

**COMMISSION OF INQUIRY INTO THE CONSTRUCTION WORKS  
AT AND NEAR THE HUNG HOM STATION EXTENSION  
UNDER THE SHATIN TO CENTRAL LINK PROJECT APPOINTED  
PURSUANT TO SECTION 2 OF THE COMMISSIONS OF INQUIRY  
ORDINANCE (CHAPTER 86) ON 10 JULY 2018**

**5<sup>TH</sup> WITNESS STATEMENT OF LOK PUI FAI**

I, LOK PUI FAI, Senior Structural Engineer/Railway Development, Kowloon and Rail Section, New Buildings Division 2, Buildings Department (“BD”), 8/F, 14 Taikoo Wan Road, Taikoo Shing, Hong Kong, do say as follows:

2. I am the same LOK PUI FAI who gave the 1<sup>st</sup> Witness Statement dated 13 September 2018 [H7/2187-2213] (“my 1<sup>st</sup> Witness Statement”) and the 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> Witness Statements all dated 14 May 2019 [DD7/10270-10285, DD7/10286-10291 and DD7/10292-10296] (respectively referred to as “my 2<sup>nd</sup> Witness Statement”, “my 3<sup>rd</sup> Witness Statement” and “my 4<sup>th</sup> Witness Statement”) to the Commission. Save where otherwise specified, the facts deposed hereto are within my personal knowledge or are derived from office files and records and sources to which I have access and are true to the best of my knowledge, information and belief. Save as otherwise specified, I will adopt the same abbreviations and nomenclature as my 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> Witness Statements.

3. I make this 5<sup>th</sup> Witness Statement in response to the following documents and for clarifying matters stated in my 2<sup>nd</sup> Witness Statement:

- i. Paragraphs 10 – 12 of Supplemental Witness Statement of Chan Chun Wai Chris dated 16 May 2016 [BB8/5236-5239];
- ii. Paragraphs 46, 48 and 54 of Witness Statement of Chan Kit Lam dated 16 May 2019 [BB8/5187-5206];
- iii. Paragraphs 60 and 63 of 6<sup>th</sup> Witness Statement of Karl Speed dated 17 May 2019 [CC6/3752-3763];
- iv. Paragraph 28 and 31 – 34 of 2<sup>nd</sup> Witness Statement of William Holden dated 17 May 2019 [CC6/3764-3783];
- v. Paragraphs 44 and 46 of Leighton’s Opening Address dated 22

- May 2019; and
- vi. Paragraphs 61 and 62 of MTRCL's Opening Address dated 22 May 2019.

**A. Need for Prior Consultation on the Change of Rebar Lapping to Coupler Connection**

4. In paragraphs 46 [BB8/5200], 48 [BB8/5202] and 54 [BB8/5204] of Chan Kit Lam's Witness Statement dated 16 May 2019<sup>1</sup>, it was alleged that as the change of rebar lapping to coupler connection was a "minor change", there was no need to submit consultation submission to BD for acceptance before implementing the change.

5. I disagree with such a contention. In response to the allegation, I will first set out the requirements for design management under the IoE and IoC.

6. The IoE and IoC are issued with regard to the Project Management Plans ("PMPs") submitted by MTRCL, which "outlines the scope of the works for the [SCL] and provides details on how the SCL Project is to be managed by the MTRCL in order to demonstrate that the proposed management process will meet the exemption requirements under the Buildings Ordinance ("BO") ..."<sup>2</sup> [H7/2375].

7. The Administrative Procedure for Consultation Submissions under IoE or IoC is stipulated in Appendix 9 of the PMP [H7/2498]. Under Appendix 9, all designs of permanent works (irrespective of new proposals or amendments to accepted proposals) have to go through the consultation process under the IoE or IoC and acceptance by BO Team ought to be obtained prior to the commencement of the works. No exception is provided for so-called "minor changes in construction details" as alleged by MTRCL and Leighton.

8. MTRCL in its Opening Address paragraphs 61 and 62 and Mr. Chan Kit Lam's statement paragraphs 46, 48 and 54 [BB8/5200, 5202 & 5204] rely on Appendix 7 [H7/2492] of the PMP to argue that minor changes or

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<sup>1</sup> See also Supplemental Witness Statement of CHAN Chun Wai Chris §§10-12 [BB8/5238-5239] and 2<sup>nd</sup> Witness Statement of William Holden §28 [CC6/3778].

