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Wednesday, 6 March 2013

(10.00 am)

CAPTAIN NIGEL ROBERT PRYKE (on former oath)

THE CHAIRMAN: Good morning, Captain Pryke.

A. Good morning, sir.

THE CHAIRMAN: May I remind you that you continue to testify according to your original oath.

A. Yes, sir.

THE CHAIRMAN: Mr Shieh?

MR SHIEH: Mr Chairman, just before we recommence Captain Pryke's evidence, could I just report on the latest development about the inspection, the need of which has evaporated because of some revelations last night, that after all the wires had indeed been cut by Mardep after the collision. Initially, for some reason, it wasn't spotted or was not on the record, but eventually Mardep confirmed that for investigation purposes, the various wires that were observed to be cut, as we saw yesterday, had indeed been cut by them after the event.

THE CHAIRMAN: Very good.

Examination by MR SHIEH (continued)

MR SHIEH: Captain Pryke, we now come back to your written report. Yesterday we stopped, I believe, at expert bundle 3, page 1130. You were commenting on the figures that had been made available to you as to fatalities in

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marine accidents or collisions by MAISSPB. Do you remember that?

A. Yes, I do.

Q. That is the last part of section C.5, where you set out your observations. May I now move on to part D, where the suggested changes were discussed. The relevant part is D.5, which is page 1142.

A. Yes.

Q. D.5.1, "Requirements for High-speed Craft":

"Paragraph 25 above notes that also high-speed local ferries are required to have an operating manual, route operating manual, training manual and maintenance manual. I would suggest a review of the current situation which appears to exempt HSC built before 2007 from the new system of control in the 2006 Code. I fully understand why such vessels should be exempt from new structural requirements, but I completely fail to understand why they would be exempt from the requirement for an operating manual, route operating manual and a training manual."

A. Yes.

Q. That's your view. Is that dividing line because for structural matters, you can't go back and redo the vessel if it's been done pursuant to the rules in place at that time, but for things such as having an operating

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manual, these are readily achievable. Is that really the rationale for your drawing that distinction in this paragraph?

A. Yes. I think I'm drawing the distinction between technical build matters and operational matters. And operational matters, it seems to me, are relatively easier to modernise. I mean, it's only the question of having the manual printed; it's not very difficult.

THE CHAIRMAN: Could you help us as to what material one would find in those various manuals, the operating manual and the route operating manual? And applying it, say, particularly to the journeys that the Sea Smooth would have been involved in. We know it went to Peng Chau once and then it went to Lamma -- I think it was on its eighth trip to Yung Shue Wan.

A. The operating manual would have basic information about the equipment on the bridge, for example. Training manual speaks for itself, really.

THE CHAIRMAN: What about route operating manual?

A. Well, the route operating manual is -- I suppose the simplest way to describe it is it makes the operator think about the various parts of the route before the coxswain is given charge. In other words, perhaps where the anchorages are, what you need to watch out for in the anchorages, various navigation lights along the

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route, traffic you might find in particular places, et cetera. And very often reporting arrangements on the radio.

THE CHAIRMAN: Would it condescend to detail, for example, as to the recommended or suitable radar range to employ?

A. Yes, it probably would. Yes.

MR SHIEH: These manuals would obviously have to be tailor-made by the operator?

A. Yes, that's correct. The point about them is that they're relevant to a particular craft on a particular route.

Q. Which obviously calls for thinking and planning on the part of the operator?

A. Yes, planning. Yes.

Q. Coming back to the point which we touched upon earlier. In terms of let's say radar and technical equipment on the bridge, very often they come with English manuals or manuals in German or wherever they come from. So your suggestion of making these matters understandable to crew would again call for some work or planning or thinking on the part of the operator, because someone in the office would then have to make an effort of turning these into understandable language for the crew?

A. Absolutely right. I mean, the operating manual -- for instance, if all of the crew were Chinese-speaking and

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didn't speak English, then obviously they would have to provide the operating manual in Chinese.

THE CHAIRMAN: Dealing with radar, and correct me if I'm wrong, but the radar on Lamma IV was Furuno, was it not, and there's an issue about that not being in Chinese; only in English. But Furuno is a very big producer of radar, is it not?

A. Yes. It's a Japanese company and I would expect there to be a Chinese version.

THE CHAIRMAN: If they're anything like Japanese camera companies, they produce their manuals in more or less every known language, do they not?

A. Yes, indeed. I would fully expect a Furuno operating manual to be available in Chinese.

THE CHAIRMAN: Thank you.

MR SHIEH: But sometimes these manuals come in the form of a book -- I mean, even sometimes we get tired of reading a camera manual. But you would actually urge the operator to put some effort into perhaps distilling relevant parts or salient parts and turning them into proper language, understandable language?

A. Yes, absolutely. The point is --

Q. What I'm trying to get at is sometimes there may be a mentality of, "Look, this is something that comes in a box. I'll just dump it on the bridge and whoever wants

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to read it, they read it. I've done my part. If you don't read it, it's your problem". There is this mentality prevailing in many circles. You would obviously not go along with that?

A. This is the whole philosophy of the designated person. He is the man who is responsible for being the link between the stores office, the office generally, and the bridge of the ship. He is the man who would go down and say to the coxswain, "Look, have you got any problems with this? Can you understand this?" And he would be the man to sort it out.

THE CHAIRMAN: Would you expect the route operating manual, dealing now again specifically with Sea Smooth and its voyages to and from Yung Shue Wan, to have some reference to the lights emanating from the Hongkong Electric typhoon shelter?

A. Yes, I would. It's important to point out with all these safety management systems, it's a two-way thing. I mean, I would expect the coxswains to be delivering information to the designated person in the same way that he delivers information to them. So he would very quickly pick up the idea that there was a problem, if there was a problem, and it would go in the manual. That's how it works.

MR SHIEH: "D.5.2. Marine investigation.

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The Code of the International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Marine Incident (Casualty Investigation Code) ... sets out the international standards and recommended practices for a safety investigation into a marine casualty or marine incident. 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 organisation involved in a marine casualty. This is strictly speaking not the case with MAISSPB as they are a unit within Mardep. I note this was also observed in an IMO audit of Hong Kong, during which it was remarked that the 'degree of separation' between the MAISSPB and the prosecutions unit of Mardep 'needs to be very carefully monitored to ensure independence'."

Captain Pryke, perhaps you can develop this point further about separation and independence between Mardep, the regulator, and the authority responsible for taking disciplinary action.

A. Yes. I think it's well understood internationally that the investigation unit, its function is to investigate

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without any sort of blame or prosecution or being on any particular side. It's supposed to be completely independent and come up with findings that are useful to all sides, and findings that are aimed at increasing safety for the future. I know very little about how this works in Hong Kong. I just happen to notice that it is within Mardep and that's not such a good idea.

What I found a little disappointing was it's not easy -- and I've been through the MAISSPB website on two or three occasions -- to pull out really useful safety information and statistics, particularly on local craft. It tends to be much more focused on bigger ships.

Q. When you say "pull out useful safety information and statistics", you mean from Mardep?

A. No, from MAISSPB. In other words, what has been the previous history of incidents of local passenger vessels, can we extract any trends, et cetera. That's the purpose of MAISSPB as I understand it, to help everybody -- the operator, Mardep, the coxswain -- understand what is going wrong, if anything is going wrong.

Q. Paragraph 85:

"My understanding currently is that internal investigation of accidents by the ferry operators is patchy. Also the MAISSPB as the official marine

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accident investigation branch is firmly established within Mardep. In other administrations, the official accident investigation branches are completely separated from the safety administration department. In the UK, for example, there is the Marine Accident Investigation Branch. In Australia, it is the Australian Transport Safety Bureau, which covers aviation, marine and rail accident investigation. In my view, consideration should be given to how this might be achieved outside the Mardep structure. It is important that such a body is separate from the regulatory body."

Can you perhaps describe the manner in which these two examples work, to the best of your knowledge, let's say from your home jurisdiction in the UK? The MAIB is a separate government department or bureau?

A. Yes. The MCA, the Maritime and Coastguard Agency, which is, I suppose, the closest thing to Mardep, works as a separate organisation under the Department of Transport, and MAIB, the Marine Accident Investigation Branch, also works as a separate undertaking, alongside MCA but with totally separate management. And they both report to the Shipping Minister.

Q. "Enforcement", D.5.3 --

THE CHAIRMAN: Before we move on, can you remind me, did Mr Wong Wing-chuen address this issue at all in his

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various statements? Mr Mok?

MR SHIEH: As to separation of roles?

THE CHAIRMAN: Well, as to the current system, as to how this accident investigation unit is housed within Mardep and its relationship.

MR SHIEH: Could I just have one moment to check?

THE CHAIRMAN: Yes, please.

If you're able to assist, Mr Mok, please do.

MR MOK: I'm looking for the reference, Mr Chairman.

MR SHIEH: It is in his second supplemental report, where he set out an overview of the current regime. But can I just check?

THE CHAIRMAN: Yes.

MR SHIEH: Paragraph 51, for example, at page 4177. He refers to the prosecution unit. I wonder whether that can be put on the screen for Captain Pryke to have a look.

THE CHAIRMAN: Yes. Page 4177.

MR SHIEH: Paragraph 51. He refers to it as a prosecution unit, which is probably the same as the MAISSPB.

A. With respect, no, it's not.

THE CHAIRMAN: This will be criminal prosecutions as opposed to marine investigations of accidents?

A. Yes, that's correct.

MR SHIEH: Could I just check whether or not there is any

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other ...

Mr Chairman, a quick look at the second supplemental doesn't appear to --

THE CHAIRMAN: We can come back to this, if somebody could be looking through it to see if they can find it.

MR SHIEH: If it's actually there.

THE CHAIRMAN: Yes, if it is addressed.

MR SHIEH: If it's there, yes. Perhaps I'll move on with "Enforcement" while Mr Mok and those acting for Mardep look up whether or not there's anything there about the MAISSPB.

Paragraph 86, under "Enforcement":

"I have seen a record of fines issued to coxswains of local vessels for breaches of the COLREGs and/or local speed limits. My impression is that generally these fines are quite low and I am unable to judge how effective the current system is."

But do you have any suggestion as to possible areas of consideration in respect of enforcement or deterrents by way of fines and punishments?

A. Yes. It's one thing to prosecute a coxswain for failure to obey a speed limit. But I don't think that's really the issue. If I may turn to what is tab 6 in my report, page 1223.

Q. Yes.

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A. This gives the details of merchant shipping, domestic passenger ships, safety management code regulations. And this is admittedly UK regulations, but just for example, on page 4, item 9, "Enforcement":

"An authorised person ..."

Which would obviously be a Mardep surveyor:

"(a) may inspect a safety management system on the basis of which a domestic ship safety management certificate has been issued,

(b) may inspect a ship for the purpose of seeing that these regulations are complied with.

(2) An authorised person exercising functions under this regulation shall have the powers conferred on an inspector --

(3) Where an authorised person considers that a ship, notwithstanding that a domestic ship safety management certificate is in force in relation to that ship, is unable to operate without creating a risk of serious danger ... the Secretary of State may suspend the ... certificate of that ship until such time as any risk is removed."

