notes:
1 Longitudinal welds are those made parallel with the member axis. All other welds are transverse.
2 The size of fillet weld is identified in the table by the leg length.
3 MPI Magnetic Particle Inspection (see clause 14.3.6.5).
4 U/S Ultrasonic Examination (see clause 14.3.6.6).
5 For steels with a yield strength greater than 500N/mm² the frequency of testing should be 100% unless agreed otherwise by the Responsible Engineer.



14.3.6 Non-destructive testing of welds (NDT)

14.3.6.1 *Scope and frequency of inspection*

Visual inspection shall be carried out at all welds by a qualified welding inspector (see clause 14.3.6.3).

The scope and frequency of inspection using non-destructive testing (NDT) shall be in accordance with Table 14.3a. Inspection requirements may be reduced at the discretion of the Responsible Engineer, based upon satisfactory performance in the initial production demonstrated against the requirements. Conversely, where testing indicates that weld quality problems have occurred (in similar materials, assembly methods or welding procedures), non-destructive testing requirements should be increased and should be extended to non-mandatory components.

Where the requirement for inspection is less than 100%, the joints for testing shall cover all the different joint types, material grades and weld equipment. Apart from this the selection should be random.

Temporary Works Control in HA Contract

STR1.G030 RESPONSIBLE ENGINEER

Employ a Registered Structural Engineer as specified in PRE.B6.060 to take up the role of Responsible Engineer stated in the Code of Practice for the Structural Use of Steel 2011. The Responsible Engineer shall take responsibility for **the design, erection and construction of all permanent and/or temporary works and falsework for the construction of major structural steelwork**. No consent or dissent of the CM will relieve the Contractor of his sole responsibility for the design, construction and obtaining Approval.

Off-site Fabrication

STR1.W1430 REGISTERED STRUCTURAL ENGINEER

1. Appoint an Registered Structural Engineer (RSE) registered under Buildings Department for ensuring and certifying the fabrication works are in compliance with the drawings and Specification;
2. The duties and roles of the RSE include but not limited to:

a. Pay regular site visits for proper control of the works and submit reports after each visit;

b. Carry out inspection on all activities which, in his professional judgement, are critical and require close supervision;

3. The frequency of RSE's visits shall be a minimum of two visits per month.

QE's Role under HA Contract

14. Qualified Engineer (QE):
    a. The qualifications and experience of the QE shall be as follows:
        i. Member of the Hong Kong Institution of Engineers or a Registered Professional Engineer in Civil or Structural discipline registered under the Engineers Registration Ordinance in an appropriate discipline plus at least 5 years of relevant experience; plus
        ii. .....
    b. Utilise standard forms (EPS-F1 and EPS-F2 in APPENDIX PRE.B6/I to this Worksection) when submitting the items requiring QE's certification as detailed in sub-clauses (14)(d) to (14)(g) below;
    c. Allow sufficient time in the construction programme for such checking and certification by the QE and submission to the CM for written consent;

(Guidance Note: Sub-clause (14)(d) - insert below only when necessary, items of Temporary Works to be certified by the QE for design and construction. Suggested Temporary Works under this category include Case 3 Temporary Works defined in CoPSS clause 4.5, erection of temporary protective canopy at F1 of domestic buildings and erection of temporary wall-supported platform inside lift well. The CM may specify items as appropriate for the avoidance of doubt.)

    d. Certification by the QE is required for the design and construction of the following Temporary Works:
        i. Erection of temporary protective canopy at F1 of Blocks ..... and Carport ..... as specified in PRE.B10.860;
        ii. Erection of movable noise barrier as specified in PRE.B8.856;
        iii. .....

(Guidance Note: Delete sub-clause (14)(e) and use sub-clause (14)(f) if staged submission of the QE certificate is required.)

    e. Submit QE certificate for construction of the Temporary Works listed in sub-clause (14)(d) above to the CM for consent before the Temporary Work is put in use;

(Guidance Note: Sub-clause (14)(f) - where the Temporary Works are erected in stages and staged checking and certification by the QE is required, PSE is required to fill in the schedule of QE certificate submission in the following table. For example, if certificate submission is required at completion of "part of the Temporary Works" and before commencement of the next stage of the Temporary Works, state in the table 'after completion of "that part of Temporary Works" and before it is put in use'. Delete sub-clause (14)(f) and use sub-clause (14)(e) if staged checking and certification by the QE is not required.)

    f. Submit QE certificate for construction of the Temporary Works listed in sub-clause (14)(d) above to the CM for consent before the staged Temporary Work is put in use in the order of the following schedule:

Temporary Works	Schedule of stages for QE certificate submission
i.	.....;
ii.	.....;
iii.	.....

