

Commission of Inquiry
into the Collision of Vessels near Lamma Island on 1 October 2012

CLOSING SUBMISSIONS
OF COUNSEL FOR THE COMMISSION

A. 1 October 2012

1. The 2012 National Day Fireworks Display was scheduled at 21:00 in the Central Harbour in the area off Wan Chai.¹
2. The Hongkong Electric Company Limited (“HKE”) organised an excursion for its employees and their families and friends that day. The excursion was supposed to end after the Fireworks Display. Those joining the trip boarded Lamma IV in Tsim Sha Tsui, Central and Ap Lei Chau in the afternoon and were taken to a guided tour at HKE’s power station on Lamma Island.
3. They had dinner at HKE’s premises and set off for the fireworks after dinner. The boarding of Lamma IV and Lamma II for the Fireworks Display began at about 19:30. Lamma IV would disembark in Central and Lamma II in Ap Lei Chau after the show.

¹ See Marine Department Notice No.131 of 2012 [Miscellaneous, 53+].

There were a total of 124 passengers² on board Lamma IV with Chow Chi Wai (master)³, Leung Pui Sang (engineer)⁴ and Leung Tai Yau (sailor)⁵. Lamma II had on board 66 passengers⁶ with Cheng Muk Hee (master)⁷, Wong Wah Yau (engineer)⁸ and Lee Ah Ngau (sailor)⁹. Lamma IV set sail from No.2 berth¹⁰ of the power station at about 20:15. Lamma II left No.1 berth shortly afterwards.

4. Hong Kong & Kowloon Ferry Holdings Limited (“HKKF”) runs a route between Central and Yung Shue Wan. On 1 October 2012, there were 44 sailings scheduled from Central to Yung Shue Wan. Sea Smooth, one of the six ferries sailing the route that day, was to depart from Central Pier No.4 at 20:00.¹¹ Its crew comprised Lai Sai Ming (master)¹², Lo Pui Kay (engineer)¹³, Wong Tai Yau (sailor)¹⁴

² See lists of 39 deceased [Police Q, 4967+] and 85 survivors [Police Q, 4969] on board Lamma IV. A total of 17 passengers on board Lamma IV had testified in this Inquiry (Days 3 to 6).

³ Interview on 2.10.2012 [Police M, 3324-1+]; interview on 16.10.2012 [Police M, 3324-15+]; interview on 7.11.2012 [Marine 1, 89-1+]; statement dated 6.2.2013 [RSRB 3, 1562+]; and testimony on Days 34 to 36.

⁴ Interview on 2.10.2012 [Police M, 3333-1+]; interview on 25.10.2012 [Police M, 3333-39+]; interview on 1.11.2012 [Marine 1, 39-1+]; statement dated 6.2.2013 [RSRB 3, 1591+]; and testimony on Days 37 and 38.

⁵ Interviews on 2.10.2012 and 25.10.2012 [Police M, 3343-44+ & 3343-54+]; interview on 1.11.2012 [Marine 1, 63-1+]; statement dated 6.2.2013 [RSRB 3, 1606+]; and testimony on Days 37 and 38.

⁶ 5 passengers of Lamma II testified in this Inquiry (Days 8 and 9).

⁷ Interview on 19.10.2012 [Police C, 1114-1+]; interview on 25.10.2012 [Marine 1, 19-1+]; and testimony on Day 9.

⁸ Interview on 22.10.2012 [Police C, 1120-1+] and testimony on Day 10.

⁹ Interview on 22.10.2012 [Police C, 1128-1+] and testimony on Day 10.

¹⁰ See diagram [Police O, 4654-2].

¹¹ Ferry Schedule of 1.10.2012 [HFW 1, 360].

¹² Interview on 2.10.2012 [Police M, 3352-1+]; interview on 16.10.2012 [Police M, 3352-79+]; interview on 30.10.2012 [Police M, 3352-67+]; statement dated 4.10.2012 and signed on 18.1.2013 [HFW 1, 124+]; and testimony on Days 38, 39, 41 and 42.

and Wong Yung Shing (sailor)¹⁵. Actual departure time that night was about 20:00 from Central Pier No.4,¹⁶ and Sea Smooth would normally arrive at Yung Shue Wan in about 20 to 25 minutes.¹⁷

B. Causes of collision

5. The circumstances in which Lamma IV and Sea Smooth collided were unremarkable. Wind direction off Lamma Island was easterly at 9 km/hr at 20:00, and northeasterly at 14 km/hr at 21:00. High water was at 22:10. Tidal stream was in northwesterly direction in the East Lamma Channel and northerly to West of Lamma Island.¹⁸
6. Captain Nigel R Pryke was of the view that neither the weather nor the tide had any material effect on the navigation of the two vessels before the collision.¹⁹ Such view had not been challenged.

¹³ Interview on 2.10.2012 [Police M, 3368-1+, 3368-3+ & 3368-60+]; interview on 25.10.2012 [Police M, 3368-162+]; statement dated 4.10.2012 and signed on 18.1.2013 [HFW 1, 133+]; and testimony on Day 40.

¹⁴ Interview on 2.10.2012 [Police M, 3354-1+ & 3354-5+]; interview on 25.10.2012 [Police M, 3354-16+]; statement dated 4.10.2012 and signed on 18.1.2013 [HFW 1, 138+]; and testimony on Days 39 and 40.

¹⁵ Interview on 2.10.2012 [Police M, 3366-1+]; interview on 24.10.2012 [Police M, 3366-13+]; statement dated 4.10.2012 and signed on 18.1.2013 [HFW 1, 142+]; and testimony on Days 40 and 41.

¹⁶ See also the captured images of the route of Sea Smooth for the relevant sailing printed out from the AIS on board [HFW 1, 311 & 360].

¹⁷ Lai Sai Ming [Day 38, p.105, 16+].

¹⁸ Weather Report provided by the Hong Kong Observatory [Expert 1, 177+]; Hong Kong Observatory Calendar with Tide Tables for October 2012 [Expert 1, 183+]; Tidal Stream Atlas, Hong Kong (NP217, Edition 1-1975) produced by Hydrographic Department, Ministry of Defence, Taunton, Somerset, England [Expert 1, 189+].

¹⁹ Captain Pryke's First Report dated 4.12.2012 §12 [Expert 1, 6].

B1. Radar data

7. There is no dispute on the accuracy and reliability of the radar data track reports produced by the Hong Kong Marine Police (“Marpol”) and the Marine Department (“Mardep”),²⁰ with reference to which Captain Pryke had prepared his chart plots depicting the courses of Lamma IV and Sea Smooth. Captain Pryke had prepared a number of chart plots, and the final version was dated 11 December 2012.²¹

8. Captain Pryke prepared his first chart plot²² using the information in the track reports generated by the Digital Radar Surveillance System (“DRSS”) of Marpol.²³ Mardep thereafter²⁴ produced another set of different data from its Vessel Traffic Service System (“VTSS”).²⁵ Queries then arose as to why the data kept by Marpol and Mardep could be different (albeit only slightly) even when DRSS and VTSS had received and processed data from the same radars located at the 13 radar stations in Hong Kong.

²⁰ Officers of Marpol (Yau Wing Hang: statement [Police E, 1255-97+] and testimony [Day 1, p.6+]) and Mardep (Yim Kit Ming: statement [Marine 8, 1873+] and testimony [Day 1, p.27+]; Ma Chi Tak: statement [Marine 8, 1878+] and testimony [Day 1, p.90+ and Day 2, p.2+]) had given evidence on DRSS and VTSS.

²¹ [Expert 1, 361], which is exhibited to Captain Pryke’s Supplemental Report dated 8.12.2012 [Expert 1, 300+].

²² Chart plot at [Expert 1, 284].

²³ See Track Report for Lamma IV from 20:17:38 to 20:26:40 [Police E, 1222+] and Track Report for Sea Smooth from 20:04:02 to 20:28:59 [Police E, 1231+].

²⁴ Letter of the Department of Justice (“DOJ”) dated 6.12.2012 with enclosures [Marine 8, 2025+].

²⁵ Yim Kit Ming, Mardep’s VTSS specialist, had explained the operation of VTSS: see statement dated 28.11.2012 [Marine 8, 1873+] and testimony [Day 1, p.27].

9. An officer of HITT (HK) Ltd,²⁶ which had supplied radar systems to Marpol and Mardep since about 2002, was then called to explain the difference between the radar data kept by Marpol and Mardep, and generally the processing of radar signals by both DRSS and VTSS. According to HITT (HK) Ltd, the differences arose because Marpol and Mardep had used different programs to process identical radar signals from the radar stations in view of their different operational needs and objectives. As a consequence, the information generated by their respective programmed analyses of identical radar signals would be different. Such differences were expected and within the accuracy specifications of their different systems. In the opinion of HITT (HK) Ltd, the differences should not give rise to any concern about the reliability of track reports from Marpol and Mardep.

10. The differences are clearly not material insofar as the depiction of courses is concerned. As indicated in the final version of chart plot prepared by Captain Pryke, the slightly different data from Mardep do not materially or fundamentally alter the depiction of the courses of Lamma IV and Sea Smooth previously done without those data.²⁷

B2. Evidence of the crew of Lamma IV

11. At about 20:15, Chow Chi Wai received through Leung Tai Yau the instructions from Lai Ho Yin, the Event Organiser on board Lamma

²⁶ Harm Jelle Boorsma: see statement dated 11.12.2012 [Miscellaneous, 73+] and testimony [Day 2, p.52+].

²⁷ For the same reason, we submit that the merit of Captain Pryke's opinion on the causes of collision set out in his First Report is not compromised by the fact that he had only relied on the data from Marpol when preparing his First Report.

IV, that the vessel could set sail.²⁸ Chow Chi Wai asked the crew to slip the forward and aft moorings, and made sure that the navigation lights were on and working. In insisting that the navigation lights were on and working, he relied on his observation of the Navigation Light D/ST Board that²⁹ (1) the switches for the lights were in their “on”/“up” positions; (2) the yellowish-white indicator lights for the navigation lights were on; and (3) the alarm (which would sound if any navigation light failed) never sounded. In corroboration, Leung Pui Sang said earlier that evening he had seen Chow Chi Wai board Lamma IV to turn on the navigation lights and cabin lights and also observed from the pier that the starboard green light had been turned on;³⁰ Leung Tai Yau also said he had seen all navigation lights of Lamma IV turned on during his after-dinner walk around the pier.³¹

12. Having checked that the navigation lights were on, Chow Chi Wai switched off the upper deck passenger cabin lights and the deck lights on the outside of the main deck so that those lights would not interfere with his forward visibility. The main deck passenger cabin lights were left on but they did not affect his forward visibility since its outside windows were tinted with shading paper. All windows of the wheelhouse were closed; but the sliding door between it and the upper deck was open, and Lai Ho Yin was standing by the door.

²⁸ Lai Ho Yin: statement dated 12.10.2012 [Police A(II), 646-1+] and testimony [Day 6, p.28+].

²⁹ See photo at [Marine 12, 4900].

³⁰ Leung Pui Sang: statement dated 6.2.2013 §16 [RSRB 3, 1595] and testimony [Day 37, p.27].

³¹ Leung Tai Yau: statement dated 6.2.2013 §12 [RSRB 3, 1609-1610] and testimony [Day 37, p.18; Day 38, pp.7 & 107].

13. Through the sliding door of the wheelhouse, Chow Chi Wai saw that a lot of passengers had gone outside to the sundeck or downstairs as soon as he had turned off the lights. He did not stop the passengers from doing so because he considered it not very practical to require all the passengers to remain in their seats for a pleasure cruise like theirs.³² In any case, his view was that overloading the sundeck with more than 14 passengers (the permitted maximum)³³ did not and would not affect his navigation. He relied on Leung Tai Yau and Lai Ho Yin (and his team) to take care of the passenger, and trusted that Leung Tai Yau would alert him if there were any concern about passengers concentrating in any one space exceeding the limit.
14. Chow Chi Wai set the radar at one nautical mile range on a head-up relative motion display. His practice was to set the radar at that range.³⁴ He considered that range to be sufficient for Lamma IV operating at 12 knots, and at larger range scales the picture would become cluttered and shrunk and confused with excessive targets in and around the anchorages and in the Lamma Channel. He checked the functions of the radar and that the speed, position and depth of water were properly displayed on the screen.
15. After slipping the forward mooring ropes, Leung Tai Yau went back to the wheelhouse to write down the passenger number and weather

³² Leung Pui Sang said there were about 20 people on the sundeck: see statement dated 6.2.2013 §19 [RSRB 3, 1595].

³³ See photos showing signs on the wall of upper deck passenger cabin at [Police Album, 166-167]; Certificates of Survey dated 15.12.1997, 5.11.1998, 29.11.1999, 29.8.2000, 5.9.2001, 21.8.2002, 27.6.2003, 25.6.2004 [Marine 3, 417, 481, 523, 537, 548, 567, 608, 627]; 26.7.2005 and 29.6.2006 [Marine 4, 640 & 726]. The permitted maximum of passengers on sundeck was not indicated in the Certificates of Survey since 2007.

³⁴ Chow Chi Wai [Day 34, p.101].