So my idea of enforcement is more that the inspector in effect ties the ship up until it's put right, rather than all the time focusing on the coxswain's right or wrongs. It's about the whole management of that ship,

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and it is up to the authority, which in this case is Mardep, to check whether things are going well and according to the safety management plan, and if not, that the safety management certificate would be withdrawn and the ship is tied up. That's more my idea of enforcement than fining somebody $2,000.

Q. Thank you. Captain Pryke, turning on to part E of your written report --

THE CHAIRMAN: Before we do that, could we just have a look at the footnote reference 210, where these fines have been set out. Looking at paragraph 86.

MR SHIEH: Marine bundle 12, page 4636-19, which is an email, at the bottom. I think the table is what we are really looking at. The table is actually page 4636-21. There is a number of codes, offence code and vessel type and length and date of the relevant offences. But they're all pleaded guilty, and the highest of them amounted to 15,000; the lowest of them was 1,000.

Is that the data you had in mind, Captain Pryke?

A. Yes. Believe me, I'm not saying it's wrong to prosecute somebody for blatant rule of the road offences. I'm not saying that's wrong, but I'm saying that's not the only thing that ought to be considered in terms of enforcement.

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THE CHAIRMAN: So that we can understand how these prosecutions come about, are we to understand the email at page 4636-19 to detail 11 cases of collision, 11 that involved high-speed craft, which cases had been investigated by the Marine Accident Investigation Section, and that then led in two of the cases -- that then led in four of the cases to prosecution. So it was an accident investigation followed by a prosecution. So there is a link between the two bodies, it would appear?

A. Yes.

THE CHAIRMAN: So a collision triggers an investigation. In some of the investigations, that then leads to a prosecution?

A. Yes. That's quite logical in some cases. But what I was trying to get at was that the investigation is supposed to be wider than just the offence of an individual. I'm not saying it's wrong to prosecute somebody who offends, but there should be a greater degree of separation, in my view.

THE CHAIRMAN: Yes. Thank you.

A. I think what I'm trying to say is that the MAISSPB accident report should not be purely a tool for the prosecuting department.

THE CHAIRMAN: Well, on its face it doesn't look as though it is, because it's only four out of 11 that then

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resulted in prosecutions. Perhaps they were egregious examples of breaches.

A. Yes.

MR SHIEH: Can I now turn to part E, where you set out your conclusion and summary of opinions.

E.2, you would suggest that consideration be given to the following aspects, and you then set out 14 points:

"(1) Whether safety legislation for ferries and launches carrying more than 100 passengers is made common.

(2) Whether operators of ferries carrying more than 100 passengers should be required to implement a safety management system. It would be appropriate for Mardep to arrange or specify suitable training courses for owners and coxswains.

(3) Whether all ferries or launches carrying more than 12 passengers should be fitted with VHF radio. All ferries or launches carrying more than 100 passengers should be fitted with AIS, collision-avoidance radar, and VHF radio.

(4) Whether serious consideration is given to the provision of life raft capacity for all passengers [on board] on longer voyages outside the harbour. It may be considered that this could be implemented over several

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years.

(5) Whether sufficient children's life jackets are carried for every child on board, and whether the statutory requirement for children's life jackets should be one life jacket for every child actually on board the vessel.

(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 look-out should have an eyesight test.

(7) Whether legislation should permit the harbour police to randomly test for drug and alcohol consumption.

(8) Whether all vessels carrying more than 100 passengers should have a look-out 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 look-out on the bridge at all times.

(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.

(10) Whether a small adjustment should be made to the VTS boundary between the channel 67 area and

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channel 14 area.
(11) Whether a new speed limit should be introduced in the approaches to Lamma Island. As there is no specific port control for Lamma Island berths a speed limit would be an improvement to the local safety regime. This would have a negligible effect on the passage time of Lamma Island ferries.
(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. Evidence has been given that Sea Smooth was not required to display this light, however it would appear that there might be a general impression that having the light gives right of way over other vessels.
(13) Given the frequency of collisions in this very busy harbour and the extreme hazard associated with high-speed collisions, 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).
(14) Whether consideration should be given to removing MAISSPB from the Mardep organisation in accordance with the Code of the International Standards

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and Recommended Practices ..."
So these are the suggested areas for consideration, are they not, Captain Pryke?
A. Yes, that's correct.
THE CHAIRMAN: That paragraph 12, there is an omission, is there not? You suggest there should be an operating manual as well as a route operating manual, together with a training manual?
MR SHIEH: Yes, three types of manuals instead of the two mentioned there, Captain Pryke.
THE CHAIRMAN: I'm looking back at paragraph 83.
A. Yes. The operating manual is more a technical thing about the craft. I consider these two to be more important in an operational safety sense.
THE CHAIRMAN: Yes, I follow that. But in our evidence that we've received, we have indications of the absence of understandable equipment operating manuals causing a problem.
A. Yes, I understand. Yes, I should have put that in.
MR SHIEH: Mr Chairman, subject to what Mr Mok is about to clarify about whether any specific evidence has been given on behalf of Mardep on MAISSPB, I have no further questions for Captain Pryke.
THE CHAIRMAN: Thank you very much.
Mr Mok?

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MR MOK: Mr Chairman, I don't think there is a specific section in the witness statements dealing with the investigation section. But my understanding is this, that usually the frontline people are the patrol division of the police, the harbour patrol, and then if an accident is spotted or there is a report of it, then the marine investigation section would then be engaged to investigate into the cause of the accident or incident, and a report would be provided. The report will go to the relevant ranks within the Department for follow-up, to reassess whether or not any risk should be addressed and any measure should be taken to improve either the system or the procedures in the future, and then, in suitable cases, they will of course be referred for prosecution.
So that's the sort of process that I understand is in place. If, Mr Chairman, you need something in writing, we can follow up by a letter or an email to set out --
THE CHAIRMAN: I think it would help, for this reason, that Captain Pryke is recommending that this accident investigation body should be independent from the Marine Department.
MR MOK: Right.
THE CHAIRMAN: I think it would help to have information

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from the Marine Department as to how it is currently constituted and what, if anything, the Marine Department has to say about the recommendation.
MR MOK: Then should I ask the Marine Department to follow up this matter by a letter setting out the procedure?
THE CHAIRMAN: Or a short statement from somebody.
MR MOK: Or a short statement.
THE CHAIRMAN: Simply so that we have the information. For example, we have no idea how many personnel are involved, what the rank structure is, how it does liaise with the rest of the Marine Department.
MR MOK: All right. Maybe a short statement about the structure and the function of the marine investigation section.
THE CHAIRMAN: That would help, thank you.
MR SHIEH: I have no further questions for Captain Pryke.
THE CHAIRMAN: Thank you. Give me a moment, please.
Mr McGowan, do you have an application?
MR McGOWAN: Yes, sir, I do. The questions I'd like to ask, or the areas I'd like to cover are the actions of Coxswain Chow; the radar; the fourth crew member; and the organisation of the marine department or the marine section of Hongkong Electric and its relationship with management.
THE CHAIRMAN: So Hongkong Electric's marine section and its

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link with management?
MR McGOWAN: Yes.
THE CHAIRMAN: Having regard to what he said about the position that the marine officer occupied in the hierarchy?
MR McGOWAN: That's correct.
THE CHAIRMAN: Yes, please do so.
MR McGOWAN: Thank you.
Examination by MR McGOWAN
MR McGOWAN: Perhaps before I deal with anything else, Captain Pryke, I'd like to go back to something you said yesterday in the transcript, which appears on pages 53 and 54. There seems to have been some confusion, when you were dealing with what you'd said in paragraph 27 of your initial report, as to which vessel you were referring to. I refer particularly to the report in the South China Morning Post this morning which appeared to be referring to your comment which appears on page 54 at lines 6, 7 and 8. At that particular answer, you said:
"Well, I was tempted to say that I would change paragraph 27(d) ..."
That's of your original report; is that correct?
A. Bear with me.
THE CHAIRMAN: Perhaps we ought to give Captain Pryke a chance to look at his report.

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MR McGOWAN: Yes, certainly. That's in the expert bundle, page 11.
A. Right, yes. I have it.
Q. Paragraph 27 in your original report refers to the actions or lack of actions of Sea Smooth; correct?
A. Correct.
Q. Yesterday, in the portion of the transcript that I've just taken you to, again, you were referring to the actions of the Sea Smooth and Coxswain Lai; is that correct?
A. May I just read it?
Q. Yes, certainly.
A. Yes. Referring to paragraph 27(d) obviously refers to Coxswain Lai on the Sea Smooth.
Q. Right. So the reference that appears on page 54 of the transcript of yesterday, where you said, "It wasn't a practical collision-avoidance option; it was just a last-minute panic", was referring to what Coxswain Lai did?
A. Correct.
Q. Not Coxswain Chow?
A. Correct.
THE CHAIRMAN: That's made perfectly clear from page 50, where Captain Pryke read out that part of his report.
MR McGOWAN: Yes. I don't know whether you've seen the

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South China Morning Post this morning --
THE CHAIRMAN: I'm not in the business of correcting misleading press reports, Mr McGowan, and you've been long enough in this business to know that when one participates either as a barrister or as a judge, one often pinches oneself when one reads what the press has written up as being the story.
MR McGOWAN: Well, I know, sir, that's correct, but I just wanted to correct this.
THE CHAIRMAN: You better direct your attention to what we form as our view. I have no doubt at all because Captain Pryke referred to Sea Smooth in terms when he read out paragraph 27.
MR McGOWAN: Right, sir.
You also made mention of Coxswain Chow yesterday.
A. Yes.
Q. And you referred or you were asked about his use of radar which he had referred to in his evidence.
A. Yes, correct.
Q. On his evidence, as I think he originally said to the police, he had his radar switched to the 1-mile range scale?
A. Yes.
Q. He was doing a speed of 11 or 12 knots?
A. Yes.

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Q. Do you think that 1-mile range scale is a good range scale in Hong Kong waters for the initial detection of targets or other vessels?
A. Yes, generally. The STCW rules would have you change up a range routinely to check what was coming ahead of you, and I agree with that. I think every five minutes or so, you would go up to a 3-mile range to check what was happening a bit further away. But generally the 1-mile range for him would be correct, I would think.
THE CHAIRMAN: Just give me a moment, please.
The STCW rules you refer to, are you able to refer us to them?
A. Yes, I am, sir. It might take a minute.
THE CHAIRMAN: First of all, could you help us with the acronym STCW?
A. It's on page 1401. STCW is the standards of training, certification and watchkeeping.
THE CHAIRMAN: Yes. Thank you. Where is the --
MR SHIEH: Paragraph 14 to this Code, Mr Chairman, at page 1110. There's a reference in footnote 24 to the actual Convention.
THE CHAIRMAN: Is there anything that condescends to this particularity, that every five minutes you would go up to a 3 nautical mile range?
A. Yes, there is a reference to going up to a higher range.