(Guidance Note: Sub-clause (14)(g) - insert items of Temporary Works to be checked and certified by the QE for design only. Suggested Temporary Works under this category include Case 2 Temporary Works in CoPSS clause 4.5. The CM may specify items as appropriate for the avoidance of doubt.)

    g. Checking and certification by QE are required for design only on the following Temporary Works:
        i. .....;

RSE's Role under HA Contract

7. Registered Structural Engineer (RSE):
   a. Employ a RSE registered with Building Authority to comply with the requirements of the Specification;
   b. The RSE shall utilise standard forms (EPS-F1 and EPS-F2 in APPENDIX PRE.B6/I to this Worksection) when submitting all items requiring his certification, approval and calculation as detailed in the relevant sections of the Specification and including the following:
      i. All temporary works classified as Case 1 under the CoPSS clause 4.7;
      ii. All substantial temporary works stipulated in PRE.B10.010, as directed by the CM;
      iii. Temporary works erected on slopes or retaining walls, as directed by the CM;
      iv. Design and calculation for metal scaffolding in lift well for lift installation;

(Guidance Note: Sub-clause (7)(b)(v) - use for (i) building contracts, (ii) foundation contracts, (iii) demolition contracts or (iv) combined building & foundation contracts, where a Design Certifying Consultant is required as per sub-clause (11) below.)

      v. All submissions to ICU other than those submissions signed by the Design Certifying Consultant as required under sub-clause (11) below;

(Guidance Note: Sub-clause (7)(b)(vi) - use for (i) building contracts, (ii) foundation contracts, (iii) demolition contracts or (iv) combined building & foundation contracts, where a Design Certifying Consultant is NOT required as per sub-clause (11) below.)

      vi. All submissions to ICU.

(Guidance Note: Sub-clause (7)(c) – is used for demolition contracts only)

   c. The RSE shall carry out the responsibility stipulated in DEM1.D050;

(Guidance Note: Sub-clause (7)(d) – is used where ELSP submission in accordance with ICUI10 is required.)

   d. The RSE shall possess the experience stipulated in EAR1.D010 and shall carry out the responsibility detailed in EAR1.D050;

(Guidance Note: Sub-clause (7)(e) – is used where structural steelworks, including steel piles, are designed by the Contractor.)

   e. The RSE shall take up the role of Responsible Engineer as stipulated in the Code of Practice for the Structural use of Steel 2005 and in STR1.G030;

(Guidance Note: Sub-clause (7)(f) – is used where structural steelworks are included.)

   f. Where off site fabrication of structural steelworks is proposed by the Contractor, the RSE shall carry out the responsibility detailed in STR1.W1430;

(Guidance Note: Sub-clause (7)(g) – is used where tempered glass is used as part of the Works.)

   g. The Registered Structural Engineer shall carry out the responsibility stipulated in COM4.M060 and PNAP APP-37;

(Guidance Note: Sub-clause (7)(h) – is used where structural sealant is used as part of the Works.)

   h. The Registered Structural Engineer shall carry out the responsibility stipulated in COM4.M485 and PNAP APP-37.

11. Design Certifying Consultant (DCC):

(Guidance Note: Sub-clause (11)(a) - before giving approval to the Contractor, PSE shall check with the Procurement & Technical Secretary Section on the latest listing status of the consultant proposed by the Contractor so as to make sure that it is not suspended by Housing Department.)

a. Select a consultant on the Architectural and Associated Consultants Selection Board's (AACSB) List of Structural Engineering Consultants for the CM's approval as the DCC;

*(Guidance Note: Sub-clause (11)(b) – * delete as appropriate including the Specification Clauses.)*

b. DCC shall certify all layouts, details and calculations submitted to the CM for * foundation works designed by the Contractor as stated in Clauses PIL1.D040, PIL1.W055, PIL1.W070, PIL1.W2010 and PIL1.W2030 as appropriate and * permanent works designed by the Contractor as stated in PRE.B6.085. The submissions must be signed by a Director of the DCC, who must be a structural engineer registered with the Building Authority;

c. The DCC shall utilise standard forms (EPS-F1 and EPS-F2 in APPENDIX PRE.B6/I to this Worksection) when submitting all items requiring his certification.

STR1.T050.P TESTING OF SECTIONS

(Guidance Note: The Specifier is to put down the frequencies of tests in sub-clause (1) if it is considered that those stated in the Code of Practice for Structural Use of Steel 2011 are not sufficient. For example, the CM may consider necessary to test Class 1 steel, which required no testing by the Code, because the project involves large quantities of steel. A suggested frequency is 1 test sample per every 40 tonnes of steel for such purpose.)

Testing samples:

1. Provide specimens for testing which shall be in accordance with the requirements stipulated in the Code of Practice for the Structural Use of Steel 2011. In addition, provide further specimens for testing which shall be at a frequency of ……for Class …..… Steel or as Instructed. For minor steel structures, further test specimens for Class 1 Steel are not required. Test specimens to be taken from sections selected at random on Site by the CM;

2. Prepare the test specimens to BS EN 10025:2004 or BS EN 10210:2006 as directed and appropriately mark and deliver them to a Direct Testing Contractor employed and paid direct by the Authority for testing. Testing and documentation to include tensile tests and impact tests;

3. For steel sections used for construction of hoardings and associated covered walkways and gantries, the frequency of sampling stated in the sub-clauses (1) above may be reduced at the discretion of the CM.

