

IN THE MATTER OF

THE COMMISSION OF INQUIRY INTO THE DIAPHRAGM WALL  
AND PLATFORM SLAB CONSTRUCTION WORKS AT THE HUNG HOM STATION EXTENSION  
UNDER THE SHATIN TO CENTRAL LINK PROJECT

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**WITNESS STATEMENT OF JEAN-CHRISTOPHE, JACQUES-OLIVIER GILLARD**

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I, Jean-Christophe, Jacques-Olivier Gillard, of 20<sup>th</sup> Floor, Eight Commercial Tower, 8 Sun Yip Street, Chai Wan, Hong Kong say as follows:-

**Introduction**

1. I am duly authorised to make this witness statement on behalf of Intrafor Hong Kong Limited ("Intrafor") in response to the questions set out by the Commission in Lo & Lo's letters dated 25 July 2018 and 9 August 2018. Intrafor is ready to assist the Commission.
2. I am a director of Intrafor and hold ultimate responsibility for the management and operation of Intrafor, including all projects where Intrafor is involved. This includes SCL 1112 Hung Hom Extension project ("Project"). I have been involved with the Project in this capacity from the beginning. A copy of my CV is included in **Exhibit 1** to my statement together with a copy of a brochure setting out Intrafor's experience and expertise.
3. In preparing this statement, I have been assisted by members of my team at Intrafor including those who were involved in the Project.

4. Where matters that I set out are within my own knowledge, they are true. All other matters are true to the best of my knowledge and belief.
5. As will become apparent in my statement, there is a significant volume of documents that will be provided to the Commission in support of my witness statement. I would ask that this be treated as exhibits to my statement. Where indicated in the relevant parts of my statement, they will be provided along with my statement. Where this has not been possible, the documents will be provided, in accordance with the procedures set out by Lo & Lo, 7 days later.
6. I confirm that if further material matters subsequently come to my attention, I will draw these to the attention of the Commission. If further relevant documents are located or requested, these will be provided in batches in accordance with the procedures set out by Lo & Lo.

## Section One

### Overview and Key Background

7. As I explain in greater detail below, Intrafor was engaged to construct the diaphragm walls but was not involved with the platform slabs. Intrafor has no knowledge of the events relating to the platform slabs. As such, and save where I indicate to the contrary, I have answered the Commission's questions with regards to the diaphragm walls but am unable to provide answers with regards to the platform slabs.
8. Before I respond to the various questions set out in Lo & Lo's letters of 25 July 2018 and 9 August 2018, I thought it would also assist the Commission if I:
  - (i) set out some general background to Intrafor's involvement and works; and
  - (ii) addressed the summary of press and media reports set out on pages 3 to 6 of Lo & Lo's letter of 25 August 2018.

### General Background

### Intrafor's experience and expertise

9. Intrafor has been in operation in Hong Kong for about two decades. It is recognized as a leading ground engineering specialist and has been successfully involved in numerous high profile and complex projects. Intrafor has its origins in France since 1850, and has a global reputation for excellence.
10. Intrafor has very substantial experience of constructing diaphragm walls and similar structures. For example:
  - Tuen Mun Chek Lap Kok Link Northern Connection Sub-Sea Tunnel Section
  - Shatin to Central Link, Contract No. 1106 Diamond Hill Station
  - Shatin to Central Link, Contract No. 1128 South Ventilation Building to Admiralty Tunnels
  - Express Rail Link, Contract No. 811B West Kowloon Terminus Approach Tunnel (South)
  - Express rail Link, Contract No. 820 Mei Lai Road to Hoi Ting Tunnel
  - Lok Ma Cha Spur Line, Contract No. LDB201 Sheung Shui to Chau Tau tunnels
  - Central Reclamation Phase III, Contract No. HK12/20

### Intrafor had no involvement in the platform slabs

11. As I have indicated above, Intrafor was not involved with the construction for, or works to, the platform slabs. These platform slabs were outside Intrafor's scope of works.
12. Intrafor was also not involved with the connection of the platform slabs to the diaphragm walls.
13. Intrafor did, however, install starter bars, inside the diaphragm walls, to enable Leighton subsequently to connect the platform slabs to the diaphragm walls. A number of these starter bars had coupler on either one or both ends. The limit of Intrafor's involvement was to install these starter bars inside the diaphragm walls. Intrafor was not responsible for executing the subsequent connections works of the platform slabs to the diaphragm walls themselves.
14. The connection of the platform slabs to the diaphragm walls was done later by Leighton, who would need to expose the relevant couplers and to screw into them the threaded re-bars from the platform slabs. Intrafor had no involvement in this.

Intrafor only work was the original construction of the diaphragm walls

15. Intrafor was engaged as a sub-contractor for the construction of the diaphragm walls, barrettes and associated works. The sub-contract is dated 6 September 2013. Intrafor's scope of works is set out in the sub-contract.
16. Intrafor was engaged on a **construct only** basis to build the diaphragm walls in accordance with the design provided, and instructed, by Leighton. Intrafor has no design responsibility for any of the permanent works.

Intrafor was not involved with the manufacture or supply of re-bars or couplers or threads

17. Intrafor was also not responsible for the supply of re-bars or rebars threaded and supplied with couplers for use in the diaphragm walls.
18. All re-bars with or without couplers were supplied to Intrafor by Leighton on a "free issue" basis paid for by Leighton.
19. Leighton engaged the services of BOSA for the manufacture and supply of threaded rebars and couplers. Such threaded rebars with couplers were made available by Leighton to Intrafor.
20. Intrafor had no contractual relationship with BOSA. Leighton is responsible for the quality of the actual re-bars, threads and couplers.

Intrafor was not involved in demolition or modification of the completed diaphragm walls

21. Intrafor had no involvement in the alleged demolition of, or modifications to, the completed diaphragm walls. It did not participate in any way.
22. Intrafor did not have any knowledge either of the demolition or the modifications.
23. Intrafor did not have any design responsibility for the diaphragm walls. As such, there would have been no need, from a design or engineering perspective, for MTR or Leighton to advise or consult Intrafor prior to undertaking demolition of, or modifications to, the completed diaphragm walls.
24. Intrafor was equally not aware of the alleged deviation of the as-built conditions from BD's approval plans, or of the apparent removal of couplers previously installed by Intrafor.

### Sub-contracting arrangements

25. Intrafor, with the knowledge and approval of Leighton, engaged various domestic sub-sub-contractors to assist Intrafor. The key domestic sub-sub-contractors were:
- (i) Bachy Soletanche Group Limited, who provided specialist equipment and resources. A copy of the sub-contract, together with the additional partnering agreement (**Exhibit 2**), is being provided to the Commission.
  - (ii) Hung Choi Engineering Company Limited, who carried out steel fixing works. A copy of the sub-contract (**Exhibit 3**) is being provided to the Commission.
26. Intrafor did not sub-contract any work to Fang Sheung and China Technology. Neither Fang Sheung and China Technology were involved in the construction of the diaphragm walls.
27. Intrafor also did not sub-contract any work to BOSA. There was no contractual relationship between BOSA and Intrafor. BOSA was Leighton's sub-contractor and/or supplier.

### Early resolution of construction challenges for the Diaphragm Walls

28. At tender stage, Intrafor recognised that the assembly of the re-bar cages for the diaphragm walls would be challenging, from a construction perspective because of a combination of factors:
- (i) There was limited head-room at the work site, which would impact upon the lifting options for the re-bar cages during assembly;
  - (ii) The height of the diaphragm walls required up to multiple re-bar cages to be assembled and connected vertically;
  - (iii) The fact that some of the cages involved two or three layers of 50 mm diameter vertical rebars.
29. Having recognised these construction challenges at an early stage, Intrafor provided three alternative methods for the assembly of the re-bar cages which were incorporated in the approved method statements. By way of background here, I should explain that there were several iterations and revisions of the method statements during the project. I address this further in Section 2 of my statement.

Copies of each of the revisions of the method statements that have been located to date are enclosed in **Exhibit 4**.

30. In addition, Intrafor invested time before the cages were installed for any panels to work out the most efficient and simplest method for assembly of the cages.
- (i) A trial was, for example, carried out in July 2013 at the steel assembly yard at site by fully pre-fabricating the cages, three -layers in lieu of one or two layers, for the very first panel (EM 98). For this trial, these cages for the first panel were assembled horizontally on a L-frame work bench, and then connected together by screwing the couplers from one cage into the threaded rebar of the adjoining cage. Once the connections were made, the adjoining cages were then disconnected by un-screwing the re-bar from the couplers before the cages were moved one by one to the diaphragm wall location to be re-assembled and re-connected.
  - (ii) The intention behind this trial was to see if overall construction efficiency could be improved by getting the connections between all cages to touch fully in the yard, where the work could be done in advance – so that when the cages were later re-assembled at the diaphragm wall itself, everything would be perfectly aligned and all that would need to be done would be to re-connect the cages by re-screwing the threaded bars back into the couplers.
  - (iii) This trial, however, did not yield the full expected efficiency as it proved challenging to disassemble the connected cages. It was difficult on some occasions to screw the couplers into the bars when the cages were horizontal because the weight of the re-bar had a tendency to move the bars out of alignment. It was also particularly difficult to unscrew the couplers with the cages horizontally because of the weight of the re-bar. This was particularly the case for the cages that had three layers of reinforcement.
  - (iv) This approach, of assembling and connecting all cages in the L shaped frame was not used after the first panel. Instead, only cages with one or two layers of reinforcement were assembled and connected in the L shaped frame in the yard, before being disconnected and sent to the diaphragm wall to be re-connected. Cages with three-layers of reinforcement were instead built in-situ at the diaphragm wall itself.
31. Turning back to the first panel, the dissembled cages for the first panel (EM 98) were moved from the steel yard to the work face. Assembly and installation of these cages at the diaphragm wall was carried out by connecting each cage successively

vertically, and then lowering them into the trench. This proved challenging and time consuming. It was though ultimately successful. Each connection was individually inspected, and signed off as satisfactory by each of Intrafor, Leighton and MTR.

32. From the second panel on, it was decided, as I have already mentioned, not to continue with fully pre-fabricating every cage. Ultimately, the solution adopted was a combination of pre-fabricated cages and in-situ installation as described in the method statement. This proved to be a more effective method.

#### Quality Control of cages and connections

33. Intrafor assigned experienced engineers for full time supervision of works on site. Intrafor's engineers supervised and inspected the assembly of each cage and each and every connection. This included:-
- (i) checking the length, spacing and diameters of the rebars and also position for the starter bars against approved drawings; and
  - (ii) supervising the screwing down of each individual coupler, visually inspecting the amount of thread visible, and, on occasions, measuring the visible thread with a tape measure.
34. Once the Intrafor's engineers were satisfied with both the assembly and installation and each individual connection, the three-party joint inspection (with Intrafor, MTR and Leighton) would be requested.
35. Such three party inspection involved a visual inspection of each area of the cage and each connection. If a coupler was not (a) properly tightened or (b) was not connected, this would be apparent visually both by looking at the amount of thread visible on each connection, and also by comparing the amount of thread visible on each connection with the thread visible on the surrounding connections in respect of (a) and obvious in the case of (b).
36. In addition, and to ensure that the couplers are properly connected and threaded bars are in contact, MTR measured exposed threads with a tape measure and conducted spot checks on random couplers by unscrewing the couplers and visually inspecting that the threaded bars are in contact. On occasions MTR had been observed, as an additional proof test to prove contact, by attempting to slide a piece of paper between the two ends of threaded bars being connected. .

37. Intrafor was not permitted to progress the work on the relevant panel until MTR, Leighton and Intrafor were all satisfied that the cages and the connections were done properly. This was a “hold” point.
38. Once MTR, Leighton and Intrafor had all inspected the cages and connections, and were satisfied, all three parties signed a cage by cage inspection form. MTR, Leighton and Intrafor also signed a separate set of inspection forms confirming, on a coupler by coupler basis, that each individual coupler was satisfactory. These various signed inspection forms are included in the “Panel Records” maintained by Intrafor.
39. Intrafor has one of these “Panel Records” for each individual panel. Each Panel Record is a set of documents for the relevant individual panel that includes the relevant shop drawing, the Bar Bending Schedule, the cage by cage signed inspection sheets, and the coupler by coupler signed inspection sheets. A complete sets of these Panel Records will be provided to the Commission in a batch on 22 August 2018 when they have been bulk copied. In the meantime, I have exhibited some examples so that the Commission can see such nature of the documentation (**Exhibit 5**). Two of the samples that I have included are the panel records for the first (EM98) and the second (EH93) panels installed.
40. The formal system for inspection and testing was, as I explain in more detail in the response to later questions, evolving during the early stages of the works (broadly July to November 2013) as is apparent from, for example, the various iterations of the Inspection and Testing Plan (IATP) that I have enclosed as **Exhibit 6**. However, despite the evolution of the IATP during this initial period, two of the things that remained constant from the first to last panel was that, on site, each and every cage, and each and every coupler, was:
- (i) inspected by each of MTR, Leighton and Intrafor following a certain methodology which included at a minimum the inspections and checks common on diaphragm wall construction of this nature as detailed above; and
  - (ii) the independent signing by the three parties to the inspection onto the drawings that form part of the panel records;
- as I have described above.
41. The tri parte signing onto the drawing to record the inspection by each of MTR Leighton and Intrafor has consistently been adopted from the first to the last panel of each and every cage, and each and every coupler.