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THE CHAIRMAN: Yes. Where do we find that? Take your time.
A. It's on page 1407, paragraph 38:
"The officer in charge of the navigational watch shall ensure that the range scales employed are changed at sufficiently frequent intervals so that echoes are detected as early as possible. It shall be borne in mind that small or poor echoes may escape detection."
THE CHAIRMAN: And in the context of these waters, in particular no doubt the waters -- rather, whilst the vessels are plying between Lamma Island and Green Island and Sulphur Channel, a 1 nautical mile range you would accept would be described as a good range, but with changes every five minutes upwards to 3 nautical miles?
A. I mean, I shouldn't be specific in saying "five minutes", but every so often they should go up to a higher range to check what else is in the area. There is further reference in here on, for instance, page 1404, when the general requirements for a look-out -- you look at the traffic density, the proximity of dangers, et cetera. And clearly, the presence of high-speed craft operating in the area would make you look a bit further ahead.
THE CHAIRMAN: And in your initial evidence, you said that Coxswain Chow, whilst in the typhoon shelter, should have had a look at his radar on a 3 nautical mile range,

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and if he'd done so he would have seen Sea Smooth at something like 20:16 as she was making her way south from Sulphur Channel?
A. Yes. In my view, it would have been best practice to look at the radar before he actually left the berth.
MR McGOWAN: Which I think he said he did, but not at a 3-mile range scale.
A. Yes.
Q. But in terms of any immediate dangers to his navigation, a 1-mile range scale would give him that indication. Do you agree with that?
A. Yes. But of course you have to also bear in mind what we've said on so many occasions: that 1-mile range scale at the speeds that we're talking about here would only cover something like a minute and a half ahead when two ships are approaching at these speeds.
Q. Yes. I think, Captain, you're also aware of the evidence from the VTC operators and indeed the port control director, who you spoke to -- I think that's Mr Cheung --
A. Yes.
Q. -- about the ranges at which people operate in Hong Kong and the times that they alter course with these small, highly manoeuvrable vessels?
A. Yes, I'm aware of that.

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Q. Indeed I think you very fairly changed your original views with more experience of how these vessels operate in Hong Kong?
A. Yes.
Q. In your note, when you came back on the second occasion?
A. I think sometimes the close proximity of incidents is what I would consider too close, but I understand that it happens a lot. But I take your point. I understand what you're saying.
Q. Yes. And we know, of course, that Lamma IV was proceeding at a speed of 11 or 12 knots?
A. Correct.
Q. Whereas Sea Smooth was operating on a 0.75 radar range and travelling about twice as fast?
A. Yes, indeed.
THE CHAIRMAN: What do you say about that? The question that Mr McGowan asked you was was 1 nautical mile a good range for Lamma IV, travelling at her speed and where she was? What about a 0.75 nautical mile range on the radar for a vessel travelling at 24.5 knots?
A. I would say that was clearly inadequate. I would think -- Coxswain Lai did in his evidence say that he manoeuvred through a fleet of small fishing boats when he was coming through the anchorage, and I'm assuming he put it on the low range because he was doing some quite

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difficult manoeuvring between small boats. In my view, when he completed that, he should have gone up a range.
MR McGOWAN: I stand to be corrected: I don't believe he changed his range scale at all when the small vessels he encountered were coming through the Sulphur Channel.
THE CHAIRMAN: That's my understanding.
A. Yes, quite possibly.
THE CHAIRMAN: The range was set at 0.75 nautical miles.
MR McGOWAN: Throughout, and it stayed on that throughout.
THE CHAIRMAN: Yes, because visibility was good.
A. I think when we're talking about the ranges, it's important to note -- and we discussed yesterday about bridge design. If the radar screen is in front of the coxswain, not obviously interfering with his visibility, but so that he can glance at it frequently all the time, then of course 1 mile is perfectly adequate because he wouldn't miss anything. But if it's over here (indicates) and you have to lean over and make a special effort to look at it, then it becomes a very different situation.
MR McGOWAN: Yes. I don't think anyone disputes that, Captain.
Really, it would appear that Coxswain Chow's failure was not to not use the radar at all, but not to maintain a reasonably frequent update of the radar picture as he

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proceeded northwards?
A. That would be my understanding, yes.
THE CHAIRMAN: That's an issue for the Commission to determine, whether or not radar was used.
MR McGOWAN: Yes. I'm prefacing this -- that was his evidence, that he used it. It's obviously a matter for you to decide whether he did, and whether he did it sufficiently.
But the radar would give you the initial sort of look-out warning which you could then look for the contact in the direction which you expect it to come visually?
A. That's what I would expect to happen, yes.
Q. And that shorter ranges of visual look-out are, I suggest, probably more accurate than a radar look-out, in that you'd be aware of the changing aspects of lights earlier, indicating a change or alteration of course or indeed a steady bearing?
A. When you're navigating, particularly on a small ferry, and you have a lot of echoes to deal with all at one time, then the radar picture is very much easier to deal with than the visual picture.
Q. That wasn't the situation on the night of 1 October, was it? Certainly as far as Lamma IV was concerned.
A. Lamma IV had, as I recall, a number of echoes in the

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anchorage, together with obviously Sea Smooth, yes.
Q. Yes. The echoes in the anchorage were a considerable distance away, and they were obviously at anchor?
A. Yes. I can't remember the exact distance, but -- well, not very far away.
Q. No, they were on his radar, but at anchor and off his track.
A. Well, he would have had other echoes on his radar. That's all I'm saying.
Q. Yes. Now, would you agree with me that estimating distances at night at sea is difficult?
A. Well, again, that's where the radar comes in. It makes it very easy.
Q. Yes. If you look away from what you've just seen and go to the radar and then try and find it on the radar. What I'm just saying is that an estimate of 3 cables, as we've had in this particular matter --
THE CHAIRMAN: So you're describing a visual estimate?
MR McGOWAN: A visual estimate, yes.
On first sight, it takes a little bit of time to actually work out exactly what the lights are indicating to you?
A. Yes, indeed.
Q. Particularly if you're trying to estimate distance. That can be quite difficult?

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A. Yes. I think distance is very often difficult to judge at sea.
Q. So the estimates that you have used to describe the actions and the times in this case are based on estimates of distance at night made by Coxswain Chow, the engineer, and indeed later on Coxswain Lai?
A. I'm sorry, I'm not with you. Which estimates are you talking about?
Q. Well, for example, yesterday when you were describing your view of what happened and when it happened, you were using Coxswain Chow's estimate of 3 cables when he first saw Sea Smooth.
A. If I could just absolutely clarify that. What I was trying to do was to put down on a timeline what we had heard in evidence.
Q. Yes.
A. I'm not saying that was my opinion of what happened. I was just trying to say that if you wanted a timeline based on the evidence that had been heard by the Commission, based on the distance travelled between various points -- that's all I was trying to do.
Q. Yes. I think you were matching up your plot and the times that could be discerned from the VTC information with various observations made by people on board the vessels. Would that be a fair way of putting it?

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A. Don't forget this was in the context of the Chairman saying to me, "What do you now know that you didn't know then from listening to the evidence of the two coxswains?" So it's in that context.
Q. Yes, that's right. But their estimates are difficult estimates, made at night, effectively on first sighting another vessel, calculations of distance.
MR SHIEH: I don't mean to unnecessarily intervene, but very often questions of this nature really verge on asking the witness to really comment on the veracity of the primary witnesses, whether they were actually giving --
THE CHAIRMAN: We have your point. Thank you. We have your point.
MR SHIEH: Not that these are submission points, but --
THE CHAIRMAN: Well, it is a submission point, and the point is going to be: 3 cables may not be accurate. Is that what you're going to come to, really, at the end of the day?
MR McGOWAN: Yes.
THE CHAIRMAN: All Captain Pryke can do is deal with the evidence as it was.
MR McGOWAN: Yes, and I think he's very fairly conceded that 3 cables, 600, 700 yards, et cetera, or metres are all approximately in the same area and they are based on estimates of distance.

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THE CHAIRMAN: Can I ask you, Captain -- forgive me for interrupting, but whilst I remember the point. If Sea Smooth had been spotted at 1 nautical mile by Coxswain Chow on his radar, how long would it take him identify it as a high-speed craft?
A. It depends on a number of things. You mean purely from the radar picture?
THE CHAIRMAN: Yes. Given that they were going head-on to one another.
A. It comes back to the issue of whether you're monitoring the radar or whether you're just looking at it every two minutes. I mean, if you just look at it and look away, you won't learn anything about its speed at all. But it you're truly monitoring it, you will see the echo move very, very fast across the screen. Particularly if you're deploying your range rings, which on a 1-mile range you might have quarter-mile range rings, you would see the echo cover a quarter of a mile very, very quickly.
THE CHAIRMAN: Thank you.
MR McGOWAN: But it was only the alteration to port by Sea Smooth that brought her heading effectively directly towards Lamma IV, wasn't it?
A. Yes. The whole incident, the two echoes would have caused a collision alert in the VTS for quite

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a considerable time. But what had actually happened at about half a mile apart, they were -- because of Lamma IV's alteration to starboard, and before Sea Smooth then altered to port -- in fact not on a collision course for a very brief period. And the alteration to port brought them back on to a collision course. That was, I think, the point I was trying to make.
Q. Yes. I think you described it as something like a "fatal alteration" yesterday.
A. Yes. I think when you're that close and you alter in towards another vessel, and particularly altering to port, because it is -- in most rule-of-the-road situations you do not alter to port, except at a great distance.
Q. I think you described the alteration as "the fatal manoeuvre in this whole thing" yesterday.
A. Yes.
Q. The proposition put to Coxswain Chow by Mr Sussex was put to you yesterday, which is that his alteration to starboard was done at the very last moment, no more than 10 seconds before the collision. You disagreed with that and you said there were a lot of reasons why he altered a lot more than 10 seconds before the collision; that's Coxswain Chow altering to starboard. I wonder if

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you could just tell us what those reasons, that you believe he altered before that, are.
A. Well, I think in the timeline I put together yesterday, having looked at all the evidence, which is what I was asked to do, I concluded that the Coxswain Chow alteration to starboard, the sort of hard to starboard, was about a quarter of a minute before the collision.
It would not have been -- I think one of the reasons -- what you've driving at is that I have also said in the past that the collision onto the port quarter of Lamma IV would naturally force the bow round to port. But in actual fact, according to Dr Armstrong's calculations, the angle of the collision was about 42 degrees. In order for that to happen, Lamma IV would have had to have gone over, altered to starboard by some considerable amount. I think that's what I was trying to put across.
Q. Yes. So she came a long way round to starboard?
A. Yes, indeed.
Q. And that would take time? Although it's difficult perhaps to be specific.
A. It's very difficult to be specific. Both of these vessels I think would alter very quickly with a hard-over manoeuvre. I wouldn't like to guess on how many seconds that would be, but it could be quite quick,

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I would think.
Q. Were there any other reasons why you believe it was considerably more than 10 seconds before the collision?
THE CHAIRMAN: Well, so that I can try and follow this evidence, you call it "considerably more", but Captain Pryke has just said he concluded Coxswain Chow altered course hard to starboard one-quarter minute before the collision.
MR SHIEH: About 15 seconds. So not a good deal more.
THE CHAIRMAN: Yes. That's why I'm trying to understand the evidence.
MR McGOWAN: I think the expression he actually used --
THE CHAIRMAN: Let's deal with what he said today.
Today you've just told us, Captain Pryke, if my note is right, you concluded that Coxswain Chow had altered course hard to starboard one-quarter minute before the collision. Have I got your evidence correctly?
A. That's indeed what I said, Chairman, but I think I might have made a mistake. What I had written down yesterday, and I think probably what I said in evidence yesterday, was that Coxswain Chow altered course to starboard on his joystick at about 20:20:10. And the collision was --
MR SHIEH: 20:20:17.
A. -- 20:20:17, so that would in fact be seven seconds.

