

COMMISSION OF INQUIRY  
INTO THE COLLISION OF VESSELS NEAR LAMMA ISLAND  
ON 1 OCTOBER 2012

**SUBMISSIONS FOR CHEOY LEE SHIPYARDS LIMITED**

**Background**

1. Cheoy Lee Shipyards Limited (“**CLS**”) was established in Hong Kong in 1936 and is a well respected shipbuilder in the marine industry worldwide.  
**[Armstrong / Day 27 / 31.01.13 / p. 72-22 to p. 73-2]**
2. CLS was the builder of the vessel “LAMMA IV” commissioned by the Hongkong Electric Co., Ltd. (“**HKE**”).
3. The “LAMMA IV” was one of the vessels involved in the collision near Lamma Island on 1 October 2012. The “LAMMA IV” sank as a result and tragically claimed 39 lives.
4. Criticism has been leveled against the construction of the “LAMMA IV” by the expert naval architect advising the Commission (“**the Commission’s expert**”) in the following areas:-
  - (a) the vessel was constructed with side plating of 4.5 mm thickness rather than the required 5.0 mm;
  - (b) the bulkhead between the Tank Room and the Steering Gear compartment was not watertight as it should; and

(c) the attachment of seats to the upper deck was inadequate.

### **Design of the “LAMMA IV”**

5. The design of the hull for the “LAMMA IV” (“**the Design**”) was undertaken by the Singaporean company Naval-Consult Pte Ltd. (“**NC**”) in December 1994.

**[Lo Ngok Yang (“Lo”) / Day 18 / 18.01.13 / p. 92-16 to 92-19]**

6. NC was a specialist in aluminium hull design.

**[Lo / Day 18 / 18.01.13 / p. 93-5 to 93-19]**

7. The Design was to be based on a previous vessel, the “Eastern District No. 1”, designed by NC in early 1992.

**[Marine 2 / 4 / pp. 196-200]**

**[Lo / Day 18 / 18.01.13 / p. 94-4 to 94-12 and p. 94-24 to p. 95-5]**

8. At the time, “*there were no regulations covering these types of craft*”.

**[Armstrong / Day 24 / 28.01.13 / p. 9-21 to p. 10-6]**

9. The “Eastern District No. 1” was a vessel with an aluminium hull divided into 6 compartments by 5 watertight bulkheads and was designed with a damage stability of 2 compartment flooding.

**[Marine 2 / 4 / p. 197]**

**[Lo / Day 18 / 18.01.13 / p. 95-18 to 95-22]**

10. The Tender Specifications for the Design submitted by CLS to HKE in about August 1994 was based on the hull specifications of the “Eastern District No. 1”.

**[Marine 10 / 28a / pp. 3297-3359 at 3298 & 3310]**

**[Lo / Day 19 / 21.01.13 / p. 75-24 to p. 77-6]**

11. The Design was intended for a damage stability of 1 compartment flooding, the bulkhead separating the steering gear compartment and the tank room (“**Bulkhead at Frame 1/2**”) was changed by NC to a non-watertight bulkhead with an access opening in place of a watertight door in the original design.

**[Marine 2 / 4 / p. 198]**

**[Marine 2 / 5 / p. 205]**

**[Lo / Day 18 / 18.01.13 / p. 102-3 to 102-19]**

12. The reason was believed to be that the steering gear compartment in the original design was less than 10% of the overall length of the vessel and accordingly, the Bulkhead at Frame 1/2 would have to be ignored in the assessment of damage stability of the vessel, it was decided that the Bulkhead at Frame 1/2 need not be watertight.

**[Miscellaneous / 22 / pp. 111-179]**

**[Lo / Day 18 / 18.01.13 / p. 96-23 to p. 97-12 and p. 100-23 to p. 101-6]**

13. It transpired that in the course of adapting the plans and drawings of the “Eastern District No. 1” for the “LAMMA IV” in about December 1994, the draughtsman of NC, while changing the notation at the Bulkhead at Frame 1/2 from “W.T. DOOR” to “ACCESS OPENING”, had forgotten to erase the notations of “W.T. BHD” from other parts of various plans and drawings.

**[Lim / Day 19 / 21.01.13 / p. 151-14 to 151-25 and p. 152-7 to p. 154-23]**

14. The mistakes of these contradictory notations were not discovered until some 16 years later when everything relating to the “LAMMA IV” was put

under the microscope after the accident.

