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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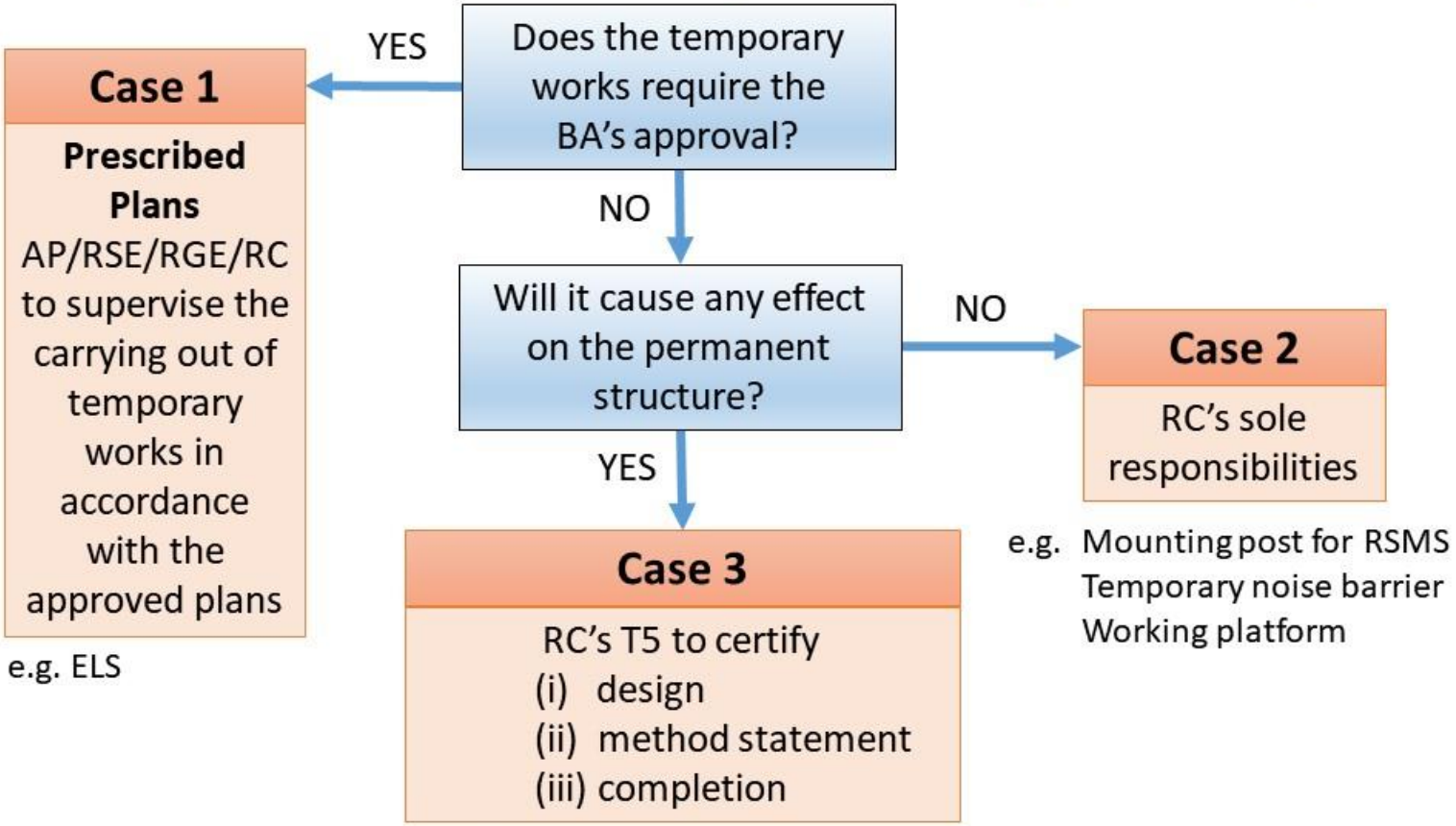
Background