42. From Intrafor's side, the Site Engineering team involved had significant experience of checking diaphragm walls. There are signed inspection sheets for each cage and also each coupler.
43. Whilst I would prefer the formalization of the the IATPs to have been at a more advanced stage during the initial period broadly between July to November 2013, I am satisfied from the material available that the inspection process on site was carried out in a proper, professional and consistent manner from the first to the last panel of the constructed diaphragm wall. I believe on the evidence, and have no reason to doubt, that each connection and coupler was individually supervised and inspected. This is supported by the detailed contemporaneous records such as the Panel Records (**Exhibit 5**).

#### No defective steel works

44. To the best of my knowledge and belief, there was no shortening or cutting of steel bars or improper connection in the diaphragm walls.
45. Further, I am not aware of any fact or information that causes me, or Intrafor, to have any reason to believe that cutting or shortening of steel bars or improper connection in the diaphragm walls may have occurred at any stage during Intrafor's works.
46. As a matter of general principle, shortening or cutting rebars contrary to the dimensioned requirements specified in the approved reinforcement drawings is unacceptable whether in the diaphragm walls or platform slabs.

#### Summary of Press and Media reports in Lo & Lo letter of 25 July 2018

##### Introduction

47. There has, as the Commission will be aware, been a large amount of attention in the press and media about the matters now being considered by the Commission. There are news articles and reports appearing on an almost daily basis.
48. In light of this, I have restricted my responses to the particular matters raised in Lo & Lo's summary (on pages 3 to 6 of their letter of 25 July 2018) of the Press and Media Reports.

49. I have also restricted my comments to matters concerning the diaphragm walls. I have not commented on matters related to the platform slabs or other matters which Intrafor was not involved with. This is particularly important to emphasize as some of the articles in the press and media do not always clearly, or correctly, distinguish between the diaphragm walls and the platform slabs.

Article in Hong Kong 01 on 12 July 2018

50. Lo and Lo set out, on pages 3 and 4 of their letter, a summary of the information contained in the article. The gist of this summary is that:
- (i) The photographs in the article were apparently taken in July 2013, and show Intrafor's work at the SCL 1112 Site.  
  
[Lo & Lo summary paragraphs (d) and (e)];
  - (ii) The photographs show that most of the steel bars were not properly screwed into the couplers. Some of the steel bars were only rotated a few turns into the couplers. Others were not connected at all.  
  
[Lo & Lo summary paragraphs (a) (c), (f), (g)].
  - (iii) MTR was present when this steel fixing was being carried out.  
  
[Lo & Lo summary paragraph (a)]
  - (iv) The video shows a worker trying to forcefully screw a steel bar into a coupler but was unable to do so. The fellow worker next to him suggested he should just "loosen it", and the worker then stopped and loosened the pliers and said "forget it".  
  
[Lo & Lo summary paragraph (b)]
  - (v) The connections were improper and shocking. They pose a huge risk structurally.  
  
[Lo & Lo summary paragraphs (c), (g)]

- (vi) That the steel bars which were not properly screwed into the couplers was the reason why cracks have appeared in the diaphragm walls and could, if the position is serious, lead to the collapse of the diaphragm walls.

[Lo & Lo summary paragraph (c)]

- 51. These allegations are extremely serious but they are not factually accurate and are based on a demonstrably incorrect understanding of what the photographs and video actually show.
- 52. Whilst Intrafor has not had access to raw photographs and the complete video, they do appear, from what I can see, to have been taken in July 2013. The video and the photographs were taken at different locations Neither the video nor the photographs show the steel work in their completed or installed state.

#### *The Video*

- 53. The video was not taken at the location of the diaphragm wall works but instead was taken in Intrafor's steel assembly yard at site.
- 54. This is clear from several visual features including:
  - (i) The re-bar cages in the video are clearly lying on their side, horizontally. This could not be the case if the video showed the cages in the process of being assembled and installed in the diaphragm wall itself. The re-bar cages when installed in the diaphragm wall are installed, and connected, vertically – with one cage on top of another.
  - (ii) The cages, which are horizontal, are lying on a L-frame work bench.
  - (iii) This work bench was available in the steel yard but was never taken to the location of the diaphragm walls.
  - (iv) A yellow beam can be seen at the top left of the picture in some frames.
  - (v) There was no such yellow beam in the location of the diaphragm walls.
  - (vi) The yellow beam is in the steel yard as can be seen from the photograph of the yard enclosed as **Exhibit 7**:

55. From the short clip of the video that is publicly available on line, I think what it in fact shows is part of the trial that I have described above that took place in the steel fixing yard from July 2013. This trial was carried out before any steel work for any panel was installed in the actual works.
56. As I have explained in Section one of my statement this trial was to evaluate whether the construction process could be made more efficient by assembling and connecting all cages for a particular panel horizontally on a L-frame work bench in the yard, then disconnecting the cages, moving the cages to the diaphragm wall, and re-connecting them. It was hoped this might be more efficient as it might enable the alignment of bars etc to be achieved in the yard.
57. The trial was conducted in July 2013 using all of the pre-fabricated cages for the very first panel (EM 98). These cages were set out horizontally in the yard on a L-frame work bench, connected, and then disconnected. The trial, however, did not yield the expected efficiency as it proved challenging to assemble and particularly, then to disconnect the connected cages by unscrewing the couplers. After the trial was concluded, the cages for panel EM 98 were then moved from the yard to the diaphragm wall, and were connected vertically.
58. I am advised that a more accurate translation of the exchange (rather than what was expressed in the Lo & Lo's letter – paragraph (b) in Lo & Lo's summary of the article) between the two workers in the video would be:
- Worker 1: Over here (subtitle: loosen it, loosen it).
- Worker 2: Can't help you.
59. I think what one sees in the video may be the workers trying to disconnect the cages after the end of the trial. This would also appear to be consistent with the direction in which the worker is trying to turn the coupler and not the rebar as it was reported.
60. However, even if the video shows the workers trying to connect up the cages, it would not be surprising. It was difficult to connect the cages horizontally.
61. If, as seems to be the case, the video was taken in July 2013 and shows the trial, it does not show the re-bar cages at the location of the diaphragm wall or in their installed or completed state. The re-bar cages for the first panel were then disconnected, moved to the diaphragm wall and re-connected. Installation at the diaphragm wall took place from 26 to 31 July 2013.

62. Even if the video was taken after July 2013, it still shows work in the yard. The re-bar cages shown would then have been disconnected, moved to the diaphragm wall and re-connected.

*The photograph of couplers*

63. The photograph of the cage showing couplers not properly connected would appear to have been taken in July 2013 as has been reported.
64. The cages here are vertically arranged, one on top of the other. This indicates that it was taken at a location of the diaphragm wall. It was taken at ground level because two wheels and caterpillar track can be seen in the background. This would be crane that was used for lifting the re-bar cages for assembly and installation. You can see the crane more clearly in a photograph that was taken at the diaphragm wall location in July 2013 and enclosed as **Exhibit 8**:
65. On the basis that the photograph in the press article was taken in July 2013 it can only show cages from the very first panel. The very first panel installed on site was EM98, which was installed and inspected from 26 to 31 July 2013. I refer to the enclosed panel records (**Exhibit 5**) confirming these dates. The second panel installed on site was EH 93, which was installed from 3 to 8 August 2013. I refer to the enclosed panel records for the second panel (**Exhibit 5**).
66. It can be confirmed that the photograph in the press article does indeed show cages for the first panel, EM98, by zooming in on the details. If the photograph is looked at in screen, "EM 98" can be seen marked in chalk on the tremie pipe. A copy of the photograph showing the location of the chalk mark is enclosed as **Exhibit 9**.
67. As I have noted above, the re-bar cages for panel EM98 were assembled and connected over the course of several days (26 to 31 July 2013). It is not clear what exact day or what exact time the photograph was taken. It could have been taken at any point during that time, and shows the state of those connections at a particular point of time. It does not show the connections as completed and installed.
68. As I have also already explained, it was challenging and time consuming to align the pre-fabricated cages for this first panel vertically so that the connections could be made. It took time and a considerable number of people were involved. MTR and Leighton were present at various points over the relevant days. This was particularly the case as it was the first panel on the project. It therefore does not surprise me that there are photographs during this process that showed couplers only partially

screwed down or not connected at all. Quite a few photographs were taken at that time. I enclose a number of photographs taken in relation to the installation of the first panel as **Exhibit 10**.

69. Each coupler was ultimately connected properly, and fully screwed down. Each connection was checked and inspected individually by Intrafor. MTR and Leighton and Intrafor also carried out cage by cage and coupler by coupler inspections. There were hold points between cages, so that the next cage could not be assembled and connected until the previous cages and the connections had been signed off by all three parties. So, for example, Intrafor could not proceed to assemble and connect cage 5 until cages 6 and 7 (and the connections between them) were signed off by all parties.
70. All cages were signed off as I have described above by all three parties and so was each and every connection. This was done in order to pass the hold points. The records of EM 98 (very first panel installed and the subject of the Media Press and Reports) that include the signed inspection sheets for each cage and the signed inspection sheets for each connection (splice) are included in **Exhibit 5**.
71. I note that paragraph (f) of Lo & Lo's summary records that the 12 July 2018 article reports an informant as saying that each steel bar should have 20 turns of thread, and the workers should rotate the steel bars into the coupler for at least 15 turns. This statement is inaccurate in a number of respects:
  - (i) The couplers used to connect the re-bar cages in the diaphragm walls – including in panel EM98 are “Position Splice - Type B” couplers. As I explain in more detail below, with a Position Splice - Type B coupler, the re-bar is not rotated and screwed into the couplers when making the connections. Instead, the lower re-bar to be connected remains fixed, and the coupler on the upper rebar itself is screwed onto the thread of the lower re-bar. With a Position Splice -Type B coupler, some exposed thread will always be visible even when the two ends of the upper and lower rebars being connected are in contact with the coupler on the upper rebar fully screwed down.
  - (ii) It is not the case that each steel bar should have 20 turns of thread. The number of turns of thread varies depending on the size and type of the coupler and diameter of the rebars being connected. Equally the number of exposed threads that are visible after screwing down the coupler will vary depending upon the size and type of the coupler and diameter of the rebars being connected.

72. I have seen no evidence to support the suggestion that the reason why cracks have appeared on the diaphragm walls is due to steel bars not being properly screwed into the couplers.
- (i) I am not aware of evidence that shows that the steel bars in the diaphragm walls were not properly connected.
  - (ii) Each and every connection was individually inspected and signed off by three parties.
  - (iii) As I explain below in my response to question 9(a), some cracks may appear in diaphragm walls as with any other concrete structure. This is expressly recognized by the Sub-Contract between Leighton and Intrafor (**Exhibit 11**), which sets out tolerances for cracks and water seepage.
  - (iv) As I also explain below, the photographs in the press articles showing cracks do not provide enough detail to form the view regarding the nature of the cracks, and/or whether the particular cracks shown were caused by improper connections between steelwork, or whether there is any structural risk.
  - (v) Intrafor has attended site since the completion of the diaphragm walls to address Non-Conformance Reports (including NCRs concerning cracks and/or water seepage). Intrafor has not seen signs, nor been notified, of structural cracks in the diaphragm wall or give Intrafor cause for concern. Documents concerning these NCRs and the other snagging are in **\*Exhibit 28**.
  - (vi) At no point has any stakeholder in the Project ever suggested or notified Intrafor that there are structural concerns in relation to the cracking or water seepage.

Article in Hong Kong 01 on 18 July 2018

73. Lo & Lo note (on page 4 of their letter of 25 July 2018) that the 18 July article contained similar allegations but elaborated further. Lo & Lo then summarise the elaborations in their sub-paragraphs (a) to (f).
74. The responses that I have set out in relation to the 12 July 2018 article apply equally here. In addition, I would like to comment on each of Lo & Lo's sub-paragraphs (a) to (f).

75. In paragraph (a), Lo & Lo note the following elaboration:

*"The photographs which were supplied to Hong Kong 01 showed that the steel fixing works had already been completed but many steel bars were either not screwed into the couplers properly or that they were not screwed into the couplers at all, and there were gaps of up to a few centimeters between some steel bars and the couplers."*

76. The 18 July 2018 article contains four photographs that show connections between re-bars (the first photograph in the article). These are described as having been taken in July 2013.

- (i) The first of these photographs is the same photograph as appeared in the 12 July 2018 article. It does not show that the steel works had already been completed as I have explained above.
- (ii) The second of these photographs is a still taken from the video in the 12 July 2018 article. It shows the worker using a wrench. The video was taken in the steel yard. The photograph does not show that steel works had already been completed as I have explained above.
- (iii) The third of these photographs is another still taken from the video in the 12 July 2018 article. It shows the cages in a horizontal position. The video was taken in the steel yard. The yellow beam to which I have previously referred is visible. This photograph does not show that steel works had already been completed as I have explained above.
- (iv) The fourth photograph was taken at a diaphragm wall location, and shows cages being assembled vertically. If this photograph is compared with the first photograph, the two seem to show the cage and the same connections. I think the first photograph may have been taken from inside the cage looking out whilst the fourth photograph was taken from outside the cage looking in. In any event, even if I am wrong about this, the fourth photograph, if it was taken in July 2013, can only show cages for the first panel (EM 98). The observations that I made in relation to the 1<sup>st</sup> photograph (in connection with the 12 July 2018 article) would apply equally here. It does not show that the steel works had already been completed as I have explained above.