**[Lim / Day 19 / 21.01.13 / p. 155-3 to 155-20]**

**[Lo / Day 18 / 18.01.13 / p. 108-11 to p. 109-24]**

15. The mistakes of NC's draughtsman led to a series of further calculation errors down the line at CLS.

**[Marine 2 / 59 / pp. 338-344]**

**[Marine 3 / 84 / pp. 473-479]**

**[Marine 4 / 142 / pp. 668-724]**

**[Cheung Fook Chor ("Cheung") / Day 41 / 27.02.13 / p. 80-15 to p. 81-24 and p. 97-3 to p. 99-2]**

**[Kwok Hing Yin ("Kwok") / Day 44 / 04.03.13 / p. 51-15 to 51-22]**

16. Throughout the years, the mistakes had not been spotted or queried notwithstanding the detail plan approval process for the "LAMMA IV" and the numerous subsequent inspections and surveys of the "LAMMA IV".

### **Bulkhead at Frame 1/2**

17. The Bulkhead at Frame 1/2 was not intended to be watertight.

**[Lo / Day 18 / 18.01.13 / p. 114-21 to 114-25]**

18. The manner in which the access opening was constructed, i.e., without a frame or plate around its edges, indicated that it was never meant to have hinges and latches for a door, watertight or otherwise.

**[Lo / Day 18 / 18.01.13 / p. 115-1 to p. 116-12]**

**[Fung Wai Man ("Fung") / Day 17 / 17.01.13 / p. 120-18 to 120-24]**

19. It was not a question of costs that the access opening was left without a door. A door would only cost a few thousand dollars in 1995. The

“LAMMA IV” costs over HK\$9.88 million.

**[Marine 10 / 28a / p. 3299]**

**[Lo / Day 18 / 18.01.13 / p. 119-20 to p. 120-22]**

20. The draughtsman’s mistakes resulted in different interpretations being given to the plans and drawings by different persons.

21. The Wuzhou Shipyard constructed the Bulkhead at Frame 1/2 as a non-watertight bulkhead. The “*Hull construction (internal)*” was “*inspected with approved drawings*” on about 13 November 1995. None of the outstanding items required to be re-inspected related to a “missing watertight door” on the Bulkhead at Frame 1/2.

**[Marine 4 / 165 / pp. 831-835]**

**[Fung / Day 17 / 17.01.13 / p. 120-18 to p. 122-6]**

22. CLS’s staff in its design office “understood” the Bulkhead at Frame 1/2 as a watertight bulkhead and prepared the first Damage Stability Booklet in 1996 on that basis. The staff member in question also admitted that he had omitted to take into consideration the requirement to ignore the Bulkhead at Frame 1/2 for the calculations of damage stability on account of the shortness of the steering gear compartment.

**[Cheung / Day 41 / 27.02.13 / p. 80-15 to p. 81-24]**

23. This mistaken understanding and omission was carried through to the 1998 Damage Stability Booklet after 8.25 tonnes of lead ballast was added to the hull of the “LAMMA IV” and to the 2005 Stability Booklet after the lead ballast was raised by 10 inches.

**[Cheung / Day 41 / 27.02.13 / p. 97-3 to p. 99-2]**

**[Kwok / Day 44 / 04.03.13 / p. 51-15 to 51-22]**

24. By 1998 and 2005, after the lead ballast was added and subsequently raised by 10 inches, the question of whether or not there should be a watertight door on the Bulkhead at Frame 1/2 became academic, because had the proper “floodable length” calculations been conducted by ignoring the existence of the Bulkhead at Frame 1/2, it would have shown that the Margin Line would be submerged at the stern of the “LAMMA IV” and other solutions would have to be found.

**[Armstrong / Day 25 / 29.01.13 / p. 164-5 to p. 166-1]**

**[Armstrong / Day 26 / 30.01.13 / p. 13-2 to p. 15-1]**

25. So far as it concerns the question as to whether in 1995 there was a practice or requirement that there should be an Aft Peak bulkhead at the after end of the vessel at about 10% or less of its waterline length or overall length and that it was required to be watertight, i.e., to consider the Bulkhead at Frame 1/2 as such an Aft Peak bulkhead, it is apparent that the Marine Department holds a view different to that of the Commission’s expert.