AP/RSE/RGE Responsibilities for ELSW under CoP for SSP

Table 5.1
Typical Items for the Checklist of Specific Tasks for AP's TCPs

Item No.	Description	
A9	Check and monitor that lateral supports are installed in accordance with approved/agreed working sequence and not to be removed in advance of adequate propping or restraint.	Engineering item

Table 5.2
Typical Items for the Checklist of Specific Tasks for RSE's TCPs

Item No.	Description	
E7	Check that there is no over-excavation and temporary cut slopes will not cause any instability to adjoining ground/structures/buildings.	Engineering items
E9	Check and monitor that lateral supports are installed in accordance with approved/agreed working sequence and not to be removed in advance of adequate propping or restraint.	
E10	Check that the design and supports of formwork, shoring and temporary working platform are adequate to support all intended loads.	
E11	Check that there is no risk of artesian conditions for excavation and lateral support works.	
E12	Check that stability and integrity of nearby buildings and ground are not adversely affected.	
E13	Check that the groundwater table is consistent with design of excavation and lateral support works.	
E14	Check that before excavation takes place, the highest new deck level for top down construction is in place and has achieved sufficient strength to provide lateral support.	

Table 5.3 Typical Items for the Checklist of Specific Tasks for RGE's TCPs		
Item No.	Description	
G7	Check that there is no over-excavation/over-loading and temporary cut and fill slopes will not cause any inadequate margin of safety against instability to adjoining ground/buildings/structures/utility services or any harm to members of the public and workers on site.	Engineering items
G8	Check and monitor that the sequence of work and necessary protection works and supports are installed in accordance with approved plans/agreed method statements/precautionary measures proposals and that the supports are not to be removed or loaded in advance of adequate propping or restraint.	
G9	Check that there is no risk of hydraulic failure causing ground collapse or excessive deformation.	
G10	Check that there is adequate margin of safety against instability and integrity/functionality of nearby ground/buildings/structures/utility services and members of the public and workers on site are not adversely affected/harmed.	
G11	Check that the ground and groundwater conditions, ground deformations/vibrations and geotechnical hazards/risks are consistent with the design of excavation and lateral support works.	
G12	Check that the geotechnical assumptions (i.e. ground model, surface water regime, ground water regime, ground deformations/vibrations, geotechnical hazards/risks, etc.) are consistent with the geotechnical assessment/study/works design, and to assess their compatibility/adequacy taking into account the actual geotechnical conditions encountered on site and the original method statement and precautionary and protective measures proposed, and update the method statement, precautionary and protective measures and advise the RGE accordingly.	

Example of Additional Requirement for Case 2 Temporary Works in HA Contract

PRE.B8.856.9 MOVABLE NOISE BARRIER

(Guidance Note: This clause is used for building, foundation and demolition contracts. Delete if inappropriate.)

1. Design, construct, operate and maintain movable noise barrier(s) of screen type or shed type or a combination of screen type and shed type to mitigate the noise generated by construction works including but not be limited to pile head trimming, rock / concrete breaking, metal hammering and the like. The design of the movable noise barrier shall be in the form of screen type or shed type as referred to in BS 5228:Part 1:2009:Noise - Code of Practice for Noise and Vibration Control on Construction and Open Sites;
2. The movable noise barrier(s) shall be located at positions such that the intensity of noise propagating to the noise sensitive receivers is attenuated on the spot by the noise barrier(s);
3. The movable noise barrier(s) shall also conform to the following:

PRE.B8.856.9 MOVABLE NOISE BARRIER

6. Submit the design, calculations and construction method statement certified by the Qualified Engineer as stipulated in PRE.B6.060 for the movable noise barrier(s) to the CM for approval not less than 4 weeks prior to the adoption of design and construction of the movable noise barrier(s) and commencement of the construction works which require noise mitigation measures under this clause;
7. Accept responsibility for the design of the movable noise barrier. The submission to the CM of such design or amendment shall not relieve the Contractor of any duty or responsibility under the Contract;

sound level (L_{eq}) 5 dB(A) measured over any 5-minute period (5 min) on all covered sides. Design and provide additional noise reduction measures on the open side of the shed type movable noise barrier(s) to achieve a minimum noise reduction of L_{eq} 5 dB(A) (5 min) or such other noise reduction value approved by the CM if the open side is facing the noise sensitive receiver;

h. The sound levels described in sub-clauses (f) and (g) above shall be measured at 10 m away from the noise source and 1.2 m above ground unless otherwise approved by the CM. The noise reductions shall be determined by the noise measurements taken before and after placing of the movable noise barrier(s) with the noise generating source for construction works in operation; and

i. Indicate on the outer face of the movable noise barrier(s) with contrast colour paint the Chinese characters "隔音屏障" and English characters "Noise Barrier". The minimum size of the Chinese characters shall be 450 x 450 mm and of the English characters shall be 450 mm high.