- 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

	design	method statement	completion
Case 2	✓	✗	✗

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

- 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

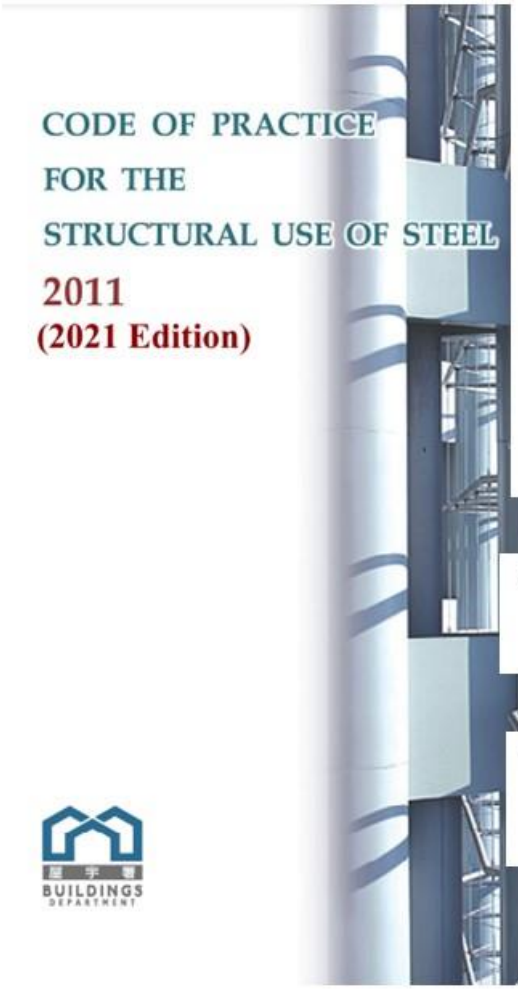
Case under CoPSS	Design	Method Statement	Completion	Independent Checking Engineer (ICE)	Dismantling Video	Annual Safety Certificate
Case 2 & Case 3	Design Engineer (DE) (RPE with 5yr experience) *(use TW1)*		RC's T4 + AS *(use TW3)*	ICE (RPE with 5yr experience) to check DE's **design only** *(use TW2)*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

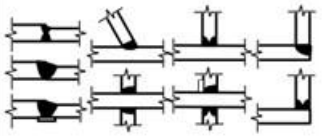
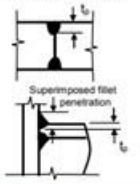
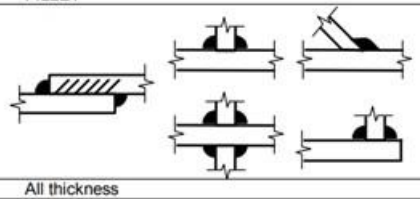
The most adverse loading situation arising from the intended construction works should be considered in the design.

4.3.4 Load combinations for temporary works in construction

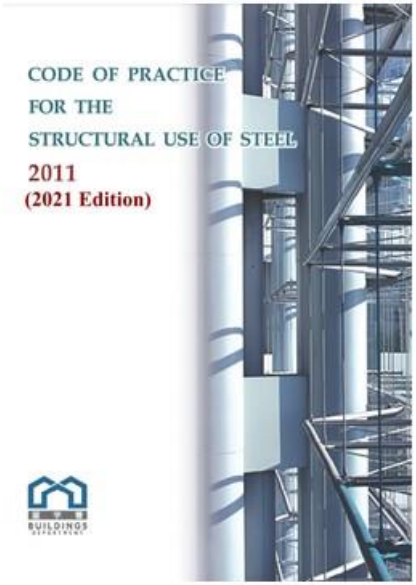
The values in Table 4.2 should be used if it is considered that the consequences of failure of a particular element are not serious enough to warrant a higher load factor. In no circumstances should any adverse load factor be less than 1.2. This includes load factors for wind loads.

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發達，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.

This is a clip from the 16 January 2024 recording of the

Hong Kong Housing Authority

“Site Safety Seminar for Capital Works New Works Contracts”

The speaker on stage is

Mr. Timothy Wan Chi-kin, Senior Structural Engineer (12)

& Mr. Stanley Ng Tsz-kit, Structural Engineer (39)

Their topic is “Enhanced Control of Temporary Works in HA”

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(00:26)

Hello everyone, I am Timothy Wan, Senior Structural Engineer from the Housing Department

Next to me is my colleague, Mr Stanley Ng

In this session we will introduce

the Housing Authority’s upcoming enhancements for monitoring temporary works

Thank you Dr Yeung for sharing the latest technologies

This session is closer to real-life scenarios

focusing on administrative measures to strengthen the monitoring of temporary works

In September 2022

a serious industrial accident occurred on Anderson Road, Hong Kong

A tower crane collapsed and crushed a container causing the deaths of three workers

In response, the Housing Authority immediately formed a task force

to review the HA contracts

and how to enhance the control on temporary works

updating some contract provisions and internal guidelines

Today we will mainly introduce

the new contract requirements

which are aligned with the Buildings Department’s “The Code of Practice for Site Supervision 2009”