**[Wong Wing Chuen (“Wong”) / Day 43 / 01.03.13 / p. 36-23 to p. 39-18]**

**[Marine 13 / 81a / Wong 4<sup>th</sup> Statement / paragraph 6 at p. 4928]**

**[Marine 13 / 81b / “WWC-25” at pp. 4932-4958]**

**[Armstrong / Day 25 / 29.01.13 / p. 158-16 to p. 159-5 and p. 161-14 to p. 162-16]**

**[Armstrong / Day 46 / 06.03.13 / p. 65-22 to 69-17]**

26. The proposition that it was or has been a practice or requirement that there should be a watertight Aft Peak bulkhead at the after end of the vessel at about 10% or less of its waterline length or overall length and that the existence of this bulkhead should be ignored for the purpose of certain calculations in respect of certain aspect of the stability of the vessel, is difficult, if not impossible, for shipbuilders to follow unless clearly expressed and set forth in instructions or directives issued and circulated by

the Marine Department.

27. For the construction of any given vessel, CLS can only follow the directions, instructions and answers queries communicated to CLS by the Marine Department during its plan approval process, throughout the period of its construction and in respect of any other material alteration thereafter, as was in the case of the “LAMMA IV”.

### **Thickness of Plating**

28. The evidence is that CLS ordered the aluminium plating for the construction of the hull of the “LAMMA IV” from the American company, Production Supply Company of Florida, Inc., on or about 19 December 1994 under Purchase Order No. P-94605.

**[W&G / 1 / p. 17]**

29. The specification for the side plating in question was “*5mm x 72” x 288” alloy 5083-H116 plate*” and it was a specific requirement under the Purchase Order that inspection certificates issued by the American Bureau of Shipping (“ABS”) were to be supplied.

**[W&G / 1 / p. 18]**

30. Apparently, upon receipt of the ABS inspection certificates, CLS realized that the plating was supplied in imperial measurement with thickness of 0.19”, which was equivalent to 4.83mm.

**[Lo / Day 19 / 21.01.13 / p. 8-9 to 8-22]**

31. By a letter dated 4 April 1995, CLS informed the Marine Department of the change in the thickness of the plating.

**[Marine 2 / 6 / p. 206]**

**[Lo / Day 19 / 21.01.13 / p. 9-19 to p. 10-9]**

**[Armstrong / Day 25 / 29.01.13 / p. 44-20 to p. 47-7]**

32. On about 22 April 1995, the plating was shipped to the Wuzhou Shipyard, where the hull of the “LAMMA IV” was to be built.

**[W&G / 1 / p. 28 and pp. 23-27 at 25]**

33. The plating was inspected and certified by the China Classification Society (“CCS”) at the Wuzhou Shipyard on about 2 June 1995.

**[Marine 2 / 31 / pp. 265-267]**

**[Zhang Yu / Day 48 / 08.03.13 / p. 75-16 to p. 76-17]**

34. The CCS Certificate was an acceptable confirmation of the thickness of the plating by the Marine Department and was indeed accepted. The thickness of the plating was within the tolerance level allowed by CCS.

**[W&G / 1b / pp. 40-51 to 40-52]**

35. The Commission’s expert now accepts that the 4.5 mm thickness measurement upon which his opinion was based could have been the result of corrosion or the inaccuracy of the device used to measure it and that it was likely that the “LAMMA IV” was constructed with side plating of 4.83 mm.

**[Armstrong / Day 27 / 31.01.13 / p. 75-9 to 75-19 and p. 78-4 to 78-14]**

**[Armstrong / Day 27 / 31.01.13 / p. 16-13 to p. 17-4]**

### **Seats on the Upper Deck**

36. The evidence is that the seats on their metal frames were fastened onto the GRP sandwiched upper deck with self tapping screws and bedding compound. They were securely fastened to the upper deck for the



intended normal operation of the “LAMMA IV”. They had been in use for some 16 years and had been subjected to the annual inspection of the Marine Department.

**[Lo / Day 18 / 18.01.13 / p. 120-23 to p. 122-13 and p. 124-20 to p. 125-17]**

**[Armstrong / Day 25 / 29.01.13 / p. 102-17 to 102-22]**

**[Marine / pp. 384, 417, 481, 523, 537, 548, 567, 608, 627, 640 & 726 at (9)]**

37. The record produced by HKE does not support its assertion that “*some*” or “*many*” passenger seats had defects which required CLS “... *to do something about ...*” them during the warranty period of 1996 to 1997.

**[RSRB 2 / 47 / pp. 1369-1376]**

**[Tang Wan On (“Tang”) / Day 29 / 04.02.13 / p. 72-21 to p. 73-4]**

**[Tang / Day 30 / 05.02.13 / p. 7-4 to p. 8-17]**

38. The expert evidence is that these seats would not be dislodged by the fierce impact force of the collision that occurred on 1 October 2012.