4. The movable noise barrier(s) shall be designed to cater for the wind load in accordance with the Code of Practice on Wind Effects in Hong Kong 2004, various ground level differences that may exist amongst the support(s) of the movable noise barrier(s) for blocking the noise produced by various noise sources and in particular, where the concrete / rock breaking machine operates;
5. A schematic sketch of a conceptual design of the movable noise barrier is given in drawing no. CPT/NB/S/SK001 in Appendix U to this Specification. The sketch is for reference only and given in good faith without prejudice to the Contractor's responsibilities and liability under the Contract;

Table 2 - Frequency of test, thorough examination and inspection of tower cranes under the LALGR

	← Competent Examiner →			Competent Person	
Regulation No.	Testing & Thorough Examination	Testing	Thorough Examination	Inspection	Approved Form No.
5(3) 7B	during the preceding 4 years before use (includes the test of the automatic safe load indicator)				3
5(5) 7B	before use, after undergoing substantial repair, re-erection, failure, overturning or collapse (includes the test of the automatic safe load indicator)				3
5(1)			at least once in the preceding 12 months		5
7A 7B				within the preceding 7 days (includes the inspection of the automatic safe load indicator)	1
7E		after erection, removal to a new location, or adjustment of any component member (being a removal or adjustment which involves changes in the arrangements for anchoring or ballasting)	all the devices used for the anchoring or ballasting of the crane before the crane is erected		2
7G		after exposure to weather conditions likely to have affected the stability of the crane			2

Safety Supervision Personnel (i.e. T5) under Code of Practice for Safe Use of Tower Cranes

9.2.3 The siting of the crane, the assessment of maximum loads and the design of foundations, supporting structures and ancillary details should be certified by a safety supervision personnel. Particular care should be taken to ensure that the imposed loadings are not underestimated. Careful assessment of probable wind pressures should also be made, taking into account the degree of exposure of the site and any other special factors. For construction site, when the installation of the tower crane may have effect on the permanent structure by way of overstressing or overloading, the safety supervision personnel should submit the certified plan, design information and/or method statement of the works to the project engineer and certify the completion of work.

Safety supervision personnel

For building works and street works, it means the "Technically Competent Person of Grade T5" (TCP T5) who possesses the academic or professional qualifications and experience of building works or street works that satisfy the requirements set out in the Code of Practice for Site Supervision issued by the Buildings Department for a particular type of site supervision or management tasks; or the person responsible for engineering safety supervision as specified in the works project(s) of the government departments of the Hong Kong Special Administrative Region, as the case may be. For other industrial undertakings, it means a registered professional engineer in structural discipline.

勞工處
2022年9月7日安達臣道建築地盤
涉及塔式起重機倒塌致命意外的簡述

背景資料

- 2022年9月7日上午，在秀茂坪安達臣道石礦場R2-2號地皮一個建築地盤發生了一宗致命工作意外，意外中一部突然倒塌的塔式起重機（「天秤」）擊中附近的臨時貨櫃辦公室，導致三名男性員工不治及六名男性員工（包括起重機操作員）受傷。
- 上述建築地盤正進行香港房屋協會資助出售房屋興建項目工程，主要是興建五幢住宅樓宇。

意外經過

- 意外當日，有關建築地盤已豎立了三部天秤進行工程。事發時，地盤如常運作。
- 涉事的天秤在未有吊運物件情況下，突然倒塌並跌落至下方數個臨時貨櫃辦公室。
- 在幾個貨櫃辦公室內工作的三名工人被倒塌的天秤壓住。其中兩工人經搶救後，被證實當場死亡。另一工人被送往醫院時昏迷，並於當日較後時間身亡。六名受傷工人包括塔式起重機操作員。

調查結果

- 涉事的天秤是安裝在一個由三層工字鐵以電弧焊接組成的格排基座（grillage foundation）上。基座頂部連接天秤腳的工字鐵，意外後被發現與連接到第二層工字鐵的焊接位置的焊縫被拉開，使安裝在其上的天秤倒塌。

刑事法律程序

- 勞工處已根據《工廠及工業經營條例》（第59章）及《職業安全及健康條例》（第509章），向相關持責者（包括有關承建商、分判商及個別人士）提出共67項檢控。

安全使用塔式起重機

為確保塔式起重機的安全操作，起重機的擁有人／承建商／僱主應提供及維持作業裝置屬安全。當中應包括，但不限於以下各項：

- 確定塔式起重機對地面或其他支撐物及繫架施加的最大壓力或力度；
- 確保供塔式起重機停放的土地或地基、臨時支承結構、腳墊、填塞物、連接物及錨椿應有足夠強度，可承受起重機操作時或在不操作期間的最高重量；
- 確保塔式起重機架設的地點、最高重量的評估、地基的設計、支持結構及附屬物詳情，應由一名安全監督人員核證；
- 確保由聘任的工程師直接監督塔式起重機的架設工作；
- 確保塔式起重機的構造良好，並以堅固質佳的物料造成；
- 確保塔式起重機在操作前，經由合資格檢驗員進行測試和徹底檢驗，證明該塔式起重機處於安全操作狀態；
- 確保塔式起重機由曾接受適當的訓練並有足夠能力的人士按照製造商的指引進行妥善的保養；及
- 確保塔式起重機分別由合資格檢驗員和合資格的人定期進行測試及徹底檢驗和檢查。