The code outlines requirements for monitoring temporary works

First, contractors have to determine whether the temporary works require Buildings Department approval
If so, drawings must be submitted
known as "Plan Submission"
Authorised persons, Registered Structural Engineers (RSE), Registered Geotechnical Engineers (RGE), and contractors
all have responsibilities in monitoring the works
If the temporary works have no impact on the permanent structural design
they fall under Case 2 in the current system

where the contractor bears full responsibility
to ensure the overall stability and safety of the temporary works
Examples include simple temporary works like noise barriers
The third category refers to temporary works
that structurally affect the permanent design

According to the BD code
this is classified as Case 3
Contractors must appoint to register a T5 competent person
to complete the design, method statement, and completion verification
This is the existing system
So how does the Housing Department implement these in our contracts?
We follow the approach in the BD code

For Case 1 temporary works
our contracts specify that
a Registered Structural Engineer must verify the design and method statement

but do not clearly require completion verification

For Case 2 temporary works

the contractor's Qualified Engineer (QE) must verify the design

Since Case 2 is relatively minor

method statement and completion requirements are not clearly specified

For Case 3 temporary works

the contractor's Qualified Engineer must verify both design and completion

These are the current Housing Authority contract requirements

for different types of temporary works

They are scattered across various sections of the contract

Works contractors working with us may already know this

each section has its own set of requirements on temporary works

which may differ

so changes will be made

The contract requirements for temporary works in future HA contracts

will be allocated in one central section

In section PRE.B10

will list out all the requirements of temporary works

For HA staff and works contractors

it will be easier to understand the requirements for temporary works

Another new requirement is to classify temporary works

based on their importance and risk level

Different levels will require different qualified personnel

to verify the design, method statement, and completion

Some may even require video recording during dismantling

and the appointment of an Independent Checking Engineer (ICE) to verify the works

Now, Mr Stanley Ng will explain in more detail

Hello everyone. This chart provides a simple overview

of the upcoming HA contract requirements

As Mr Wan just mentioned

all requirements for temporary works

will be placed under contract specification PRE.B10.010

This section also contains subordinate clauses

This chart shows the classification

Case 1 refers to temporary works requiring plan submission

A Registered Structural Engineer must certify the design, method statement, and completion

This has always been required

The red highlights show our new requirements

These include completion verification, video recording of dismantling

and for works lasting more than a year

an annual safety certificate must be obtained

As for Case 2 and Case 3

they are further classified by importance level

from low to high. For example, what falls under the lowest level?

A simple case like a ground opening on site

which needs to be covered and fenced off

Though there is no structural concern, it still poses safety risks

In such cases, safety inspections are typically handled by Safety Officer (SO)

Structural Quality Control Coordinator (SQCC), Quality Control Managers (QCM)

or site agent

Design requirements at this level are not high

If we move up to the second importance level

a Qualified Engineer is required to verify the design

Moving on to the third level

design certification by a Qualified Engineer is not enough

Method statement and completion must also be verified by a Qualified Engineer

Going further, at the fourth importance level

a Registered Structural Engineer is required

because certification by a Qualified Engineer is not sufficient

A Registered Structural Engineer must carry out the verification

Finally, as mentioned

earlier a new requirement has been added

In addition to certification of the design, method statement and completion by a Registered Structural Engineer

it is also required for

an Independent Checking Consultant (ICC) to review the design and completion of the works

Let's take a closer look at each classification

under PRE.B10.010(5) in the fifth subordinate clause

Previously, for works requiring plan submission

a Registered Structural Engineer was already required to certify the design and method statement

Now an additional requirement has been added

completion must also be certified

But certification is not just about signing a form

At completion, the works must provide As-Built drawings

Preparing As-Built drawings is not too complicated

If the completed works match the design

then the design drawings themselves serve as the As-Built drawings

Photo records must also be submitted

to prove the completed structure matches the As-Built drawings

Besides, if the materials used in the temporary works

remain on site for over a year, there is a risk that they may deteriorate

So if a temporary work lasts more than one year

an annual safety certificate must be provided

Also, many accidents occur during dismantling

So we referred to PNAP APP-21

In addition to submitting a method statement for dismantling

a video must be recorded during the dismantling process

to ensure all steps are carried out exactly as stated in the method statement

For Case 2 and Case 3

the second level of importance requires a Qualified Engineer for the design

You do not need to worry about how to determine the importance level

It is already specified in the contract

Just follow the contract specification requirements

This slide shows examples

of temporary works requiring design certification

by a Qualified Engineer at the second importance level

For example, common temporary supports and scaffolding

If they do not affect the permanent structure

typical designs can be used

for such temporary works

At the third importance level

design certification alone is not enough

a method statement and completion certification are also required

Which types of temporary works need this?