- conditions in the logbook, and then left to check on the passengers. Leung Pui Sang, after slipping the aft moorings, remained aft to check that there was nothing in the water fouling the propellers as Lamma IV was manoeuvred off the pier; he then went to the engine room to confirm that the engines were turning at 1,200 RPM.
16. Chow Chi Wai had to turn Lamma IV to the north to face the exit of the typhoon shelter since it had been facing south with its starboard alongside No.2 berth. He used the joystick instead of the wheel to steer Lamma IV. He found the wheel large and cumbersome and it took several turns to put the helm hard over, whereas the travel of the joystick was short and there would be helm response within a second of moving the joystick.
 17. As Lamma IV headed towards the typhoon shelter entrance, Chow Chi Wai set its engines to about 1,000 RPM and checked the radar: he saw the echoes of Lamma II at the berth and of No.98 Beacon off Shek Kok Tsui, but no other moving targets within one nautical mile range. Passing the breakwater, he put the engines to 1,200 RPM and saw the acceleration on the speed indicator of the radar. The vessel was settled on a course of about 350° to 353° and would pass at 1 to 1½ cables off No.98 Beacon, which course he considered safe since there would only be a weak northerly tidal flow 2 hours before high water. According to Chow, there were no other vessels ahead or around the immediate vicinity and he could see the usual glow of the anchored vessels in the North West Lamma Anchorage ahead.
 18. After sailing for about 3 minutes, Chow Chi Wai noticed from the speed indicator on the radar that the vessel was sailing at 12 knots

and therefore Lamma IV should then be at about 6 cables from the typhoon shelter astern. At that time, Leung Pui Sang came into the wheelhouse after checking the engines in the engine room. He stood on the portside of the wheelhouse³⁵ to help lookout; and saw the indicator lights on the Navigation Light D/ST Board were on and so was the radar.

19. Chow Chi Wai said that at this juncture he saw visually for the first time the yellow flashing light of Sea Smooth then adjacent to No.98 Beacon at about 3 cables (by estimation) from Lamma IV. Leung Pui Sang saw the same within only a matter of seconds after he had stationed himself on the portside of the wheelhouse; and he saw Sea Smooth sailing towards them from the portside at an estimated speed of above 20 knots.³⁶ Chow Chi Wai said that he did not see Sea Smooth earlier with his naked eyes because the lights from the northwest anchorage had blinded his sight;³⁷ and since he could see its masthead light and both sidelights, Sea Smooth must have been sailing straight ahead towards Lamma IV at the time. Estimating that Sea Smooth was approaching at a speed of 20 to 25 knots, he immediately took avoidance actions by sounding one short blast on the whistle³⁸ and putting the joystick hard over to starboard. There was only a one-second delay when he saw the rudder indicator

³⁵ Chow Chi Wai said that Leung Pui Sang stood on the starboard side of the wheelhouse, although this might have been a reference to where the latter first stood upon entering into the wheelhouse: see statement dated 6.2.2013 §50 [RSRB 3, 1578]. Leung Pui Sang said he did at first stand on starboard side of the wheelhouse to check the radar before walking around Chow Chi Wai to the portside: [Day 37, pp.67-68].

³⁶ Leung Pui Sang: [Day 37, pp.29 & 69].

³⁷ Chow Chi Wai [Day 34, p.106].

³⁸ Leung Pui Sang [Day 38, pp.78-79] and Leung Tai Yau [Day 38, p.11] did not hear any sounding of horn by Lamma IV at any time before the collision.

showed that the helm being applied and another second passed before Lamma IV began to turn starboard.

20. In the witness stand, Chow Chi Wai for the first time said that in fact he had seen Sea Smooth on the radar when it was one nautical mile from Lamma IV, but continued to sail by sight without continuously monitoring the radar and only checked it “every now and then”. He was not able to tell how much time had lapsed between his spotting Sea Smooth on the radar and the collision. He was unable to tell at what point in time he saw Sea Smooth on the radar screen.

21. At about the same time, Leung Pui Sang shouted to Chow Chi Wai that a ship was coming at them and that shout came seconds before the collision. Leung Tai Yau similarly yelled (after Chow Chi Wai had taken avoidance actions)³⁹ that a vessel was coming at speed from portside. Chow Chi Wai said that upon hearing this shout he realised the sailor was also in the wheelhouse. However, Leung Tai Yau said it was the master who first alerted him to the coming vessel directly ahead and that had prompted him to look out of the window in the direction as indicated by the master whereby he then saw Sea Smooth at about 300m away with its yellow flashing light, masthead light and sidelights all on; he then acknowledged to the master that a vessel was coming at them. Such conflict may not be material and in any case, there is no evidence before the Commission to suggest

³⁹ Chow Chi Wai [Day 36, p.19].

that Chow Chi Wai was not aware of the approach of Sea Smooth until being alerted by any other person in the wheelhouse.⁴⁰

22. According to Chow Chi Wai, upon the taking of avoidance actions, Lamma IV turned quickly to starboard and in a few seconds he saw No.98 Beacon through the portside outboard window of the wheelhouse in front as well as the starboard green sidelight of Sea Smooth, which indicated to him that she was turning port. He said he had given a quick flick of the searchlight switch⁴¹ so as to signal to Sea Smooth that Lamma IV was then turning starboard, but he did not have time to check the direction that the searchlight was pointing at. Sea Smooth was then only 200m away from Lamma IV and he increased the engine speed to 1,300RPM to 1,400RPM to increase the rate of turn to starboard.
23. However, it soon occurred to Chow Chi Wai that a collision with Sea Smooth was unavoidable, he then stopped Lamma IV's engine to reduce the force of impact. He had no recollection of the exact lapse of time between his first sighting of Sea Smooth (by its yellow flashing light) and the collision, and estimated it was about a minute.

B3. Comments on the evidence of the crew of Lamma IV

24. First, Chow Chi Wai estimated that it was about one minute between his sighting of Sea Smooth and the collision. That estimate was probably incorrect (assuming he did first have sight of Sea Smooth

⁴⁰ Chow Chi Wai [Day 35, p.93]. It is of note when he was interviewed with Mardep on 7.11.2012, Chow Chi Wai said that he could not remember whether Leung Pui Sang or Leung Tai Yau had informed him of a vessel in front of Lamma IV [Marine 1, 89-6+].

⁴¹ See photo 3 at [Marine 1, 141].

at a distance of 3 cables⁴² – see comment below) because according to the chart plot of Captain Pryke,⁴³ the distance between the two vessels one minute before the collision was more than the distance of 3 cables (which Chow Chi Wai alleged to be the distance between the vessels when he first saw Sea Smooth) and he had fairly accepted that.⁴⁴ At an approaching speed of about 36 knots, the time needed for the two vessels to collide would be about 30 seconds and he had also accepted that.⁴⁵ In the premises, if the Commission is to find that Chow Chi Wai did in fact first see Sea Smooth at a distance of 3 cables, it should follow that he had only about 30 seconds to take avoidance actions.

25. Another possible finding in this regard would be that Chow Chi Wai first did see Sea Smooth about one minute before the collision, i.e. when the vessels were 6 cables apart (being the distance which they could traverse in one minute at an approaching speed of 36 knots). However, that was inherently unlikely, because it does not fit into the timeframe of actions thereafter taken. Put simply, had Chow really seen Sea Smooth one minute before the collision, and even factoring in a short period of time for him to ponder his next steps, it was unlikely that the avoidance actions taken would have failed to avert the collision. In the circumstances of the case, and bearing in mind the understandable difficulty for any person to give a time estimate with precision, it is submitted a more plausible view of the

⁴² At the interview with Marpol on 2.10.2012, Chow Chi Wai reckoned it was less than one minute between the sounding of short blast and collision [Police M, 3324-12+].

⁴³ See also Dr Armstrong's Report on the distance between Lamma V and Sea Smooth calculated using Mardep radar data [Expert 3, 1804+.]

⁴⁴ Chow Chi Wai [Day 35, pp.102-103].

⁴⁵ Chow Chi Wai [Day 35, pp.103-104].

matter would be that Chow Chi Wai had been inaccurate with his time estimate. In this respect, the Commission is reminded of Chow Chi Wai's answer when questioned by Marpol that it was less than one minute between his sounding of short blast and the collision.

26. Secondly, related to the first point above, it is also questionable if Chow Chi Wai did see Sea Smooth when it was 3 cables away and took immediate avoidance actions because the radar track records simply do not show any sharp or noticeable change of course of Lamma IV to starboard (whether at the time alleged or within the two minutes before collision). Chow Chi Wai's assertion that he had put the joystick hard over to starboard and later increased the engine speed to about 1,300RPM to 1,400RPM to increase the rate of turn is not made out, if not contradicted, by the undisputed radar data. Given the angle at which the collision occurred, it is highly probable that Lamma IV had turned starboard at some point before the collision (so that her port stern was hit), but there is in our submission also some merit in the suggestion that avoidance actions (whether in the manner as alleged or otherwise) were indeed taken at a time much closer to the collision, i.e. too late. The Commission is reminded of Captain Pryke's evidence⁴⁶ that if Chow Chi Wai had seen Sea Smooth distant 3 cables at 20:19:50, assessed the situation and turned starboard, the turn probably took place at about 20:20:10 by which time the vessels would only be 1 cable apart. In a sense, whether or not Chow did see Sea Smooth at 3 cables (and then took time to consider his position) or only saw Sea Smooth much later

⁴⁶ Captain Pryke [Day 45, pp.51-54].

(say, shortly before 20:20:10) matters little – avoidance action was taken too late.

27. Thirdly, there may be an issue about Chow Chi Wai's claim that he had seen Sea Smooth on the radar when it was one nautical mile from Lamma IV, but continued to navigate by sight without continuously monitoring the radar and only checked it "every now and then". He was not able to tell how much time had lapsed between his spotting Sea Smooth on the radar and the collision,⁴⁷ but confirmed that he did not take any avoidance action until visually seeing Sea Smooth at a distance of about 3 cables away.⁴⁸ When questioned why he had not disclosed the same previously (to Marpol, Mardep or his own lawyers), he said he had forgotten about that. He denied the claim was a recent invention, but proffered no further explanations despite being given chances or urged to do so in the questioning which ensued.
28. At the end of the day, whether he did see Sea Smooth on the radar may not matter much because in either case it was (as will be our submission) a case of inadequate lookout. However, the following comments are made on the issue of credibility for the assistance of the Commission:-

⁴⁷ Pursuant to the Commission's request on Day 35, Dr Armstrong had calculated the distance between Lamma IV and Sea Smooth using the radar data from Mardep: report dated 6.3.2013 [Expert 3, 1804+]. His results show that the earliest time when Sea Smooth could have appeared on the radar of Lamma IV and been observed by Chow Chi Wai was between 20:18:38 and 20:18:41, slightly more than 90 seconds before the collision.

⁴⁸ Chow Chi Wai [Day 35, p.79+].

- 28.1. It may be said that it cannot be a case of forgetfulness because he positively said at the interview with Mardep that he had not checked the position of Sea Smooth on the radar; and had never checked the radar between leaving the typhoon shelter and the collision.⁴⁹ It is not a case where he was silent on the issue of radar monitoring in his previous interviews or even the detailed statement prepared with lawyers' assistance.
- 28.2. In his interview with Mardep and also his statement prepared with the assistance of his lawyers, he had mentioned a number of times the use of radar and his looking at its screen when steering Lamma IV: he checked the radar when Lamma IV was heading towards the typhoon shelter entrance (and he saw Lamma II and No.98 Beacon on the radar); checked the radar for vessel speed upon passing the breakwater; and checked the speed indicator on the radar again about 3 minutes after leaving the power station. It is hard to accept that he could have forgotten to mention spotting Sea Smooth on the radar screen prior to the collision had that been the case.
- 28.3. On the other hand, it may be said that the statement that he had looked at the radar was, on analysis, not an exculpatory statement (since even if it had been true it was still a case of insufficient lookout) and there was no need for him to make this up. That may be so. However, it is also possible that it is a case whereby Chow had unnecessarily embellished his evidence in the witness box in the spur of the moment, in the

⁴⁹ Chow Chi Wai's interview with Mardep on 7.11.2012 [Marine 1, 89-5+].

misguided belief that to say that he had looked at the radar could put him in a more favourable light.

29. Fourthly, it was put to Chow Chi Wai that when he visually saw the yellow flashing light on the approaching vessel, he should assume or infer that it was a high-speed vessel heading for Yung Shue Wan as part of its usual course from that moment onwards.⁵⁰ The criticism levelled against him seemed to be that he should not have steered Lamma IV starboard since he knew or should have known that Sea Smooth would be gradually turning port on its normal course to Yung Shue Wan. In response, Chow Chi Wai said that he did not make any assumption at the time because it was dangerous to do so when there are many high-speed crafts in Hong Kong waters.
30. It is submitted that there is no valid basis to criticise Chow Chi Wai for not assuming the approaching vessel would navigate a particular course because the evidence (which is not seriously challenged) is that he Chow Chi Wai saw not only the yellow flashing light, but also red and green lights, of the approaching vessel. In such circumstances (and assuming his evidence is accepted), he can hardly be criticised for judging the vessels to be in a head-on or nearly head-on situation and on that judgment steering starboard pursuant to the International Regulations for Preventing Collisions at Sea 1972 (“Colregs”).⁵¹ In this regard, it is of note that Rule 7(c) of the Collision Regulations does provide that assumptions shall not

⁵⁰ Chow Chi Wai [Day 35, pp.29-31].