勞工處
2023年3月

安全使用塔式起重機

- 確保塔式起重機架設的地點、最高重量的評估、地基的設計、支持結構及附屬物詳情，應由一名安全監督人員核證；

Extract of CoP for Safe Use of Tower Cranes

9.2.3 The siting of the crane, the assessment of maximum loads and the design of foundations, supporting structures and ancillary details should be certified by a safety supervision personnel. Particular care should be taken to ensure that the imposed loadings are not underestimated. Careful assessment of probable wind pressures should also be made, taking into account the degree of exposure of the site and any other special factors. For construction site, when the installation of the tower crane may have effect on the permanent structure by way of overstressing or overloading, the safety supervision personnel should submit the certified plan, design information and/or method statement of the works to the project engineer and certify the completion of work.

Extract of PRE.B6.060 – GCC 5.8 – Contractor's Superintendence

16. Technically Competent Person (TCP) for SP:
    a. Appoint one or more TCP of the grade and with qualification and relevant experience specified in the TMSP and CoPSS for various types of works as required under the SP, to carry out the duties as specified in the SP, and to act as and perform the duties of the "Safety Supervision Personnel" as referred to in the CoP for Safe Use of Tower Cranes issued by LD and the Guidelines on Safety of Tower Cranes issued by CIC;

安全使用塔式起重機

- 確保由聘任的工程師直接監督塔式起重機的架設工作；

Extract of CoP for Safe Use of Tower Cranes

10.2 Appointment of supervising engineer

10.2.1 The owner should appoint a supervising engineer as described in sub-section 10.2.3 below in writing to directly supervise on site the erection, dismantling and height alteration operations of tower crane. The supervising engineer should conduct a briefing session with the competent person, the safety professional, the crane operator and other associated working crew to discuss on the whole process of the operation and to ensure a safe system for the operations including the working procedures, checklists and programme. Upon completing of each operation, the supervising engineer is responsible for certifying the completion of such operation.

Extract of PRE.B6.060 – GCC 5.8 – Contractor's Superintendence

21. Supervising Engineer (Tower Crane):
    a. The qualification and experience of the Supervising Engineer (Tower Crane) shall be same as those required for the supervising engineer in Paragraph 10.2 under the CoP for Safe Use of Tower Cranes issued by LD and Section F(i) under the Guidelines on Safety of Tower Cranes issued by CIC;
    b. The Supervising Engineer (Tower Crane) shall carry out the duties of the supervising engineer same as those required in Paragraph 10.2 under the CoP for Safe Use of Tower Cranes issued by LD and Section F in the Guidelines on Safety of Tower Cranes issued by CIC.

安全使用塔式起重機

- 確保塔式起重機在操作前，經由合資格檢驗員進行測試和徹底檢驗，證明該塔式起重機處於安全操作狀態；
- 確保塔式起重機由曾接受適當的訓練並有足夠能力的人士按照製造商的指引進行妥善的保養；及
- 確保塔式起重機分別由合資格檢驗員和合資格的人定期進行測試及徹底檢驗和檢查。

Extract of PRE.B8.242 – Use of Tower Cranes

2. Engage or arrange through Contractor's sub-contractor(s) the engagement of the following personnel full time on Site during the operation of tower crane (except the personnel under sub-clauses (2)(a), (2)(f) and (2)(g) who need to be on Site for the carrying out of the duties in accordance with the said CoP and Guidelines):

   a. Competent Examiner:

      i. The competent examiner shall be a registered professional engineer registered under the Engineers Registration Ordinance within the discipline of Mechanical Engineering or Marine & Naval Architecture or a relevant discipline specified by the Commissioner for Labour.

   f. Competent Person:

      i. The competent person shall possess adequate training, experience and competency as specified in the said CoP and Guidelines.

   g. Competent Mechanical Engineer (CME):

      i. The CME shall possess relevant qualification, experience and competency as specified in the said Guidelines;

      ii. The role of CME can be taken up by a competent examiner as specified in sub-clause (2)(a) above.

DEM1.W140.9 SITE VIDEO RECORDING SYSTEM

1. Provide, operate and maintain, including all necessary cables, wirings, lightings and other accessories, a video recording system to record the entire demolition process with the following essential features:
   a. The video cameras used in the system should be of high resolution, lowlight and colour type;
   b. Power backup should be provided to cater for accidental breakdown of the power supply to the system;
   c. Videos captured by the system shall be recorded continuously without break unless agreed by the CM; and
   d. Videos shall be captured in a format acceptable to CM.
2. Install a minimum number of video cameras per block at strategic locations as specified in Project Specific Specification. Re-locate the video cameras from time to time to suit the progress of the demolition works as instructed by the CM;
3. Securely protect the video cameras from being damaged or blocked so that the entire demolition process including movement of debris and the overall sequences of demolition can be recorded;
4. Design and construct all necessary temporary works, including any supporting frames and protections, for the video cameras and their accessories, even at high level;
5. Provide the software and hardware for CM's viewing the recorded videos and keep the videos for at least 14 days;
6. Post sufficient notices at conspicuous positions to notify the workers and staff about the purpose of video recording system in accordance with Data Protection Principles set out in the Personal Data (Privacy) Ordinance.