77. In sub-paragraph (b), Lo & Lo note that the article elaborates:

*"A senior steel fixing worker, Mr Wong, pointed out that the steel*



*fixing works were obviously completed (and that the photographs were not taken when the steel fixing works were still going on) because all the joints in the steel structure were tightly secured with iron wires."*

78. The fact that all joints in the steel structure were tightly secured with "iron wires" (tie wires) in the 1st photograph is because the cage is prefabricated. The tie-wires hold the re-bar in place after fabrication and hold the cage together. All the cages for panel EM-98 were pre-fabricated, and "EM-98" is marked in chalk on the tremie pipe in photograph 1. Tie wires of the same type can also be seen on the horizontal cages in the video when the cages were in the steel yard. The iron wires in and of themselves do not indicate that the steel works have been completed.
79. In sub-paragraph (c), Lo & Lo note that the article elaborates:
- "Mr Wong also explained that at least half of the threads should be screwed into the couplers to ensure the steel structure would not disintegrate during the concrete pouring process and the structural integrity of the walls. He believed that the worker in the video was unable to screw the steel bar into the coupler either because the coupler was of inferior quality or because the steel bar cage structure was not constructed in proper alignment"*
80. As I have previously explained, the video was taken during the trial of assembly of cages set out horizontally in the steel assembly yard before the cages were moved to the work location.
81. Further, as I have explained above, the records show that all connections for Panel EM98 were inspected and signed off by Intrafor, MTR and Leighton, thus passing the hold points.
82. In sub-paragraph (d), Lo & Lo note that the article elaborates:
- "It appears from the photographs that most of the steel bars in the steel structures were not properly connected and Mr Wong took the view that the chances of disintegration would be high and the walls would become fragile. Even if it could pass the load bearing test today, there was no guarantee that the walls would not collapse over time."*

83. The photographs do not show the steel works after the cages had been assembled and connection work completed. The connections were ultimately made properly by fully screwing down the couplers onto the steel bars. This is confirmed by the inspection records signed off by all parties, samples of which I have exhibited in **Exhibit 5**.
84. In sub-paragraph (e), Lo & Lo note that the article elaborates:
- "Given the Hung Hom Station project is a high quality railway construction project, there would be stringent requirements over monitoring and inspection of works. Mr Wong believed that it was impossible that MTRCL as the project manager and Leighton as the main contractor would not have known about the extensive defects in the steel fixing works. Front-line workers only followed instructions."*
85. To the best of my knowledge and belief, there are not extensive defects in the steel fixing works in the diaphragm walls. Further, I am not aware of anything that causes me, or Intrafor, to consider that there might be extensive defects with the steel fixing works in the diaphragm walls. There is no evidence that I am aware of that supports such an allegation.
86. Further, as I have explained above, the records show that all connections for Panel EM98 were inspected. These records were signed by Intrafor, MTR and Leighton.
87. It is, however, the case that both MTR and Leighton would have known if there were extensive defects in the steel fixing works. MTR and Leighton (along with Intrafor) inspected each cage and each connection. There was a hold point until each cage had been signed off. A complete set of inspection records are available and will be produced to the Commission in the next batch of documents to be provided.
88. In sub-paragraph (f), Lo & Lo note that the article elaborates:
- "Experienced railway engineer Mr Ng shared the same views as Mr Wong and emphasised that concrete should not have been poured if the steel fixing works were not properly carried out. To avoid irreparable consequences, the defects in the steel fixing works ought to be rectified there and then and if necessary, by dismantling the entire steel bar cage structure and re-doing it properly again instead of turning a blind eye to the problem. After concrete is poured, it is impossible to turn the clock back, the only solution left would be to knock down the walls completely and rebuild them, in order avoid the walls collapsing in the*

*future, jeopardising the safety of the public."*

89. I agree that concrete should not be poured if the steel fixing works were not properly carried out, inspected and hold point passed. Indeed, Intrafor was not permitted to pour concrete until after all of the cages and connections had been inspected and signed off. This was a hold point.
90. Further, as I have explained above, the records show that all connections for Panel EM98 were inspected (the subject of the photos referenced by the Press and Media Report) and were signed by Intrafor, MTR and Leighton.

Two articles in the Apple Daily of 30 May 2018

91. Lo and Lo observe in relation to these two articles that they "...in particular, contains [sic] photographs showing water leakage at the diaphragm walls."
92. Whilst some of the photographs do show apparent water marks from seepage, it is not possible to ascertain from the photographs the extent of water seepage let alone to identify the source or cause of the water seepage.
93. In one photograph exhibited as **Exhibit 12**, for example, there is an apparent water mark that suggests that water may have seeped down the wall from the top. Assuming that this is what is shown, there is no way from the photograph to ascertain whether this water is coming through the diaphragm wall or whether it is seeping through the platform slab. It is also not possible to ascertain how much water has leaked, when and for how long based on that photograph.
94. Intrafor has on a number of occasions been asked to attend site to address water leaks in the diaphragm walls. It did so. These site visits did not indicate any unusual concerns or problems either in relation to leakages or cracks.
95. Intrafor has not, however, been notified by Leighton or the MTR or any Government or Statutory body of any other issues or concerns regarding cracks or water leakage in the diaphragm walls other than the ones referred to and addressed/ resolved as explained in the preceding paragraph 45.
96. I note that the articles in the Apple Daily also discuss matters that occurred after Intrafor had completed the diaphragm walls, including matters relating to the connection of the platform slabs to the completed diaphragm walls. I confirm that Intrafor was not involved in these matters and has no knowledge of them.

97. I also confirm that no stakeholder in the Project has ever made a complaint or raised a suggestion against Intrafor of any unlawful cutting or shortening of steel bars or improper connection in the diaphragm wall.

## **Section 2**

### **Responses to Questions 1 to 13 in Lo & Lo's Letter of 25 July 2018**

#### **II.I QUESTION 1**

*"Describe and explain the respective roles duties and responsibilities of Your Company and Leighton in the construction of the diaphragm walls and platform slabs under Contract 1112 (i.e. both the EWL platform slab and NSL platform slab), including the respective construction, supervisory, monitoring, inspection and reporting roles in ensuring the compliance, quality, safety and integrity of the construction works. Please adduce the relevant contract(s), sub-contract(s), specifications, approved plans and drawings. Drawings and diagrams which may assist the Commission in understanding the relevant works should be provided as well."*

#### **Overview**

98. Intrafor was engaged as a sub-contractor by Leighton for the construction of the diaphragm walls, barrettes and associated works ("the Sub-Contract Works").
99. Intrafor was engaged to carry out the Sub-Contract Works on a construct only basis. Intrafor had no design responsibility for the permanent works. It constructed the permanent works to the design instructed by Leighton.
100. For the avoidance of doubt, I should also highlight that the Sub-Contract Works did not include the construction works of the platform slabs and the connecting works connecting the platform slabs to the completed diaphragm walls.

- (i) The platform slabs were constructed by Leighton after the diaphragm walls had been built. Intrafor was not involved with, and no responsibility for this work.
- (ii) Leighton also connected the platform slabs to the completed diaphragm walls by screwing the threaded re-bars from the platform slab into the couplers that Intrafor had pre-installed inside the diaphragm walls.

101. In terms of steel work inside the diaphragm walls:

- (i) Intrafor was also not responsible for the procurement or manufacture of the steel re-bar or threads or couplers. These were procured by Leighton and were provided "free issue" by Leighton to Intrafor.
- (ii) Threaded re-bars or re-bars with attached couplers were manufactured and cut by BOSA who was subcontracted by Leighton to provide such services. Intrafor upon receiving such rebars from Leighton was then responsible for bending such rebars.
- (iii) Re-bars with no threads or couplers were procured by Leighton but cut and bent by Intrafor in Intrafor's steel yard. Intrafor was responsible for the cutting and bending of the re-bars provided by Leighton where there were no threads or couplers.
- (iv) Leighton was responsible for the quality of the actual bars, threads and couplers.
- (v) Intrafor was responsible for assembling, splicing and installing the re-bar cages into the diaphragm walls.

102. Intrafor was responsible to Leighton for the construction of the Sub-Contract Works to Leighton's instructed design.

#### The Sub Contract

103. Leighton and Intrafor entered into a Pre-Bid Agreement dated 17 April 2013 in relation to the construction of the diaphragm walls, barrettes and associated works. A copy of this agreement is included in **Exhibit 11**.

104. Intrafor mobilised to site in May 2013. The first site daily record

and daily photograph was on 20 May 2013. The formal contract had not been executed at that stage, which is not uncommon on construction projects.

105. Leighton and Intrafor executed the formal Sub-Contract document on 6 September 2013, consisting of General Conditions, Special Conditions, and nine Schedules. A copy of this Sub-Contract is included in **Exhibit 11**.

Scope of the Sub-Contract Works

106. GCC clause 1 (k) of the Sub-Contract defines Intrafor's Sub-Contract Works as being "*the works described in documents specified in the Second Schedule of this Sub-Contract*".

107. The documents specified in the Second Schedule (see Second Schedule Part A) include:

- "1. *Contractors Programme*
2. *Toe Grouting Drawings*
3. *Shear Pin Drawings*
4. *Responsibility Matrix*
5. *Diaphragm Wall Elevation and Detailed Drawings*
- . *Slurry Wall Layout Plan 4.0*
7. *Staging Plans 4.6 to 4.14*
8. *Site Installation 10.6"*

108. A general overview of the scope of the Sub-Contract Works for which Intrafor was responsible can found in Part B of Second Schedule of the Subcontract.

109. In relation to the steel works for the diaphragm walls, this provides:

*“1.6 Collect from the Contractor steel and GFRO reinforcement, couplers, threaded steel reinforcement bars to receive couplers and reservation / access tubes.*

*1.7 Fix couplers within reinforcement cages in accordance with drawings approved by the Engineer.*

*1.8 Excavation in all materials for Diaphragm Walls (D-Walls) and barrettes including removal of obstructions, placing of concrete, reinforcement cages linked by couplers and the provision of all necessary box-outs in the permanent D-Walls.”*

110. Intrafor’s full Scope of Works must, of course, be ascertained by looking at all of the documents listed in the Second Schedule.

#### The division of responsibilities between Intrafor and Leighton

111. The Responsibility Matrix (headed “Scope Matrix”) is helpful in gaining more specific details and understanding of the respective contracting parties’ roles, responsibilities, and duties were. In the Responsibility Matrix references to the “Subcontractor” are for Intrafor and references to “Contractor” are for Leighton.

112. Whilst a copy of the Responsibility Matrix is contained in the copy of the Sub-Contract included in **Exhibit 11**, I am also exhibiting the extracted Responsibility Matrix for the Commission’s ease of reference (**Exhibit 13**).

#### Method Statements and Quality Control systems

113. The Sub-Contract of course includes provisions dealing with matters such as Method Statements, Quality Control Systems, and the like including :

- (i) The requirements in GCC 23 that Intrafor is to make itself familiar with Leighton’s quality control system, and to make due allowance for such competent staff as may be necessary to comply with such requirements and Intrafor’s own quality control arrangements;
- (ii) The requirements in Schedule 2 Part B section 3. This section refers, amongst other things, to the provision of deliverables such as Method

Statements and Inspection and Test Plan/s (paragraphs 3.1, 3.20), as well as competent supervision (paragraph 3.8);

- (iii) The requirements in Schedule 7 in relation to both Leighton's quality systems and Intrafor's own quality system.

## II.II QUESTION 2

*"Where contracts are adduced, please identify the relevant sections, parts and contents pertaining to the diaphragm walls and platform slabs construction works at the Hung Hom Station Extension and the system of supervision, monitoring, inspection and reporting to ensure the compliance, quality, safety and integrity of such works."*

- 114. I refer to my answer to Question 1 and to the copy of the sub-contract document produced. Intrafor was only engaged to carry out the construction of the diaphragm walls, barrettes and associated works. As such the whole subcontract is relevant to the diaphragm wall construction work and only relates to the Hung Hom Station Extension.
- 115. The subcontract does not concern the construction works for the platform slabs nor the connection work of the platform slab to the constructed diaphragm wall.

## II.III QUESTION 3

*"With reference to an Organisation Chart of Your Company, describe and explain the roles and responsibilities of each person in Your Company involved in the construction, supervision, monitoring, inspection of the diaphragm walls and the platform slabs and the steel bars and steel bar structures within the diaphragm walls and the platform slabs. Identify, with names and job description, the relevant persons on the Organisation Chart and indicate whether such persons are still in the employment of Your Company. If such persons have left Your Company, please provide contact details if such information is available."*

- 116. An Organisation Chart for the Subcontract Works is attached as **Exhibit 14**. During the course of the project, although the key positions identified in the Organisation Chart does not change, the number /personnel fulfilling the roles evolved to meet



the demands of the works over the course of the project. Attached in **Exhibit 15** is a list of the personnel that based on our records were engaged to occupy the roles identified in the Organisation Chart over the course of the project.

117. I also thought that it would assist the Commission if I provided below a general explanation of the general roles of the most pertinent positions.

118. Project Manager:

- (i) Overall responsibility to plan, resource and execute the project so as to achieve the client requirements and company objectives. This in particular includes achieving objectives for health & safety, quality assurance, environmental protection, programme, financial result and contractual and statutory compliance.
- (ii) Establishes and maintains a competent team to carry out all aspects of the project including: administration, technical and methods, production, plant & equipment, contracts/subcontracts, purchasing, and quality-health & safety-environment.
- (iii) Approves or endorses methods, plans and submissions.
- (iv) Monitors the performance of the teams and standard or works through meetings, reports, reviews, routine inspections.
- (v) Closely monitors the administration of the contract.
- (vi) Sets and monitors actions to achieve plans and address non-compliances (e.g. delays, injuries or near misses, damage or defects)
- (vii) Liaises with, and reports to the main contractor

119. Deputy Project Manager:

- (i) Supports the Project Manager to carry out their duties and acts as deputy in their absence or as required
- (ii) Closely manages the production aspects of the project including line management of Site Agents.

120. Site Agent:

- (i) Organizes and coordinates the site operations including line management of engineers and senior foremen and with production management of main contractor, and management of suppliers and subcontractors to achieve programme and minimise delays/problems.
- (ii) Monitors the execution of methods, supply of resources and materials, and inspections of work.