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I mean, this is -- I have to say it's a bit arbitrary.
MR SHIEH: Yes, because I remember Captain Pryke saying it was 20:19:50, first sighting, 3 cables; and then 20:20:10, altered course to starboard. That was the exact note of the timeline yesterday, Mr Chairman.
THE CHAIRMAN: Thank you.
MR McGOWAN: Perhaps if we're looking at what was said yesterday, could we have a look at page 57 of the transcript.
THE CHAIRMAN: Could you read out passage you say is relevant?
MR McGOWAN: Yes. The question was put by my learned friend Mr Shieh at line 11:
"Therefore, if it had been 3 cables, then fine, it may be slightly better. But if the finding is, no, it's actually about 10 seconds prior to the collision, then it perhaps casts more doubt on the adequacy of look-out.
Answer: Yes. I mean, I couldn't agree with that. I think it's got to be a lot more than 10 seconds --
Question: I know, I know.
Answer: -- for all sorts of reasons."
THE CHAIRMAN: You haven't established what he's talking about so I think you better go back to the bottom of page 56, please. Would you be kind enough to read that out.

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MR McGOWAN: Yes. Line 25?
THE CHAIRMAN: Yes.
MR McGOWAN: Right.
I'm asked to put this in Captain Pryke. Mr Shieh's question starts at the bottom of page 56, line 25:
"But, of course, depending on the Commission's factual finding as to at which point it was that he first visually sighted the Sea Smooth, questions as to adequacy of look-out could well have to be modified; would you agree with that? Because, I mean, from my perspective it's really a commonsense question, because the later you are found to have first sighted the other vessel, the more problematic your look-out must have been. Because otherwise you might have been able to see it earlier.
Answer: Oh, absolutely.
Question: Therefore, if it had been 3 cables, then fine, it may be slightly better. But if the finding is, no, it's actually about 10 seconds prior to the collision, then it perhaps casts more doubt on the adequacy of look-out.
Answer: Yes. I mean, I couldn't agree with that. I think it's got to be a lot more than 10 seconds --
Question: I know, I know.
Answer: -- for all sorts of reasons."

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A. I think what I'm referring to is the efficacy of the look-out.
THE CHAIRMAN: Yes. That's obvious.
That was the topic being dealt with, Mr McGowan: the look-out.
MR McGOWAN: Yes. But he said that the sighting was a lot more than 10 seconds.
THE CHAIRMAN: Yes.
MR McGOWAN: I was just asking him to give any more reasons he had.
THE CHAIRMAN: Not the hard to starboard, but the look-out; that's what the Captain was dealing with.
A. The closing speed, if I can just remind you, of 36 knots, 1 cable is covered in 10 seconds. So assuming the 3 cables was correct, he would have had 30 seconds in which to take avoiding action.
MR McGOWAN: And the appropriate avoiding action was a hard alteration to starboard; correct?
A. Yes.
Q. Which he did?
A. Yes, but I don't think he did it at 3 cables.
THE CHAIRMAN: It's your evidence that you think he did it at 20:10?
A. Indeed, sir.
THE CHAIRMAN: Having spent 20 seconds assessing the

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situation. That's what you told us yesterday.
A. Yes.
MR McGOWAN: But you don't know how fast she turned?
A. I would imagine she turned very fast. If you -- on the joystick -- the only doubt in my mind here is there was some evidence of a change in speed, and I really don't know at what time that happened. So if he had slowed down before he put the toggle over hard to starboard, then obviously it wouldn't have reacted as quickly as if he was going full speed. So the answer, in all honesty, is we don't know.
Q. If I can move on to the radar on board Lamma IV, which you described yesterday as a complicated piece of kit.
A. Well, according to the very, very wordy manual, it seemed quite complicated.
Q. Yes. It's got sort of bells and whistles attached to it, really, hasn't it?
A. Yes.
Q. It does all sorts of things.
A. Yes.
Q. But the basic principles and basic use for collision avoidance are not very complicated, are they?
A. On most radar sets, you can use it in a basic form, yes.
Q. And that's really all that was required for Coxswain Chow to know?

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A. It was required for him to know what the switches were, that he could set it up to a picture that he could understand and he could use.
Q. And he said that he was aware of how to use a radar for collision avoidance?
A. As I understand it, yes.
Q. The fourth crew member, you were asked about yesterday. That appears at page 95 of the transcript.
Are you aware, Captain Pryke, of the definition of a crew member for a local vessel in Hong Kong?
A. I have not read a definition of such, I don't believe.
Q. Perhaps I could ask you to have a look, please, and could we all have a look, at the Merchant Shipping (Local Vessels) Ordinance Cap 548, which appears at tab 13 of the legislation bundle 3.
A. Yes, I see that.
Q. On the second page, in the definitions section, the definition of "crew" is give -- that's part of section 2 -- as:
"... coxswain and any other person employed or engaged in any capacity on board a local vessel on the business of the vessel".
A. Yes, I see that.
Q. So that's the only definition of a crew member that we can find in Hong Kong.

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A. Right.
Q. So that could be anybody from the ship's cook right up to anyone who isn't the coxswain?
A. I understand.
Q. I believe you've discussed, during your visits here, the question of training and certification of crew members.
A. Yes.
Q. And there's no certificate required to be, if I can use the word generally, a sailor or a deckhand on board a local vessel in Hong Kong?
A. That's apparently true, yes.
Q. And no certification required?
A. That's right.
Q. As I think from the legislation you provided, it's very different in the UK where you have the concept of -- not able seamen any more, but able crew members, whether they're engineers or deck personnel?
A. Yes, that's right.
Q. And they are certified and they do have to do a qualifying period of training?
A. Yes.
Q. In the case of Lamma IV, our position is that on the night in question, there were a number of people on board who were acting as guides for the visitors.
A. I understand.

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Q. They, I would suggest, would have been people engaged in any capacity on the business of the vessel which was --
THE CHAIRMAN: Well, that's a matter for the Commission, it being a matter of law, not for the witness.
MR McGOWAN: Right. Well, again, no doubt that will form part of our submissions in due course.
THE CHAIRMAN: Yes.
Have you ever encountered a definition in these terms of crew on a vessel before?
A. No, sir.
THE CHAIRMAN: Mr Shieh, are you able to throw any light as to the provenance of this provision in Hong Kong's legislation?
MR SHIEH: Mr Beresford has literally just been showing me some case law on the issue of the meaning of the old Merchant Shipping Ordinance and what --
THE CHAIRMAN: Hong Kong case law?
MR SHIEH: English case law. But obviously these will form part of the submissions because these are research notes done over time. It's not intended that these matters be debated with the maritime expert. These matters are --
THE CHAIRMAN: No. I've indicated the Commission's position on that.
MR SHIEH: But there is actually some degree of learning as to the ambit of the --

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THE CHAIRMAN: We look forward to hearing what it is.
Mr McGowan?
MR McGOWAN: Of course, one of the matters you mentioned was discipline amongst the passengers.
A. Yes.
Q. Unless I'm stopped asking the question --
A. Sorry, I don't think I used the word "discipline". I think I used the words "crowd control".
Q. Well, yes, okay. The expression that's been used by people from Hongkong Electric who have given evidence is talking about discipline of passengers, which is essentially the same thing.
THE CHAIRMAN: Well, let's deal with crowd control, since that's a more readily understandable term.
MR McGOWAN: Very well.
Having extra people on board, given the number of passengers on board, assisting crew -- extra people there as part of the organisation of the event, would assist with crowd control. Do you agree with that?
A. Well, yes. I think that the whole point about the crew exercising crowd control is that they are recognisable as part of the crew and under the orders of the captain. Now, I would expect in such circumstances the crew to be wearing something that was recognisable so they were recognisable as a crew member. Otherwise their, let's

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say, ability to exercise crowd control is much more difficult.
Q. Yes. It would help in the exercise of crowd control?
A. Yes, indeed.
Q. Do you have any suggestions as to how frequently crew should be exercised in fires, emergency evacuations and so on?
A. I think you have to say that depends on the vessel. I would expect that the crew on a vessel like Lamma IV, they would at least discuss it at least once a week. And whenever there's a crew change -- that's why we've had I think a lot of talk about muster lists. Whenever there's a crew change, it's very important for the new person to know where he fits in as far as all these emergency duties are concerned.
Q. Yes. I think the evidence has been that the crews employed by Hongkong Electric have been employed for many years. They're not a new bunch of people joining an organisation, or a new individual joining an organisation; they're an organisation which has operated together on the same vessels for a very long period of time.
A. Yes, I understand that. But, I mean, it's still important to know which particular function you're expected to do in an emergency.

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Q. Yes. But if you have a three-man crew with a coxswain, an engineer and a crewman or a deckhand, one of those positions, you would know what your role is. Do you agree with that, Captain?
A. Generally, yes.
Q. And you wouldn't need to exercise quite as frequently as you're suggesting?
A. Well, I would like to see exercises happening, if it was my ship. I'm not quite sure what you're driving at.
Q. Well, these evolutions were exercised once a month on board the Hongkong Electric vessels by crew experienced in their roles.
A. Yes. I mean, if for example the same crew is operating throughout that month and they exercise once a month, I'm sure that's fine. But I would imagine that there are different personnel joining and leaving within that time.
Q. Sorry, I'm corrected. They're actually exercised once a week.
THE CHAIRMAN: Then you're ad idem, are you not?
MR McGOWAN: Exactly.
THE CHAIRMAN: Can we move to something where you're not?
MR McGOWAN: Certainly. I think the only other topic that I have to ask you about is the safety management organisation. Hongkong Electric are anxious to improve

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matters there, Captain Pryke. We have a situation where the marine section, which has the marine officer, and, you've looked at, is based at Lamma Island, at the power station there. And there is a man, Mr Cheng, who gave evidence, Francis Cheng, who is the general manager of that power station.
Now, he's not on the board of directors but he is in charge of the power station. Do you believe a direct line to him would meet your views on the position of safety, particularly marine safety, within that organisation?
A. Yes. I mean, obviously the Hongkong Electric Company is not a traditional shipowner in terms of its operations, so it doesn't fit in perfectly with what you would normally expect. If I could just read what it is the designated person is supposed to do:
"A company shall in relation to each ship owned by it or for which it has operational responsibility designate a person who shall be responsible for monitoring the safe operation of the ship and, so far as it may affect safety, the efficient operation of the ship.
(2) In particular, the designated person shall --
(a) take such steps as are necessary to ensure compliance with the safety management system on the

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basis of which the domestic ship safety management certificate was issued in relation to the ship, and
(b) ensure that proper provision is made for the ship to be adequately manned, equipped and maintained, so that it is fit to operate in accordance with that ... system ...
(3) The company shall ensure that a designated person --
(a) is provided with sufficient authority and resources, and
(b) has appropriate knowledge and sufficient experience of the operation of ships, to enable him to comply with his responsibilities ..."
I mean, I think that's the key issue, isn't it? "The company shall ensure that a designated person is provided with sufficient authority and resources", and that he has -- in the main international ISM it says that he shall have access to the highest level of management. And I think the highest level of management at Lamma Island is perfectly satisfactory.
MR McGOWAN: Thank you very much. I have no further questions.
THE CHAIRMAN: Thank you.
Do you have any questions on behalf of Hong Kong & Kowloon Ferry?