<sup>2</sup> Version E dated March 2015 [H7/2369 - 2504]. Unless otherwise specified, the reference to the PMP in this witness statement refers to Version E.



amendments necessary to suit site condition without prior consultation, so long as the deviations are reflected in the as-built records. However, Appendix 7 sets out MTRCL's own design management and assurance process. In determining whether consultation submission to BD is required, one should refer to Appendix 9, not Appendix 7. Appendix 9 is specifically for the administrative procedures of consultation submissions under the IoE/IoC. In addition, after the 2015 non-conformity incident, MTRCL had reaffirmed that the working drawings are to be prepared in accordance with the accepted drawings (See para 12(a) below).

9. I would like to further point out that the necessity for consultation submissions would not affect the progress of the project but would in fact help clarify design issues. To facilitate submissions in design and construction stages, paragraph 3 of Appendix 11 of the PMP [H7/2503-2504] provides that the normal turnaround time for processing consultation submissions would be 28 days, while for urgent submissions accorded with "high priority" the turnaround time would be 14 days. This is a fast track arrangement as compared with the statutory processing time of 60 days and 30 days for new and amendment submissions respectively under the BO. As such, under the IoE and IoC consultation process, submissions for design amendments could have been dealt with expeditiously without affecting work progress on site. In addition, under paragraph 10.1.1 [H7/2394] and Appendix 10 of the PMP [H7/2499-2501], regular working level meetings between BO Team and MTRCL's Design Manager / Construction Manager, contractors, consultants, etc. had been held to facilitate close communication on technical and project management issues that are of common concern to both parties in order to meet the tight schedule for reviewing the consultation submissions. The purposes of these meetings are to align planned submissions schedule, conduct pre-consultation prior to formal submissions, clarify and resolve technical issues, etc. MTRCL should therefore have ample opportunities to clarify with BO Team.

10. The purpose of requiring prior consultation is to allow BO Team to vet the adequacy of design changes and specify requirements on supervision and documentation in relation to the scope and nature of the proposed works. Taking change from rebar lapping to coupler connection as an example, although lapping of rebars and couplers are both accepted method of splicing, the use of coupler is subject to additional quality assurance, quality control and

testing requirements <sup>3</sup> (see paragraph 40 of my 2<sup>nd</sup> Witness Statement [DD7/10284], paragraph 15 of my 3<sup>rd</sup> Witness Statement [DD7/10289] and paragraph 13 of my 4<sup>th</sup> Witness Statement [DD7/10295]).

11. Insofar as the SCL project is concerned, the rebar splicing methods are clearly shown on the accepted drawings. For example, drawing nos. 1112/B/HUH/ATK/C12/100 [H3/606] and 1112/B/HUH/ATK/C12/830 [H4/840] clearly show that rebar splicing methods at the slab-wall connections include the use of couplers for connecting rebars, while lapping of rebars are adopted elsewhere in the slab. More specifically, the connection between the base slab and kicker walls at HHS is shown in the accepted drawings as one by lapping, see drawing nos. 1112/B/HHS/ACM/C12/702 [DD8/11311] and 1112/B/HHS/ACM/C11/501 [DD8/11305]. The registered contractor should not unilaterally change the splicing method as shown on the accepted drawings, without making prior consultation. Therefore, prior to the commencement of the splicing works concerned, a consultation submission for change of rebar lapping to coupler splicing should be made in accordance with the procedures set out in Appendix 9 of the PMP [H7/2498] for acceptance by BO Team. BO Team would then specify relevant requirements on quality assurance, quality control and testing in the acceptance letter.

12. In fact, the need to make amendment submissions prior to the commencement of the works was reinforced as a result of the 2015 non-conformity incident. In 2015, BD discovered that the rebars in some completed diaphragm wall panels were not constructed in accordance with the accepted structural plans<sup>4</sup>. Subsequently, MTRCL submitted an incident report [H11/5538-5720] for the said non-conformity. In the report, the CP of MTRCL committed to a series of improvement measures and reiterated the following principles:

- (a) CP has instructed his TCPs and the Construction Manager (“CM”) to strictly follow the working drawings which are prepared in accordance with drawings accepted by the Authority such as BD/GEO in the execution of the works. TCPs should bring CP’s attention to any

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<sup>3</sup> The additional quality assurance, quality control and testing requirements have been explained in detail in paragraphs 10 to 15, 24 and 25 of my 1<sup>st</sup> Witness Statement [H7/2192-2196].

<sup>4</sup> See§55-56 of my 1<sup>st</sup> Witness Statement [H7/2203].



deviations in a timely manner (see paragraph 3.3.1 of the report) [H11/5544].