⁵¹ The Collision Regulations are applicable in Hong Kong by virtue of the Merchant Shipping (Safety) (Signals of Distress and Prevention of Collisions) Regulations (Cap.369N) as modified by s.27 of the Merchant Shipping (Local Vessels) Ordinance (Cap.548).

be made on the basis of scanty information, and Chow Chi Wai was no doubt correct in not assuming that the approaching vessel would sail towards Yung Shue Wan just because he had seen a yellow flashing light. Captain Pryke had expressed the same opinion.⁵²

B4. Evidence of the crew of Sea Smooth

31. Sea Smooth left Central Pier No.4 on schedule at about 20:00. On departure, all navigation aids were working. The radar was working well and showing targets clearly; it was set to the 0.75 miles range, which Lai Sai Ming considered to be appropriate and not too short even for Sea Smooth travelling at its usual speed.⁵³ The VHF radio was set to Channel 14. The navigation lights were switched on. The weather was fine. Visibility was good; at about 6 miles or more.

32. About 3 to 4 minutes after departing from Central Pier No.4, when Sea Smooth was still in the waters of the Central Harbour, Lo Pui Kay entered the wheelhouse followed shortly by Wong Tai Yau and Wong Yung Shing. The sailors sat on the bench at the port aft of the wheelhouse and helped keep lookout. Lo Pui Kay sat on the chair next to the bench in front of a small white low table and entered details in the vessel's logbook such as the departure time, number of passengers on board, weather conditions and visibility; as part of his routine, during the voyage he monitored the gauges for the engines including the main engines speed, oil temperatures and water temperatures; and he did not pay much attention to the navigation of Sea Smooth. The wheelhouse was dark at the time (as usual for

⁵² Captain Pryke [Day 32, pp.85-88].

⁵³ Lai Sai Ming [Day 41, p.119].

- sailing at night) and after leaving Central Pier No.4, Lai Sai Ming switched off the CCTV screen, so that the only lights in the wheelhouse were from the radar, the compass and the engine gauges. He also turned down the dimmer switches for such equipment so that there was hardly any light in the wheelhouse.
33. The speed of Sea Smooth was kept at less than 15 knots even after it had cleared the Central Pier. On passing the Easterly Cardinal Buoy Lai Sai Ming increased to the service speed of about 21 to 23 knots. He navigated through the usual route from Central to Lamma Island, i.e. through the Sulphur Channel and south of Green Island. In that area there were many small boats and yachts on that night heading towards the Central Harbour for the Fireworks Display. Most of the small crafts were going through the Sulphur Channel, and he had altered course and reduced speed 2 to 3 times for some of them.
 34. Navigating through the Sulphur Channel, Lai Sai Ming saw Lamma Island ahead and knew visibility was good. He crossed the Western Fairway at right angles to the traffic lanes, to a point north of the Lamma Anchorage; and then altered course to port to pass through the anchorage. By this time, Sea Smooth was clear of those small recreational crafts heading to the Central Harbour.
 35. Lai Sai Ming had adjusted the course of Sea Smooth in such a way as to avoid the 4 to 5 ships at the North Lamma Anchorage but kept her course generally at about 180°. He again did not check the compass or the radar very often because the weather and visibility

- were good. Having entered the North Lamma Anchorage area,⁵⁴ he saw No.98 Beacon off Shek Kok Tsui showing a bright white flashing light. He planned to follow his usual route, i.e. pass about 10 ship's lengths, i.e. about 300m, off No.98 Beacon and alter course to port gradually towards the direction of Yung Shue Wan.
36. Having cleared the North Lamma Anchorage, there were no other ships or small boats ahead of Sea Smooth and Lai Sai Ming saw the bright fog light at the entrance to the typhoon shelter for the power station on Lamma, and also other usual shore lights and lights from the power station. He did not see other lights or vessels and did not check the radar at this point even though, according to his evidence, the intensity of the fog light in the evening did hamper his ability to notice approaching vessels from a distance; he actually had to pay particular attention to approaching vessels that evening; and looking at the radar would not affect his ability to observe navigation lights on other vessels. He admitted that it was a momentary slip of attention (or "inadvertence" could be a better translation) and that due to complacency he thought it would be fine not to look at the radar even with his visual lookout affected by the fog light.⁵⁵
37. When Sea Smooth was almost abeam of No.98 Beacon,⁵⁶ Lo Pui Kay, Wong Tai Yau and Wong Yung Shing as part of their routine left the wheelhouse to prepare for the arrival at Yung Shue Wan, so there was only Lai Sai Ming in the wheelhouse since. As soon as

⁵⁴ Lai Sai Ming had marked the location of Sea Smooth at this juncture on the Nautical Chart HK 1501 (Lamma Channels) at the Inquiry on Day 42 [Miscellaneous, 1].

⁵⁵ Lai Sai Ming [Day 42, pp.13-18].

⁵⁶ No.98 Beacon was at the direction of about 10 o'clock from Sea Smooth at this point: Lai Sai Ming [Day 42, p.28].

they were abeam of No.98 Beacon, he slowly altered course to port heading towards the beacon off O Tsai Pai and in doing so he did not see any approaching vessel.⁵⁷ He said it was his usual approach to pass about 400m to 500m west of O Tsai Pai and to adjust course from No.98 Beacon as necessary and start slowing the engines once the vessel is abeam of O Tsai Pai.

38. After he had turned Sea Smooth port and was sailing straight ahead, Lai Sai Ming suddenly saw a black shadow very close and almost right ahead at about only 2 to 3 ship's lengths. Although saying that the black appeared in the bright fog light shining from the direction of the power station, he fairly accepted that Lamma IV was already quite away from the zone where the fog light would have an impact on his lookout.⁵⁸ He saw that the black shadow was a small boat and he could not recall seeing any navigation lights on that vessel. He immediately used the joystick to put the engines to full stern and the rudders hard to starboard, and the vessel rapidly decelerated and altered its course to starboard. The collision occurred seconds later⁵⁹ and the port bow of Sea Smooth collided with the port stern of the other vessel. The angle of blow was about 45°. He knew that the other vessel was Lamma IV at the time of collision as he had been assigned by HKKF to steer Lamma IV before and could therefore recognise it.⁶⁰

⁵⁷ Lai Sai Ming [Day 42, pp.28-29].

⁵⁸ Lai Sai Ming [Day 42, p.34].

⁵⁹ According to Wong Tai Yau, the collision occurred in just about 30 to 40 seconds after he left the wheelhouse [Day 39, p.43].

⁶⁰ Lai Sai Ming [Day 42, pp.50-52].

39. Lai Sai Ming said he did not hear any whistles or any warnings on the VHF before the collision. He stressed that had the other vessel sounded any horn or whistle, he would definitely have heard it even though the both bridge wing doors were closed.⁶¹ He did not have time to sound any whistle signals after seeing Lamma IV and did not notice if Lamma IV was turning or altering her speed at the time of collision. He did not see any searchlight shone from Lamma IV.⁶² All other crew said they did not hear any whistle or horn.⁶³

B5. Sidelights of Lamma IV

40. First, there is an issue concerning Lai Sai Ming's evidence that Lamma IV appeared in the form of a black shadow right ahead very close at only 2 to 3 ship's lengths and that he does not recall seeing any navigation lights.
41. The significance of this issue has to be placed in perspective.
42. If Lai's evidence about not recalling seeing navigation lights is accepted, then it could mean that Sea Smooth had no side lights (or, at any rate, port side navigation light because of the bearing of the vessels shortly before collision) or masthead light on shortly before the collision. That may not exonerate any poor lookout on the part of the Sea Smooth (which, it shall be submitted, was the case), but it

⁶¹ Lai Sai Ming [Day 42, p.40].

⁶² Lai Sai Ming [Day 42, pp.40-42].

⁶³ This is supported by the evidence of some of the testifying Sea Smooth passengers: Niu Gang [Police B, 764-4; Day 7, p.16]; Chung Kin Hing [Police B, 826-4; Day 7, p.33]; Stephen Paul Marsden [Police B, 693]; Wan Ho Yin [Day 7, p.125]; Wong Wing See [Police B, 846-4; Day 7, p.144]; and Chau Yi Ki [Day 8, p.13].

may be thought to lessen any culpability on the part of the Sea Smooth in that the absence of any lights would have rendered it more difficult for the Lamma IV to be sighted visually.

43. Although some Sea Smooth passengers had given evidence that they did not see any coloured navigation light on the other vessel,⁶⁴ some of them did confirm seeing its cabin lights or other decorative lights,⁶⁵ which corroborates the evidence from the crew of Lamma IV that the lights on the sundeck and in the passenger cabin on the main deck had been switched on at all material times (which evidence was in any event not challenged).

44. The Commission had received the following evidence that the red and green sidelights of Lamma IV had been turned on, and should have been remained lit, up to the time of collision (and even the first moments of sinking) on 1 October 2012:-

44.1. The direct evidence of all the crew of Lamma IV (i.e. Chow Chi Wai, Leung Pui Sang and Leung Tai Yau) (see Section B2 above).

44.2. Tam Kam Lun, the fireman who arrived at the scene at 20:41 on Fireboat 4, said he had seen the starboard green sidelight of Lamma IV still on when Fireboat 4 sailed near it.⁶⁶

⁶⁴ Kong Yuen Kan [Day 6, p.113]; Chung Kin Hing [Day 7, p.31]; Stephen Paul Marsden [Day 7, p.60]; Leander Piers John Rebanks [Day 7, 116]; Wan Ho Yin [Day 7, p.129].

⁶⁵ See Niu Gang [Day 7, pp.8-10]; Stephen Paul Marsden [Day 7, p.60]; and Leander Piers John Rebanks [Police B, 711+].

⁶⁶ Tam Kam Lun (Fn 12994): statement dated 13.10.2012 [FSD 2, 367-1+] and testimony [Day 10, pp.101-114]. His evidence that the green light of Lamma IV was on when he arrived at the scene was not challenged.

- 44.3. Ma Ngai Kong, the fireman who arrived at the scene at 20:47 on Fireboat 8 (who did not testify but whose statement had been referred to by Yau Wai Keung who *did* testify), said he had seen both starboard green and port red sidelights still on at the time of his arrival.⁶⁷
- 44.4. Dr Cheng Yuk Ki (Forensic Scientist at the Forensic Science Division of the Hong Kong Government Laboratory), tested the presence of tungsten oxide at the filament coil of starboard and port sidelights, and had given the opinion that the sidelights were highly likely to have been lit before their housing was flooded and glass bulbs cracked by seawater.⁶⁸ Furthermore, he concluded (by the presence of magnesium compounds) that there was likely to have been an electric current through the port and masthead light bulb.
45. Professor S L Ho (Chair Professor of Electricity Utilisation at the Department of Electrical Engineering in the Hong Kong Polytechnic University) had explained the operations of both the navigation light distribution board and the main switchboard in the wheelhouse of Lamma IV; and expressed his opinion on the possible status of the

⁶⁷ Ma Ngai Kong (PFn 8583): statement dated 19.10.2012 (Chinese) [FSD 2, 392+] (no translation). He had not been called to testify, but reference to his observations can be found in Yau Wai Keung's statement dated 31.12.2012 §7 [FSD 3, 577]. Yau Wai Keung, Deputy Chief Fire Officer, testified on Day 12.

⁶⁸ See Dr Cheng Yuk Ki's first statement dated 12.12.2012 §§4.9 & 6.5 [Expert 1, 375-376 & 379]; second statement dated 30.1.2013 [Expert 2, 1095+]; and testimony [Day 23, pp.68-75, 84-89, 136-158 & 170-176; Day 31, pp.28-58]. Since he could not detect the necessary chemical byproducts of electrolysis on metal support of the starboard light bulb, Dr Cheng accepted that he was unable to conclude that a direct current was still flowing through the metal support of the starboard light bulb when the broken light bulb was submerged in seawater [Day 31, pp.49-50].

sidelights by reference to the position of the switches on those two boards as retrieved after the accident.⁶⁹

46. Although Professor Ho's examination of the boards was hampered by the fact that Mardep had for the purpose of its own investigation cut the wires in the main switchboard for starboard light after the accident, based on his explanations it seems that the fact that the circuit breakers on the navigation light distribution board for both sidelights were in the "on" position. This tends to support the suggestion that the sidelights had been switched on at the time of collision.

46.1. As the circuit breakers were in fact switches for the sidelights, their being in the "on" position means that the sidelights had been switched on.

46.2. The only qualifications to the above view are that at the time of collision (1) there must be power supply to navigation light distribution board;⁷⁰ and (2) the circuit breaker for the external lights on the main switchboard also had to be in the "on" position (because the navigational lights would not be lit if this circuit breaker was "off", even if the circuit breakers on the navigation light distribution board were "on").⁷¹

46.3. For (1), there was neither evidence nor suggestion that there had been no power supply to the navigation light distribution

⁶⁹ Professor Ho's Report dated 6.3.2013 [Expert 3, 1743+].

⁷⁰ Professor Ho's Report dated 6.3.2013, p.4 [Expert 3, 1747].