121. Site Engineer (Reinforcement Cage Fabrication/ Fixing):

- (i) Responsible to ensure that reinforcement works are completed in accordance with designs, method statements and specifications etc
- (ii) Responsible to explain designs, shop drawings and methods to Foremen
- (iii) Responsible to submit reinforcement bar orders to Main Contractor in line with bar bending schedules and programme.
- (iv) Responsible to check reinforcement bar deliveries from Main Contractor to company stock yard.
- (v) (After testing of reinforcement by Main Contractor) Responsible to deliver reinforcement bars to reinforcement cage fixing subcontractor with cage fixing details.
- (vi) Inspect (with other parties) threaded bar/coupler deliveries from fabrication subcontractor and release for use by reinforcement cage fixing subcontractor.
- (vii) Inspect (with other parties) pre-fabricated reinforcement cages prior to delivery for installation.
- (viii) Inspect (with other parties) coupling of reinforcement cages during installation to diaphragm wall and barrette trenches, and in-situ-fabricated reinforcement cages.
- (ix) Prepare records to demonstrate that works have been completed in accordance with requirements.

122. Quality Control Coordinator for Installation of Threaded Bars and Connection of Couplers (position requirement equivalent to T3 Technically Competent Person from Site Supervision):

- (i) Responsible for full time on-site supervision of couplers with /without ductility for steel reinforcing bars requirements and with respect to couplers with ductility, in line with the Quality Supervision Plan (**Exhibit 16**)

(This role does not involve quality control in relation to the manufacturing of the threaded bars and couplers).

**123. QA/QC Engineer:**

- (i) Develop Project Quality Plan (**Exhibit 17**)
- (ii) Assist in development of method statements and related inspection and test plansProvide relevant training on developed documentation application of procedures.
- (iii) Carryout quality surveillance inspections
- (iv) Monitor Quality Control activities of engineers and supervisors
- (v) Carryout quality audits in line with planning and follow up on improvement actions

**124. Senior Foreman**

- (i) Report to the Site Agent
- (ii) Organise and supervise the foremen responsible for the different production activities (e.g. guidewall construction, excavation, spoil removal, bentonite supply, reinforcement cage fabrication and installation, concreting, maintenance)
- (iii) Oversee all human and plant resources on site.
- (iv) Coordinate with Site Engineers and Surveyors to ensure that inspection and test requirements are completed.
- (v) Ensure requirements, including health and safety precautions, are undertaken in line with the approved methods statements, ITP's and Risk Assessments etc.

**125. Diaphragm Wall Specialist**

- All responsibilities as with Senior Foreman (as above) and

- Provision of Expert Advice on diaphragm wall techniques.

126. Foreman at Reinforcement Cage Pre-fabrication Yard:

- (i) Report to Senior Foreman
- (ii) Supervise logistics, equipment and deliveries of materials, check quantities / dimensions of delivered rebar
- (iii) Supervise a team of steel fixers and riggers to fabricate reinforcement cages in accordance with shop drawings
- (iv) Coordinate with Site Engineers to arrange inspections or tests, and address differences to requirements.

127. Foreman Reinforcement Cage Fixing, including In-situ-Fixing:

- (i) Report to Senior Foreman
- (ii) Supervise logistics, equipment and deliveries of materials, check quantities/dimensions of delivered reinforcement cages and insitu reinforcement cage works
- (iii) Supervise a team of steel fixers and riggers to install or fabricate reinforcement cages in accordance with shop drawings
- (iv) Coordinate with Site Engineers to arrange inspections or tests, and address differences to requirements.

128. The Intrafor's project team was supported also by the technical department of the head office, which among others was responsible for producing the shop drawings and developing bar bending schedules per rebar cage, based on approved drawings.

129. The identity of the people fulfilling these roles, the dates they did so, and their employment status I set out in the list in **Exhibit 15**.

130. The Intrafor's project team was supported also by the technical department of the head office, which among others was responsible for producing the shop drawings and developing bar bending schedules per rebar cage, based on approved drawings.

#### II.IV QUESTION 4

*"Please provide as an exhibit to the witness statement a list of the managers, supervisors and workers (with names and contact details) employed or engaged by Your Company who were involved in the steel fixing works and the construction of the steel structures within the diaphragm walls and platform slabs. Identify the type of work and duties undertaken by such managers, supervisors and workers."*

131. I enclose, as **Exhibit 18** a list of managers and supervisors involved with the steel fixing works and the construction of the steel structures within the diaphragm walls.
132. In relation to the list of workers, I enclose, based on our records, as **Exhibit 19** a list of the workers involved with the steel fixing works and the construction of the steel structures within the diaphragm walls. If any further names are identified, Intrafor will advise the Commission. The type of work and duties undertaken by these workers would be those described as the subcontract works in the subcontract between Intrafor and its steel fixing subcontractor Hung Choi. A copy of the steel fixing subcontract is attached as **Exhibit 3**.
133. Intrafor had no responsibility for, nor involvement in, the platform slab works.

#### **II.V QUESTION 5**

*"Describe and explain the steps, procedures and timeline in the construction and completion of the steel fixing works in the diaphragm walls and platform slabs. With reference to the said steps, procedures and timeline, please describe and explain the respective roles and involvement of MTRCL, Leighton, Fang Sheung, Your Company and China Technology and elaborate on the interaction and relationship between Your Company and these parties on site and on a day-to-day working basis. Please provide the site diaries and/or workers attendance records of Your Company in relation to the steel fixing works in the diaphragm walls and platform slabs under Contract 1112"*

134. As I have explained above, Intrafor had no involvement at all with the platform slabs or any part of their construction. The construction works of the platform slabs and the connection works of the platform slab to the constructed diaphragm wall are the responsibilities of Leighton. My answer to question 5 is

therefore restricted to the construction and completion of the diaphragm walls.

135. I confirm that Fang Sheung and China Technology had no role in the diaphragm walls.
136. I set out below, in sections (a) through to (e) a general overview of the steps, procedures and timeline in construction and completion of the steel works in the diaphragm wall which have, in the main, been extracted from the approved method statements.
137. The Commission will find a more detailed description, together fuller description with diagrammatical representations, in the approved method statements (which can be found in **Exhibit 4**).
138. As I have indicated in section one of my statement, the method statements evolved during the early stages up to about November 2013. There were various iterations and revisions of the Method Statements. For completeness, I should add that the position was similar in relation to the Inspection and Testing Plans that are referred to in the Method Statements (and sometimes enclosed as an Appendix – usually Appendix G- to the Method Statements). These Inspection and Testing Plans were also evolving during the early period, and were the subject of ongoing development between Leighton and Intrafor. As far as I am currently aware, the Inspection and Testing Plans were approved in their final form by November 2013, and included in Rev. 2 of the Method Statement (signed off on 29 November 2013). The Method Statement continued to evolve, and, as far as I am currently aware, the Method Statement was approved in its final form in April 2014 (Method Statement Rev. 3). I have included in Exhibit 4 the various iterations of the Method Statements that have been located to date, and in Exhibit 6, the various iterations of the Inspection and Testing Plans that have been located to date. If I become aware of any further relevant matters or further documents are located, I will inform the Commission.

#### Reinforcement Cages Placement Method

##### (i) General

Cages are fabricated in accordance with the approved shop drawings including provision of lifting bars and hooks, stiffeners, box out, couplers, starter bars and steel pipes for rock fissure grout, shear pins and sonic testing. Cage sections can vary in length depending on detailing.

A rebar cage fabrication yard was setup on site for preparation of the

reinforcement cages.

Cages are spliced together over the trench using approved couplers and, in the case of 12m cages, traditional rebar lapping by U-bolts. To secure sections of cages together, coupler or U-bolts are used to connect to each vertical bar.

Due to the low-headroom restriction, space constraints and also close proximity of existing columns, different cage lifting arrangements were adopted for cage installation.

In general, cages are lowered down into the trench in 3.5m~4m sections using traditional means, in the case of this project by a low headroom service crawler crane. Hydraulic and lorry cranes were also used on the actual specific site conditions / restrictions.

For rebar cage installation in areas where there is no headroom limitation an alternative 12m cage connection methods and rebar lapping were adopted. The typical working procedures for lifting and installing of 12m length rebar cage were using U-bolts for lapping and full scale standard crawler cranes, details of which were included in the "Lifting Plan" (generally appearing as Appendix F of most versions of the approved method statement).

Different cage lifting point and lifting gear arrangements are adopted dependent on cage size and which plant was used for lifting cages.

It was anticipated to handle 5m reinforcement cages by means of a combination of forklift and a gantry crane. After the working drawings for diaphragm were finalised, a specifically designed for purpose gantry was fabricated that was able to support the weight of the heaviest cage. A specific handling and securing device was also utilised to safely move and lift the cage sections. The handling of reinforcement cages by forklift and gantry anticipated a more effective operation and would minimise the need for low-headroom service cranes. In the end the gantry crane arrangement did not yield the expected efficiency.

Pre-fabricated cages were transported to the trench work areas for subsequent lifting installation using lorry cranes and / or a forklift.

## (ii) Splicing Couplers

Two types of couplers are used:

- a. Seisplíce (ductility couplers Type II)

b. Servisplíce (non-ductility couplers Type I)

Two types of splicing arrangements have been utilised in the diaphragm wall for future connections of rebars in the platform slabs to the diaphragm wall rebars carried out by others or for rebar to rebar connections within the diaphragm wall itself, namely:

- a. Standard splice – Type A; and
- b. Position Splice – Type B.

Standard splice Type A (Location – Horizontal Starter Bars)

The installation method is very simple and comprises three steps:

Step 1: Position the 1<sup>st</sup> stage bar

- a. Ensure the coupler is fully screwed on to the bar prior to being cast in concrete
- b. Ensure protective cap is fitted on the coupler end to prevent ingress of foreign material.

Step 2: Connect the continuation bar (By others)

- a. Position the continuation bar
- b. Remove both the thread protective cap on the rebar and the cap on the coupler
- c. Fully engage the thread to the coupler using hand. This should develop full tensile strength of the splice once fully engaged.

Step 3: Lock the splice

- a. Use a typical pipe wrench to tighten the splice.
- b. No special torque amount is required.

Position Splice – Type B (Location – Vertical Rebars)

The installation method is very simple and comprises three steps:

Step 1: Position the 1<sup>st</sup> stage bar

- a. Ensure the thread protective cap has been fitted to the rebar.
- b. Ensure that the coupler on the continuation bar has been fully screwed on the continuation bar and fitted with a protective cap to prevent ingress of foreign material.

Step 2: Prepare connection of continuation bar

- a. Remove both the thread protective cap on the rebar and the cap on the coupler

Step 3: Lock the splice



- a. Butt the ends of the 1st stage bar and continuation bar and then rotate the coupler by hand until the coupler is screwed on to the 1st stage bar
- b. Use a typical pipe wrench to tighten the splice.
- c. No special torque amount is required.

Refer to **Exhibit 20** extracted from BOSA Standard Manual for Couplers Installation Method

(iii) Splicing of 2 to 3 layer reinforcement cage

To overcome the challenges of steel fixing of three layers of reinforcement three splicing options were developed.

**OPTION 1 –**

After placement of the 1<sup>st</sup> layer of prefabricated cage, Install the full 2<sup>nd</sup> and 3<sup>rd</sup> layer of main bars of cage section in-situ and complete the links by adding U-shape links and U-bolts.

- This allows good access for steel fixers to tighten the couplers and the spacing bars provides good support to help positioning and better alignment of the bars.
- However usage of this option is restricted due to the presence of numerous starter bars. Fitting reinforcement layer through the starter bars is potentially more difficult with some risk of damage to starter bar couplers.

**OPTION 2 –**

In-situ tightening of all of the main bars from inner to outer face (i.e. all layers) and complete the links layer by layer in-situ.

- There is no access problem for steel fixers to tighten the vertical coupler bars and spacing bars.
- This alternative involves more in-situ tightening compared to option 1. However, more flexibility is provided to install horizontal starter bars together with the main bars tightening.

**OPTION 3 –**

Use connection bars for the third and outer most layer in order to provide clear access to the first two inner layers.

- This alternative involves in-situ tightening of short connection bars (700mm – 1000mm). Compared to full face of reinforcement in Option 1, it potentially faster for fixing but increases the needed number of couplers.

(iv) Fabrication

Unless cages were fully fabricated and installed in-situ, all the reinforcement cages less than or equal to 2 layers of reinforcement are fabricated on L-frame workbenches. All cage splicing is according to Bar Bending Schedule (BBS).

All pre-fabricated cages are connected with couplers, spliced, with necessary links to check alignment of reinforcement bars between cage sections. The full set of cages are then disassembled into individual cage sections to be stored and then transported to panel location.

The remaining reinforcement cages with more than 2 layers are fixed in-situ following the splicing option 1, 2 or 3.

Cage installation is then completed with additional in-situ steel fixing work and coupler starter bars insertion.

(v) Handling & Transportation

Individual prefabricated cage sections at the rebar yard were lifted by means of cranes and transported using crane Lorries and / or forklift, 12m cages were transported on trailers.

Where forklifts were used they had dedicated banksman to guide the movement.

Cage Installation

Low-headroom / Typical Service Cranes, Telescopic Hydraulic Cranes and Crane Lorry

Pre-fabricated reinforcement cages with less than 2 layers were transported to site, positioned then lifted at the trench by the designated crane, relevant to site conditions. All crane types used had sufficient capacity for the loads to be lifted.