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MR CHAN: No, sir. Thank you.
THE CHAIRMAN: Mr Mok?
MR MOK: I have two minor matters of fact which I wish to invite Captain Pryke to consider correcting for the record.
THE CHAIRMAN: Yes. They are in which area?
MR MOK: They are in paragraph 1 of the expert report, and also paragraph 38.
THE CHAIRMAN: That's the latest report?
MR MOK: Of the latest report. They are minor matters.
THE CHAIRMAN: Yes, very well. Ask those questions.
MR MOK: Thank you.
Examination by MR MOK
MR MOK: Captain Pryke, can I invite you to the first paragraph of your second expert report. The second sentence starts with:
"On any day there may be up to 130 ocean-going vessels and 150 river-trade vessels being monitored by the VTC."
The true situation, Captain Pryke, seems to be more serious or busier than that. What I invite you to consider amending is replacing the words "On any day" with the words "At any moment", and for that may I invite you to look at appendix V, which is what your footnote refers to, page 1191.

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A. Yes.
Q. At lines 17 to 19. That's a record of your interview of Mr Chung Siu-man; correct?
A. Yes, I'm very happy to change that. "On any day", that was just a figure of speech, if you like.
Q. Thank you. It's just that --
A. It didn't mean a 24-hour day.
Q. Rights. I understand.
THE CHAIRMAN: So "At any moment"?
A. "At any moment", yes.
MR MOK: The second matter is paragraph 38 on page 1122, where you first of all refer to the control of marine traffic through the VTS system, and then you raise a number of points. It's the first one that I draw to your attention. You say:
"... no warning was issued to Sea Smooth by VTS control notwithstanding the collision alerts shown in the VTS system."
What I invite you to consider is to delete the words "notwithstanding the collision alerts shown in the VTS system". This is because, as you know, the VTC radar system is different from the one used by the police, which is tuned differently.
A. Oh, right. Right.
Q. And you see your reference at footnote 106 is to the

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police bundle.
A. Oh, right.
Q. So in the police radar system, there are some collision alerts which may be shown, but on the VTS system, maintained by Mardep, those same collision alerts may not be shown. So what I invite you to look at here is Mr Chung Siu-man's statement where he says that the non-participating vessels and vessels less than 35 metres in length would be filtered out of the VTS system. Could I invite you to look quickly at that. This is Chung Siu-man's witness statement at marine bundle 12, page 4621, please.
So you see in the first sentence, where he says:
"In order to avoid generating excessive alerts ... the VTS system is set to eliminate the generation of collision alerts for non-participating vessels which are less than 35 metres in length ..."
Which would include the Sea Smooth. Do you see that?
A. Yes, I do.
Q. And also in your supplemental statements, where those records from the Mardep VTS are produced, you will see that they are a little bit different from the ones maintained by the police.
THE CHAIRMAN: Just dealing with this particular point, the

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effect of what I think Captain Pryke is agreeing with is this: no warning was issued to Sea Smooth by VTS control, given that the system filtered out any collision alert for a vessel less than 35 metres?
MR MOK: Non-participating vessels, yes.
THE CHAIRMAN: Yes.
MR MOK: Yes.
Are you happy to accept that?
A. Yes, I am, indeed.
MR MOK: In that case, I don't need to refer to the records.
Those are my only questions, Mr Chairman.
THE CHAIRMAN: Thank you.
Yes, Mr Shieh?
MR SHIEH: Mr Chairman, just to follow up on two questions about the radar.
Further examination by MR SHIEH
MR SHIEH: Captain Pryke, just now Mr Chairman asked you about the swiftness with which one could see from the radar if they were 1 nautical mile apart, which the observer would be able to identify Sea Smooth as a high-speed craft; do you remember that?
A. Yes.
Q. Mr Chairman asked you how long would it have taken for Coxswain Chow to identify Sea Smooth as a high-speed craft if he had actually spotted it at 1 mile apart?

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A. Yes.
Q. I think the answer you gave, again prefaced by whether or not you were monitoring the radar or whether you're just looking at it every two minutes, but you said you would see the echo cover a quarter of a mile very, very quickly?
A. Yes.
Q. Again, prefacing my question with the acknowledgment that it's very difficult to give estimates as to time, would it be in a matter of a few sweeps that would be able to identify Sea Smooth as a high-speed craft, at the sort of speed that she is closing in?
A. Well, the closing speed, as I have mentioned before, would see 1 cable covered in 10 seconds.
Q. 10 seconds, yes.
A. So a quarter of a mile would be 25 seconds. So you would see it move through the quarter of a mile range ring in a matter of 25 seconds.
Q. Less than half a minute?
A. Less than half a minute.
Q. Yes. The second question is this. Mr McGowan asked you -- this is about the effect of the turn to port on the part of Sea Smooth and the effect of earlier radar monitoring. Because after you had given the answer that you would see the echo cover a quarter of a mile very,

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very quickly, Mr McGowan reminded you of your evidence that it was the alteration to port by Sea Smooth that brought the two vessels directly towards each other, and he reminded you of the evidence that you gave as to your description of a "fatal alteration" yesterday. Do you remember that?
A. Yes, I do.
Q. In fact, your notes you did previously at expert bundle 1, page 361-54, you actually made more or less a similar point. That is paragraph 10:
"At 20:19 hours, Lamma IV alters course to starboard such that at 20:19:30 hours she is steering 000 degrees. This means that Sea Smooth is no longer on her starboard bow, but is in fact on her port bow. If both vessels remain on their current courses, there will be no collision. They will pass each other on reciprocal courses at a distance of just under 1 cable or 1/10th of a mile. This is an unacceptable close-quarters situation, but there will be no collision."
Do you see that?
A. Yes.
Q. You lead on to the effect of the Sea Smooth's alteration to port. My question is this: obviously, looking at the matter with hindsight, you would know, ah, had there not been a turn to port, they would pass at extremely close

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quarters. No collision, but unacceptable.
A. Yes.
Q. And turning the clock back a bit, to the point in time when they were spotted at 1 nautical mile apart, of course that was before Sea Smooth turned port; correct?
A. Yes, indeed.
Q. But the fact that had they remained on the same course there would not have been a collision doesn't actually turn a bad look-out into a good one; correct?
A. No. No, absolutely not.
Q. The point I want to get at is one has to look at the matter in perspective. The fact that had there not been a turn to port, they would have missed each other in an extremely hazardous situation doesn't actually justify a pat on Coxswain Chow's shoulder, to say, "Nice try, not looking at the radar after you have first seen Sea Smooth at 1 mile away", putting it bluntly?
A. No --
Q. That's very blunt.
A. No, that's correct.
Q. Of course, whether he had indeed seen it on radar is something else. But even assuming that he saw the radar and assuming had the vessels continued on their courses they would have missed each other doesn't turn a bad look-out into a good one; correct?

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A. No, that's correct.
MR SHIEH: Thank you.
I have no further questions, Mr Chairman.
Questions by THE COMMISSION
THE CHAIRMAN: Given the sighting that Coxswain Chow has said that he had of Sea Smooth visually, on the basis that it was at about 3 cables, and given the change of course executed by Sea Smooth, was there any time at which, in your opinion, Coxswain Chow ought to have given the five-short-blasts sound signal indicating he was unaware of the intentions of the other vessel?
A. Yes, sir. I think in an ideal world, he would have done that. I suspect he was -- we're only talking about matters of very few seconds. I suspect he had other things on his mind. But, yes, he should have done, really.
THE CHAIRMAN: And at what stage, on the basis that he's observing the vessel at 3 cables apart?
A. Pretty much instantly.
THE CHAIRMAN: Thank you, Captain Pryke, and thank you for returning to assist us with the matters arising in all three parts of our terms of reference. You've been of great assistance to us, and we thank you. But your evidence is now complete and you're free to leave the witness box.

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A. Thank you, sir.
May I make a small correction to something I said yesterday at page 127, line 24?
THE CHAIRMAN: Just give us a moment to turn it up. Yes?
A. Where I said:
"And she's built like a high-speed craft. She's a lightweight catamaran build."
THE CHAIRMAN: In the transcript, you were describing Lamma IV?
A. That's correct. I should have said "a lightweight aluminium construction".
THE CHAIRMAN: Because she's not a catamaran build?
A. Exactly, yes.
(The witness withdrew)
THE CHAIRMAN: Mr Shieh, we'll take our break now but where do we go after our break?
MR SHIEH: Dr Armstrong is ready to start giving evidence, and Mr Beresford will be taking Dr Armstrong's evidence.
THE CHAIRMAN: And we have a report from him that's been filed?
MR SHIEH: Yes, at the end of expert bundle 3, following Captain Pryke's report. It has recently been included, in fact just included this morning. It can be found as the third supplemental report of Dr Armstrong, page 1619

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of expert bundle 3, and also page 1637, expert report part 2.
May I explain the significance of these reports. What's been called the third supplemental report that we can find at page 1619 is a report -- I'm sorry, Mr Chairman --
THE CHAIRMAN: I don't have page 1619.
MR SHIEH: -- it may not have been inserted as yet.
THE CHAIRMAN: What does that report deal with?
MR SHIEH: Page 1619 is entitled "3rd supplemental expert report". It deals with Mr Wong Wing-chuen's fourth supplemental statement, where Mr Wong Wing-chuen addressed various issues about watertight bulkheads. Mr Chairman might recall Mr Wong Wing-chuen taking issue with Dr Armstrong's view as to what might constitute an aft peak bulkhead, and the examples that Mr Wong Wing-chuen gave by way of numerous other vessels.
THE CHAIRMAN: Yes.
MR SHIEH: The third supplemental report at expert bundle 3, page 1619, seeks to address the points made by Mr Wong Wing-chuen in his fourth supplemental statement.
THE CHAIRMAN: Very well.
MR SHIEH: And the expert report part 2, at page 1637, deals with what we call part 2 of the terms of reference proper.

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THE CHAIRMAN: Thank you.
MR SHIEH: So this is the delineation between the two reports.
THE CHAIRMAN: We had asked for a calculation to be done to show us the distance between the two vessels at different points in time. Can Dr Armstrong deal with that?
MR SHIEH: The calculations have been done, but it actually hasn't been put into either one of these reports. But if the Commission actually wishes to have, for example, a table setting out the data as time went by, then I think that could be dug up and put into a printed form.
THE CHAIRMAN: Yes. What we would like is the distance between the two vessels.
MR SHIEH: At various points in time?
THE CHAIRMAN: If possible at every position that is taken on the radar, which is every three seconds.
MR SHIEH: I think the raw data has been done on a computer. It's just a matter of printing it out and putting it into the bundle. We will do that.
THE CHAIRMAN: Thank you very much.
We'll adjourn, then, for 20 minutes.
(11.40 am)
(A short break)

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(12.00 pm)
THE CHAIRMAN: Mr Beresford?
MR BERESFORD: Mr Chairman, the next witness is Dr Armstrong, who is being recalled.
THE CHAIRMAN: Yes.
DR NEVILLE ANTHONY ARMSTRONG (sworn)
Examination by MR BERESFORD
MR BERESFORD: Good morning, Dr Armstrong.
A. Good morning.
Q. I'm going to ask you today about two additional reports that you've prepared, one called the 3rd supplemental expert report, which is dated 3 March 2013 and which is to be found at page 1619 of expert bundle 3, and the other being expert report part 2, dated 5 March 2013, which is to be found at page 1637 of expert bundle 3.
Turning to page 1626. Do you recognise your name and signature there, Dr Armstrong?
A. Yes, sir, I do.
Q. And similarly, if we turn to page 1676, do you also recognise your name and signature there?
A. Yes, sir, I do.
Q. Do you adopt these reports as your own?
A. I do adopt them as my own.
Q. Are they true, to the best of your information and belief?