As mentioned earlier—temporary supports and scaffolding

What is the difference? They affect the permanent structure

This falls under Case 3 in the Code of Practice for Site Supervision

It requires a T5 competent person

to certify the design, method statement and completion

We are following the Code of Practice for Site Supervision's requirements

In addition, some temporary supports and metal formwork

are not Case 3 by definition

but are relatively large in scale

These are also listed in the "Code of Practice for Site Supervision"

such as cantilevered or long-span beams, tall columns or walls

These are already defined in the "Code of Practice for Site Supervision"

and are now written into the new specification

For these higher-risk temporary supports and metal formwork

a Qualified Engineer must certify the design, method statement and completion

Another common example is metal platforms

not the platforms for workers to use

but metal platforms defined in the "Code of Practice for Site Supervision"

as platforms designed to support lifting machinery

These are also divided into two levels

The lower level requires certification by a Qualified Engineer

The higher level will be mentioned shortly

Large platforms require not only a Registered Structural Engineer

but also an independent checking consultant for certification

Now we move on to the fourth level of importance

In simple terms, it requires certification by a Registered Structural Engineer

There is no need to worry about the workload for

Registered Structural Engineers

Only a few types of temporary works require their certification

for example, protective canopies

These may pose a risk to public safety

so they must be certified by a Registered Structural Engineer

Other examples include bridge structures or transfer plates

These larger and higher-risk temporary works

require certification by a Registered Structural Engineer

Besides construction, dismantling also

requires method statement certification by a Registered Structural Engineer

The contractor must also record a video during dismantling

to ensure the process fully follows the method statement

The highest level of importance is about tower crane works

Certification by a Registered Structural Engineer alone

is not enough

There is a new requirement for an Independent Checking Consultant

to again review both the design and the completion

This consultant must meet the same qualifications

as the design certifier and consultant named in the contract

In simple terms, they must be listed

under the Structural category of

on the Architectural and Associated Consultants Selection Board

on the Buildings Department website

So what counts as the highest level—fifth level of importance?

Mainly tower cranes

The Registered Structural Engineer does not need to certify the entire crane

It is listed that they are mainly responsible for the base and its connection to the permanent structure

Another example is temporary passenger lifts

which are important for workers' safety

In terms of public safety

some temporary supports span across roads

If any incidents happened

it could pose a serious risk to the public

so both a Registered Structural Engineer and an Independent Checking Consultant are required to certify the works

For large steel working platforms

if they only support small machines

certification by a Qualified Engineer is enough

But if they support lifting equipment

with a loading above 20kPa

certification by a Registered Structural Engineer and an independent checking consultant is required

This also follows the current Code of Practice for Site Supervision

Contractors are required to maintain records for temporary works

In the future, contractors must continue

to keep clear records of all certifications for temporary works and requirements from different clauses

This includes design, method statement, completion certification, and annual safety certificates

all must be clearly documented

with nothing omitted

At monthly site meetings

we recommend communicating with the contractor

closely monitoring the checklist

to see if any requirements are outstanding

Having certifications

is not just a piece of paper

How can Registered Structural Engineers

independent checking consultants and Qualified Engineers

have confidence in endorsing the works?

In addition to visual inspection

testing is also important

The basic test results should meet the same standards with those for permanent works

With proper testing and visual checks

certifying the works can ensure site safety

These tests are mostly arranged by the contractor

and carried out by HOKLAS-accredited laboratories

To enhance monitoring

the Housing Department's direct testing contractor will also regularly conduct the same tests

to ensure the quality is acceptable

Finally, we have consulted with the industry

The Hong Kong Construction Association (HKCA) and Hong Kong Construction Association

Piling Contractors Committee (HKCAPCC)

have provided numerous feedback

We have also revised the requirements several times based on their input

and this version will be implemented soon

Our colleagues from the Housing Department can check the latest contract specification

on the Technical Feedback platform

As for tower crane safety

the Buildings Department will introduce new measures

The Housing Department's requirements are aligned

though in some cases stricter

But the overall direction is the same

That concludes our presentation today

Thank you for watching

(18:20)