A combination of spreaders lifting beams and lifting bars, fixed at designated

positions on the cages, were used for lifting the reinforcement cages in the vertical position and lowering into trench. Pre-fabricated reinforcement cages of less than 3 layers were lowered into position at the trench section by section after being connected by couplers.

The three layers of reinforcement were fixed in-situ. After all vertical sections were connected by couplers the whole length of the cage section was supported by the guide wall by horizontal suspension beams inserted through the cage.

#### By Typical Crawler Service Crane and Crane Lorry

For rebar cage installation operation in areas without headroom limitation, typical full scale crawler crane and crane lorries were used for cage installation and connection as an alternative. Individual rebar cages of 12m long were lifted up by crawler crane and connected with subsequent cage by rebar lapping and U-bolts.

#### Lift Planning

A specific detailed specific lifting plan was developed and approved to cover the various cage transportation and lift operation for the Diaphragm Wall and Barrettes Cage installation works. The plan was part of the appendix of the work related approved method statement.

139. The interaction and relationship between Intrafor, MTR and Leighton is represented in the table below.

Steps	Description	Responsibility			
1	Issue to Intrafor approved diaphragm wall related "Working Drawings"	Leighton			
2a	Prepare specific diaphragm-wall panels Shop Drawings and related Bar Bending Schedules	Intrafor	2b (1)	Prepare of Order for global steel bar	Intrafor
			2b (2)	Submission of Order to Leighton	Intrafor
			2b (3)	Delivery of requested steel rebar to the diaphragm-wall steel yard	Leighton
			2b (4)	Sampling and testing of the delivered steel rebar's	Leighton

			2b (5)	Confirmation of acceptance criteria being met	Leighton
3	Submit the Shop Drawings and related BBS for approval	Intrafor			
4	Approve the Shop Drawing and related BBS	Leighton MTRC			
5a	Issue Approved Shop Drawings and related BBS to the diaphragm-wall steel fixer subcontractor	Intrafor	5b (1)	Preparation of Order for Horizontal Starter Bar and vertical bars requiring threading and couplers	Intrafor
			5b (2)	Submission of Order to BOSA	Leighton
			5b (3)	Cutting, threading and installation of coupler onto the horizontal starter bar and vertical bars	BOSA
			5b (4)	Delivery of the threaded bars with couplers to the site	Leighton
			5b (5)	Inspection of the Threaded / Bars equipped with couplers	Leighton MTRC / Intrafor
			5b (6)	Delivery of the inspected threaded Bars / Couplers to the diaphragm-wall steel yard	Intrafor
6	Prefabricate / Insitu Fabricate diaphragm wall reinforcement cage in accordance with the approved Shop Drawing & BBS	Intrafor / steel fixer subcontractor			
7	Inspect the Prefabricated / Insitu Fabricated steel reinforcement cage	Intrafor / Leighton / MTRC			
8	Install and	Intrafor/ steel			

	connect the threaded bars and couplers of steel reinforcement cage	fixer subcontractor
9	Inspect the cage to cage connections	Intrafor Leighton MTRC
11	Lower the inspected connected reinforcement cage into the trench	Intrafor
12	Repeat steps 6 onwards for all further steel reinforcement cages until the panel installation is fully completed.	As above per step

140. In terms of timeframe in construction and completion of steel fixing works in the diaphragm walls, on average for one cage from fabrication to installation to inspection it takes approximately 14 days.
141. Copies of the site daily records are available and are being copied. They will be produced to the Commission in 7 days after submission of my statement in accordance with the procedures set out by Lo & Lo.

## II.VI QUESTION 6

*"Explain with reference to the terms of Contract 1112, sub-contract(s), approved plans, drawings, laws and regulations, practice notes, handbooks, guidelines, circulars, industry standards, practice and requirements (the "Requirements, Standards and Practice") how the steel bars in the diaphragm walls and platform slabs should be installed and connected to ensure the compliance, quality, safety and integrity of the structures. Please identify and provide the authorities relied on by Your Company on this topic."*

142. As I have explained above, Intrafor had no involvement at all with the platform slabs or any part of their construction. My answer to question 6 is therefore restricted to the construction and completion of the diaphragm walls.
143. The primary source of reference is the sub-contract wherein the scope of works to be performed by Intrafor is described in, amongst others, the subcontract drawings and specification.
144. The subcontract drawings and specification are contained in the various schedules attached to and forming part of the subcontract, namely:
- (i) The various specifications contained in the First Schedule in so far as they relate to the subcontract works; and
  - (ii) The subcontract drawings contained in the Second Schedule.
145. Within the above mentioned documents, the following are particularly pertinent to how the steel bars in the diaphragm walls are to be installed:
- (i) Within the subcontract Scope Matrix, pursuant to item E-19, Leighton is responsible, to supply Intrafor with free issue couplers to connect the steel rebars. Leighton procured the couplers from its subcontractor BOSA and the couplers are required to be installed in accordance with Leighton's quality supervision plan for installation of couplers arising from, and in compliance with Buildings Department letter reference BD RAIL/30SCL/02-1112(S) (**Exhibit 21**).
  - (ii) Section 19 *Deep Foundation Works* of the Materials and Workmanship Specification for Civil Engineering Works (Volume 2) (**Exhibit 22**) prescribes the requirements for, amongst others, Diaphragm Walls and Barrettes.
  - (iii) Sub-section 19.78 *Reinforcement* refers to Section 10 of the Materials and Workmanship Specification for Civil Engineering Works (Volume 1) (**Exhibit 23**).
  - (iv) The fixing of steel reinforcement is prescribed in Sub-section 10.30 *Fixing Reinforcement* whilst fixing reinforcement connectors is prescribed in Sub-section 10.31 *Fixing Reinforcement Connectors*.
  - (v) The fixing of steel reinforcement and couplers is prescribed in the method statement with due cognizance of, amongst others, the Materials and

Workmanship Specification for Civil Engineering Works (Volumes 1 and 2). As mentioned above, section 10 in Volume 1 and section in Volume 2 of the Materials and Workmanship Specification for Civil Engineering Works are exhibited as Exhibits 22 and 23. I believe the Commission may already have access to the entire Volumes 1 and 2 of the Materials and Workmanship Specification for Civil Engineering Works. However should the Commission require, Intrafor will be happy to provide a copy.

146. The other sources of reference documents are stipulated in Section 2 of the method statement and are supplementary to the overarching subcontract specifications and drawings.
147. The Working Drawings, issued by Leighton, are reviewed by Intrafor from which Shop Drawings are produced in order to detail Bar Bending Schedules.
148. The Shop Drawings and Bar Bending Schedules are produced in compliance with the various reference documents and submitted to Leighton for approval.
149. Upon approval of the Shop Drawings and Bar Bending Schedules Intrafor proceeds to fabricate and install the reinforcement cages, utilizing the free issue materials (Steel reinforcement and couplers) supplied by Leighton.

## II.VII Enquiry 7

*"Describe and explain Your Company's system and measures in place at the material time to ensure that the steel bars in the diaphragm walls and platform slabs were properly installed and connected in compliance with Requirements, Standards and Practice. Please adduce all related manuals, records and documents on this topic."*

150. As I have explained above, Intrafor had no involvement at all with the platform slabs or any part of their construction. The construction works of the platform slabs and the connection works of the platform slab to the constructed diaphragm wall are the responsibilities of Leighton. My answer to question 7 is therefore restricted to the construction and completion of the diaphragm walls.
151. The following plans and method statements were put in place for the diaphragm walls which Intrafor had to comply with:

Document	Author	Notes
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Construction Method Statement for Diaphragm Wall & Barrette Construction.	Content Prepared by Intrafor Issued to and approved by Leighton	There are various iterations as mentioned above.
Inspection and Testing Plan. (in appendices of above mentioned method statement), including associated inspection records.	Issued to and approved by Leighton but prepared by Intrafor	There are various iterations as mentioned above.
Approved Working Drawings	Leighton	
Materials and Workmanship Specification for Civil Engineering Works	MTRC	
Building Department letter reference BD RAIL/30SCL/02-1112(S)	Buildings Department	Intrafor was the statutory quality control co-ordinator for installation
Site supervision plan together with the Code for Site Supervision	Prepared by Intrafor	Intrafor was the Authorised Signatory and also provided the T4 and T2 / T1 functions
Those parts of the BOSA Quality Supervision Plan for Installation of Couplers (for Diaphragm Wall and Barrettes)	Prepared by BOSA	
Approved Project Quality Plan	Intrafor	
Approved Safety Plan	Intrafor	

152. Intrafor complied with all its statutory duties as Authorised Signatory, T4, T2 and T1 as required in respect to the submitted foundations related site supervision plan and completion and recording of necessary inspections.



153. In addition, Intrafor, as required by the BD Appendices XIII and IX, relevant to couplers, and the associated BOSA Quality Supervision Plan for installation of Couplers assigned Quality Control Co-ordinator(s) full time on site. The primary role of these Coordinators was that they directly supervised the steel works and carried out inspections as described in my response.
154. The assigned Intrafor Quality Control Coordinators are of the same grade as T3, technically Competent persons, as detailed within the as per requirements to the BD COP and technical Memorandum, Site Supervision Plan.
155. The assigned Intrafor Quality Control Coordinators, in order to be able to competently execute the responsibilities of the role, received specific training directly from BOSA on aspects relevant to their quality supervision plan the methodology for installation of couplers and the requirements and means to inspect the connection of same. Other relevant personnel from both MTRC and Leighton received the same training.
156. The following outlines the Intrafor corporate and project specific systems and measures in place at the material time to ensure that steel bars in the diaphragm wall were properly installed and connected in compliance with requirements, Standards, Practices and other relevant documents, as table above.
157. The overarching document describing the detail and interface of Intrafor Quality, Health, Safety and Environmental systems is the Intrafor Corporate "QHSE System Manual" (**Exhibit 24**). This document describes the various QHSE systems, their relation to each other and ISO management system and overall responsibilities, the manual additionally clarifies what process, procedures and requirements are to be applied at a project level. This manual and subsequent project plans are also informed by the overall Intrafor Company QSE Policy (**Exhibit 25**).
158. At the project level, with reference to the above, the key documents describing the QHSE project management system are the Project Quality Plan (**Exhibit 17**) and Project Safety Plan (**Exhibit 26**).
159. In relation to the specifics of diaphragm wall related steel fixing works the critical control measures at the actual work-fronts full time supervision of the work – and in particular of the connections – by an experienced site engineer and his team. This was implemented by Intrafor. Intrafor's site engineer, and his team, supervised the

work on a full time basis including every coupler connection as o have described. This is reinforced by the three party cage by cage and coupler by coupler inspection by MTR, Leighton and Intrafor. Full signed records are available in the Panel Records, which will be provided to the Commission on 22 August 2018 after they have been bulk copied.

## **II.VIII Enquiry 8**

### **Commission Question**

160. Enquiry 8 commences with the following introductory paragraph:

*"Given the extensive public concern about the safety of the diaphragm walls and platform slabs and allegations that there might have been unlawful shortening, cutting or defective connection of the steel bars in the diaphragm walls and platform slabs ("Defective Steel Works").*

161. The Commission then sets out a series of queries 8(a) to (i). For ease of reference, I set out these in turn below, together with my response to each of them.

162. Where I refer to "Defective Steel Works", I am referring to the Commission's definition as set out in the introductory paragraph of Enquiry 8.

### **Query 8(a)**

*"Explain and confirm whether Your Company has any knowledge of the Defective Steel Works whether undertaken by Leighton and/or its sub-contractors) and if so, identify and describe the relevant events and occasions. Please describe the defects, explain in what ways Requirements, Standards and Practice had been breached and provide particulars of such events and occasions (with reference to plans and drawings, photographs and documents as necessary and appropriate), including but not limited to the dates, time, locations, number of steel bars affected and the equipment used to shorten or cut the steel bars."*

### **Platform slabs**

163. As I have explained above, Intrafor was not involved with, or responsible for, the construction works of the platform slabs and the connecting works connecting the platform slabs to the completed diaphragm walls.
164. Intrafor does not have any knowledge of Defective Steel Works undertaken by Leighton and/or its sub-contractors with respect to the platform slabs.

### Connections between the platform slabs and the diaphragm walls

#### *Overview*

165. Intrafor does not have any knowledge of any Defective Steel Works in relation to the connections between the platform slab and the completed diaphragm walls.
166. Intrafor and its sub-contractors had no involvement with, or responsibility for, the connections between the platform slab and the diaphragm walls except for the installation of starter-bars with or without couplers in the diaphragm walls for later use by Leighton. These “starter bars” are horizontally steel re-bar with either a coupler at one end (“single ended”) or a coupler at both ends (“double ended”) or bent out bars (without couplers).
167. Intrafor was responsible for the installation of the starter bars in the diaphragm walls<sup>1</sup>. The installation was carried out, checked and inspected in accordance with the procedure that I have previously described for the installation of re-bars.
168. Single ended starter bars are installed, and are concreted inside the diaphragm wall with the coupler opening exposed on an exterior face of the diaphragm wall. The coupler opening itself is covered by a protective cap. Double-ended bars are installed and protected in the same way save that the couplers at both ends are exposed on the two opposite external faces of the diaphragm wall.
169. The connections between the starter bars and the platform slab re-bars are outside Intrafor’s scope and were nothing to do with Intrafor. This connection

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<sup>1</sup> See Sub Contract, 2<sup>nd</sup> Schedule Part B Item 1.7. See BOQ page D.1.2/2. Item Code C699.1-5

work was done separately by Leighton after Intrafor had completed the diaphragm walls.

