

**Commission of Inquiry into the Construction Works at and near the
Hung Hom Station Extension under the Shatin to Central Link Project**

FIRST WITNESS STATEMENT OF WILLIAM HOLDEN

I, **WILLIAM HOLDEN** of 39/F, 30 Harbour Road, Hong Kong, say as follows:

1. I am an Engineering Manager employed by Leighton Contractors (Asia) Limited (“**Leighton**”), the main contractor for the Hung Hom Station Extension contract (Contract SCL 1112) (the “**Project**”) under the Shatin-Central rail link project. The project manager for the Project is MTR Corporation Limited (“**MTRCL**”).
2. Unless otherwise stated, the facts stated herein are within my personal knowledge and are true. Where the facts and matters stated herein are not within my own knowledge, they are based on the stated sources and are true to the best of my knowledge, information and belief.

My qualification and experience

3. I am a qualified civil engineer and hold a degree in civil engineering. I have over 18 years of experience in engineering and construction.
4. I was employed by Leighton in July 2005. Prior to joining Leighton, I worked as an engineer in Australia.

My role and responsibilities

Roles in the Project

5. I have worked on the Project since its commencement. My primary title and role has been Senior Site Agent. Since May 2017, I have been an Engineering Manager.
6. From March 2013 to early 2015, I was responsible for managing the foundation works, primarily the diaphragm wall for the new Hung Hom Station (**HUH**). From early 2015 to mid-2016, I was primarily responsible for managing the underpinning works required for the existing podium structure. In addition, I was responsible for the technical aspects related to the construction of the primary structure of the HUH, including

development and review of temporary works, method statement preparation, programming, procurement, management of resources and sequencing of the works. From mid-2016 to late 2016, I was involved in the broader planning and commercial aspects of the Project, including preparation of documents related to entitlement under the Contract and preparation of completion programmes. In early 2017, I was involved in managing the construction of the Stabling Sidings (“HHS”) area and co-ordination of designated contractors’ works within that area.

7. From May 2017 to date, I performed the role of Engineering Manager. In this role, I have been responsible for managing various engineering matters that arise from time to time on the Project, including the remediation of the stitch joints at the North Approach Tunnel (“NAT”) area and in the NAT Shunt Neck.
8. Unless stated below, I did not personally undertake formal inspections of the works in the Project and did not directly supervise those members of the construction engineering team who performed such inspections. Generally, the management of those relevant engineers was handled by site agents and sub-agents in the construction engineering team.

Daily routine

9. During the construction period, my usual working hours on the Project were from 8am to 6pm on Monday to Friday, and every second Saturday.
10. I would spend most of my day in the site office. I would visit the site at least once or twice a week at a minimum. There were also periods, when works were being completed in my responsible areas, when I would visit the site almost every day.
11. During my site visits, I would walk around the area that I was responsible for and check the progress of the works and note any safety issues or concerns.
12. I attended informal and formal meetings with MTRCL, including weekly progress meetings and safety walks.
13. I had limited communication with the sub-contractors. From time to time, I had dealings with them regarding their contracts and other commercial issues. However, I

was not responsible for instructing them or communicating with them about the works on the Project.

Stitch joints at NAT

14. The permanent works design for Contract 1112 required three stitch joints to be constructed in the NAT area. Two of the stitch joints were located in the NSL tunnel box structure and one was located at the EWL track trough.
15. In this statement, I refer to the three stitch joints as follows:
 - (a) the stitch joint at the EWL level at the interface of Contract 1111 and Contract 1112 as the “**EWL Stitch Joint**”;
 - (b) the stitch joint at the NSL level at the interface of Contract 1111 and Contract 1112 as the “**NSL Stitch Joint 1111/1112**”; and
 - (c) the stitch joint at the NSL level between bay 5 and bays 6/7 of the tunnel structure within Contract 1112 as the “**NSL Stitch Joint 1112/1112**”,

(together, the “**NAT Stitch Joints**”).
16. I was not involved in the initial construction of the NAT Stitch Joints.