**[Cheng Yuk Ki / Day 23 / 25.01.13 / p. 123-7 to 127-17 and p. 167-15 to p. 168-20]**

**[Armstrong / Day 27 / 31.01.13 / p. 56-23 to p. 57-17]**

39. The attachment by CLS of seats to the upper deck was indeed secure for their intended service.

### **Remaining Question**

40. The only remaining question would be the hypothetical one, namely, whether the presence of a watertight door on the Bulkhead at Frame 1/2 might have prevented the “LAMMA IV” from sinking.

41. The Commission's expert suggested that despite the ferocious impact of the collision and the grave injury caused to the hull of the "LAMMA IV", his calculation of a hypothetical flooding of the engine room and tank room of the "LAMMA IV" with a watertight door on the Bulkhead at Frame 1/2 would show the "LAMMA IV" "... *would have floated ...*".

**[Armstrong / Day 27 / 31.01.13 / p. 59-5 to 59-13]**

42. The Commission's expert now changed his position and said that the "LAMMA IV" by his calculation "... *would not have sunk immediately ...*".

**[Armstrong / Day 46 / 06.03.13 / p. 64-13 to p. 65-3]**

43. The calculation was based on various assumptions, which in turn were based on data extracted from Stability Booklets which the Commission's expert had criticized as containing "*some error in the calculations somewhere*" and "*something fundamentally wrong with the calculation*".

**[Armstrong / Day 24 / 28.01.13 / p. 34-6 to p. 35-17]**

**[Armstrong / Day 24 / 28.01.13 / p. 143-16 to p. 144-16]**

**[Armstrong / Day 26 / 30.01.13 / p. 71-15 to p. 72-8]**

44. More importantly, the calculation of this hypothetical flooding of the engine room and the tank room is required to assume that "*the ship has no list*".

**[Armstrong / Day 24 / 28.01.13 / p. 107-11 to 107-20]**

**[Armstrong / Day 24 / 28.01.13 / p. 109-4 to 109-17]**

45. The Commission's expert knew that "*You only need two or three degrees of heel for there to be a difference*".

**[Armstrong / Day 24 / 28.01.13 / p. 129-2 to 129-12]**

46. The evidence is that the "LAMMA IV" was leaning starboard at the stern

shortly after the collision.

**[Wong Tai Wah / Day 3 / 14.12.12 / p.142-16 to p.142-24 and p.144-1 to p.144-3]**

**[Tang Ying Kit / Day 28 / 01.02.13 / p. 163-13 to p. 165-18]**

47. The “LAMMA IV” leaning starboard could well be the result of the immense impact force of the collision and the subsequent impact of the powerful single wave created by the wake of the catamaran “Sea Smooth”. It might also be caused by the uneven weight distribution of the passengers on board.

**[Armstrong / Day 24 / 28.01.13 / p. 32-1 to p. 33-8]**

**[Armstrong / Day 46 / 06.03.13 / p. 65-4 to 65-9]**

48. None of the above facts has been factored into the calculation of the hypothetical flooding of the engine room and the tank room of the “LAMMA IV”.

49. Another fact that the calculation of the hypothetical flooding has assumed was that had there been a door on the Bulkhead at Frame 1/2, that door would have been securely fastened at the time of the accident.

50. We have heard that there has been evidence that the watertight manhole on the main deck of the “Sea Smooth” was not securely fastened resulting in water gushing into the main deck after the collision.

**[Lo / Day 19 / 21.01.13 / p. 67-9 to p. 68-4]**

51. By reason of the above, even with the presence of a watertight door on the Bulkhead at Frame 1/2, the calculation of the hypothetical flooding is not determinative nor should it be relied upon by the Commission for a conclusion that such a door would save the “LAMMA IV” from sinking as

it did.

## **Conclusion**

52. It is most unfair to now criticize the “LAMMA IV” for not having a watertight door on the Bulkhead at Frame 1/2 when it was not intended to have such a door while it was designed some 16 years ago.
53. Every detail of the Design prepared by NC was considered and approved under the regulations and requirements current at the time.
54. The construction thereafter of the “LAMMA IV” was inspected and surveyed at various stages and finally signed off with the issue of its first Certificate of Survey.  
**[Marine 2 / 67 / pp. 384-385]**
55. During its operating life in the following 16 years, the “LAMMA IV” was inspected and surveyed annually and issued with its annual Certificate of Survey.
56. Although there were mistakes on the part of a number of CLS’s staff, it is submitted that, throughout the life of the “LAMMA IV”, CLS has in good faith fulfilled the obligations as its shipbuilder.

Dated the 11<sup>th</sup> day of March, 2013.

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