*Threading and supply of the starter bars*

170. Intrafor is not responsible for the manufacture or supply of these “starter bars” or the couplers that are attached. This is Leighton’s responsibility.
171. Leighton provided the already threaded starter bars to Intrafor on the same free issue basis as it did with all other steel bars with couplers and/or threads used in the diaphragm walls. Leighton procured the starter bars cutting and threading services and supply of the couplers from its sub-contractor BOSA.
172. BOSA were required to thread the starter bars (in the same way as other bars with couplers) by cutting steel bars in accordance with the requirements set out in the “Bar Bending Schedule”<sup>2</sup> and fixing the required coupler to it. Each panel has its own Bar Bending Schedule and as part of the sample Panel Records exhibited in **Exhibit 5** the corresponding sample Bar Bending Schedule are included. A complete set of the Bar Bending Schedule will be included in the complete set of the panel records to be provided to the Commission as mentioned above.
173. BOSA also put the protective cap onto the couplers. Intrafor is not responsible for the threading or supply of the starter bars or the couplers.
174. The starter bars were delivered by BOSA to Intrafor at site for Intrafor to install them in the diaphragm walls.

*Installation of starter bars in the diaphragm walls*

175. Intrafor was responsible for the installation of “starter bars” in the diaphragm walls in accordance with the design that it was given by Leighton and required to build to.

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<sup>2</sup> As I have previously described, the Bar Bending Schedule (BBS) is prepared by Intrafor and provided to Leighton and BOSA. It sets out the length, type, shape and quantity of steel re-bar required by Intrafor to construct the diaphragm walls in accordance with the design for the walls provided to us by Leighton. The BBS also specifies which bars need couplers and/or threads to construct the diaphragm walls in accordance with the design for the walls provided to us by Leighton.

176. The installation of the starter bars was no different from the installation of any other re-bar – save that the couplers were left unconnected with their protective caps on.
177. The starter-bars were installed by Intrafor and integrated into the reinforcement cages. The inspection of the reinforcement cage (including but not limited to the installation of the starter bars) to ensure it was in compliance with the specification and construction drawings was a hold point under the MTR's Request for Inspection and Survey Checks (RISC) process. Such inspection and relevant approvals are required to be recorded on the MTR's RISC forms. We are not a signatory to the RISC forms we do not have a complete set of the relevant RISC forms. We have located some of the RISC forms concerning the reinforcement cages which are exhibited as **Exhibit 27**. If we locate additional RISC forms we will provide copies of such to the Commission if required.
178. To the best of my knowledge and belief, neither Intrafor nor its sub-contractors ever unlawfully cut or shortened starter bars (or any other bars).
179. Further, I am not aware of any fact or information that causes me, or Intrafor, to have any reason to believe that unlawful cutting or shortening of the starter bars (or any other bars) in the diaphragm walls may have occurred at any stage during Intrafor's works.
180. As I explain in more detail in Section Three below, Intrafor was not involved in the apparent subsequent partial demolition and modification of the Eastern diaphragm wall. If, however, the information presented by the Director of Highways (at the press conference on 8 August 2018) is correct, it would appear that Leighton and/or MTR has made modifications to Intrafor's completed diaphragm walls. It would also appear from the information presented by the Director of Highways that these modifications involved removing some couplers and bars that were previously installed by Intrafor. The information in Lo & Lo's letter of 9 August 2018 is not, however, sufficient for me to comment in any detail.

*The work connecting the platform slabs with the diaphragm walls*

181. Intrafor was also not involved with, or responsible for screwing the threaded re-bar for the platform slab into the couplers of the diaphragm walls exposed by

Leighton. This work was the responsibility of Leighton and was subsequently carried out by Leighton.

182. Intrafor does not have any knowledge of Defective Steel Works with respect to the subsequent works connecting the platform slabs with the diaphragm walls carried out by others.

Steelwork and connections inside the diaphragm walls

183. To the best of my knowledge and belief, Intrafor does not have any knowledge of Defective Steel Works.
184. Further, I am not aware of any fact or information that causes me, or Intrafor, to have any reason to believe that there may have Defective Steel Work carried out to the steel bars or connections inside the diaphragm wall.

Query 8(b)

*"Identify the workers and persons who witnessed such events and occasions."*

185. Given our explanation in our answer to query 8(a) that Intrafor has no responsibility nor knowledge in relation to the Defective Steel Work, the queries 8(b) to (g) are not applicable.

Query 8(c)

*"Identify the workers and persons who shortened, cut or defectively connected the steel bars and the party or entity which employed or engaged those workers and persons."*

186. No such workers or people have been identified and nor have any such activities or occurrences.

Query 8(d)

*"If the events and occasions were reported to you by your workers and/or other persons, identify the person(s) who made the reports to you."*

187. No such reports have been identified and nor have any such activities or occurrences.

**Query 8(e)**

*"Following Your Company's knowledge of the relevant events and occasions, please describe and explain what steps and measures were taken by Your Company to (i) investigate the Defective Steel Works; (ii) alert and report the matter to the Main Parties or any of them and (iii) rectify the Defective Steel Works."*

188. To the best of my knowledge and belief, Intrafor has no knowledge of Defective Steel Works.
189. Further, I am not aware of any fact or information that causes me, or Intrafor, to have any reason to believe that Defective Steel Works may have occurred at any stage during Intrafor's works.

**Query 8(f)**

*"If a report was made, please identify the persons in Your Company who reported the matter to the Main Parties and the recipient(s) of such reports. If the matter was not reported to the Main Parties, please explain why no report was made."*

190. No such report was made because, as far as Intrafor has been able to identify to date, it has no knowledge of Defective Steel Works.

**Query 8(g)**

*"Describe the responses, reactions and steps taken by the recipient(s) and the relevant Main Parties in addressing Your Company's report."*

191. This is not applicable as there was no such report.

**Query 8(h)**

*“Whether or not it was as a result of Your Company's report, please confirm and identify the persons in the Main Parties who Your Company believes might be aware of the existence of the Defective Steel Works at the material time and explain the bases of your belief.”*

- 192. Intrafor has not, at this time, identified any individuals in the Main Parties who might be aware of the existence of Defective Steel Works.
- 193. Intrafor are currently unaware of any Defective Steel Work in the Diaphragm Walls as constructed and completed by Intrafor.
- 194. Intrafor was not involved in the work that Leighton or others subsequently may have carried out to demolish or modify parts of Intrafor's constructed Diaphragm Walls, and does not know which individuals at the Main Parties may have knowledge.
- 195. Intrafor was not involved with the platform slab and had no responsibility for it. Intrafor also had no involvement with China Technology or Fang Sheung. Intrafor does not know which individuals at the Main Parties may have knowledge.

**Query 8(i)**

*“Provide Your Company's confirmation that, other than the events and occasions cited in Your Company's reply to this paragraph, Your Company is not aware of any other Defective Steel Works in the diaphragm walls and platform slabs.”*

- 196. I confirm, on behalf of Intrafor, that Intrafor is not aware of any other Defective Steel Works in the diaphragm walls and platform slabs.
- 197. Whilst Intrafor has no reason to believe that this will change as enquiries continue, we will, of course, advise the Commission if Intrafor does become aware of any Defective Steel Works in the diaphragm walls or the platform slabs.

**II.IX QUESTION 9**



198. Question 9 commences with the following introductory paragraph:

*"On page 36 of the MRTCL Report, evidence was given by Fang Sheung that steel fixing works were carried out in accordance with Leighton and MTRCL's procedures. When their workers encountered difficulties in fixing the steel bars into the couplers, they would refer the difficulties to Leighton and request Leighton to resolve the issues. It was suggested that on "some occasions and as requested by Leighton, they (workers from Fang Sheung) would carry out cutting of threaded steel bars to meet the required threaded length. On other occasions and as requested by Leighton, the threaded steel bars could be cut and screwed into the couplers with the understanding that rectification measures would be carried out by Leighton." Given the matters and allegations stated in the Press and Media Reports and the evidence of Fang Sheung as extracted in this paragraph."*

199. The Commission then sets out a series of queries 9(a) to (o). For ease of reference, I set out my response to each query in turn.

#### **Query 9(a)**

*"Provide your detailed comments and explanation on the matters and allegations stated in the said Press and Media Reports. Particularly, explain the reasons for the existence of cracks and water leakage on the diaphragm walls, and explain whether it is related to the steel bar fixing works and/or Your Company's works. Please produce all relevant documents in support of your comments and explanation."*

#### **The matters and allegations stated in the said Press and Media Reports**

200. I have addressed these matters and allegations in Section One of my statement and I would refer the Commission to that Section.

#### **Alleged cracks and water leakage on the diaphragm walls**

201. Generally diaphragm walls are not expected to be water tight/ water proofed. This is recognised in Industry standards such as the British Standards BS EN 1538 (2010) (paragraph 7.1.10). It is also expressly recognised in the Contract (Materials and Workmanship Specifications for Civil Engineering Works, section 19.77 which is

included in **Exhibit 22**), which sets out tolerances for what cracking and what water leakage is contractually acceptable.

202. There is insufficient detail in the press and media reports to understand the extent, nature, cause or significance of either the alleged cracks or the alleged water leakage in the diaphragm walls. The photographs and narrative in the press and media reports do not provide enough detail to form a view regarding the *specific* cracks and water seepage about such things as the nature of the cracks, the cause of the cracks, the extent of the water seepage, or the cause of the water seepage.
203. Whilst some of the photographs do show apparent water marks from seepage, it is not possible to ascertain from the photographs the extent of water seepage let alone to identify the source or cause of the water seepage. In one photograph (as I have mentioned in Section 1) provided in the press and media Reports (Apple Daily 30th May 2018), there is an apparent water mark that suggests that water may have seeped down the wall from the top. Assuming that this is what is shown, there is no way from the photograph to ascertain whether this water is coming through the diaphragm wall or whether it is seeping through the slab. It is also not possible to ascertain how much water has leaked, when and for how long.
204. It is not possible from the information currently available to Intrafor to verify whether the alleged cracks and/or water leakage in the diaphragm walls mentioned in the Press and Media Reports exceed the specified contractual tolerances let alone what the causes are.
205. However, I have seen no evidence to date to support the suggestion that the reason why cracks have appeared on the diaphragm walls is due to steel bars not being properly screwed into the couplers, or that there are structural concerns.
206. Intrafor has, during the current and continuing defects liability period, periodically been asked to attend site to make good defects or imperfections or snags in the Subcontract Works including water leaks in the diaphragm walls. It did so. These site visits, and the nature of the alleged snags (many of which are not Intrafor's responsibility), did not indicate any unusual concerns or problems either in relation to leakages or cracks. A copy of all of the correspondence between Intrafor and Leighton concerning snags / defects clearance that has been located to date is in **Exhibit 28**. If any further relevant documents are located or further information is identified, this will be provided to the Commission.

207. For completeness, the Commission will see that the report of the most recent inspection, conducted jointly between Leighton and MTR, report was received by Intrafor on 2nd April 2018. The inspection revealed 61 water leaks of which Intrafor has identified 18 as being Intrafor's responsibility and this was notified to Leighton 7th May 2018 accordingly. None of the water leaks notified have caused Intrafor to have concerns or, to the best of my knowledge and belief, give rise to any unusual concern or problems.
208. Intrafor has not, however, been notified by Leighton or the MTR or any Government or Statutory body of any other issues or concerns regarding cracks or water leakage in the diaphragm walls other than the ones referred to and addressed/ resolved as explained in the preceding paragraphs.
209. Intrafor will, of course, fully co-operate with the Commission in reviewing any further evidence or technical information regarding cracks and water leakage that becomes available.

**Query 9(b)**

*"In relation to the steel fixing works undertaken by Your Company, explain whether your workers have experienced any difficulties and issues including, but not limited to, the fixing of steel bars into the couplers."*

210. Intrafor experienced some initial difficulties in relation to the steel fixing works in the early stages of the work (broadly the period from the end of July 2013 to mid-November 2013).
211. These initial teething difficulties were, however, not unusual for a project of this type and complexity, and were effectively resolved by the end of November 2013. After that, there were relatively few difficulties encountered. These initial difficulties are further described and explained in my answer to query 9(c) below.

**Query 9(c)**

*"If so, describe and explain the difficulties and issues and provide the reasons for such difficulties."*

212. The difficulties that were experienced in this early period fell into three types:
- (i) Challenges in dis-assembling the fully prefabricated cages constructed in the L-frame workbench for the first panel (EM 98), which was completed from 26 July to 31 July 2013;
  - (ii) Challenges in realignment (in the case of Panel EM98) and/or alignment of some of the other panel prefabricated cages to be spliced together at the panel excavation; and
  - (iii) Some limited quality issues with the re-bars and threads supplied by BOSA in the period July to November 2013.

*Challenges in assembling and installing reinforcement cages*

213. As I have explained in Section One of my statement, the installation of the re-bar cages for the diaphragm walls was challenging and complex from a construction perspective due to a combination of three factors:
- (i) The limited headroom during lifting, transportation and installation of the cages;
  - (ii) The depth of the diaphragm walls that needed to be constructed, which required multiple re-bar cages to be installed vertically and spliced for each panel;
  - (iii) Access difficulties due to the fact that some of the cages involved two or three layers of 50 mm diameter vertical rebars.
214. These construction challenges were recognised early on at tender stage and during the preparation of the method statements, as I have explained in Section One.
215. In line with the related approved method statement the plan was to prefabricate all the reinforcement cages less than or equal to 2 layers of reinforcement on a designed for purpose L-Frame work bench set up at a designated fabrication yard within the project site.
216. This method entailed pre-fabricating and connecting all required cages in series on the L-Frame work bench followed by the disconnection of the

cages, thereby allowing for individual cage transportation for storage and final installation and reconnection at the diaphragm wall excavation.