Investigation

17. In late January 2018, I was assigned to inspect some concrete cracking and water ingress at the NSL Stitch Joint 1111/1112 with a view to providing my recommendations on remedial measures.
18. I inspected the NSL Stitch Joint 1111/1112 and spoke to the Construction Manager appointed to the NAT at that time. He explained to me that there had been water leakage since late 2017 and that Leighton’s workers had been carrying out remedial injection grouting to seal up the cracking.

19. In early February 2018, a small crack (about 5mm to 10mm) appeared around the perimeter of the NSL Stitch Joint 1111/1112. I inspected the crack on or around 7 February 2018.
20. Shortly thereafter, Leighton sought approval from MTRCL to break the concrete cover of the reinforcement at the NSL Stitch Joint 1111/1112 to examine certain locations that were subject to the cracking and water ingress. MTRCL approved the proposal to break out the concrete at the locations suggested by Leighton. MTRCL gave this approval on site after speaking with Leighton's staff.
21. Between 7 February 2018 and 14 February 2018, Leighton's workers broke holes in the concrete and exposed some of the reinforcement bars ("**rebar**") at the NSL Stitch Joint 1111/1112. I was personally involved in inspecting the rebar and coupler connections. On inspection, I could see that a significant number of the exposed rebar had been incorrectly connected, or were not connected, into the couplers.
22. On or around 8 February 2018, Leighton and MTRCL agreed that similar inspections should be carried out on the other two stitch joints.
23. Between 9 February 2018 and 14 February 2018, Leighton's workers broke holes in the concrete at the other two stitch joints (the NSL Stitch Joint 1112/1112 and EWL Stitch Joint) exposing some of the rebar at those stitch joints. I was personally involved in inspecting the rebar and coupler connections at the stitch joints. On inspection, I could see that a significant number of the exposed rebar had been incorrectly connected, or were not connected, into the couplers at both stitch joints.
24. On or around 14 February 2018, I reported my findings to Leighton's senior management on the Project at that time. I concluded that the water seepage at NSL 1111/1112 Stitch Joint occurred as a result of the stitch joints opening between the stitch joint concrete and the tunnel structure. The opening of the joints resulted in cracks in the concrete, which permitted the inflow of water. At the NSL 1112/1112 joint, the water seepage occurred as a result of the failure of the installed permanent waterproofing measures. We agreed that Leighton should carry out rectification works as soon as possible on the stitch joints. I was then tasked with ensuring that the rectification works were completed.

Rectification Works at the NAT Stitch Joints

Remedial Proposal for the EWL Stitch Joint

25. On or around 5 March 2018, Leighton presented a detailed proposal to MTRCL to demolish and reconstruct the EWL NAT Stitch Joint. This document has been disclosed to the Commission and is numbered LCAL.NAT.6.04 in the Second Index of Documents disclosed by Leighton (“**Index**”).
26. On or around 3 March 2018, Leighton submitted formally via Contractors Submission Form (CSF) the “Task Method Statement for EWL Stitch Joint Reconstruction” for MTRCL’s approval. This was followed by a further revision on or around 17 March 2018. These documents have been disclosed to the Commission and are numbered LCAL.NAT.6.03 and LCAL.NAT.6.05 respectively in the Index.
27. MTRCL approved this method statement on 21 March 2018. The document in which the MTRCL gave its approval has been disclosed to the Commission and is numbered LCAL.NAT.6.06 in the Index.
28. On or around 21 March 2018, Leighton submitted to MTRCL a design amendment report entitled: “Report on 6th Design Amendment for NAT Tunnel Structures (Revised EWL Stitch Joint Details at 1111/1112 Interface)” for the rectification works of the EWL Stitch Joint. This document has been disclosed to the Commission and is numbered LCAL.NAT.7.01 in the Index.