⁷¹ Professor Ho's Report dated 6.3.2013, p.16 and Photo 17 [Expert 3, 1759].

board. The Commission is however reminded of Professor Ho's evidence that the stern light circuit breaker had been tampered with during inspection or investigation after the accident.⁷² Although that fact does not necessarily mean the same had been done to the circuit breakers of *other* navigation lights, it means that it remains a possibility.

46.4. For (2), as the circuit breaker on the main switchboard for the external lights ("navigation lights") had been damaged,⁷³ it is no longer possible to ascertain whether it was or was not "on" at the time of the collision. Professor Ho had suggested that seeing a "red flag" in the indicator below each circuit breaker would mean that circuit breaker was switched to the "on" position (and it is of note that the indicator under the external lights circuit breaker does show a "red flag"⁷⁴) but in the end he accepted that the appearance of a red flag could be inconclusive.⁷⁵

47. On the totality of evidence, it is more likely than not that the lights were *on* at the time of the collision. Further points are:-

47.1. There is much to be said about the claim that switching on navigation lights is natural or almost automatic for any master sailing a vessel at night. Chow Chi Wai said that he could not

⁷² Professor Ho [Day 47, pp.14, 17 & 58-59].

⁷³ According to Professor Ho, all the circuit breakers on the main switchboard except the Main Circuit Breaker on the leftmost and the two for emergency lights (painted white) had been damaged: see Report dated 6.3.2013, p.16 and Photo 17 [Expert 3, 1759].

⁷⁴ Professor Ho's Report dated 6.3.2013, p.26 (point 9) [Expert 3, 1769].

⁷⁵ Professor Ho [Day 47, pp.71-72].

possibly have forgotten to switch on the navigation lights of Lamam IV because a master simply could not sail at night without those lights on; to switch them on is his usual practice and also part of any master's preparatory work before sailing; and he had never sailed a vessel at night without navigation lights switched on and properly working.⁷⁶ This is indeed not surprising because sailing without navigation lights on is dangerous not just to other seafarers but also the vessel itself.

47.2. Furthermore, Lamma IV was supposed to sail all the way to the Central Harbour where there would be a large number of vessels stationed for some time to enjoy the Fireworks Display. The authorities like Mardep would also be closely monitoring the restricted area. In such circumstances, the crew of Lamma IV had to be extremely reckless, if not outright law-offending minded, not to switch on the navigation lights on that night or not to take any step to make sure that they were on.

B6. Blinded sight

48. We digress slightly to deal with an issue which is common to both vessels, that the coxswains' visions were somehow affected by background light.

49. Lai Sai Ming said in his statement that once Sea Smooth was clear of the North Lamma Anchorage, he saw the bright fog light shining

⁷⁶ Chow Chi Wai [Day 34, pp.97-99; Day 36, pp.79-80].

from the direction of entrance to the typhoon shelter of the power station⁷⁷. However, he accepted at the hearing that Lamma IV was in fact quite away from the zone where the fog light would have an impact on his lookout.⁷⁸ In other words, his evidence is now that the fog light did not affect his visual lookout insofar as the approach of Lamma IV is concerned. In any case, even if the fog light did affect his visual lookout, it is Captain Pryke's opinion that he could and should have looked at the radar for information.⁷⁹ He had not done so. No excuse was or could be given.

50. Chow Chi Wai contended that he did not see Sea Smooth with his naked eyes until she was at about 3 cables away in front of Lamma IV because the lights from anchored vessels at the North Lamma Anchorage had blinded his sight.⁸⁰ However, it is hard to see how that fact, even if true, could exculpate him for his failure to keep a proper lookout because if he had indeed felt that his vision was hampered by background light, he should and could have slowed down and/or used the radar.⁸¹

B7. Captain Pryke⁸²

51. Captain Pryke's opinion on the cause of collision, and the respective liability of Lamma IV and Sea Smooth, is as follows.⁸³

⁷⁷ [HFW, 129].

⁷⁸ Lai Sai Ming [Day 42, pp.13-18 & 27-34].

⁷⁹ Captain Pryke [Day 2, p.84].

⁸⁰ Chow Chi Wai [Day 34, p.106].

⁸¹ Captain Pryke [Day 3, pp.27-28 & 32-33].

⁸² Throughout the Inquiry, Captain Pryke had been provided with evidence presented to the Commission, documentary and testimonial, insofar as the same might be relevant to his formulating an opinion on the cause of collision. In particular, Captain Pryke had closely followed the testimony of the crew of both Lamma IV and Sea Smooth.

52. The collision occurred at about 20:20:17. The digital radar track records do not show deceleration of either Lamma IV or Sea Smooth before collision. Between 20:16 and 20:19, both vessels could have clearly seen each other on radar and visually at about 2 miles distant.
53. For the purpose of determining collision liability under Colregs, the two vessels were clearly in a head-on and not crossing situation.⁸⁴ Sea Smooth was in contravention of Rule 14 of Colregs in turning to port but not to starboard.
- 53.1. At 20:17, Lamma IV was just completing her departure manoeuvre from the typhoon shelter and under way. She and Sea Smooth were at this point about 1.9 nautical miles apart and neither was required to take any avoidance action.
- 53.2. At 20:18, the two vessels were 1.375 nautical miles apart, Lamma IV was on a steady bearing of 176° and Sea Smooth would have been able to see Lamma IV at 4° on her port bow. At this point, Lamma IV would have steadied on her course of 350°. She would have been able to see Sea Smooth bearing 6° on her starboard bow, and should make a collision avoidance assessment including deciding if there was a risk of collision.
- 53.3. At 20:19, Sea Smooth would have been able to see Lamma IV with the same bearing of about 175° (i.e. 5° on her port bow).

⁸³ First Report dated 4.12.2012 §§21, 24-29 [Expert 1, 8-12]; Supplemental Report dated 8.12.2012 §§1-4 [Expert 1, 303]; Note dated 7.2.2013 [Expert 1, 361-53+]; Note dated 8.2.2013 [Expert 1, 361-61]; and testimony on Days 2, 3, 32 and 33.

⁸⁴ See, by reference, the chart plot at [Expert 1, 361-1].

This must be considered a steady bearing. Travelling at 24 knots with Lamma IV on a steady bearing on her port bow which was then only 8 cables distant, she had to alter course to keep clear and turning starboard was the only option for Sea Smooth in compliance with Rule 14 of Colregs. At the same time, Lamma IV altered course to starboard such that at 20:19:30 she was steering 000°, meaning that Sea Smooth was then on her port bow. If both vessels had remained on their current courses, there would be no collision and they would pass each other at a distance of just under 1 cable. This would be an unacceptable close quarters situation but at least no collision would occur.

54. A hazardous close quarters situation developed primarily since the two vessels were not fully aware of each other's intentions, and the combined speed of approach of about 36 knots (at which speed one cable⁸⁵ would be covered in 10 seconds) allowed little time for the masters to appraise and take avoidance action.

55. Sea Smooth was primarily responsible for the collision by turning to port at about 20:19:30 in breach of Rule 14(a) of Colregs. This was significant because even at that last moment Sea Smooth could have very easily avoided contact with a small alteration of course to starboard. While Lamma IV had altered course of about 13 degrees to starboard between 20:19 and 20:20:17, Sea Smooth had turned about 16 degrees to port in an apparent attempt to cross ahead of

⁸⁵ 1 cable = 0.1 nautical mile or 608 feet.

Lamma IV.⁸⁶ Even if the two vessels were in a crossing situation (as per Rule 15), Sea Smooth would still have acted in breach of Rule 17(a)(i) because she was obliged to maintain her course.

56. In addition, Sea Smooth was in breach of the following rules in Colregs on the basis that she:-

56.1. did not keep a proper lookout (Rule 5);

56.2. did not proceed at a safe speed (Rule 6);

56.3. did not make proper use of radar (Rule 7(b));

56.4. did not take action to avoid collision (Rule 8);

56.5. did not alter course to starboard (Rule 14); and

56.6. did not make any warning signals (Rules 34 & 36).

57. Lamma IV was also at fault. She did not take positive action in ample time to avoid collision or alter her course sufficiently to starboard, in breach of Rule 8 and Rule 14 of Colregs respectively. She also did not make the warning signals in compliance with Rules 34(d) and 36 of Colregs. Such failures should, however, be judged against the obvious geographical limitation that at the material time

⁸⁶ Captain Pryke was of the view that the radar data provided by Mardep did not change the fundamental position even though the exact angle of steering of both vessels would be slightly different: see Supplemental Report dated 8.12.2012 §3 [Expert 1, 303].

she was in close proximity to the rocks off Shek Kok Tsui and her manoeuvrability to starboard was to some extent hindered.

58. In any case, irrespective of whether Chow Chi Wai sighted Sea Smooth at any earlier time (and simply took some time in deciding his next step), to take action at 20:20:10 is very late.⁸⁷

B8. Conclusion

59. In our submission, the cause of the collision was failure to keep proper lookout (both visually and by use of radar) on the part of both vessels.

59.1. This view is premised on the objective radar data (which do not show any noticeable change of course by either vessel and thus taking of avoidance action until such a late stage which could not be captured by the radar) and the evidence from the crew of both vessels.

59.2. In so concluding, we have proceeded on the basis of a factual finding that neither Lai Sai Ming nor Chow Chi Wai had used radar (whether properly or at all) to assist their lookout. The credibility of Chow Chi Wai's claim to have seen Sea Smooth at one nautical mile away has been addressed above but if he had, he had still failed in his lookout duties by not regularly monitoring the radar. One is required to check the bearing over time – if it remains constant, there is a risk of collision.

⁸⁷ See also Captain Pryke's evidence [Day 45, pp.50-54].

Chow did not do this. The obligation to keep a proper lookout is not satisfied (and nor was it suggested by Chow Chi Wai to have been satisfied) by having seen a vessel once on radar at one nautical mile distant and doing nothing about it.

60. Subject to the comments below, Captain Pryke's view on the cause of collision is in our submission sound and should be accepted. The premise of his analysis on liability under Colregs was that Lamma IV and Sea Smooth were in reciprocal or nearly reciprocal situation in the period since a risk of collision had arisen (at 20:18), so that Rule 14 applies. Looking at the chart plots, he must be right.

60.1. It was suggested to Captain Pryke that Rule 14 of Colregs is concerned with headings of vessels and not their courses over ground. Captain Pryke did not agree.⁸⁸ In our submission, he must be correct. Rule 14(a) mandates that where two power-driven vessels are meeting on reciprocal or nearly reciprocal courses so as to involve a risk of collision, each shall alter her course to starboard so each shall pass on the port side of the other. It clearly focuses the analysis on courses. The concept of heading comes in play in Rule 14(b), which is a deeming provision, where a reciprocal or nearly reciprocal situation shall be deemed to exist where a vessel sees the other ahead or nearly ahead, and (not citing those parts that do not apply in the circumstances of this case) by night she can see both sidelights of the other vessel. Rule 14(b) in fact only provides

⁸⁸ Captain Pryke [Day 32, p.89+].

a sufficient but not the sole test for determining whether two vessels are in reciprocal or nearly reciprocal course.⁸⁹ In fact, as Captain Pryke had commented, it is wrong to read Colregs as imposing a requirement a vessel *must* see both sidelights on another vessel before the two vessels could be described or treated as in reciprocal or nearly reciprocal situation; and that seeing both sidelights of another vessel at night does not mean necessarily that the two vessels are in reciprocal or nearly reciprocal courses.⁹⁰

60.2. There was also a suggestion that whether Lamma IV and Sea Smooth had been in a head-on (or nearly head-on) or crossing situation must be decided at the time when a risk of collision arose, and any analysis on proper manoeuvre could only be done in terms of that beginning situation. In other words, the situation would be frozen when risk of collision arose, which in our case would be about 20:18. Captain Pryke disagreed.⁹¹ It is submitted that Captain Pryke must be correct for reasons he had given. The proposition does not make sense when one is concerned with a dynamic situation where two vessels are manoeuvring in pilotage waters.

60.3. In any event, even if the vessels had been in a crossing situation, they were still on a constant bearing and on collision course and Sea Smooth would still have been

⁸⁹ Captain Pryke's Note dated 7.2.2013 §§31-39 [Expert 1, 361-59+]; Craig H Allen, *Farwell's Rules of the Nautical Road* (8th ed), p.370+ [Expert 1, 361-27+].

⁹⁰ Captain Pryke [Day 33, p.73+].

⁹¹ Captain Pryke [Day 32, 102, 5+; Day 33, pp.75-78].

obliged to turn to starboard, not to port: see Rule 17(c) of Colregs.

61. At this juncture it is appropriate to comment on one aspect of the conduct of Lai Sai Ming. Given the submission above that it is likely that he only saw Lamma IV very late in the day because of bad lookout, his conduct in turning port was likely to be part of a navigational move to get ready for berthing at Yung Shue Wan in ignorance of the presence of Lamma IV, instead of a reckless move to cross ahead of Lamma IV in the knowledge that she was on a near collision course (or, as part of a wrongly executed collision avoidance action). This does not absolve Lai Sai Ming from bad lookout, but the nature of the fault is different.

62. Chow Chi Wai claimed that he saw Sea Smooth when it was at a distance of about 3 cables. Even if his evidence is accepted, it is submitted that a distance of 3 cables was still too dangerously close for any master to take avoidance actions.⁹² In such a situation, that he had steered Lamma IV starboard immediately does not exculpate him for not keeping a proper lookout. The same logic applies if the Commission is to find that he saw Sea Smooth at a much later stage than alleged (which, as submitted above, is possible, if not actually likely).