217. For the first set of cages to be pre-fabricated, panel EM98, it was decided to trial extending the pre-fabrication to all layers of cages, i.e. inclusive of 3 layers of reinforcement.
218. Accordingly all layers of the cages for EM98 were then prefabricated. Some difficulties were encountered in connecting the couplers when the cages were in the horizontal position. These difficulties were more pronounced when it came to trying to unscrew the couplers to disconnect the cages as I have explained in Section One of my statement.
219. These difficulties were caused by a number of factors. One was the effect of the weight of the cage (particularly where there were three layers of reinforcement) when in the horizontal position (as opposed to the vertical position in the diaphragm walls), which tended to cause alignment issues. The second was steel congestion, particularly in the cages with three layers of reinforcement, which caused difficulties for the workers carrying out the work.
220. Due to the difficulties encountered related to fully prefabricating all layers for EM98, this method of assembly where subsequently used was limited to cages of one or two layers only.
221. Utilizing the above option for cage prefabrication effectively reduced the difficulty in disconnection, unscrewing of couplers, to isolated and limited individual occurrences.

*Difficulties – Bar alignment of Pre-Fabricated of Cages – to Installed Cages*

222. Prefabricated cages were lifted by crane, from the L-Frame work benches, transported to the temporary storage area or the excavation panels, either by lorry or forklift, then lifted by crane to allow connection of the cage to the corresponding lower cage already installed in the excavation. As was anticipated the above various cage transportation / lifting activities led to some limited movement of some individual main vertical bars of the pre-fabricated cages, this is not an uncommon occurrence which also happens for pre-fabricated cages with the traditional and more common “rebar lapping” design.

223. The effect of this limited movement means that sometimes not every individual bar, with attached coupler, was totally aligned to its corresponding receiving bar in the already installed lower cage. When the cage is lowered, the couplers on the upper cage are screwed down to engage the full thread of the pre-installed lower cage to achieve the proper connection. If any of the upper cage bars was not fully aligned with a lower cage bar, then the upper cage individual bar, i.e. one by one, would be manually adjusted in order to achieve the alignment and contact with the lower cage bars and then couplers would be screwed down in the same manner as described above.
224. It should be further explained that where panel cages were fabricated in situ, this meant that there were no difficulties encountered in being able to make immediate full contact and proper connection of bars and couplers as each bar and coupler was installed one by one.
225. Ultimately all bars required to be connected by means of a coupler were fully in contact with their corresponding bars and the couplers properly installed and connected. All such bars and coupler connections were inspected for compliance with this requirement by three parties, Intrafor, Leighton and the MTR authorised representatives before the “hold point” was approved and the next stage of works authorised.

*Some quality issues with the re-bar and threads supplied by BOSA*

226. Intrafor also experienced some problems with the quality of re-bars and rebar threads supplied by BOSA during the early stages of steel fixing. Some threads were difficult to screw into couplers. Where this happened, Intrafor called for replacement bars from BOSA as BOSA had a manufacturing facility on site. The replacement bars were installed. This approach is evidenced by various contemporaneous correspondence between Intrafor and BOSA requesting replacements.
227. The frequency of these problems was not, as far as I have been able to establish, abnormally high for the start of a project. It is not unusual for there to be some quality issues at the start.
228. Intrafor raised the quality issues with Leighton (see for example Intrafor’s letter of 16 October 2013 regarding non-conformities exhibited in **Exhibit**

29). This led to Leighton conducting a quality control audit on BOSA's manufacturing and quality control systems in November 2013. This audit identified various quality control issues to be addressed. A copy of the audit report is exhibited in **Exhibit 29**.

- 229. The actions taken arising out of the audit effectively and significantly reduced the occurrences of quality issues with bars and threads.
- 230. Following the completion of the audit in November 2013, Intrafor only experienced very rare problems with an odd bar or thread. Where there was a problem with the bar, a replacement bar would be obtained from BOSA.

**Query 9(d)**

*"Explain and confirm how often or common it was that workers would encounter difficulties in fixing the steel bars into couplers."*

- 231. As I have described above, in relation to the steel fixing works undertaken by Intrafor, there were very few problems encountered after November 2013. Prior to the end of November 2013, the problems were more frequent but not unusually so for the start of a project. For sake of clarity, as already described above, the steel fixing works undertaken by Intrafor do not cover among others the connection between the platform slab and the diaphragm wall.
- 232. The key challenges that Intrafor were encountering were not in relation to steel fixing works per se but concerned lack of access, insufficient working area, timely supply of sufficient quantities of bars from BOSA, and environmental air quality issues in the enclosed work site.

**Query 9(e)**

*"With the help of diagrams and drawings, indicate the exact locations of where the steel bars were shortened, cut or improperly connected within the diaphragm walls and platform slabs."*

- 233. To the best of my knowledge and belief, there was no steel bars that were shortened, cut or improperly connected within the diaphragm walls.

234. Further, I am not aware of any fact or information that causes me, or Intrafor, to have any reason to believe that unlawful cutting or shortening of the steel bars or improper connections in the diaphragm walls may have occurred at any stage during Intrafor's works. As I have described elsewhere in this Statement, all of the cages and all connections were inspected and signed off by Intrafor, Leighton and MTR.
235. Intrafor had no responsibility for nor any involvement in the platform slab works or the connection of the platform slab with the diaphragm wall.
236. I am not aware of any fact or information that causes me, or Intrafor, to have any reason to believe that these inspections were carried out anyway other than professionally and properly. All of the three-party (Intrafor, Leighton and MTR) sign-off inspection records are available as are all of the on-site assembly of coupler records.

**Query 9(f)**

*"Indicate and confirm (either with reference to contemporaneous records or provide your best estimate) how many steel bars had been shortened, cut or improperly connected within the diaphragm walls and platform slabs. Explain the bases of your confirmation or best estimate."*

237. Based upon all inspection records signed off by Intrafor, Leighton and MTR, the evidence adduced above and the fact that we have had no knowledge or notice of any shortening or cutting of steel bars within the diaphragm wall, we confirm that, to the best of my knowledge and belief, there was no steel bars that had been shortened, cut or improperly connected within the diaphragm walls.
238. Intrafor had no responsibility for nor any involvement in the platform slab works or the connection of the platform slab with the completed diaphragm wall.

**Query 9(g)**

*"Confirm whether workers of Your Company had referred such difficulties and issues to Leighton and if so, please identify (with particulars) the worker(s) who referred the*



*difficulties and issues to Leighton and describe the replies and instructions given by Leighton to resolve the difficulties and issues. Please state whether the replies and instructions were given orally or in writing. If orally, identify by whom and to whom the same were made, when and in what circumstances. If in writing, please produce all relevant documents."*

239. As I have explained above, the various exchanges between Intrafor and Leighton which culminated in a formal letter issued to Leighton in October 2013 advising them of the quality issues being experienced with BOSA. Subsequent to this, an additional quality control audit of BOSA manufacturing and quality control procedures was carried. This audit process was documented and effectively and significantly reduced the occurrences of issues with the bars and thread.
240. As described above, Leighton carried out an audit in November 2013 on BOSA to be done in light of the quality issues of the rebars and thread supplied by BOSA and wrote to BOSA by a letter dated 21 November 2013 following up on the audit result.

**Query 9(h)**

*"Please provide contemporaneous written documents (if there were any) recording Your Company's reports on the said difficulties and issues to Leighton and the replies and instructions given by Leighton."*

241. Copies of the correspondence and emails that have been located to date are included in **Exhibit 29:-**

**Query 9(i)**

*"Describe and explain what steps and works were carried out by workers of Your Company to the steel bars upon receiving instructions from Leighton."*

242. Intrafor received no instruction whether oral or written from Leighton to shorten or cut the steel bars or to carry out any improper connection in relation to the diaphragm wall.

**Query 9(i)**

*"Confirm whether instructions were given for the steel bars to be shortened and cut in order to overcome the said difficulties and issues. Indicate how exactly the steel bars were shortened, cut and/or connected into couplers in order to overcome the said difficulties and issues."*

243. Intrafor received no instruction whether oral or written from Leighton to unlawfully shorten or cut the steel bars or to carry out any improper connection in relation to the diaphragm wall.

**Query 9(k)**

*"After the steel bars were shortened and cut, or in some cases, after the shortened steel bars were screwed into the couplers, please explain and confirm whether rectification measures were taken by Your Company and/or any other Main Parties to ensure the compliance, safety and integrity of the diaphragm walls and platform slabs. Describe and explain the rectification measures taken and rectification work(s) carried out."*

244. To the best of my knowledge and belief, there was no unlawful shortening or cutting of steel bars or improper connection in the diaphragm walls.
245. Further, I am not aware of any fact or information that causes me, or Intrafor, to have any reason to believe that unlawful cutting or shortening of steel bars or improper connection in the diaphragm walls may have occurred at any stage during Intrafor's works.
246. Intrafor had no responsibility for nor any involvement in the platform slab works or the connection of the platform slab with the completed diaphragm wall.

**Query 9(l)**

*Explain whether it is common in the construction of diaphragm walls and platform slabs for steel bars to be shortened and cut and confirm whether such shortening and cutting of steel bars within the diaphragm walls and platform slabs is acceptable and in compliance with Requirements, Standards and Practice.*

247. Shortening or cutting rebars contrary to the dimensioned requirements specified in the approved reinforcement drawings is unacceptable whether in the diaphragm walls or platform slabs.

**Query 9(m)**

*“Explain and confirm whether such shortening and cutting of the steel bar's within the diaphragm walls and platform slabs would compromise the quality, safety and integrity of the diaphragm walls and platform slabs.”*

248. As a matter of general principle, shortening or cutting rebars contrary to the dimensioned requirements specified in the approved reinforcement drawings would compromise the quality, safety and integrity of the diaphragm walls and platform slabs.

**Query 9(n)**

*“In cases where steel bars were shortened and inserted into the couplers but not to the full extent as specified under the Requirements, Standards and Practice, explain and confirm whether,:*

- (i) it would compromise the quality, safety and integrity of the diaphragm walls and platform slabs.*
- (ii) it would be apparent on a visual inspection to supervisors and/or inspectors that the steel bars were shortened and cut and not properly inserted into the couplers.*
- (iii) it is possible on inspection (visual or otherwise) to detect and identify that the steel bars were shortened and cut and not properly inserted into the couplers.”*

249. To the best of Intrafor's knowledge and belief, there was no unlawful shortening or cutting of steel bars in the diaphragm walls or bars that were improperly connected.
250. Further, I am not aware of any fact or information that causes me, or Intrafor, to have any reason to believe that unlawful cutting or shortening of the rebars or

improper connections in the diaphragm walls may have occurred at any stage during Intrafor's works.

251. As to the specific allegations of unlawful shortening or cutting of steel bars in this project, it is difficult for Intrafor to provide an informed response on this without further details.

*In response to ii) above,*

252. Firstly it is necessary to understand that two types of splicing arrangements have been utilised on this project for connections of rebars within the diaphragm wall, namely Standard Splice - Type A, and Position Splice - Type B. (Refer to **Exhibit 20**)

Starter Bars with Couplers – Horizontal (When installed during fabrication of the Diaphragm Wall Cage)

253. Diaphragm Wall starter bars use a Standard Splice Type A for future platform slab connections by others.
254. If the starter bar thread, within the diaphragm wall, inserted in to the coupler had been cut then this would not be visible to the supervisor and/or inspector unless the protective cap supplied, when the starter bar and coupler was delivered by Leighton, is removed. Intrafor does not remove the protective cap.

Diaphragm Wall Cage to Cage Bars and Couplers – Vertical

255. Diaphragm wall vertical bars use a Position Splice Type B for connecting reinforcement cages.
256. The reason for using a Position Splice Type B is that rebars within the prefabricated upper cage are fixed and cannot be screwed in to a coupler where the coupler fixed to the already installed lower cage to which the upper cage is to be connected. Accordingly the rebar of the prefabricated upper cage has couplers attached to the rebars to be connected and are screwed on to the already installed lower cage.
257. If the rebar thread of the already installed lower cage had been cut then this would be visible to the supervisor and/or inspector prior to connecting the prefabricated upper cage.
258. If the rebar thread of the prefabricated upper cage had been cut then this would be visible to the supervisor and/or inspector prior to connecting the prefabricated upper cage.

259. If the thread of either connecting rebars had been cut and connected with the coupler, it would not be visible to the supervisor and/or inspector unless the exposed thread of the upper rebar was less than the maximum length of thread permitted to be exposed once the coupler had been screwed down.

In-situ Diaphragm Wall Upper Cage to Lower Cage Bars and Couplers – Vertical

260. Responses 87 to 91 apply equally.

*In response to iii) above*

Starter Bars with Couplers – Horizontal (When installed during fabrication of the Diaphragm Wall Cage)

261. If the starter bar thread, within the diaphragm wall, inserted in to the coupler had been cut then this would be visible to the supervisor and/or inspector if the protective cap supplied, when the starter bar and coupler was delivered, is removed for quality control purposes. Intrafor does not perform the quality control for the manufacturing process – threading and couplers.

Prefabricated Diaphragm Wall Upper Cage to Lower Cage Bars and Couplers – Vertical

262. It is possible on inspection to detect and identify that the steel bars were shortened and cut and not properly inserted into the couplers.
263. Detection is possible by unscrewing the coupler and visually inspecting the connected rebars. This checking practice was performed ad hoc by the MTR and Leighton inspectors on each panel by randomly selecting connected rebars and instructing Intrafor to disconnect connected rebars during the inspection process.