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A. They are true, to the best of my information and belief, apart from one error which I noticed this morning.
Q. Yes, please.
A. It refers to page 1682; in the second report. In the second line, there is a reference to a distance above the deck of 0.3 metres, and then a subscript "65" which refers to the code of practice.
Q. Yes.
A. Unfortunately this morning I noticed the code of practice refers to 0.3 of a metre above the seat, not 0.3 of a metre above the deck. So the 0.3 of a metre above the deck should be corrected to a distance of 0.9 metres, which results in the maximum moment of 65 newton metres being corrected to 195 newton metres.
Then on the fifth line, that figure of 65 newton metres, also corrected to 195 newton metres.
Q. Thank you.
A. I felt the value of 65 newton metres was very small this morning when I read it, and then I realised what the mistake had been. My apologies.
THE CHAIRMAN: Thank you.
MR BERESFORD: Dr Armstrong, taking first your third supplemental expert report at page 1620, you had stated that you had made this in response to observations made in a fourth supplemental witness statement of Mr Wong

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Wing-chuen.
A. Yes.
Q. You deal basically with two issues in this report: the question of the watertight bulkhead at frame 1/2, and the question of an aft peak bulkhead.
In relation to the first issue, in paragraph 2, you observe:
"In paragraphs 4 and 5 of Mr WC Wong's 4th supplemental witness statement, I believe that he has misunderstood the line of questioning when referring to the transcript of Day 28, page 97."
A. I did, yes.
Q. You explain that you had been asked by Mr Mok about your second supplemental report, specifically the table at the lower part of page 6, which we can see in expert bundle 2 at page 928.
If we could just have that up on the screen for a moment, please.
You say that this was a table of results of various calculations that you did to determine where the final waterline would be if the tank room was flooded in a hypothetical accident with the Lamma IV as it was, with a lightship weight in 1996, 1998 and 2005, and also if it had a watertight door or not?
A. Correct, yes.

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Q. And the point you wish to clarify is that there is no reference to 0.1L anywhere in this report, because this, you say, was a straightforward calculation of flooding a space which was longer than 0.1L?
A. Correct. With the intention of showing what the results would be if that one compartment was flooded, with a watertight door or without a watertight door in the aft bulkhead.
Q. So you go on to point out it wasn't intended to represent any regulatory requirement; just to illustrate the practical and, as you say, vital importance of the watertight door if Lamma IV had been in an accident in which the tank room alone was flooded?
A. Correct.
Q. Then in paragraph 3, you say:
"The same calculation was repeated for both the tank room and engine room flooded, with the results shown at the bottom of page 7 of my 2nd supplemental report, under the same conditions."
That should, I think, be at page 929 of expert bundle 2. We can see there "Engine room and tank room flooded".
A. Yes.
Q. You say, again, this was not presented in a way that demonstrated anything to do with 0.1L, and nor was it

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intended to imply any interpretation of the regulations.
A. That was my intent, yes.
Q. You point to the final line on page 7 of your supplemental report, page 929 of the bundle, which you say:
"... reflects closely the situation in which Lamma IV sank, and the previous line indicates that the vessel would not have sunk immediately if a watertight door had been fitted."
A. Correct.
Q. You point out these are not regulatory issues.
A. Yes.
THE CHAIRMAN: Just before you move on.
You've qualified this by saying "would not have sunk immediately". By that do you mean it would have sunk, but not as quickly as it did?
A. Mr Chairman, the margin line, if you recall the definition of the margin line, was submerged in this condition. So although the deck was not immersed, it was very close. So eventually the effect of waves and wash from passing vessels and similar effects, and maybe even people standing on the side of the deck rather than inside the cabin, would have caused the vessel to sink eventually. Which is, of course, the purpose of the margin line: to give you some margin of error. So that

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is why I used the words "sunk immediately". I think it would have stayed afloat for quite some time, until eventually it was swamped.
THE CHAIRMAN: By a number of factors coming into play: passengers moving around on the vessel, perhaps to avoid what they thought was a danger in one place, congregating in another place, or by waves?
A. Or by waves, or a rescue boat coming alongside and bumping into it. All sorts of external factors.
THE CHAIRMAN: Thank you.
MR BERESFORD: But the important practical point is that if the vessel would not have sunk immediately, there would have been some more time for evacuation?
A. Yes, correct.
Q. Then you go on to say in paragraph 4:
"Paragraph 4 of Mr WC Wong's ... statement comments 'that Mardep does not agree with Dr Armstrong's interpretation'."
You point out that you merely did an illustrative calculation which involved no interpretation?
A. Yes.
Q. We then come on to the issue of the aft peak bulkhead, and you note:
"Mr WC Wong comments, in paragraph 6 of his 4th supplemental statement, on my observations that the aft

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peak bulkhead was normally located at the after end of the vessel and in my experience at about 10% or slightly less from the after end.
You wished to make further clarifications. You say:
"Firstly, it should have been taken in the context that we were discussing only passenger ships (class I) --"
A. Yes.
Q. "-- as is implied by many if not all of the other regulations and calculations involved in this case. Secondly, when quoting '10% of the length', I should perhaps have made it clear what the term 'length' referred to."
A. Yes.
Q. You say in paragraph 6:
"Most persons skilled in the art of naval architecture and specifically in the regulatory aspects would know that length is usually the distance from the forward perpendicular to the aft perpendicular on a theoretical waterline representing 85% of the Depth to the main deck of the vessel."
Dr Armstrong, I put that definition to Mr Wong and he accepted that it was a conventional measure of length. The Chairman had a question as to what was meant by "Depth", which you've capitalised there.

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Can you please clarify that?
A. "Depth" is defined in SOLAS. It's something like the vertical distance from the top of what is called the bulkhead deck -- that is, on Lamma IV, the main deck -- down to the top of what is called the rabbet, which is essentially where the shell plating meets the keel. It is essentially the bottom of the boat, a little bit above it, in fact.
Q. I didn't quite catch that last term, and neither did the stenographer.
A. "Rabbet", it is an technical naval architectural term. It has its origins in wooden technology where you would rebate the wood to accept the shell plating coming into it. It's essentially where the hull meets the centre of the ship.
Q. Thank you. You go on in paragraph 6. I'll just read this to clarify the definition that you gave:
"The forward perpendicular is at the intersection of this theoretical waterline and the stem of the vessel, and the after perpendicular is at the centreline of the rudder stock."
A. Yes. Perhaps "centreline" is not quite the right word. I think SOLAS says "axis", and "centre" perhaps would have been better. My apologies for that.
Q. Thank you. Then you say:

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"Alternatively, if 96% of the distance between the forward perpendicular and the extreme after end of the vessel on the same theoretical waterline is greater than the distance to the rudder stock, then this alternate distance."
A. Yes.
Q. You then give chapter and verse. You say:
"This is the definition used in SOLAS ..."
You have attached at appendix IV to your report, which is at page 1628 of the bundle, a copy of the relevant amendment to the Convention.
A. Correct. Definition of length is on page 1631.
Q. Page 1631, item 5 at the top of the page?
A. Correct.
Q. That refers to the International Convention on Load Lines?
A. Yes.
Q. I think we have that at page 1635, do we not?
A. Correct.
Q. So when my learned friend Mr Mok says there is no definition of length in SOLAS, you would respectfully disagree; is that right?
A. With great respect, yes. There are of course many different lengths and different interpretations of them, but for the purposes of subdivision and watertightness,

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that is the correct definition, I believe.
Q. Thank you. Then you also refer to the definition of length in part 1, section 2 of Cap 548G. That's in our legislation bundle at tab 15.
A. Yes.
Q. Unless anybody wants me to, I won't read it out, but you point out that it is essentially the same.
So you say:
"Therefore my distance of 10%L for the aft peak bulkhead was not intended to represent 10% of the overall length of the vessel or some other length. With reference to the approximate location of the aft peak bulkhead in my experience, it was a distance intended to be measured forward of the centre of the rudder stock."
A. That is was I was intending to refer to in my mind, but of course this is not a regulatory requirement; it is just an observation.
Q. Then you also wished to clarify your observations in relation to multihull crafts and particularly catamarans, which you have set out in paragraph 7. You point to a number of distinguishing factors in relation to catamarans that mean that they are not truly comparable to a monohull such as Lamma IV?
A. Correct, yes.
Q. You say:

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"[They] have excellent stability characteristics and have demonstrated an ability to survive severe damage from collisions and grounding."
A. Yes.
Q. You give the example of the catamaran St Malo in 1997 in which the entire length of one hull was opened up after striking rocks at 35 knots off the Channel Islands?
A. Yes.
Q. And apparently it remained afloat on the remaining undamaged hull and was eventually towed to harbour and repaired?
A. It was.
Q. You point out that the survivability of catamarans when open to the sea was also demonstrated in the present case by Sea Smooth.
A. I believe it was.
THE CHAIRMAN: Just give me a moment, please.
As far as Sea Smooth was concerned, am I right in recalling that it was two of her six watertight compartments on the port hull that were damaged, took in water?
A. There were certainly two, Mr Chairman. I'm not too sure about the third compartment.
THE CHAIRMAN: Yes. As I understood the evidence, the first compartment is destroyed, in effect.

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A. Correct.
THE CHAIRMAN: You can see the open sea?
A. Correct.
THE CHAIRMAN: There was water ingress into the second compartment?
A. The hull was opened, yes.
THE CHAIRMAN: And perhaps a little bit of water in the third compartment, as I recall the evidence?
A. That is, I believe, the case.
THE CHAIRMAN: But we're describing a vessel that has six watertight compartments in the port hull?
A. Correct. I think the angle of heel on Sea Smooth was reported as something like 2 degrees after the experiment, which is quite small.
MR BERESFORD: You then point out in addition:
"On catamarans, there are two aft peak spaces, each one being of considerably smaller size than the equivalent monohull craft."
A. Yes.
Q. You say:
"Because of [this], I have observed that the aft peak bulkhead is often considerably further forward than on the equivalent monohull."
A. Yes.
Q. "In an accident, for example when the rudders go

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aground, it is most unlikely that both aft peak spaces will be flooded."
Then you point out:
"Lamma IV ... was not a catamaran, and my observations about 10%L were not meant to include catamarans, just as they did not include sailing craft or other non-standard vessels that are fundamentally different to Lamma IV."
A. Yes, sir.
Q. You then comment on the examples of the location of the aft peak bulkhead that Mr Wong produced in WWC-25, where he provided "15 examples of designs which purport to show the location of the aft peak bulkhead at distances in excess of 10%L".
You refer first of all to the code of practice, the 2006 code of practice which can be found in marine bundle 11. The relevant page is 3461. This is in chapter IIIA, entitled "Hull construction, machinery, electrical installations and fittings -- category A vessel".
In part 2, "Hull construction", paragraph 2, "Bulkheads", paragraph 2.1 says:
"Every launch or ferry vessel should be fitting with the following watertight bulkheads:
(a) collision bulkhead;

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(b) fore and after bulkhead of main engine space;
(c) when any compartment exceeds 2/5ths of the length, an additional bulkhead at any intermediate position unless it meets the relevant ... requirements;
(d) if the vessel exceeds 24 metres in length, an aft peak bulkhead unless the engine room is situated at aft end of the vessel.
2.2. In double-ended vessels, collision bulkheads should be fitted at both ends."