63. In our submission, the Commission should avoid making comments or findings on the apportionment (by way of percentage) of liability if it is to find both masters culpable in causing the collision (whether

⁹² Our submissions on Chow Chi Wai's assertion that he found 3 cables a comfortable distance for taking avoidance actions are in Section B3 above.

for failure to keep proper lookout or other reasons).⁹³ Apportionment of responsibility is only called for in a determination of civil liability but not this Inquiry since such determination is outside the Terms of Reference. Similarly, a qualitative assessment as to which of them was “more” to blame should be avoided as any such comment will be readily translated into an apportionment of over 50% responsibility.

C. Manner of collision and extent of damage

64. Dr Neville Anthony Armstrong had given his opinion on the manner of collision including how Lamma IV and Sea Smooth had collided and separated, and the extent of structural damage to both vessels.⁹⁴ His evidence in this respect was never challenged.
65. The Commission had heard evidence from passengers on Lamma IV that the two vessels had clung together upon collision, and then Sea Smooth withdrew from Lamma IV moments later.⁹⁵ This point has to be addressed because had there been such “embedding”, the crew of Sea Smooth might be criticised for withdrawing or allowing the withdrawal of their vessel from Lamma IV, thus contributing to its more rapid sinking.

⁹³ Captain Pryke had given his opinion on the apportionment of liability between the two vessels [Day 33, p.4].

⁹⁴ See First Report dated 3.1.2013 §§7-22 [Expert 1, 404+]; Supplemental Report dated 16.1.2013 §9 [Expert 1, 474+]; and testimony [Day 24, p.15+].

⁹⁵ Chan Wing Hang [Police A(I), 202-1+; Day 5, p.94] (although the witness did say that he was not very sure); Lai Ho Yin [Police A(II), 646-1+; Day 6, p.71].

66. It is of note that those who testified to such embedment did not see the two vessels physically attached to each other. It was only their impression or feeling. Apart from the fact that in moments of chaos one's impression might understandably be wrong, Dr Armstrong had in fact opined that the two vessels were never truly "joined" together during and after the collision.⁹⁶ It is submitted that Dr Armstrong's reasons in support of his view are cogent and forceful, and should be preferred to the passengers' evidence.

D. Rate of sinking

67. The collision flooded the engine room, tank room and steering gear compartment of Lamma IV. The hull was punctured at the position of the engine room and tank room creating two holes allowing water ingress.⁹⁷ Flooding of steering gear compartment, however, was not due to a punctured hull at the position of that compartment but water ingress through an access opening (without a watertight door) at frame ½ bulkhead between that compartment and the tank room.

68. Dr Armstrong concluded that Lamma IV sank rapidly because of the number of large holes in the hull and also the lack of a watertight frame ½ bulkhead. He calculated that it took only 96 seconds from initial contact for the deck at the stern of Lamma IV to sink below water level; and only 118 seconds from initial contact for the vessel to assume a position of 70° to the horizontal. In his opinion, these

⁹⁶ See First Report dated 3.1.2013 §22 [Expert 1, 409]; 2nd Supplemental Report dated 25.1.2013 §§31-35 [Expert 2, 934-935]; and testimony [Day 24, p.64+].

⁹⁷ First Report dated 3.1.2013 §36 and Appendix IV-8 [Expert 1, 414-415 & 464].

were extremely short times in which to organise effective passenger escape. His opinion and calculations were not challenged.⁹⁸

E. Access opening at frame ½ bulkhead

E1. Relevance

69. The issue of having an access opening without a watertight door at frame ½ bulkhead is relevant for two reasons.

70. First, Dr Armstrong’s opinion was that having a watertight door at frame ½ bulkhead would make a difference to the manner and rate of sinking of Lamma IV in that although its stern would still be almost submerged, it would remain stably afloat after about 1¾ minutes (or 165 seconds) from the time of collision.⁹⁹ As explained by Dr Armstrong, Lamma IV with a watertight door fitted at frame ½ bulkhead would not sink “immediately” and would have stayed afloat for a longer period of time allowing more time for escape or evacuation.¹⁰⁰ The final position in this scenario is depicted at Appendix IV-6.2 to Dr Armstrong’s First Report.¹⁰¹

71. Secondly, there were express requirements in the “Instructions for the Survey of Launches and Ferry Vessels” (“the Blue Book”)¹⁰² and the “Instructions for the Survey of Class I and Class II Launches and

⁹⁸ First Report dated 3.1.2013 §§34-41 and Appendix IV-6.3 [Expert 1, 414-417 & 463]; Supplemental Report dated 16.1.2013 §6 [Expert 1, 472].

⁹⁹ First Report dated 3.1.2013 §38-2 and Appendix IV-6.2 [Expert 1, 415-416 & 463].

¹⁰⁰ Dr Armstrong [Day 46, pp.64-65].

¹⁰¹ [Expert 1, 463].

¹⁰² [Marine 8, 1761+].

Ferry Vessels (1995)” (“the 1995 Instructions”)¹⁰³ that any access opening in a watertight bulkhead is to have an efficient watertight closing appliance. The Blue Book referred to Regulation 5 (which should have been Regulation 6) of Merchant Shipping (Passenger Ship Construction and Survey) Regulations 1984 requiring compliance with watertight subdivision requirements.¹⁰⁴ There is no dispute on these.¹⁰⁵ The 1995 Instructions referred to the equivalent provision in the Hong Kong regulations for ocean-going vessels.

E2. Whether a watertight frame ½ bulkhead was intended

72. Naval-Consult Pte Ltd (“Naval-Consult”), a Singaporean firm, was awarded the contract for design of the hull of Lamma IV. It had prepared “General Arrangement” Drawing No.NC-391-1, “Profile and Deck” Drawing No.NC-391-4, “Shell Expansion” Drawing No.NC-391-7 and “Sections and Bulkheads” Drawing No.NC-391-5 (Sht 1 of 2).¹⁰⁶ The hull design of Lamma IV followed closely the design of the drawings of another vessel designed by Naval-Consult and built by Cheoy Lee Shipyards Limited (“Cheoy Lee”) in the name of “M.V. Eastern District No.1” (“Eastern District”).

¹⁰³ [Marine 8, 1810+].

¹⁰⁴ There is a dispute as to whether the Blue Book or the 1995 Instructions applied to Lamma IV. For the purposes of this Inquiry, it only matters in relation to the issue of thickness of hull shell plating: the Blue Book imposed no requirement whereas the 1995 Instructions required minimum thickness of shell plating of more than 5mm: Dr Armstrong’s Report dated 3.1.2013 §54 [Expert 1, 421].

¹⁰⁵ See Dr Armstrong’s Report dated 3.1.2013 §56 [Expert 1, 422]; and Wong Chi Kin’s statement dated 14.1.2013 §§23-24 [Marine 11, 3873-3874].

¹⁰⁶ [W&G, 43-46].

73. One crucial difference between the drawings for Lamma IV and for Eastern District is that the words “W.T. DOOR 1200x600 W/50R AT CORNER” in bottom leftmost of “Sections and Bulkheads” Drawing No.NC-227-5¹⁰⁷ for Eastern District had for some reasons been replaced by the words “ACCESS OPENING 1200x600 W/50R AT CORNER” in the same part of “Sections and Bulkheads” Drawing No.NC-391-5 (Sht 1 of 2) for Lamma IV. However, all the references to the frame ½ bulkhead as a “W.T. BHD” (i.e. watertight bulkhead) in other drawings for Lamma IV had not been amended.
74. In terms of construing the drawings for Lamma IV, the reference to *access opening* is not necessarily inconsistent with other references to the frame ½ bulkhead being *watertight* because this bulkhead can be made watertight by fixing a watertight door at the access opening on its port side. However, that does not answer the question of what the parties in design and construction *in fact* intended at the material time.
75. Mardep’s stance is that there had been departure from the approved plans in not constructing a watertight frame ½ bulkhead.¹⁰⁸ Lo Ngok Yang, a director of Cheoy Lee, disagreed and argued that references to “W.T. BHD” in the drawings were in fact mistakes.¹⁰⁹ John Lim, a director of Naval-Consult, agreed with Lo Ngok Yang.¹¹⁰ Neither Lo Ngok nor John Lim had any independent

¹⁰⁷ [Marine 2, 198].

¹⁰⁸ Wong Chi Kin’s statement dated 14.1.2013 §52 [Marine 11, 3881].

¹⁰⁹ Lo Ngok yang: statement dated 16.1.2013 §§22-34 [W&G, 6-8]; statement dated 18.1.2013 §§3-4 [W&G, 40-1]; and testimony on Days 18-19.

¹¹⁰ John Lim: correspondence by emails [Miscellaneous, 94+] and testimony [Day 19, pp.153-155]. It is of note that he had expressed the view that ½ frame bulkhead was

recollection of what had happened when Lamma IV was designed back in 1994-1995.

76. The Commission had received the evidence of “Preliminary Trim & Stability Booklet” prepared by Naval-Consult in December 1994 for Lamma IV that set out (inter alia) the results of damage stability calculations by combining the steering gear compartment and tank room.¹¹¹ However, this does not necessarily mean that the person preparing the report knew or intended that the frame ½ bulkhead would not have a watertight door; it could be that that person simply applied the 0.1L rule and ignored the frame ½ bulkhead.

E3. Had the lack of watertight door at frame ½ bulkhead been known

77. The purpose of this exercise is to investigate whether Mardep’s failure to discover the lack of watertight door at frame ½ bulkhead of Lamma IV has any causal relationship with the sinking of the vessel in its then conditions. Put it simply, if Lamma IV could and would still be approved for navigation even if Mardep had found out at the material time that there was no watertight door installed at the access opening at frame ½ bulkhead, then its failure to discover the absence of that door should have no relevance in this Inquiry.
78. Mardep had approved the drawings for Lamma IV on the basis that the frame ½ bulkhead would be watertight, and hence now considers the actual frame ½ bulkhead without watertight door a departure

intended to be watertight before having a telephone conversation with Lo Ngok Yang in which he became persuaded by Lo Ngok Yang [Miscellaneous, 94 & 100].

¹¹¹ Preliminary Trim & Stability Report pp.26-29 [Miscellaneous, 141-144].

- from the approved drawings.¹¹² This is also consistent with their approval of damage stability calculations in 1996, 1998 and 2005 for Lamma IV as a vessel with 6 compartments and 5 watertight bulkheads.
79. Assuming the frame ½ bulkhead was designed to be watertight (i.e. the access opening would have a watertight door), the absence of a watertight door would be a departure from the approved drawings. Had Mardep discovered the construction mistake, it would refuse to certify Lamma IV. Cheoy Lee and Naval-Consult might be told but it would only be a matter for Cheoy Lee as shipbuilder. The result would be the installation of a watertight door at frame ½ bulkhead.
80. But assuming that the Commission were to find that the frame ½ bulkhead was not designed or intended (by Naval-Consult or by Cheoy Lee) to be watertight (i.e. the access opening was not intended to have a watertight door), then in the event of Mardep refusing to certify Lamma IV on the ground that it had departed from the approved drawings, Cheoy Lee and Naval-Consult would be informed. But in this scenario they would inform Mardep that the frame ½ bulkhead was not intended to be watertight or fixed with a watertight door at the access opening.
81. Bearing in mind the evidence that to add a door to the access opening to make it watertight would simply entail a few thousand

¹¹² See Wong Chi Kin's statement dated 14.1.2013 §52 [Marine 11, 3881]. He had approved all the drawings for Lamma IV: Wong Wing Chuen's statement dated 14.1.2013 §39 [Marine 11, 3939].

dollars,¹¹³ a likely outcome would be that a door would be fitted. There is no suggestion or evidence that for some design or technical reasons, the *absence* of a watertight door is something that Naval-Construct or Cheoy Lee would have insisted upon, to the extent that they would have chosen to amend the plans to make clear the absence of a watertight door at the frame ½ bulkhead rather than to take the simple step of adding a door.

82. This, in our submission, is the most sensible course to have followed. Wong Chi Kin’s ex post facto supposition as to what might have been the considerations tending *against* requiring a watertight bulkhead at frame ½ is artificial and contrived. It is respectfully submitted that a regulatory authority, faced with a non-conforming plan, is more likely to require the vessel to conform, rather than take it upon itself to develop theories, reasons, or calculations as to how the vessel could be approved *despite* non-conformity.

83. Separate from the question of the physical fitting of a door is the question of the margin line test (which is incorporated into the concept of watertight subdivisions under the relevant rules). We know that everyone (including Mardep) “missed” the 0.1L point in 1996. Had damage stability calculations been done in 1996 with the 0.1L rule applied correctly, Mardep would have granted the certificate of survey for Lamma IV on the ground that the margin line test was passed on a one-compartment flooding basis (which is

¹¹³ Lo Ngok Yang [Day 19, pp.85-86].

common ground¹¹⁴). Mardep had in fact confirmed this as their position in this Inquiry¹¹⁵ although the context in which it had done so was had the 0.1L rule been applied properly at the time, and not had they discovered the absence of watertight door at the frame ½ bulkhead access opening.