In-situ Diaphragm Wall Cage to Cage Bars and Couplers – Vertical

264. Responses 94 and 95 apply equally

Query 9(o)

*"Explain and confirm whether there would have been other effective solutions or steps to resolve the issues and difficulties encountered by the workers and if so, why such solutions and steps were not taken by Your Company."*

265. Intrafor took the appropriate steps and solutions to address the difficulties as mentioned above. These steps and solutions were effective in respect of the diaphragm wall and Intrafor's responsibilities in the project.

**II.X        QUESTION 10**

266. Question 10 commences with the following introductory paragraph:

*"On the same page of the MTRCL Report, Fang Sheung "further confirmed that their steel fixing works were regularly checked by Leighton and MTRCL" and Fang Sheung would not proceed to next stage of works unless permission was given. With reference to the steps, procedures and timeline in the construction and completion of the steel fixing works in the diaphragm walls and platform slabs as stated in your answer to paragraph 5 above, please:"*

267. The Commission then sets out a series of queries 10(a) to (e). For ease of reference, I set out my response to each query in turn.

**Query 10 (a)**

*"Describe at which stage the steel fixing works carried out by Your Company would be inspected by Leighton and MTRCL."*

268. As I have described in more detail both above and below, the steel fixing works would be inspected by MTR and Leighton and Intrafor each time that two cages were connected for a panel. These inspections involved inspecting the cage and also the connections. This was a hold point. The next cage could not be installed until the previous cages and connections had passed inspection.

**Query 10 (b)**

*"state how frequent Leighton and MTRCL would carry out the inspections."*

269. 100% of the cages and connection in relation to the diaphragm wall were systematically inspected by Leighton and MTR as required in accordance with the approved processes under the Subcontract.

**Query 10 (c)**

*"identify the supervisors and persons in Leighton and MTRCL who carried out the inspections."*

270. Based on our records, the supervisors and persons in Leighton and MTR carrying out inspections in respect of the diaphragm wall were:

Organisation	Name	Title
MTR	Dick Kung – SLOW	Senior Inspector of Works
	Pedro SO– SLOW	Senior Inspector of Works
	Tommy LEUNG	Asst. Inspector of works
	Kobe WONG	Inspector of Works
Leighton	Ian CHIC	Sub Agent
	Tim TSE	Civil Technician
	MOK Edward	Grad. Engineer
	Charles ZHANG Jun He	Assistant Engineer
	Ryan KOW	Grad. Engineer
	Kobe Law	Sub Agent / Senior Engineer
	Ian CHIC	Sub Agent

**Query 10 (d)**

*"describe and explain how the inspections would be carried out, whether they were visual inspections only or equipment was used or both."*

271. As I have explained in Section One of my statement, Intrafor was required to comply, with respect to steel fixing works carried out by Intrafor for the diaphragm wall, with contractual site supervision obligations.

272. The steel cage installation engineer assigned by Intrafor was full time on site. The steel cage installation engineer supervised and inspected the assembly and installation of each and every cage, and each and every connection. This involved
- (i) checking the length, spacing and diameters of the rebars and also position for the starter bars against approved drawings; and
  - (ii) supervising the winding down of each individual coupler, physically trying to wind the coupler down further, visually inspecting the amount of thread visible, and, on occasions, measuring the visible thread with a tape measure.
273. Once the Intrafor's cage installation engineer was satisfied with both the assembly and installation and each individual connection, the three-party joint inspection would be requested.
274. The three party inspection (with Intrafor, MTR and Leighton) involved a visual inspection of each area of the cage and each connection. If a coupler was not properly screwed down or the connection was not properly made, this ought to be apparent visually both by looking at the amount of thread visible on each connection, and also by comparing the amount of thread visible on each connection with the thread visible on the surrounding connections. In addition, and to ensure that the threaded bars being connected are in contact, MTR made spot checks on some couplers by measuring threads with a tape measure. Other spot checks involved unscrewing a coupler and winding it back down again, and others by seeing if a piece of paper could be slid between the two ends of a threaded bars being connected. The combination of the above checks and inspection ensures that the cages are fully and properly connected.

**Query 10 (e)**

*"confirm whether reports or records were kept following the inspections and if so, please produce such reports and records."*

275. A complete set of the cage by cage tripartite signed inspection forms has been located and is available. Attached in **Exhibit 5** are samples of such signed inspection record for the first panel installed EM 98.

**II.XI QUESTION 11**



276. Question 11 commences with the following introductory paragraph:

*"Since June 2018, a director of China Technology, Mr Poon Chuk Hung ("Mr Poon"), made various press statements, responded to enquiries by the media, attended interviews in radio programmes (including "左右大局" on 27 June 2018 and "在晴朗的一天出發" and "千禧年代" on 28 June 2018). Mr Poon also attended a special meeting of the Subcommittee on Matters Relating to Railways of the Panel on Transport of the LegCo held on 13 July 2018 ("RSC Meeting"). He suggested at the RSC Meeting that the extent of the Defective Steel Works was much more substantial than that portrayed in the MTRCL Report. He estimated there might be up to 1,000 steel bars which were shortened, cut or defectively connected. In order to expedite the cutting of the steel bars, a special hydraulic cutter was used by the workers and the process was carried out surreptitiously in quiet areas on site. Please.."*

277. The Commission then sets out a series of queries 11 (a) to (g). For ease of reference, I set out my response to each query in turn.

**Query 11 (a)**

*"Comment on Mr Poon's allegations."*

278. Intrafor has no knowledge of the matters alleged by Mr. Poon. They did not occur in relation to Intrafor's work on the diaphragm walls.

279. Intrafor cannot comment on these matters in relation to the platform slab or in relation to any modification work undertaken by Leighton on the diaphragm walls after Intrafor completed them.

**Query 11 (b)**

*"Confirm whether Your Company was aware that steel bars were being shortened or cut by hydraulic cutters on site, and if so, what were the reasons for using a hydraulic cutter to carry out such work."*

280. To the best of Intrafor's knowledge and belief, there was no unlawful shortening or cutting of steel bars in the diaphragm walls or bars by hydraulic cutter or any other

means.

**Query 11 (c)**

*"Confirm whether workers engaged by Your Company had used hydraulic cutters to shorten and cut the steel bars embedded or to be embedded within the diaphragm walls and platform slabs and if so, please identify the workers and/or entities who carried out such shortening or cutting work by hydraulic cutters, and the persons and/or entities who gave instructions (i) for such work to be carried out and (ii) for hydraulic cutters to be acquired."*

281. To the best of Intrafor's knowledge and belief, there was no unlawful shortening or cutting of steel bars in the diaphragm walls or bars by hydraulic cutter or any other means.

**Query 11 (d)**

*"Please explain and confirm whether it is a common practice within the construction industry to use a hydraulic cutter to shorten or cut steel bars embedded or to be embedded within the diaphragm walls and platform slabs."*

282. To the best of Intrafor's knowledge and belief, there was no unlawful shortening or cutting of steel bars in the diaphragm walls or bars by hydraulic cutter or any other means.
283. Intrafor was not involved with the platform slabs and would not want to speculate on this.

**Query 11 (e)**

*"Please confirm whether Your Company has ordered or given instructions and/or approval to order any hydraulic cutters for the purpose of shortening or cutting steel bars and if so, please produce all relevant correspondence, emails, instructions, approvals, purchase orders, delivery notes, manuals and literature on the model(s) of the hydraulic cutters used and the specifications thereof and other relevant documentation and records on this topic."*

284. I confirm that no such orders, instructions or approvals were given by Intrafor.

#### **Query 11 (f)**

*"Given the existing state and condition of the diaphragm walls and platform slabs and public concern about their safety, describe and explain, to the best of Your Company's knowledge, feasible method(s) (i) to ascertain whether Defective Steel Works do in fact exist and if so, the extent of such Defective Steel Works and (ii) to verify the safety and integrity of the diaphragm walls and platform slabs. Please produce and provide the authorities relied on by Your Company on this topic."*

285. Intrafor was not involved with the platform slabs and considers it would be inappropriate to comment in relation to the platform slabs.
286. In relation to the diaphragm walls, Intrafor does not currently have sufficient detail to provide detailed comments at this stage. Intrafor, however, would be very happy to co-operate and work with the Commission in this regard.

#### **Query 11 (g)**

*"On the assumption that the extent of the Defective Steel Works is more substantial than that stated in the MTRCL Report, describe and explain the effective ways and methods to strengthen the structure of diaphragm walls and platforms slabs to ensure the safety and integrity thereof. Please produce and provide the authorities relied on by Your Company on this topic. Explain the consequences in the event that such Defective Steel Works remain unrectified."*

287. Intrafor was not involved with the platform slabs and considers it would be inappropriate to comment in relation to the platform slabs.
288. In relation to the diaphragm walls, there is nothing we have seen or been notified of that causes Intrafor to have concerns about the existence of Defective Steel Works or concerns about the safety and structural integrity of the diaphragm walls. However, Intrafor remains at the disposal of the Commission to discuss and/or attend any meeting regarding specific concerns and devise feasible methods to alleviate any concerns on the safety and structural integrity of the diaphragm wall that the Commission may have.

#### **II.XII QUESTION 12**

*"Upon receipt of the MTRCL Report and on the basis of further information provided separately by the MTRCL to the HyD, the HyD considered the matter might involve criminal elements and reported the matter to the Police on 15 June 2018. Please produce all statement(s) given by Your Company and your workers to the Police (if any)."*

289. Intrafor has not made any statements to the Police and, as far as it is aware, neither have any of its workers.

**II.XIII Question 13**

*"Apart from the Defective Steel Works, please confirm whether, in respect of the diaphragm wall and platform slab construction works at the Hung Hom Station Extension under Contract 1112 of the SCL Project, Your Company has knowledge of any other works which raise concerns about public safety and if so, describe and set out all the facts and circumstances surrounding such other works."*

290. Intrafor does not have any such knowledge. In the event it becomes aware of any matters in the future, Intrafor will, of course, advise the Commission.

### **Section 3**

The following are my response to the questions raised in the Lo & Lo's letter of 9<sup>th</sup> August 2018.

#### **III.I QUESTION 1**

*"The Commission requires Your Company, as the sub-contractor responsible for the construction of the diaphragm walls, to explain and confirm whether Your Company is aware of the alleged deviation of the as-built conditions from the BD's approval plans and whether Your Company has participated in the works to demolish the completed diaphragm walls. If so, please describe your involvement in the said works."*

291. I confirm that Intrafor did not have any knowledge of, or participated in, the alleged demolition of, or modifications to, the completed diaphragm walls.
292. I also confirm that Intrafor was not aware of the alleged deviation of the as-built conditions from BD's approval plans.

#### **III.I QUESTION 2**

*"Please also comment on the allegations and matters raised in the Government Press Conference and the MTRCL Press Conference in relation to the diaphragm walls."*

293. Intrafor does not have any knowledge of the allegations and matters raised in these Press Conferences. Intrafor was not aware of, and did not participate in, the demolition of, and modifications to, the completed diaphragm walls.
294. Intrafor constructed, and completed, the diaphragm walls in accordance with the designs provided. The East diaphragm wall was constructed and completed to the full height specified in the design – with cut-off level ranging between +4.37m to

+2.01m. Starter bars with couplers were installed and inspected in the manner that I have described in sections one and two of my statement.

295. I enclose some examples of the shop drawings that were prepared by Intrafor for the construction of the East diaphragm wall based on the working drawings issued by Leighton together with the as-built drawings for the East diaphragm wall issued by Intrafor and endorsed by Leighton (**Exhibit 30**). A full set of the shop drawings for the construction of the East diaphragm wall will be provided in soft copy to the Commission on 22 August 2017. The cage by cage inspection sheets signed by Intrafor, MTR and Leighton for the steel work are also being copied and will be provided by Intrafor to the Commission.
296. If MTR/ Leighton has carried out the demolition and modifications described in the press conferences, it would follow that the top layers of starter bars with couplers in the East diaphragm wall would no longer be needed for the reasons explained by the Director of Highways. It would not be surprising, in these circumstances, if MTR/ Leighton had removed these previously installed starter bars with couplers. Indeed, a number of these starter bars with couplers might have had to be removed as a result of the demolition of the concrete. Intrafor, however, has no knowledge about these matters or the removal of the starter bars with couplers.
297. Intrafor did not have any design responsibility for the diaphragm walls. As such, there would have been no need, from a design or engineering perspective, for MTR or Leighton to advise or consult Intrafor prior to undertaking demolition of, or modifications to, the completed diaphragm walls.
298. The demolition or modification of parts of Intrafor's completed works may, however, have implications for the completed diaphragm walls. Without further details, however, Intrafor cannot comment further at this stage.

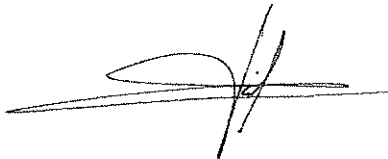
### **Conclusion**

299. I confirm that where matters are my own knowledge they are true. All other matters are true to the best of my knowledge and belief based on the documents and information that my team and I have as at today.
300. I confirm that if further material matters subsequently come to my attention, I will draw these to the attention of the Commission. If further relevant documents are

located or requested, these will be provided in batches in accordance with the procedures set out by Lo & Lo.

301. I also confirm that myself and Intrafor are generally available to assist the Commission.

Dated this 15th day of August 2018



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Jean-Christophe, Jacques-Olivier Gillard

Corrigendum to the Witness Statement of Jean-Christophe,  
Jacques-Oliver Gillard dated 15<sup>th</sup> August 2018 (“**1<sup>st</sup> Statement**”)

<b>Page</b>	<b>Paragraph</b>	<b>Content</b>
F44	66	Amend “tremie pipe” to “reservation pipe”
F46	72(v)	Delete “including NCR/snag’s concerning cracks and/or water seepage”
F50	95	Amend “preceding paragraph 45” to “preceding paragraph 94”