PNAP APP-21: Demolition Works Measures for Public Safety

Video Record of Demolition Works

9. Video cameras to record the entire demolition process should be provided by the RSC for all types of demolition sites. The video cameras should be installed at strategic locations agreed by AP/RSE/RGE and be securely protected from being tampered with so that the entire demolition process including the movement of debris and the overall sequence of demolition can be recorded for reference and review purposes. While the exact number of cameras is to be determined by AP/RSE/RGE, there should be at least one video camera for each site. The location of the video cameras should be shown in the demolition plan.

10. The video records should be kept by the RSC for at least 14 days.

Safe Use of Lorry-mounted Cranes

PRE.B8.248.A **SAFE USE OF LORRY-MOUNTED CRANES**

1. Carry out a full inspection of lorry-mounted cranes once a week by a competent person in accordance with the Factories and Industrial Undertakings (Lifting appliances and Lifting Gear) Regulations Cap. 59J and make reference to LD's "Code of Practice for Safe Use of Mobile Cranes" for using the lorry-mounted cranes safely and properly with a view to preventing accidents;
2. Carry out a pre-use check of lorry-mounted cranes by a competent person / crane operator before starting the lifting operation of each shift or working day. The checklist should cover but not limited to outriggers, jib, oil hoses, hook, safety latch, control lever, automatic safe load indicator, emergency control button, cut-off device, etc. The competent person shall possess adequate training, experience, competency in discharging his duties safely;
3. Cease to use the lorry-mounted cranes and report immediately to the responsible person concerned if any defect such as twisted / broken wires, hydraulic oil leak etc. or abnormality in the crane be found or the cranes be accidentally damaged;
4. Take out of service the lorry-mounted crane with defects or damage until all the defects or damage have been rectified, with endorsement given by the responsible person concerned;
5. The responsible person shall possess relevant training, experience and competency in respect of discharging duties for the proper implementation of the safety of work.

Delivery of Materials by Vehicles to Site (including precast units)

PRE.B8.295.A DELIVERY OF MATERIALS BY VEHICLES TO SITE

1. Suitable types of vehicles shall be used with respect to the loads to be transported;
2. Only vehicles designed for the loadings to be transported in compliance with the requirements stipulated in the Code of Practice for the Loading of Vehicles issued by the Transport Department shall be allowed to enter into the Site;
3. The following safety measures shall be taken for loading / unloading of vehicles:
   a. Planning:
      i. Conduct risk assessment of lifting operations by the safety officer or a competent person to identify hazards and risk control measures beforehand;
      ii. Prepare statement with substantiation for the extent of danger zone to be fenced off in relation to loading and unloading of vehicles;
      iii. Provide appropriate and adequate warning signs, guards, fences or barriers around danger zone to prevent unauthorized entry.
   b. Crane Operators and Personnel:
      i. Maintain a list of lorry-mounted crane / operators employed by the Contractor and his sub-contractors of all tiers for handling loading and unloading operations on the Site. All operators shall be trained as both qualified riggers & signallers and worker(s) assisting in unloading material from the vehicle on the Site shall be trained in lifting operation;
      ii. Provide a lifting supervisor to monitor and supervise the whole lifting process. The lifting supervisor shall possess certificate for lifting safety supervisors provided by CIC. The lifting supervisor(s) who have not received the training are acceptable up to 31 December 2024 provided that they have made arrangement to attend and complete the relevant training. The lifting supervisor shall have a minimum of four-year experience in lifting operation.
   c. Operation:
      i. Park the vehicle on a level ground as far as possible before loading / unloading. If a level site condition is not available, adjust the vehicle to be level with outriggers fully stretched to rest on pads for stability;
      ii. Stretch the outriggers of the lorry-mounted crane fully to rest on pads laid on solid ground.
   d. Handling Load:
      i. If there is a risk of the load falling down from the vehicle, secure and keep the load to be unloaded from the vehicle in a position by a device or method such as a crane before the strap / chain fastening the load is unfastened;
      ii. When the load is higher than the sideboard of the vehicle, provide lateral barriers which may take the form of a metal frame mounted on the vehicle to restrain the position of the load;
      iii. When the load comprises layers stacked over one another, add devices between the layers to secure them altogether to avoid risk of sliding;
      iv. Tie all loads on the vehicle securely to the vehicle to prevent undue movement during transportation.

4. EOO – Environmental and Other Obligations Assessment (Cont')

Factor	Item		Proposed Guidelines for Assessment of Grading
EOO3 – Documentation	4.18	Submission of temporary works or ELSW design	**A -** (a) Consistently submitted on time for approval; and (b) Consistently obtaining approval upon first or second submission. **B -** (a) Instance of submitting later than scheduled deadline but likely not affecting progress/completion of works; or (b) Instance of obtaining approval upon third submission. **D -** (a) Instance of submitting later than scheduled deadline and likely affecting progress/completion of works; or (b) Instance of obtaining approval upon fourth submission or beyond.