84. However, it does not mean that there existed any good reason for Mardep to dispense with the requirement of a watertight door at the bulkhead at frame ½ because according to Dr Armstrong, the frame ½ bulkhead of Lamma IV is positioned as an aft-peak bulkhead and must therefore be watertight in order to serve its function properly as an aft-peak bulkhead. The safe design of a vessel is dependent not only on the fulfillment of margin line non-submersion or damage stability GM_T requirements; and the frame ½ bulkhead should for other purposes be made watertight. It is a superadded requirement from a naval architectural perspective to cater for accidents outside the ambit of the one-compartment flooding assumption. For instance, as explained by Dr Armstrong, a watertight frame ½ bulkhead would provide a space of restricted volume such that in case of leakage of seawater past the two rudder shafts penetrating the hull which were contained in the steering gear compartment, then the volume of seawater that could be admitted to Lamma IV would be minimized.¹¹⁶

¹¹⁴ See Dr Armstrong's 2nd Supplemental Report dated 25.1.2013 §12 [Expert 2, 928]; Dr Peter Cheng Jui Shan's Report dated 21.1.2013 p.16 [Expert 2, 706].

¹¹⁵ Wong Chi Kin's statement dated 14.1.2013 §§54-57 [Marine 11, 3881+].

¹¹⁶ See Dr Armstrong's 2nd Supplemental Report dated 25.1.2013 §§15-18 [Expert 2, 930-931]; 3rd Supplemental Report dated 3.3.2013 [Expert 3, 1619+]; and testimony [Day 47, p.180+].

85. If the Commission accepts the view of Dr Armstrong on aft-peak bulkhead, then Mardep would have no valid justification in approving Lamma IV in 1996 (and reapproving it in 1998 and 2005) despite the departure from the plans. In other words, the failure of Mardep to spot the absence of watertight door at frame ½ bulkhead did contribute to the sinking of Lamma IV in its configuration as at 1 October 2012.

E4. Had the 0.1L rule been correctly applied in 1998 and 2005

86. The consequence of missing the 0.1L rule in the 1996 calculation of damage stability for Lamma IV was not material as at that time because the margin line test would still be passed. However, it would be significant in the 1998 and 2005 calculations since the margin line test would have failed had the tank room and steering compartment been treated as one compartment.

87. A question then arises: would or could Mardep have approved the addition of ballasts in 1998 and the raising of the added ballasts in 2005 had it applied correctly the 0.1L rule? The purpose again is to investigate whether Mardep's mistake in this regard had contributed to the sinking of Lamma IV in its configuration as at 1 October 2012.

88. Had the 0.1L rule been applied correctly in 1998, Lamma IV would not be allowed to sail and Cheoy Lee would be obliged to conceive ways to re-jig the ballasts. For instance, they could have lightened the ballasts to be added; added buoyancy in the shape of foam or making alterations to the vessel such as putting buoyancy boxes

behind the transom.¹¹⁷ The same should happen in 2005 in respect of the raising of ballasts, although this issue is academic because had the 0.1L rule been properly applied in 1998, Lamma IV would probably have configured differently which might or might not lead to the raising of ballasts in 2005.

89. However, it would appear that the correct application of the 0.1L rule would not result in any suggestion of adding a watertight door at the frame ½ bulkhead because by virtue of the application of the 0.1L rule, the steering gear compartment and tank room would have been merged and treated as one anyway. The calculations were also done on paper and there would be nothing to prompt the officers of Mardep to inspect Lamma IV.
90. Since the addition of a watertight door at the frame ½ bulkhead would not be a response in correctly applying the 0.1L rule and refusing the application for adding and raising ballasts, it is our submission that the failure of Mardep to apply the 0.1L rule in 1998 and 2005 did not by itself contribute to the sinking of Lamma IV in its configuration as at 1 October 2012. However, Mardep's failure to insist on the frame ½ bulkhead being watertight (so as to comply with the plans, and also to serve as a watertight aft-peak bulkhead as required by the Blue Book) *did* contribute to the loss of the vessel more quickly than would otherwise have been the case, as discussed in the previous section above.

¹¹⁷ Dr Armstrong [Day 26, p.14+].

F. Hull thickness

91. Dr Armstrong had observed that the “Midship Section” Drawing No.NC-391-3 approved on 17 May 1995¹¹⁸ shows the thickness of the side plates of hull of Lamma IV to be 5mm, but the shell plating gauging carried out on 15 June 2005¹¹⁹ showed a thickness of 4.5mm only and the gauging on 25 May 2001¹²⁰ further showed a lower range from 4.3mm to 4.5mm (averaged 4.4m). Based on his own inspection of the plating, Dr Armstrong formed the view that there was no measurable reduction of thickness over the past 6 years, and the 0.1mm discrepancy was more likely caused by differences in the accuracy of the instrumentation and the measurement process used at the time in May 2011.
92. Given the protective paint scheme on both the outside and inside of its hull plates, he considered it most likely that Lamma IV had been constructed with side plating thickness of only 4.5mm not compliant with the approved drawing. He opined that the thinner plating size on Lamma IV might have contributed to the extent of damage it had experienced in the collision, as plating of a greater thickness would have reduced the damaged hole size, which in turn might provide marginally more time for escape before the vessel sank. In forming such view, he considered that the 1995 Instructions should apply to require the side plating to have a minimum thickness of 5mm and the side plating, as built, was 0.5mm undersized.¹²¹

¹¹⁸ [Marine 2, 203].

¹¹⁹ [Marine 4, 654-655].

¹²⁰ [Police P, 4870-4871].

¹²¹ Dr Armstrong’s Report dated 3.1.2013 §§25 & 28 [Expert 1, 410-412].

93. Mardep disagreed. It argued that the Blue Book applied to Lamma IV and it did not stipulate any construction standard or guideline regarding plate thickness. Mardep said it accepted hull scantlings of the vessel to be designed according to the accredited classification societies like Lloyd’s Register of Shipping (“Lloyd’s Register”), the American Bureau of Shipping (“ABS”) and the China Classification Society (“CCS”). The CCS has participated in this Inquiry.¹²² By reference to the “Rules and Regulations for the Classification of Yachts and Small Craft” of the Lloyd’s Register (“the Lloyd’s Register Rules”), Mardep considered that the required thickness of side plating of Lamma IV should be 3.5mm and on that basis it agreed to accept Cheoy Lee’s proposed change of side plating from 5mm to 4.83mm. It disagreed with Dr Armstrong on the application of the 1995 Instructions because the provision (Ch II §3.2) identified by Dr Armstrong only applies to steel vessels and Lamma IV was an aluminium vessel.¹²³ Cheoy Lee shared the same stance.¹²⁴
94. Despite his view stated in the First Report as summarised above, Dr Armstrong had in the course of evidence accepted that neither the Blue Book nor the 1995 Instructions contained any requirement as to the thickness of aluminium side plating.¹²⁵ He also accepted that

¹²² There is no dispute about the evidence from CCS in relation to their role and work done on the inspection of Lamma IV. The Commission had received a statement made by Zhang Yu, Chief Surveyor and Senior Engineer of CCS, dated 29.1.2013 [DLA, 33+]. He was not called to testify but his statement was read out on Day 48.

¹²³ Wong Wing Chuen’s statement dated 14.1.2013 §§18 & 45-50 [Marine 11, 3933 & 3942-3944].

¹²⁴ Lo Ngok Yang: statement dated 16.1.2013 §§40-52 [W&G, 9-12] and testimony on Day 19.

¹²⁵ Dr Armstrong [Day 27, pp.113-114 & 127-129].

side plating of 5mm could be accepted whether one were to adopt the Lloyd's Register Rules under which the minimum thickness would be (by calculation) 4mm¹²⁶; or to apply the 1995 Instructions by converting requirements for steel plating to aluminium plating.¹²⁷

95. In our submission, given the concessions made by Dr Armstrong in the course of testimony and the further discovery of materials, there is no sufficient ground for the Commission to find that the thickness of side plating of the hull of Lamma IV had been or might have been causative of its rapid sinking. The reasons are as follows.

95.1. Cheoy Lee had produced evidence that it had never purchased 4.5mm plates for Lamma IV. Instead, it had placed orders for 5083-H116 aluminium plates (5mm)¹²⁸ and the goods delivered were only 4.83mm thick.¹²⁹ Cheoy Lee then sent the 4.83mm plates to Wuzhou Shipyard.¹³⁰ Certificates had been issued by the ABS certifying their quality and there was evidence that those certificates came with the plates; and the CCS had also inspected and accepted them.¹³¹ Having seen such documentary evidence, Dr Armstrong accepted it was likely that the side plates delivered were 4.83mm thick.¹³²

¹²⁶ See extract of the Lloyd's Register Rules at [Marine 11, 4067] and calculations at [Marine 11, 4068]; Dr Armstrong [Day 28, pp.7-9].

¹²⁷ Dr Armstrong [Day 27, pp.129-130].

¹²⁸ Cheoy Lee's Purchase Order (No.P-94605) dated 19.12.1994 [W&G, 17].

¹²⁹ Cheoy Lee's letter dated 4.4.1995 to Mardep [Marine 2, 206].

¹³⁰ Cheoy Lee's Packing List p.3 [W&G, 25]. Solicitors for the Commission had tried to contact Wuzhou Shipyard with a view to seek their assistance in this Inquiry but failed.

¹³¹ Survey Items List [Marine 2, 265].

¹³² Dr Armstrong [Day 27, p.75].

95.2. The next question would be whether side plates of 4.83mm thick were acceptable. Dr Armstrong agreed that the 0.17mm difference (being less than 0.2 mm) was indeed in line with the practice in the industry and thus acceptable, and in giving his view he fairly mentioned also the inherent difficulty in the manufacturing process.¹³³ Moreover, the 0.17mm difference was within the range of permissible tolerance accepted by the recognised classification societies.¹³⁴ Dr Armstrong had in the end accepted that the use of 4.83mm plates for building the hull side-plating would not be non-compliant with the 1995 Instructions, even if they were to apply (as he opined at the very beginning).¹³⁵

95.3. Finally, Dr Armstrong accepted that the reduction in thickness of side plates from 4.83mm to 4.5mm or 4.6mm in 9 years and then further to 4.4mm or 4.5mm in another 5 years was plausible¹³⁶ in view of the corrosion of the material in the particular context of Hong Kong where one would find high temperatures, high humidity and atmospheric pollution.¹³⁷

G. Lifejackets

96. Some passengers of Lamma IV had given evidence on the difficulty of putting on the lifejackets on board the vessel after the collision.

¹³³ Dr Armstrong [Day 25, p.48; Day 27, pp.64, 69 & 72].

¹³⁴ See DNV Rules [Marine 11, 4050] and materials of other classification societies [W&G, 29, 40-51, 40-53 & 40-57].

¹³⁵ Dr Armstrong [Day 27, pp.130-131].

¹³⁶ Dr Armstrong [Day 27, p.84].

¹³⁷ Dr Armstrong [Day 27, pp.77-78 & 83-90].

The problems they had encountered were the lifejackets were too big, did not float or had the strings all entangled. Some of them did not know how to put on the lifejackets and some had difficulty in putting an adult lifejacket on a child.¹³⁸

97. The evidence of the officers of HKE and the crew of Lamma IV was that there were at all material times no child lifejackets on board the vessel.¹³⁹ On the other hand, the inspectors of Mardep who conducted the survey in 2012 claimed that he had seen and counted child lifejackets at the time of the inspection. Both he and the inspector of the previous year relied upon their “usual practice” in that given that they had put down asterisks for “adult lifejacket(s)” and “child lifejacket(s)” in the certificate of surveys dated 8 July 2011¹⁴⁰ and 8 May 2011¹⁴¹, they believed they should have seen and counted the number of lifejackets, including children lifejackets, in the course of the relevant surveys.¹⁴²

98. However, Mardep in fact had not strictly enforced against existing Class I vessels (including Lamma IV) the requirement on lifejackets under the Merchant Shipping (Local Vessels) (Safety and Survey) Regulation (Cap.548G), i.e. 100% for adults plus 5% for children on

¹³⁸ Wong Tai Wah [Day 3, pp.133, 139-140 & 150]; Lau Kam Bor [Day 4, pp.10-11]; Lo Lai Ngan [Day 4, p.35]; Lee Ming Sun [Day 4, pp.52-54]; Chan Kam Ho [Day 5, pp.17-18]; Cheng Yin Bun [Day 5, pp.38-39]; Chan Wing Hang [Day 5, pp.92-93]; and Lau Hau Yin [Day 6, pp.101 & 103-104].

¹³⁹ Tang Wan On [Day 29, pp.66-67 & 69-70; Day 30, pp.60-62]; Chow Chi Wai [Day 35, p.24]; Leung Pui Sang [Day 37, pp.23-24]; Leung Tai Yau [Day 38, pp.3-4].

¹⁴⁰ [Marine 4, 805+].

¹⁴¹ [Marine 4, 822+].