(b) The amended connection design had substantially changed the original design intent of the reinforcement lap and anchorage at the connection but the change was allowed to progress in the shop drawing preparation process. CP has instructed his TCPs not to deal with future design changes to the permanent works proposed by the contractor (i.e. Leighton) in the shop drawings process which could not guarantee a thorough review by all concerned parties (see paragraph 3.3.2 of the report) [H11/5544].

(c) TCPs shall not allow changes to be made to the permanent works in contractor's shop drawing submissions. TCPs in the CP stream shall supervise the works to ensure they are executed in accordance with the working drawings / accepted drawings. They should bring CP's attention to any deviations in a timely manner (see paragraph 4.4 of the report) [H11/5546].

13. I expect Leighton being the registered contractor to have knowledge of such commitment as set out above.

**B. Need For Prior Consultation on the Change of Coupler Connection to Drill-in Rebar**

14. Paragraphs 31 to 34 of 2<sup>nd</sup> Witness Statement of William Holden [CC6/3779] alleged that the drill-in rebars were used for temporary purpose and Leighton left it to MTRCL to determine whether it was necessary to consult with BD in relation to the use of drill in bars.

15. The standpoints given in paragraphs 6 to 13 above are also applicable to the change of coupler connection to drill-in rebars, regardless of whether it affects the temporary or permanent design.

### **C. Rebars used in the Construction Work without On-site Sampling and Testing**

16. Paragraphs 60 [CC6/3761] and 63 [CC6/3762] of 6<sup>th</sup> Witness Statement of Karl Speed admitted that approximately 4,000 tonnes of rebar (around 7 percent of all rebars ordered by Leighton and used in Contract 1112) delivered to site were not sampled for testing, in breach of the requirements in clauses 5.1.1 of Construction Standard 2:1995 – Carbon Steel Bars for the Reinforcement of Concrete (“CS2:1995”) [H10/4751-4786] and Clause 10.4.1 of the Code of Practice for Structural Use of Concrete 2004 [H8/2983] which specifies that reinforcement should conform to CS2:1995. Leighton suggests that the tests performed on the rebar for Contract 1112 is sufficient to establish that the materials used are safe and fit for purpose because tests have already been performed by the manufacturer, and states that it would adduce expert evidence to demonstrate that the tests are adequate.

17. To ensure compliance with the Buildings Ordinance (Cap. 123) (“BO”), BO Team has specified certain requirements on the relevant acceptance letters for the works under Contract 1112. As regards sampling and testing of steel rebars, it should be carried out in accordance with Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers (“PNAP”) APP-45 [H10/4787-4789] for compliance with CS2:1995, which is also stipulated in the acceptance letters (for example, Appendix II to the acceptance letter of 26 September 2013 for HHS [DD8/11571]). This is one of the specific requirements that MTRCL and Leighton were required to fulfill, irrespective of whether the materials used are eventually found to be safe or not. It is stipulated in Clause 6.1.2 of the PMP [H7/2385] that MTRCL will consult the relevant Government departments on all deviations from the Government Standards during the consultation submissions. According to BO Team’s records, MTRCL did not submit any request for deviations from the testing requirements.

18. Pursuant to clause 5.1.1 of CS2:1995 [H10/4777], on top of the testing carried out at the steel mill by the manufacturer [H10/4767-4773], a series of tests are required to be carried out on all rebars delivered to site before they are allowed to be used in the construction works. Every batch of steel rebars arriving on site shall be sampled for testing. Such tests shall be performed by a laboratory accredited by the Hong Kong Laboratory



Accreditation Scheme (“HOKLAS”) in accordance with CS2:1995 and test certificates shall be HOKLAS endorsed. For the purpose of testing, the batch of rebars delivered to site shall be subdivided into different lots according to their steel grade and nominal diameter. Test specimens shall be taken from each lot and the sampling rate for testing shall be in accordance with Table 9 of CS2:1995 [H10/4778]. The purpose of such testing is to verify the specified properties of steel bars delivered to site as stated in paragraph 5.1.1 of CS2:1995 [H10/4777]. Under paragraph 2 of PNAP APP-45 [H10/4787], these tests are additional to the routine testing carried out by the manufacturer at the rolling mill. This is the level of quality assurance required under the BO and CS2. For this purpose, the CP of MTRCL should ensure that the correct numbers of random samples selected from different lots of the batch of steel rebars delivered to site.