現在放映的是2024年1月16日

香港房屋委員會

「新工程合約工地安全講座」的片段

台上的講者是房屋署高級結構工程師(12) 溫志堅先生

及結構工程師(39) 吳子傑先生

他們的講題是「房委會對臨時工程優化監控」

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(00:26)

大家好，我是房屋署高級結構工程師溫志堅

旁邊是我的同事，吳子傑先生

以下環節是介紹

房委會未來對臨時工程監控的優化措施

謝謝剛才楊博士分享很精彩的新科技

這個環節接近現實情況

介紹在行政上如何加強臨時工程監控

在2022年9月

香港安達臣道發生一宗很不幸的嚴重工業意外

天秤倒塌壓倒貨櫃，令三名工人喪失了生命

有見及此，房委會立即成立了一個工作小組

研究房委會工程合約

如何更好地監控臨時工程

更新了一些合約內容以及內部工作守則

今天主要為大家介紹

新合約的更新要求

跟隨屋宇署的《2009年地盤監督作業守則》

作業守則有對臨時工程監控要求

首先，臨時工程項目是否需要屋宇署批准

如果有需要批准，需要訂明圖則

就是所謂的「入則」

認可人士、註冊結構工程師、註冊岩土工程師和承建商

都有責任去監控工程

如果那個臨時工程對永久結構設計是無影響

現行的制度下，叫做Case 2

Case 2主要是承建商承擔全部責任

確保臨時工程的整體穩定性和安全性

例子是簡單的臨時工程，例如隔音屏障

第三類就是臨時工程

對永久結構設計有結構上影響

根據屋宇署作業守則

叫做Case 3

要求承建商聘請T5註冊合資格人士

完善設計、施工方案和完工

這是本來的制度

在房署的合約是怎樣監控的呢

都是跟隨屋宇署作業守則的做法

對於Case 1臨時工程

合約訂明

需要註冊結構工程師去驗證設計和施工方案

完工就沒有很明確要求

到Case 2臨時工程

需要承建商的認可工程師驗證設計

由於Case 2是相對次要

所以施工方案和完工沒有特別很明確的要求

到Case 3的臨時工程

需要承建商的認可工程師去驗證設計和完工

以上就是現有房委會的合約內容

對不同類型的臨時工程

列於合約不同部份

如果同我們合作的工程界朋友都知道了

不同的部份都有列明對臨時工程的要求

但每個部份都有不同要求

所以將會有所更新

在未來的工程合約要求

主要放在一個集中的地方

在合約規格PRE.B10的部分裡面

列明了對臨時工程的要求

對房委會同事或者是業界朋友

會更清晰臨時工程的要求是甚麼

另外新的要求就是對臨時工程的

不同重要性和危險性

分了不同程度，也要求不同的合資格人士進行驗證

包括設計、施工方案、完工

甚至拆卸工程需要拍攝影片

和聘請獨立審核工程師驗證臨時工程

以下由吳子傑先生詳細說明

大家好，這個圖表簡單說明

未來房署工程合約要求，可以一目了然

剛才溫志堅先生提及

將所有的臨時工程要求

都放在合約規格PRE.B10.010

合約規格PRE.B10.010也有不同的從屬條款

看這個圖表

Case 1是須要入則的臨時工程

需要有註冊結構工程師去做設計、施工方案和完工

這是一向的需求

在紅色的部份，是我們新增的要求

包括要求有完工驗證，需要拍攝拆卸影片

以及如果臨時工程為期超過一年

就要取得年度安全證書

另外Case 2和Case 3

把它們分為不同的重要性級別

由最低到最高，例如最低級別有甚麼？

很簡單，如地盤空洞

要蓋好一塊板和圍封起來

沒有結構性憂慮，但也有危險性的

一般找安全主任巡查

或者結構質量控制員、品質控制經理

地盤代表實行安全管理

但是設計要求就不高的

要求去到高一點，例如第二級重要性等級

設計就需要有合資格工程師進行認證

如果再進一步，第三級重要性等級

合資格工程師完成設計也不足夠

施工方案和完工都需要合資格工程師進行認證

再進一步，第四級重要性等級

就是需要註冊結構工程師

因為合資格工程師認證是不足夠

就須要註冊結構工程師進行認證

去到最後，剛才提及

新增了一個新的要求，除了註冊結構工程師

去做設計、施工方案、完工的認證之外

還要

獨立審核顧問再覆核工程的設計和完工

再詳細地說明每一個分類

在PRE.B10.010(5)，第五條從屬條款中

以前入則的註冊結構工程師

一直需要認證設計和施工方案

但是現在新增要求

就是完工都需要認證

但不是單純簽署就保證了認證

需要工程在完工的時候提供竣工圖

其實完成竣工圖不是很複雜

基本上如果竣工圖跟設計圖是一樣

設計圖本身就是竣工圖

另外需要遞交圖片紀錄