¹⁴² Wong Kam Ching’s statement dated 5.2.2013 §11 (2012 survey) [Marine 11, 4088]; Lau Wing Tat’s statement dated 6.2.2013 §13 (2011 survey) [Marine 12, 4096]; Wong Kam Ching [Day 34, pp.25-31 & 45-46]; Lau Wing Tat [Day 34, pp.55 & 62-63].

board, which came into force in 2007.¹⁴³ This raises doubt about the reliability of the belief of those inspectors saying they had counted the number of child lifejackets on board Lamma IV in the 2011 and 2012 surveys since if the requirement on lifejackets had not been strictly enforced against Lamma IV, there would be little reason for them to do the counting. For example, the inspectors¹⁴⁴ who carried out surveys in 2009 and 2010 had simply recorded there was no child lifejacket on board Lamma IV.

99. For the same reason, there was no need or incentive for HKE to transport some child lifejackets to Lamma IV in 2011 and 2012 just to stage a show for the surveys because the vessel would still have passed the surveys without any child lifejacket on board.

H. Manning requirements

100. In Lamma IV's Certificate of Survey dated 16 July 2007,¹⁴⁵ the manning requirement was stated to be two. In the Certificate of Survey dated 2 June 2008,¹⁴⁶ the manning requirement was stated to be four. This was the requirement at 1 October 2012.¹⁴⁷ Tam Yun Sing, the Ship Inspector from Mardep who was responsible for imposing the change did not record and could not recall the reason

¹⁴³ Wong Wing Chuen's 2nd supplemental statement dated 8.2.2013 §92 [Marine 12, 4190] and testimony [Day 43, pp.44-61].

¹⁴⁴ Tam Yun Sing's supplemental statement dated 22.2.2013 §6 [Marine 12, 4919] and testimony [Day 44, p.97+]; Yuen Chi Wai's statement dated 22.2.2013 §10 [Marine 12, 4924] and testimony [Day 44, pp.111-112].

¹⁴⁵ [Marine 4, 760].

¹⁴⁶ [Marine 4, 775].

¹⁴⁷ Certificates of Survey dated 27.10.2009 [Marine 4, 796], 13.5.2010 [Marine 4, 798], 8.7.2011 [Marine 4, 805] and 8.5.2012 [Marine 4, 822].

for the change.¹⁴⁸ He said that it was the usual practice of Mardep not to record the reason for change in manning requirements.¹⁴⁹ No similar change was made in relation to Lamma II, whose minimum crew continued to be stated as two.¹⁵⁰

101. HKE did not challenge this decision, although the General Manager of its Generation Division Francis Cheng said that he thought that it was unfair. Hong Kong Electric did not employ a new crew member specifically for the purpose of crewing Lamma IV. Neither did HKE a crew from Lamma II's complement of three to make up the number. Instead, they decided upon an ad hoc arrangement whereby some member of staff would be regarded as the fourth crew member.¹⁵¹ Although there were operation manuals prepared for the other crew members, no such operation manual was prepared for the fourth crew member.¹⁵² The person relied upon for the night of 1 October 2012, Lai Ho Yin, was not told that he was required to fulfill this function.¹⁵³

102. The question arises whether this fourth person could properly be regarded as "crew" so as to satisfy the minimum crew requirement in the Certificate of Survey. In the 8 May 2012 survey, Tang Wan

¹⁴⁸ [Marine 11, 4035]. Tam Yun Shin [Day 22, pp.37].

¹⁴⁹ Tam Yun Shin [Day 22, pp.37]. According to him, based on the information at hand the manning requirements should have been increased because during the annual survey, he had found that two crew members were not enough to handle the situation in case of fire or emergent [Day 22, pp.42-43 & 49].

¹⁵⁰ Certificates of Survey dated 10.12.2011 [Marine 11, 3745] and 10.12.2012 [Marine 11, 3743].

¹⁵¹ Sign-in records [RSRB 2, 1377]. It is of note also that HKE did not maintain a sign-in record of the fourth crew on 1.7.2012 and 1.10.2012 [RSRB 3, 1624].

¹⁵² Appendix 3 to Tang Wan On's statement [RSRB 1, 276].

¹⁵³ Lai Ho Yin [Day 6].

- On (the Marine Officer) was said to have played the role of the fourth crew. He did not wear any uniform¹⁵⁴. He was not on board Lamma IV during the relevant voyage on 1 October 2012.
103. The term “crew” is defined in Merchant Shipping (Local Vessels) Ordinance (Cap.548) as meaning “the coxswain and any other person employed or engaged in any capacity on board a local vessel on the business of the vessel”.
104. The terms “employed or engaged” suggest an agreement as in “hire for work” or “take up employment”. This is consistent with the use of those words in section 89 of Cap.548 and with the distinction of “crew” from “passenger”. The words “in any capacity on board a local vessel” and “on the business of the vessel” make it clear that the employment or engagement must be for that specific purpose, i.e. a capacity on board a local vessel on the business of the vessel.
105. Hence it is submitted that a general employment or engagement by the employer will not suffice and that it would not be legitimate to regard any employee of HKE’s who happened to be on board as “crew” unless he has been specifically employed for that purpose. The requirement will not be satisfied by giving some other employee a task on board, such as passenger control, even if it is a task that would normally be carried out by the crew.
106. In this regard, the Commission is also reminded of Captain Pryke’s opinion that the fourth crew arrangement on Lamma IV is totally

¹⁵⁴ Leung Tai Yau [Day 38, pp. 74-76]

- unacceptable, because it defeats the whole point of having weekly emergency drills which allow the crew to work as a team and understand what their respective role is in case of an emergency.¹⁵⁵
107. Moreover, the concept of employment or engagement implies that the employer and the crew member must be *ad idem* as to the employment or engagement. If the employer has not told the person concerned that he is a crew member, and if that person has not agreed to be a crew member, he could not properly be regarded as crew for this purpose.
108. In the premises, it is submitted that the minimum safe manning requirements for Lamma IV were breached on the night of 1 October 2012.
109. Of course, the speed with which Lamma IV foundered suggests that there was not much the crew could have done in terms of normal emergency drills. However, if there had been one more trained or regularly drilled seaman on board, the possibility that he might have been able to help a passenger to safety cannot be excluded.
110. Captain Pryke was asked about safe manning levels and his view was that a double decker vessel such as Lamma IV would have required at least four crew. Mardep may wish to consider reviewing their manning requirements in the light of this experience. The imposition of manning requirements should be documented with

¹⁵⁵ Captain Pryke [Day 45, pp.93-95 & 98-100].

reasons for their imposition to permit transparency and challenge where appropriate, and to avoid arbitrary and irrational decisions.

I. Part 2

11. Causes of the incident

111. Captain Pryke's evidence has not been seriously challenged. The most significant direct causes of the collision were poor navigation by the coxswain of the Sea Smooth, as well as poor navigation by the coxswain of the Lamma IV, namely:-

111.1. Sea Smooth's breaches of Colregs due to its failure to:-

- (a) keep a proper look-out (Rule 5);
- (b) proceed at a safe speed (Rule 6);
- (c) make proper use of her radar (Rule 7(b));
- (d) take action to avoid collision (Rule 8);
- (e) alter course to starboard (Rule 14); and
- (f) make any warning signals (Rules 34 & 36).

111.2. Lamma IV's breaches of Colregs due to its failure to:-

- (a) keep a proper look-out (Rule 5);
- (b) make proper use of her radar (Rule 7(b));
- (c) take positive action in ample time (Rule 8);
- (d) alter course sufficiently to starboard (Rule 14); and
- (e) make any warning signals (Rules 34(d) & 36).

112. Although these failings are in the nature of human error, the Inquiry has revealed failings in the support system ashore and in the

regulatory environment which undoubtedly contributed to the causation of the incident.

113. From the navigational point of view, the most striking features are the failure to keep a proper look-out in both vessels, including the failure to make proper use of radar. This raises the questions of whether there should be a second person on the bridge with the coxswain and whether radar training is sufficient or adequate. Further, the speed of both vessels, but of Sea Smooth in particular, was a factor which left the coxswains very little time to appreciate the risk and take avoiding action.
114. The case also raises the question of whether there is a sufficient shore-based safety management system and training environment in place.¹⁵⁶
115. The most significant direct cause of the high loss of life was the speed with which the Lamma IV foundered, sinking by the stern so quickly that passengers were trapped and could not evacuate the vessel.
116. Dr Armstrong concluded as follows:-¹⁵⁷
 - 116.1. Lamma IV sank quickly because of the extent of the damage.

¹⁵⁶ Captain Pryke's Report §30 [Expert 1, 12].

¹⁵⁷ Dr Armstrong's Report §§72-79 [Expert 1, 430-432].

- 116.2. Lamma IV's hull was thinner than the design thickness, which contributed to the extent of the damage (had it been the required thickness, the holes in the hull would not have been so large and the vessel would not have sunk so quickly). However, in the course of his evidence he accepted that it was plausible that "conforming" plates had been worn down to the current thickness through corrosion.
- 116.3. According to the approved plans, the aft-peak bulkhead at frame ½ was designed to be watertight but in fact it had an access opening with no closing appliance. Had the aft-peak bulkhead been watertight, only two compartments and not three would have been flooded and either the vessel would not have foundered completely at all, or if it had, it would have not have foundered so quickly, thus leaving greater time for evacuation.
- 116.4. The passenger seats were insufficiently attached to the plastic upper deck and contributed to the trapping of passengers when they collapsed.
117. These conclusions raise the question of whether the Lamma IV was properly designed and built.

12. General conditions of maritime safety concerning passenger vessels in Hong Kong

118. Captain Pryke¹⁵⁸ and Dr Armstrong¹⁵⁹ have each considered aspects of the general conditions of maritime safety concerning passenger vessels in Hong Kong and the adequacy or otherwise of the present system of control.
119. Captain Pryke has considered the general principles of maritime safety, the safety management of local passenger vessels and areas of consideration for all launches and ferry vessels.
120. Captain Pryke noted¹⁶⁰ that the definition of Lamma IV as a “Class I Launch” and not a “Class I Ferry Vessel” made a big difference to the safety inspection regime for such vessels which was unjustifiable when they carried the same number of passengers. The distinction between launch and ferry is sterile. The risk arises out of the number of people that a vessel is permitted to carry.
121. Captain Pryke has noted that operators of ferries carrying more than 100 passengers are not at present required to implement a safety management system, with Mardep arranging or specifying suitable training courses for owners and coxswains¹⁶¹. Dr Armstrong has also noted that without understanding how passenger safety is intended to be ensured over a range of topics, some of which are

¹⁵⁸ [Expert 3, 1101].

¹⁵⁹ [Expert 3, 1637+]

¹⁶⁰ Captain Pryke’s Report §31 [Expert 1, 12].

¹⁶¹ Expert 3, 1108+

inter-dependent, it is difficult to offer comprehensive advice on what standard is required of ships built to previous regulations, and it would be difficult for the Local Vessels Advisory Committee, established under Part II of Cap.548 and authorised to assist with the general regulation or control of local vessels in Hong Kong, to operate cohesively and rapidly without a Statement of Safety Objectives providing a high-level scope of work¹⁶². Dr Armstrong referred to the Australian National Standard for Commercial Vessels endorsed by the Australian Transport Council¹⁶³.

122. Lamma IV was not required to carry VHF¹⁶⁴. The radio connected only with HKE. Thus, he had no means of communicating with Sea Smooth in order to clarify its intentions before the collision. After the collision, he needed to use his own (and then a passenger's) mobile telephone to dial the emergency services. Mardep also disseminate advice that includes using mobile telephones to call emergency services¹⁶⁵. The problem with the use of mobile telephones is that this does not inform the vessels who are nearest to a marine casualty that assistance is required.

123. There is no requirement for local passenger vessels (Class I) to carry liferafts for all persons on board¹⁶⁶. The liferaft on Lamma IV had a

¹⁶² Expert 3,1668

¹⁶³ [Expert 3, 1673 and 1730+] and Dr Armstrong [Day 47, 144-148]

¹⁶⁴ §17-19, Statement of Leung Wing Fai [Marine 12, 4665-4666].

¹⁶⁵ §12, 3rd Supplemental Statement of Wong Wing Chuen [Marine 12, 4641-4642].

¹⁶⁶ §87, 2nd Supplemental Statement of Wong Wing Chuen [Marine 12,4188]

- capacity of 10¹⁶⁷. This is less than 5% of the maximum number of passengers on board and is almost an irrelevance.
124. Children's lifejackets were required by Cap.548G¹⁶⁸, but only 12 were required by these regulations to be on Lamma IV, considerably less than the number of children on board on the night of 1 October 2012. Moreover, this regulation was not enforced by Mardep in relation to vessels existing before 1 January 2007¹⁶⁹. There is no definition of lifejacket or of an acceptable standard of lifejacket¹⁷⁰.
125. Coxswains of vessels carrying more than 100 passengers are not required to have a basic medical examination and eyesight test at intervals not exceeding 5 years¹⁷¹, and whether all seamen required to keep a lookout should have an eyesight test. The present system requires eyesight tests when a certificate of competency is first applied for¹⁷², but no further tests are required despite the fact that most peoples' eyesight deteriorates during their lifetimes.
126. The current legislation makes no provision for the harbour police to randomly test for drug and alcohol consumption¹⁷³. Whilst there is no evidence that drugs or alcohol were contributory facts to the incident on 1 October 2012, no tests were taken at the time.

¹⁶⁷ Cheng Cho-ying Francis [Day 14, 70]

¹⁶⁸ [Legislation, Item 15, 32]

¹⁶⁹ Wong Wing Chuen [Day 43, pp.44-52].