19. Further, as required under the acceptance letter [DD8/11571], the corresponding test reports should be appended with a statement signed by the CP<sup>5</sup> to confirm the following:

- (a) All steel reinforcing bars used for the construction and the test specimens covered by the test reports are in accordance with the types and grades of steel shown in the agreed proposal.
- (b) Sampling and testing of steel reinforcing bars used have been carried out in accordance with PNAP APP-45 for compliance with CS2:1995.
- (c) The acceptance criteria appropriate to each type and grade of steel reinforcing bars used have been complied with.
- (d) All steel reinforcing bars tests have been carried out by a laboratory accredited under the HOKLAS.

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<sup>5</sup> For example, see [BB2/1065] for CP statement for Contract 1112 and Annex LPF-37 for CP statement for Contract 1111.

#### **D. Use of Ductility Coupler in SAT**

20. Leighton alleged in paragraphs 44 and 46 of its Opening Address that there were D-walls at the NSL level of the SAT but there were no ductility zones (i.e. where couplers were subject to a ductility requirement) in the original design and as such, the higher supervision standards for couplers with a ductility requirement did not apply to the construction of SAT. This is a bare assertion without any factual basis. In any event, such assertion is wrong.

21. As a matter of fact, ductility couplers are specified in the accepted drawings of SAT. See for example, drawings no. 1112/B/000/ATK/C11/006 [H2/440], 1112/B/HUH/ATK/C12/830 [H4/840] and the specific details shown in drawing no. 1112/B/HUH/ATK/C12/981 [H4/864] for the diaphragm walls.

22. As for paragraph 50 of Leighton's Opening Address regarding the applicability of QSP at the construction works of HHS where couplers were used, I note that according to the accepted drawings, no couplers should be used at HHS. However, according to Leighton, couplers were actually used at the HHS although there was no prior consultation with the BO Team. Had a prior consultation submission been properly made, Leighton would have been required to comply with the QSP for coupler installations works at ductility zones in accordance with the further accepted drawings. As to coupler installation works at non-ductility zones, Leighton would have been required to follow another set of supervision requirements similar to those for non-ductility couplers imposed on the works at NAT, see for example Appendix V to the Acceptance Letter dated 5 November 2014 [DD7/10339-10341].

#### **E. Amendments to my 2<sup>nd</sup> Witness Statement**

23. In paragraph 27 of my 2<sup>nd</sup> Witness Statement [DD7/10279], I set out in a summary table the design package details for the three Stitch Joints and the Shunt Neck Joint. The type of materials proposed and accepted was stated to be coupler assembly with T20 threaded rebar for Shunt Neck Joint. However, upon further checking of the reinforcement details for Contract 1111, I would like to make the following clarification.

24. According to the accepted drawing of Contract 1111 no. 1111/B/352/ATK/C12/931 [DD7/10381], the proposed and accepted coupler



assembly at Shunt Neck Joint involved threaded bar size of T20 (at wall), T25 (at wall and at bottom mat of slab) and T40 (at top mat of slab). Under the QAS for Contract 1111 submitted by the CP at Annex LPF-23 [DD7/10487-10869], the Lenton QAS [DD7/10489] applies to coupler assemblies of T32, T25 and T20 rebars whereas the BOSA QAS [DD7/10652-10653] applies to those of T40 only. In sum, the brand of coupler assembly proposed by MTRCL and used at Shunt Neck Joint involved BOSA couplers for T40 rebars and Lenton couplers for T25 and T20 rebars.

25. As to Joint 1 and Joint 3, according to MTRCL's design amendment submission accepted on 4 April 2019 [DD6/6752-6754] which has incorporated the remedial works performed, while coupler assemblies with T32 rebars only were used at Joint 3, see [DD7/10402], coupler assemblies with both T20 and T32 threaded rebars were used at Joint 1 for interface with Contract 1111, see [DD7/10403, DD7/10406 and DD7/10421].

26. As a result of this clarification, what I said in paragraph 32(2) of my 2<sup>nd</sup> Witness Statement [DD7/10281] regarding the no. of types of couplers accepted to be used at the Contract 1111's side of the interface has to be revised accordingly. To achieve proper connection to either the Lenton couplers or BOSA couplers installed at the interface by the contractor of Contract 1111, all that Leighton has to do is to ensure that appropriate types and sizes of threaded rebars are used such that they can be fitted into the Lenton couplers or BOSA couplers respectively.

27. I confirm that the contents of this witness statement are true to the best of my knowledge, information and belief.

Dated this 31<sup>st</sup> day of May 2019.



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LOK PUI FAI