A. Correct, yes.

Q. In paragraph 10, you set out in a table the examples given by Mr Wong, explaining why these, with the exception of the Sakorn Wisai, are not comparable.

A. I did, yes.

Q. In fact I've been through all of these with Mr Wong, and he agreed when it was put to him that these were not comparable, for the reasons you've stated. So I'm not proposing to go through it again. The one exception is the Sakorn Wisai, which has a distance, you say, from the centre of the rudder stock to the aft peak bulkhead of about 7.8 metres on a stated length between perpendiculars of 82 metres, which gives a distance of 9.5 per cent length, which, as you point out, is within your arbitrary 10%L figure.
Mr Wong wouldn't agree to your measurements, but we

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didn't get any explanation of why.
Do you stand by your evidence on that, Dr Armstrong?

A. It is quite difficult to be sure of measurements, because we're talking about a plan at very small scale reproduced in a magazine and then photocopied. So it's not easy to measure particular distances. But I would be quite close, I believe.

Q. Then you simply say in addition that you've noted Mr Wong's comments on which set of instructions were being applied at the relevant time.

A. Yes.

Q. That's obviously a matter of fact to be dealt with elsewhere.
Turning then to the document that you've headed "Expert report part 2", in which you have addressed the issue of "Maritime safety and the present system of Control, together with items for consideration".
In this report, you have it structured in four large sections. Part A, beginning on page 1642, is headed "Current Safety Issues with reference to the loss of Lamma IV"; part B, commencing on page 1656, deals with "Current Safety Issues not related to the loss of Lamma IV". You've explained these two sections in paragraphs 11 and 12 of the report. You say:
"Some of the issues that were discussed during the

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process of understanding the causes of Lamma IV incident are raised in part A of this report, together with comment on the current (2013) maritime safety requirements, and suggestions are made to ensure ongoing safety. These comments only apply to class I ferries and launches.
Part B of this report includes comment on issues not directly related to the Lamma IV incident but on other current (2013) requirements that have come to light during the reading of the regulations and which are offered as suggestions to clarify the understanding of maritime safety issues and to prevent similar incidents in the future."

A. Yes.

Q. So part B is not entirely irrelevant; it is directed to similar incidents.

A. Yes. It was aimed more at the third part of the Commission's terms of reference.

Q. Yes. Then part C is at page 1667, which is headed "Potential Safety Issues for Vessels certified before 1 January 2007". And part D is headed "Future Safety Issues", commencing --

THE CHAIRMAN: What page is part C?

MR BERESFORD: Page 1667, Mr Chairman. And part D is page 1672.

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THE CHAIRMAN: Thank you.

MR BERESFORD: Then we have a number of appendixes, commencing with your expert declaration at page 1674, and which I'll refer to as we go through the report.
In total you have formulated 59 matters for consideration as recommendations --

A. Yes.

Q. -- by the Commission, should the Commission think fit.
Your report commences, then, with an introduction in which you introduce yourself and the incident in paragraphs 1 and 2.
From paragraph 3, you discuss the system of control of maritime safety for local vessels in Hong Kong. You say that the system in 1995 -- which was, of course, the time of construction and original certification of Lamma IV -- could best be described as informal.

A. I do, yes.

Q. You refer to the two sets of instructions that we have seen: the Instructions for the Survey of Launches and Ferry Vessels (1983), otherwise known as the Blue Book, which is at marine bundle 8, page 1761; and the Instructions for Survey of Class I and Class II Vessels (1995), which is in the same bundle at page 1810.
You point out:
"... [these] were not supported by legislation, and

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consequently there were few mandatory requirements. The surveyors and inspectors, and those carrying out the plan approval on local craft, in many cases learned the requirements on the job from more senior people, and knowledge on maritime safety issues appears to have been mainly passed on verbally."

A. Yes.

Q. Then at paragraph 4, you say:

"Different persons appear to have been carrying out the plan approval to those carrying out the survey, and there was a general 'disconnect' between these two phases of the safety checks, which led to errors in the case of Lamma IV."

THE CHAIRMAN: Could I ask you to amplify what you mean by that observation?

A. Yes, Mr Chairman. I was trying to cover the situation demonstrated by the fact the drawings showed watertight doors required at frame 1/2 -- watertight bulkheads, sorry, to be fitted at frame 1/2, and the survey of the vessel, probably checking the integrity of the watertight bulkheads, but not noting that there was no watertight integrity because the door was not fitted.

THE CHAIRMAN: Because that is something that could be dealt with later in the fitting-out of the vessel, that approach?

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A. Potentially, yes, sir. That could have been the case. But made even worse by the fact that it was still not picked up by the people doing the design and the plan approval and reflected in the Stability Book, the Damage Stability Book --

THE CHAIRMAN: Yes.

A. -- which occurs right at the end of the process. So right through that process, there were many occasions in which this issue could have been addressed, but it was not.

THE CHAIRMAN: The starting point of addressing it would have been when Cheoy Lee consulted Naval-Consult to establish that the door was not needed. But nothing was done about the drawings.

A. Yes, yes.

THE CHAIRMAN: So that the "watertight bulkhead" legend is left unchanged on the drawings?

A. Yes. And with having more than one person involved, the subsequent people would not have been aware of that discussion.

THE CHAIRMAN: Yes. Thank you.

MR BERESFORD: I think the point you are making here is also addressed to the distinction between plan approval and those carrying out the actual survey?

A. That was the intention, yes.

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Q. So we heard evidence from Mr Wong Chi-kin as to the plan approval, but completely different surveyors, a chain of surveyors, in fact, who went and surveyed the vessel at various stages of its construction.

A. Right.

Q. Then, of course, those surveyors were all different as well. So are you making the same point in relation to the surveyors that actually surveyed the vessel?

A. I am, yes.

Q. We heard from one surveyor at the beginning who said that he thought the watertight door could be fitted later, and another surveyor at the end who said that he didn't realise it was an outstanding issue.

A. I recall those witness statements, yes.

Q. Yes. Then in paragraph 5, you say:

"Ownership of fundamental safety issues such as ship stability was not taken by anyone, with documentation being noted as 'seen' by the Marine Department, rather than being carefully assessed and approved."

A. Yes.

Q. In paragraph 6, you say:

"The requirements of the Instructions in use ..."

THE CHAIRMAN: When you say "ownership of fundamental safety issues", another way of describing that would be "responsibility", would it not? No responsibility was

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being taken, if you stamp a document "seen" and nothing else?

A. Very much the case, yes, sir.

MR BERESFORD: So when you use the term "ownership", does that imply that if somebody were to stamp a document, a drawing "approved", they would then have some sense of ownership of what they had approved and would have more incentive to follow it up and make sure that the drawing was complied with?

A. Stamping a drawing or other document with "approved" or "not approved" clearly demonstrates your authority and your responsibility or acceptance of your responsibility to approve or not approve the safety demonstrated by that plan or document. You're illustrating that you own the safety embedded in that vessel, that you are acknowledging your responsibility for all the persons on board that vessel. I think it's a really fundamental requirement that was not demonstrated by putting "seen" on a drawing.

Q. Well, we've heard from Mardep that they are abandoning the "seen" stamp.

A. I read that, yes.

Q. But introducing a stamp saying "for record purposes [only]".

A. I don't personally have an issue with that,

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Mr Beresford. If you were going to ask me that question. I'm sorry, I jumped in a little early.
Q. Please do.
A. Because there are some drawings -- for example, what is called a lines plan. The lines plan is a drawing which gives you the shape of the vessel. And the shape of the vessel is not really about the safety issues. But they are drawings which are of value to have looked at and to have formed an impression as to what the vessel actually looks like. The General Arrangement drawing and other drawings give you some idea of the shape, but they don't give you, sometimes, adequate information. So something like a lines plan can be useful for information and would not be approved, because it is a commercial choice to make something the shape it is. So personally, I don't have a difficulty with a stamp as you suggest, as long as it's not on a plan that is addressing a safety issue.
As to the value of whether it's worthwhile putting anything on it or not, my own personal opinion is it probably is worthwhile stamping it because it shows that you are being responsible and looking at all the information available to you.
Q. So the issue really is not in relation to the use of the stamp or the word on the stamp, but what stamps were

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applied to what documents. And to be fair to the Marine Department, they have also said that they would not be using the stamp "for record purposes [only]" on such a wide variety of documents as they had previously used it.
A. Right.
Q. The important thing is that they should take ownership or responsibility in relation to safety documents?
A. Yes. I see that as a prime function.
Q. In the Local Vessels Safety Section?
A. In the Local Vessels -- yes.
Q. In paragraph 6, you say:
"The requirements of the Instructions in use in 1995 were basic, sometimes detailing quite trivial matters, and at other times missing some fundamental issues. The Instructions themselves were brief (the Blue Book contained only 48 pages, the 1995 Instructions only 62 pages)."
A. I'm not trying to imply that safety could be measured by the number of pages, Mr Beresford, but I thought that was an indication that it was quite brief. Just as an example, the instructions in Australia for damage stability alone run to 121 pages. And that is the other extreme, of course. Somewhere in the middle there's a good compromise.

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Q. These instructions were originally based on UK instructions to surveyors, weren't they?
A. I don't have certain knowledge on that, I'm sorry. I believe so.
Q. But it's more a historical point at any rate now.
You go on to observe in paragraph 7:
"This situation changed in 2006 with the gazetting of the Merchant Shipping (Local Vessels) Ordinance Cap 548."
That, for the Commission's note, is in our legislation bundle at tab 13.
You say:
"This provided the necessary legislative backing for maritime safety to be properly addressed for local craft. [It] was also supported by subsidiary legislation of the same year, specifically the Merchant Shipping (Local Vessels)(Safety and Survey) Regulation Cap 548G."
Which is at tab 15 of our legislation bundle.
You observe that the Ordinance, Cap 548, authorises the issue of a code of practice, and that a code of practice was issued in 2006 under the authority of section 9. The code of practice is at marine bundle 11, page 3416, and a copy of it, with the same marine bundle 11 pagination, is in our legislation bundle at

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tab 4.
THE CHAIRMAN: Thank you.
MR BERESFORD: You then say:
"The comments that follow in this document [that is to say, your report] are based upon my interpretation of Cap 548, Cap 548G and the code of practice (2006). I have no knowledge of alternative procedures that may have been developed within the Marine Department as acceptable equivalents (as defined in code of practice (2006))[in chapter I, section 8], or acceptable exemptions (as defined in ...)[chapter I, section 7]."
In paragraph 10, you make the following comment:
"At present I do not understand how the current system of plan approval and ship survey and inspection operates at a practical level. The code of practice suggests that plan approval may be done by four different bodies, namely the Marine Department, an authorised surveyor, an authorised organisation or a recognised authority. Surveys may also be carried out by these four bodies, subject to Mardep's agreement. How this works in practices would require more detailed investigation within Mardep and observation of the process, but there remains the potential problem of different persons doing the plan approval to those carrying out the survey."