¹⁷⁰ Dr Armstrong [Day 46, pp.114-123].

¹⁷¹ Coxswain licences are valid until the coxswain is 65 years old, §10.1(2) of "Examination Rules for Local Certificates of Competency" [Marine 12, 4725].

¹⁷² Chapter 4 of "Examination Rules for Local Certificates of Competency" [Marine 12, 4704].

¹⁷³ [Expert 3, 1206].

127. The current legislation has no requirement for a look-out other than that contained in the collision regulations¹⁷⁴. There is in particular no requirements specific to passenger carrying vessels, especially those of higher risk because they carry 100 passengers or more, or to high speed vessels (regardless of whether they fit the formal definition of High Speed Craft).
128. There is no present requirement for passenger vessels carrying more than 100 passengers to have a muster list so that every member of the crew is aware of his duties in the event of emergency¹⁷⁵.
129. A small adjustment should be made to the VHF sector boundary between the Channel 67 area and Channel 14 area.¹⁷⁶
130. Speed played an important role in this incident. It increased the risk of collision in the first place because it gave the coxswains of both vessels restricted time in which to see each other¹⁷⁷ and respond and it had a role to play in the extent of the damage to Lamma IV.¹⁷⁸ There are speed limits in section 9 of Cap.548F¹⁷⁹, but Sea Smooth

¹⁷⁴ [Expert 3, 1197].

¹⁷⁵ §29, Captain Pryke (Part 2) [Expert 3, 1117-1118]. Para.98 of 2nd Supplemental Witness Statement of Wong Wing Chuen, Marine 12, 4191.

¹⁷⁶ §79, Captain Pryke's Report (Part 2) [Expert 3, 1139-1140].

¹⁷⁷ See Captain Pryke's First Report [Expert 1, 1+].

¹⁷⁸ See Dr Armstrong's First Report [Expert 1, 399+].

¹⁷⁹ §5, Statement of Li Kin-pong [Marine 11, 3759].

- had an exemption¹⁸⁰. Accordingly, the only restriction was the obligation to proceed at a safe speed in the collision regulations¹⁸¹.
131. There is no requirement for high speed craft built before 2007 to have a route operating manual and a training manual.¹⁸²
132. There seems to be a custom for vessels with exemptions from speed limits or High Speed Craft to carry a flashing amber light, similar to those required for hovercraft under the collision regulations.¹⁸³ Sea Smooth carried such a light.¹⁸⁴ However, there is no regulation governing this.¹⁸⁵
133. The legislative scheme relating to radar is rudimentary. There is no mandatory high speed radar simulator course for all coxswains of high speed craft (whether built before and after 2007).¹⁸⁶
134. In any event, there seemed to be a culture among the coxswains (certainly the two coxswains in questions) not to rely on radar.¹⁸⁷ Boht the employers had not been particularly vigilant in training or ensuring the use of radar by coxswains.

¹⁸⁰ [Marine 11, 3819-3820].

¹⁸¹ §11, Statement of Li Kin-pong [Marine 11, 3761-3762].

¹⁸² §11, 3rd Supplemental Statement of Wong Wing Chuen [Marine 12, 4641-4642].

¹⁸³ Captain Pryke [Day 45, pp.152-153]

¹⁸⁴ [Marine 8, 1998].

¹⁸⁵ §11 3rd Supplemental Statement of Wong Wing Chuen [Marine 12, 4641-4642].

¹⁸⁶ §70, Captain Pryke's Report (Part 2) [Expert 3, 1136].

¹⁸⁷ Captain Pryke, [Day 45, p.108]; Lee Kwok Kuen, [Day 48, p.55].

135. The Marine Accident Investigation and Shipping Security Policy Branch (“MAISSPB”) of Mardep is responsible for conducting investigations into all marine accidents occurring in Hong Kong and on board Hong Kong registered ships.¹⁸⁸ The primary purpose of investigation carried out by MAISSPB is to ascertain the circumstances and the causes with the aim of improving the safety of life at sea and, by publicising the findings of the investigations, the avoidance of accidents in the future.¹⁸⁹ The Code of the International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Marine Incident (Casualty Investigation Code), MSC.255(84) sets out the international standards and recommended practices for a safety investigation into a marine casualty or marine incident.¹⁹⁰ Chapter 16 of the Casualty Investigation Code provides that the investigator carrying out a marine safety investigation should have functional independence from the parties involved in a marine incident and anyone who may take administrative or disciplinary action against an individual or organization involved in a marine casualty.¹⁹¹ This is the case in the UK and in Australia.¹⁹² This is however not the case with MAISSPB as they are a unit within Mardep.¹⁹³ In other words, the investigator and the regulator are not separated.

¹⁸⁸ [Expert 3, 1558].

¹⁸⁹ [Expert 3, 1559].

¹⁹⁰ [Expert 3, 1533-1556].

¹⁹¹ [Expert 3, 1548].

¹⁹² §85, Captain Pryke’s Report (Part 2) [Expert 3, 1143].

¹⁹³ §5-12, Statement of Cheng Yeung Ming [Marine 13, 5098-5100].

136. Plan approval and survey are carried out by Mardep but the process may be carried out by different surveyors. In the case of Lamma IV, it appears that the Ship Inspectors who approved the plans never physically inspected the vessel, and a whole chain of inspectors who did inspect the vessel never approved the plans or had any role in that process. This resulted in the absence of a watertight door for the access opening in the watertight bulkhead at frame ½ being missed. There was some evidence from Wong Chi Kin¹⁹⁴ that he could have approved a certificate of survey in the exercise of his discretion even if it had not been build in accordance with its plans but it is submitted that such evidence is mere *ex post facto* hypothisation and it has been demonstrated in cross examination that the foundation for doing so (namely by comparing the size of the engine room and the combined size of the tank room and the steering gear compartment – see his witness statement)¹⁹⁵ was unsound because it does not take into account the increased moment involved if one is looking at the steering gear compartment and the tank room.
137. Vessel lightship weight and other particulars are not required to be noted annually in regulatory inspections¹⁹⁶ and they are not recorded in the vessel's certificate of survey and other similar instruments. In the case of Lamma IV, this meant that changes in its weight went unnoticed.

¹⁹⁴ Wong Chi Kin [Day 17, p.34].

¹⁹⁵ At §56 [Marine 11, 3882].

¹⁹⁶ Dr Armstrong (Part 2) [Expert 3, 1670].

138. The issue of watertight subdivision appears not to be understood in Annex F to the 2006 Code of Practice. This has led to much argument over whether a watertight door was required for the aft peak bulkhead in Lamma IV.
139. There is no effective regulation governing the attachment of seats. The Blue Book required seats to be “properly secured”.¹⁹⁷ The 1995 instructions required them to be “adequate for the intended service”.¹⁹⁸ The latter wording was reflected in the Lamma IV’s certificate of survey in force at the time of the collision.
140. There is no requirement for parachute rocket flares to be kept in the wheelhouse¹⁹⁹.

I3. Measures for the prevention of the recurrence of similar incidents in future

141. Captain Pryke has suggested that consideration be given to the following matters:
- 141.1. whether safety legislation for ferries and launches carrying more than 100 passengers is made common;
- 141.2. whether operators of ferries carrying more than 100 passengers should be required to implement a safety

¹⁹⁷ The Blue Book §26 [Marine 8, 1773].

¹⁹⁸ The 1995 Instructions Ch.III §4.1 [Marine 8, 1835].

¹⁹⁹ Dr Armstrong (Part 2) [Expert 3, 1660]

- management system, with Mardep arranging or specifying suitable training courses for owners and coxswains;
- 141.3. whether all ferries or launches carrying more than 12 passengers should be fitted with VHF radio, and more than 100 passengers, with AIS, collision avoidance radar, and VHF radio;
 - 141.4. whether liferaft capacity be provided for all passengers on longer voyages outside the harbour;
 - 141.5. whether sufficient children's lifejackets should be carried for every child on board;
 - 141.6. whether all coxswains of vessels carrying more than 100 passengers should have a basic medical examination and eyesight test at intervals not exceeding 5 years, and whether all seamen required to keep a lookout should have an eyesight test;
 - 141.7. whether legislation should permit the harbour police to randomly test for drug and alcohol consumption;
 - 141.8. whether all vessels carrying more than 100 passengers should have a lookout on the bridge in addition to the coxswain during the hours of darkness and in reduced visibility, and whether high speed craft should have a lookout on the bridge at all times;

- 141.9. whether all passenger vessels carrying more than 100 passengers should have a muster list so that every member of the crew is aware of his duties in the event of emergency;
- 141.10. whether a small adjustment should be made to the VTS boundary between the Channel 67 area and Channel 14 area;
- 141.11. whether a new speed limit should be introduced in the approaches to Lamma Island;
- 141.12. whether high speed craft built before 2007 should be required to have a route operating manual and a training manual, and whether Mardep should clarify the issue regarding carriage of a quick flashing amber light by High Speed Craft;
- 141.13. whether Mardep should consider the mandating of a high speed radar simulator course for all coxswains of high speed craft (built before and after 2007);
- 141.14. whether consideration should be given be to removing MAISSPB from the Mardep organisation in accordance with the Code of the International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Marine Incident (Casualty Investigation Code), IMO resolution MSC.255(84).

142. In connection with the last issue, Mardep has submitted the statement of Cheng Yeung Ming²⁰⁰.

143. Dr Armstrong has submitted a total of 59 possible recommendations for consideration. A number of these are in the nature of drafting amendments to the legislation and the Code of Practice 2006. However, the most significant recommendations are as follows:-

143.1. A high level statement of safety objectives be documented, as in Australia.²⁰¹

143.2. Consideration be given to the question of whether the division of plan approval and survey by Mardep might lead to errors;²⁰²

143.3. The instruments referred to in section 75(a) of Cap.548G record the vessel lightship particulars as well as other principal characteristics.²⁰³

143.4. The Code of Practice be modified to include reference to the impact of modification on damage stability and watertight subdivision.²⁰⁴

²⁰⁰ [Marine 13, 5097+]

²⁰¹ [Expert 3, 1668 & 1673]; *c.f.* [Expert 3, 1730-1742].

²⁰² [Expert 3, 1642-1643].

²⁰³ [Expert 3, 1645 & 1670].

²⁰⁴ [Expert 3, 1645].

- 143.5. The annual survey catalogue a number of additional features, including watertight doors, location of battery supply, and modifications.²⁰⁵
- 143.6. Cap.548 be amended to include a definition of the term “lifejacket” that incorporates ISO 12402-3:2006 or equivalent.²⁰⁶
- 143.7. Cap.548G be amended to require children's lifejackets on all classes of vessel,²⁰⁷ and consideration be given to the need for infants lifejackets.²⁰⁸
- 143.8. That Cap.548 be amended to require, in addition to “5% children jackets”, such greater number as may be required to provide a lifejacket for each child on board.²⁰⁹
- 143.9. The Code of Practice be amended to require a source of emergency electrical power separate from the main power supply which is located outside the machinery space and above the waterline.²¹⁰
- 143.10. The Code of Practice, in particular Annex F, be rewritten to cover adequately the issues of watertight subdivision

²⁰⁵ [Expert 3, 1670].

²⁰⁶ [Expert 3, 1645 & 1669].

²⁰⁷ [Expert 3, 1646 & 1669].

²⁰⁸ [Expert 3, 1672].

²⁰⁹ [Expert 3, 1646 & 1669].

²¹⁰ [Expert 3, 1647 & 1669].

and damage stability, including a concise summary of the outcomes to be achieved by watertight subdivision.²¹¹

143.11. The Code of Practice should include some realistic value against which the attachment of seats might be judged and a Regulatory Impact Assessment be made of the work and cost required to attach seats to GRP foam sandwich construction decks more robustly.²¹²

143.12. The Certificate of Survey or Certificate of Inspection contain a statement signed by the surveyor that the vessel has been built in accordance with the approved plans.²¹³

143.13. Rocket parachute flares be carried in the wheelhouse.²¹⁴

143.14. Watertight doors be fitted with alarms to the wheelhouse to indicate whether they are open or closed and that they be appropriately marked.²¹⁵

²¹¹ [Expert 3, 1647-1653]. In evidence, Dr Armstrong suggested that the summary might include a statement of the criteria (fundamentally the margin line); a calculation of the location of the bulkheads, a statement of the extent of flooding - which could be the same as already contained in Annex F and probably should be, because it is the same as SOLAS; a statement of where the damage occurs, which may be the one-compartment standard; and then a simple phrase saying. According to Dr Armstrong: "In case of damage to any one compartment, the margin line should not be submerged" [Day 46, p.163].

²¹² [Expert 3, 1653 & 1671].

²¹³ [Expert 3, 1655].

²¹⁴ [Expert 3, 1660 & 1669].

²¹⁵ [Expert 3, 1669].

- 143.15. Vessels certified before 1 January 2007 to carry more than 100 passengers be checked to identify the standard of watertight subdivision.²¹⁶
- 143.16. A regulatory impact assessment of the feasibility and cost of fitting Voyage Data Recorders to all passenger craft be carried out.²¹⁷

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²¹⁶ [Expert 3, 1671].

²¹⁷ [Expert 3, 1656 & 1671].