Remedial Proposal for the NSL Stitch Joints

29. On or around 15 February 2018, Leighton presented a detailed proposal to MTRCL to demolish and reconstruct the NSL NAT Stitch Joints. This document has been disclosed to the Commission and is numbered LCAL.NAT.6.01 in the Index of Documents disclosed by Leighton (“**Index**”).
30. On or around 28 February 2018, Leighton submitted formally via Contractors Submission Form (CSF) the “Task Method Statement for NSL Stitch Joints Reconstruction” for MTRCL’s approval. This was followed by a further revision on or around 4 April 2018. These documents have been disclosed to the Commission and are numbered LCAL.NAT.6.02 and LCAL.NAT.6.07 respectively in the Index.

31. MTRCL approved the method statement on 6 April 2018. The document in which the MTRCL gave its approval has been disclosed to the Commission and is numbered LCAL.NAT.6.08 in the Index.
32. On or around 20 April 2018, Leighton submitted to MTRCL a design amendment report entitled: “Report on 7th Design Amendment for NAT Tunnel Structures (NSL Tunnel Stitch Joint Remedial – Rev A)” for the rectification works at the NSL Stitch Joints. This document has been disclosed to the Commission and is numbered LCAL.NAT.7.02 in the Index.

Rectification of EWL Stitch Joint

33. The overall works for the EWL Stitch Joint rectification including the enabling works commenced on 27 February 2018 and was completed on 10 April 2018. Leighton engaged Kingland (Sino) Company Limited (“**Kingland**”) as the sub-contractor for the demolition works, Fang Sheung Construction Ltd (“**Fang Sheung**”) as the sub-contractor for the rebar fixing, and Hills Construction Co. Ltd (“**Hills**”) as the sub-contractor for formwork and concreting, for these rectification works.
34. On or around 20 February 2018, MTRCL informed Leighton that it could commence the EWL Stitch Joint rectification works.
35. The demolition of the EWL Stitch Joint commenced on 5 March 2018 and was completed by 10 March 2018.
36. The EWL Stitch Joint reinstatement works commenced on 11 March 2018 and was completed by 10 April 2018.

Rectification of NSL Stitch Joints

37. The overall works for the NSL Stitch Joints rectification, including the enabling works, commenced on 9 February 2018 and was completed on 18 July 2018. Leighton engaged T&M Specialists (“**T&M**”) as the sub-contractor for the demolition works, Fang Sheung Construction Ltd (“**Fang Sheung**”) as the sub-contractor for the rebar fixing, and Hills Construction Co. Ltd (“**Hills**”) as the sub-contractor for formwork and concreting, for these rectification works.

38. On or around 14 February 2018, MTRCL informed Leighton at a meeting that it could commence the NSL Stitch Joint rectification works.
39. The demolition of the NSL Stitch Joint 1111/1112 and NSL Stitch Joint 1112/1112 (together, the “**NSL Stitch Joints**”) commenced on 15 February 2018 and was completed on 6 March 2018.
40. The rectification works for the NSL Stitch Joint 1111/1112 commenced on 15 February 2018 and were completed by 19 May 2018.
41. The rectification works for the NSL Stitch Joint 1112/1112 commenced on 15 February 2018 and were completed on 18 July 2018.
42. During the demolition works of the NSL Stitch Joint 1112/1112, T&M discovered that there was a void above the cast concrete in the roof of the stitch joint. The likely reason for the void was due to difficulties encountered during the concreting works which forced the early termination of the concrete pour. I was not aware of this void at the commencement of the rectification works.
43. During the rectification of the NSL Stitch Joint 1112/1112, Hills again encountered issues with the construction of the roof of the stitch joint. Hills attempted to cast the roof slab on 31 May 2018, however the pour was required to be abandoned and resulted in the roof not being fully cast. A void was present between the top of the Stitch Joint roof pour and the outer concrete structure. The reason the pour was abandoned was due to increased pump pipe pressure during concreting.
44. A contributing factor to the failure of the roof concrete pour was the high rebar congestion and the requirement for 20mm aggregate concrete.
45. A proposal was made by Leighton on 3 June 2018 to inspect the void using a borescope and if conditions were suitable carry out concreting of the void using a high flow 45MPa 10mm aggregate concrete mix. An alternative remedial method was also proposed within this document to demolish the partly cast roof pour and carry out a design review to “dramatically reduce to as little as possible the required reinforcement”. This document has been disclosed to the Commission and is numbered LCAL.NAT.6.67 in the Index.