證明建築物是跟竣工圖一致

另外，如果臨時工程所使用之物料

在地盤超過一年，物料會有一定損壞的風險

所以臨時工程超過一年

便要求提供年度安全證書

另外，很多意外都在拆卸工作時發生

所以我們參考了PNAP APP-21

除了需要遞交拆卸工作的施工方案之外

在進行拆卸工作時，要拍攝影片

確保整個拆卸工作是完全按照施工方案的程序進行

另外Case 2和Case 3的

第二級重要程度，需要合資格工程師設計

大家不用擔心如何定義臨時工程其重要程度

合約已經定好重要程度

只要跟隨合約的規格要求就可以

這個幻燈片可以看到

第二級重要程度

有甚麼例子需要合資格工程師認證的設計

例如最常用的臨時支架和棚架

如果它們不影響永久結構

一般可以做一些典型設計

進行支架和棚架的臨時工程工序

第三級重要程度

只有認證設計還未足夠

需要做一個施工方案和完工認證

有甚麼臨時工程需要這樣做呢

如剛才的內容，例如都是臨時支架和棚架

有什麼不同呢？就是對永久結構有影響的

這就是《地盤監督作業守則》裡的Case 3

需要T5適任技術人員

完成設計、施工方案、完工認證

現在都是遵從《地盤監督作業守則》要求

另外，有些臨時支架和金屬模板

本身不是Case 3

只是大型一點

在《地盤監督作業守則》都有列明的

例如有懸臂式或大跨度的樑、較高的柱或牆

在《地盤監督作業守則》已經定義了

再寫入新的規格

這些比較高危的臨時支架和金屬鋼模板工作

要合資格工程師做設計、施工方案、完工的認證

另外常見到的金屬平台

不是工人工作平台

在《地盤監督作業守則》定義的金屬平台

是設計可作承托起重機械用途

也會分兩類

一個是比較低的要求，是合資格工程師認證

還有稍後會提到較高要求

大型平台除了註冊結構工程師做認證

亦需要獨立審核顧問進行認證

現在來到第四級重要程度

簡單來說，需要註冊結構工程師進行認證

不用怕註冊結構工程師會有過多工作

需要註冊結構工程師

進行認證的臨時工程不是很多

只有數項，例如保護性籌篷

因為有機會影響公眾的安全

需要註冊結構工程師進行認證

例如橋樑或厚板轉換層結構

這些較大型、高風險的臨時工程

需要註冊結構工程師去認證

除了興建之外，拆卸的時候

也需要註冊結構工程師做施工方案認證

另外承建商亦要在拆卸期間拍攝影片

確保完全跟從施工方案的內容

到最高重要程度，當然是指塔式起重機工程

除了註冊結構工程師做認證

認為不足夠

亦要有一個新要求有獨立審核顧問

主要是要再次檢查設計和完工

他的資歷和合約上設計認證顧問的

要求是一樣

簡單來說，就是在建築署網頁內

建築及有關顧問公司遴選委員會顧問公司名單上

的結構工程類別

去完成再次確認的工序

那有甚麼是最高級別，第五級重要程度

主要是塔式起重機

註冊結構工程師不是要認證整台塔式起重機

列明主要是負責基座及與永久結構連結的位置

另外是臨時載客升降機

對工人安全很重要的結構

另外，對公眾方面

有些橫跨公路的臨時支架

如果有任何閃失

對公眾構成很大的危險

所以需要註冊結構工程師和獨立審核顧問去做認證

另外，一些大型金屬平台

如果是普通金屬平台作承托小型機械

由合資格工程師認證就足夠

如果承托吊機，即比較大型的

負重高於20KPa

需要註冊結構工程師和獨立審核顧問認證要求

也參考現有《地盤監督作業守則》

承建商做臨時工程時，需要有工程記錄

未來承建商需要繼續做好記錄

要清楚地記錄臨時工程認證情況及不同條款的要求

設計、施工方案、完工的認證、年度安全認證

都要很清楚地記錄

沒有任何遺留

另外，在每月地盤會議

建議與承建商

密切監控列表有沒有遺留

有沒有完成全部的要求

除了做認證

不是單靠一張紙

如何令註冊結構工程師

獨立審核顧問、合資格工程師

有信心去證明工程妥當

除了目視檢查

所以都很重視測試

基本測試結果與永久工程合格要求是一致

工程做好完整測試，做好目視檢查的話

工程認證時，可以保證安全

測試主要是由承建商找

香港實驗所認可計劃（HOKLAS）中的實驗所去做測試

為了加強監管

房屋署的直接測試承包商會定期安排相同的測試

去確保質量是合格

最後與業界都討論過

香港建造商會、香港建造商會打樁小組給了很多意見

也根據他們的意見作出了數次修改

這個版本基本上會很快就會推出

房署的同事在技術回饋版面

可以知道到最新的合約要求

屋宇署就塔式起重機問題

將來有一些新的措施

我們跟屋宇署新的措施都是一致

可能房署要求更加嚴格

最後方向大致也是一樣的

今天的分享到此

謝謝觀看

（18:20）