46. The MTRCL rejected both the proposal to pump high flow concrete into the void and to carry out the design review to reduce the required reinforcement. The MTRCL did accept changing the concrete mix design to a 10mm aggregate mix. Subsequently, the design drawings were revised to reflect this change and were approved.
47. The roof of the partially cast NSL Stitch Joint 1112/1112 was demolished and recast successfully on 18 July 2018 using the revised 10mm aggregate concrete mix.
48. MTRCL issued Non-Conformance Report No. 199 (“**NCR 199**”) to Leighton in relation to the non-conforming concreting works. This document has been disclosed to the Commission and is numbered LCAL.NAT.5.22 in the Index.
49. NCR 199 has been closed out as the defective roof slab was completely removed, re-cast and completed to the satisfaction of both Leighton and MTRCL. The inspection and approval of the works was recorded by Request for Inspection and Survey Check (“**RISC**”) Form No. 13029. This document has been disclosed to the Commission and is numbered LCAL.NAT.6.41 in the Index.

Structural safety and integrity of the NAT Stitch Joints

50. Leighton has prepared a summary table of the RISC forms associated with the rectification of the NAT Stitch Joints. This document has been disclosed to the Commission and is numbered LCAL.NAT.2.01 in the Index.
51. The RISC forms, test results, TW4 (“permit to load”) forms and site diary records associated with the rectification of the NAT Stitch Joints have been disclosed to the Commission and are numbered LCAL.NAT.6.23 to LCAL.NAT.6.47, LCAL.NAT.6.48 to LCAL.NAT.6.65, LCAL.NAT.6.17 to LCAL.NAT.6.22 and LCAL.NAT.6.09 to LCAL.NAT.6.16 respectively in the Index. These records evidence Leighton and MTRCL’s supervision of the rectification works.

The works are safe

52. I believe that the NAT Stitch Joints have been rectified in accordance with the approved design amendments and the method statements. I also believe that the works were properly supervised and inspected by Leighton and MTRCL.

53. I believe that there are no issues relating to the construction of the NAT Stitch Joints which may affect the structural safety and integrity of the NAT or pose any concerns about public safety.

Shunt Neck

54. The NAT Shunt Neck (the “SNJ”) is located at the EWL level. It is a short length of track parallel to the main line for the purpose of allowing a train to shunt back into a siding or rail yard without occupying the main running line.

55. The SNJ is at the contract boundary between Contract 1112 and Contract 1111.

56. In light of the issues discovered at the NAT Stitch Joints, Leighton and MTRCL agreed to check the reinforcement at the SNJ to ensure that it was satisfactory.

57. On or around 2 March 2018, Leighton proceeded to break the concrete cover of the reinforcement at the trough walls of SNJ. I was personally involved in inspecting the exposed rebar and coupler connections at the SNJ. On inspection, I could see that the exposed rebar in the trough walls were not properly connected to couplers.

58. On or around 16 May 2018, Leighton submitted to MTRCL the “Remedial Proposal for Shunt Neck Connection at 1111/1112 Interface for North Approach Tunnel Structure” for remedial works at the NAT Shunt Neck. This document has been disclosed to the Commission and is numbered LCAL.NAT.9.01 in the Index.

59. On 30 October 2018, MTRCL issued Non-Conformance Report 267 (“NCR-267”) to Leighton in relation to the joint detail at the NAT Shunt Neck. In fact, by the time that MTRCL had issued NCR-267, Leighton had already proposed remedial measures for the SNJ. Leighton is now waiting on MTRCL to approve the proposed measures, so that the rectification work can commence on the SNJ.

Dated the 2nd day of May 2019.

Signed: 

William Holden