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This is what you address in the following paragraphs of your report.
A. Yes.
Q. Paragraphs 11 and 12 we've already read. So then we come to --
THE CHAIRMAN: Just pausing there, Mr Beresford. We have no material, do we, that deals with plan approval and ship survey, other than by the Marine Department?
MR BERESFORD: That's correct, Mr Chairman. I venture to suggest that that's because this system originated in 2007 or 2006. It did not arise out of the Lamma collision.
THE CHAIRMAN: Yes.
MR BERESFORD: So what Dr Armstrong is focusing on is the problem of different persons doing different aspects of the job, but not really getting into this aspect of the current system, which only came into place in 2007.
THE CHAIRMAN: Thank you.
MR BERESFORD: We then come to part A of your report, and under the heading, you set out a list of contents, of the 13 issues that you address. In each one you describe the issue and where appropriate, you say what the current requirement is and then under bold type "For consideration" and a number, you set out a possible recommendation that the Commission may wish to consider

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making.
A. Yes, sir.
Q. Issue (i) is headed "Potential for disconnect of design intent and actual construction":
"The code of practice outlines a procedure for survey and plan approval. There appears to be the potential for drawings to be approved by one authority (such as the classification society) and for the survey to be done by another (such as an authorised surveyor). This is likely to lead to errors, such as the surveyor not understanding the reason behind certain design features and requiring detrimental changes. The drawing approval and survey should ideally be done by the same persons to avoid situations such as happened with Lamma IV where the drawings showed a watertight bulkhead but the surveyor on site accepted it as non-watertight, and thereafter the as-built documentation (such as the damage stability book) continued to incorrectly show the bulkhead as watertight."
I'm not sure, Dr Armstrong, that the evidence is really that clear, is it, that the surveyor on site accepted it as non-watertight? When the drawings were put to the surveyors, they seemed to accept that it was a watertight bulkhead.
But nevertheless, had it been one person approving

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the drawings and carrying out the surveys, then there couldn't have been any disconnect, as you call it, in those processes, in that process?
A. Yes, I agree.
THE CHAIRMAN: And the technical skills required to do the one enable one to do the other? So you can do plan approval and survey?
A. I believe so, yes, sir.
THE CHAIRMAN: Yes. I'm stating the obvious, but I want that on the record.
A. Yes. It suddenly dawned on me it may not be obvious. But I've had the pleasure of being a surveyor and certainly understanding plans is an essential part of it.
MR BERESFORD: Would the two processes not feed off one another?
A. Yes.
Q. So that your ability to approve plans would be enhanced by your experience of actual surveys?
A. Indeed.
Q. And your ability to survey a vessel would be enhanced by your ability to understand plans?
A. And both of them require an understanding of the regulations as well.
THE CHAIRMAN: Would it not assist someone doing the survey

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to have been involved in the process of approving the plans from the outset, so that he'd become familiar with this vessel?
A. It's very beneficial, I believe, yes.
THE CHAIRMAN: We've heard some evidence that in the period 1994 to 1996, there was a shipbuilding boom in Hong Kong which may have put some pressure on the Marine Department dealing with the approval of plans and survey of vessels. Have you come across any information to that effect?
A. Indeed, sir. In reading the documents that were made available to me of correspondence between the builder and Marine Department, it was very evident in what I read that there were sometimes long delays, there were letters following up, saying, "Can you please advise me when?" It was fairly apparent from reading that that the Marine Department was under a lot of pressure.
THE CHAIRMAN: A shipbuilder saying, "Please get on it, we've got a vessel to build", in effect.
A. In some stronger language than that, in fact, Mr Chairman.
THE CHAIRMAN: Yes.
That's evidenced in the correspondence between Cheoy Lee and --
A. And the Marine Department.

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THE CHAIRMAN: -- Marine Department.
A. In one case, I can remember they're talking about "Under the terms of the contract, we are obliged to deliver the ship on date X but we have not yet got approval from you for drawings", and then a list of drawings.
THE CHAIRMAN: That had been submitted much earlier?
A. That had been submitted at a given date. I formed the firm impression, as I said, that Marine Department were under a lot of stress.
MR BERESFORD: But even if it be granted that the Marine Department were under a lot of stress, is it an answer to say, "Oh, well, surveyor 1 is busy so we'll send surveyor 2 to tick the boxes, if they can be ticked"?
A. I can't really answer that, Mr Beresford, because I don't know the circumstances at the time. Was consideration given to the fact that we would send our most experienced person to tick the boxes, as you say? I just don't know the circumstances. Ticking the boxes is not a very satisfactory answer, of course. Surveying is not as simple as that.
THE CHAIRMAN: At all events, as I understand your opinion, it would make more efficient use of manpower if it was possible within the system to have the persons involved in the plan approval being the ones that followed it through to the final surveys of the vessel?

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A. Definitely beneficial, Mr Chairman. As an example, many contracts with shipyards have an owner's representative standing by. The owner's representative is a person who is telling the shipyard what he will and will not accept, in line with the contract. And that person is usually involved in also the plan approval. So he's involved, like the surveyor, in the design, through the plan approval process, putting together the design, and then also in making sure that it shows up on the vessel that is being built. And he understands how it all works as the vessel is being built, and why it's being done the way it is. In an ideal world, I think the survey authority should also share the same authority, the same involvement in the whole process of building the ship.
THE CHAIRMAN: Thank you.
MR BERESFORD: You go on to say:
"There needs to be some continuity of knowledge between plan approval and survey and certification."
But then you say:
"Having stated this concern, such a system can be made to work, and a similar arrangement is in operation in the State of Queensland in Australia, although the certification process is not recognised by other Australian states."

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When you say "such a system can be made to work", "such a system" being a system of separate surveyors approving and surveying; is that right?
A. Yes, Mr Beresford. Would you like me to explain a little further?
Q. Yes, please.
A. The State of Queensland decided to privatise plan approval and safety inspections and the whole regime, to not be done by the government anymore and for the authority to be done privately, which is rather an adventurous approach, I felt. However, that was brought into operation some years ago, perhaps 15-17 years ago. The way it works is that a designer will take responsibility for safety in putting the design together, and he's then required to have it checked through by a second designer, and also to have it surveyed by another party, which could be the same person or the same organisation as the people doing the plan approval, the second designer.
It seems to work. However, there is one known problem with the Queensland model, and that is that the first designer, for commercial reasons, is usually not very keen to provide too much information to the approval authority, because he knows the second designer is going to go away and use his information. So there

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becomes an unfortunate situation where the designer is trying to hide information, which of course is not a very good idea. But I mentioned it here because people may be aware that there is such a system in operation in Australia.
It is seen as problematical by the other Australian states. In Australia at the moment, or in the past it has been that each state has its own marine legislation; it's not a federal issue. That has caused all sorts of problems. So in the last few months, Australia has moved to a single national jurisdiction; in other words, federal law covering maritime safety. And that is currently being changed over. What will happen to the Queensland model, I'm not privy to that information at the moment.
They say it works in Queensland. I have my personal doubts.
Q. Thank you. You give the case of changes to the plating thickness on Lamma IV as an example. Because in that case, as we know, the approved drawing shows a 5 mm plating, and if the surveyor accepts an overall plate of 4.83 mm, then:
"... it is unclear as to how this should be recorded in the as-built plans, and whether the classification society responsible for the design approval would accept

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the change authorised by the surveyor on site."
THE CHAIRMAN: Just dealing with that issue, that was the subject of a letter from Cheoy Lee to the Marine Department, was it not, explaining that the plates had been delivered as 0.19-inch thickness, which was --
MR BERESFORD: I think it was at page 206, if I remember rightly.
THE CHAIRMAN: -- 4.83 mm. But there was never any response from the Marine Department, was there?
MR BERESFORD: There's no formal approval. The letter is not marked "approved", there's no plan marked "approved", there's nothing of that nature.
THE CHAIRMAN: It was never adverted to in subsequent correspondence?
MR BERESFORD: I don't believe it was, Mr Chairman, no.
Dr Armstrong, I think your evidence on a previous occasion was that 4.83 mm was within the tolerance of 5 mm. So it could have been regarded as within the tolerance, without approving a formal change. But it wasn't a change in itself.
A. Yes, Mr Beresford. You make a valid point. However, as you probably recall, I'm under the opinion that the plating was actually less than 4.83, by some unknown amount, and that the approved drawing at the present time for Lamma IV still shows "5".

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THE CHAIRMAN: The point really is this: if these kind of changes are to be made, and even if it was approved, there should be some system of documenting it so that the plans reflect the change?
A. Yes.
MR BERESFORD: And when you come across a thickness of 4.5, the question of whether you're to judge whether it's within the tolerance of 5 mm or 4.83 mm should be clear?
A. Yes, and it gets back, Mr Beresford, to the issue of considering the design as a whole. It could well be you can put forward adequate proof to the survey authority that 4.5 is adequate, but are there other factors that you're not aware of that might require you to have a thicker plating? For example, the spacing of the stiffeners associated with the plating. They all have an impact. And it's not generally satisfactory for a survey authority to accept something without the people doing the plan approval being aware of that change, and why the change is necessary and how it will impact on other aspects of safety.
THE CHAIRMAN: And all of that is information that's available if there is an audit trail created?
A. Yes.
THE CHAIRMAN: Including, obviously, the drawings themselves?

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A. Yes, indeed. It worries me, therefore, there are four organisations mentioned in the rules at the present time, and how they interact with one another.
MR BERESFORD: And that leads on to your first possible recommendation. You've noticed that:
"The term 'authorised organisation' [which is one of those four organisations] is used throughout chapter II section 3 of the code of practice as the persons who are able to conduct surveys, but there is no definition of what is an authorised organisation."
A. Not that I can find.
Q. You say:
"... it is unclear whether this refers to a classification society ..."
And we can look at the pages. Page 3434 in the code of practice, which is the commencement of section 3. We can see that there's no definition of "authorised organisation", although there is a term "authorised surveyor". "Classification societies" is also defined.
So you've suggested that "authorisation" should be defined?
A. Yes, sir. Some of my comments are perhaps a little trivial, but I think they can be quite important.
Q. You've also suggested:
"Further clarification is needed to avoid the

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potential for breaches of safety, particularly some feedback on how this has worked over the past six years."
Can you just explain what you mean by that, please, Dr Armstrong?
A. Yes. I'm sure that the Marine Department in their wisdom have made this system work since the new regulations came into effect. But I'm not at the moment privy to how they have made it work, which is why I'm suggesting some feedback would be useful.
MR BERESFORD: I note the time, Mr Chairman.
THE CHAIRMAN: Yes.
Dr Armstrong, we'll take our lunch break now and we'll resume at 2.30 this afternoon. If you'd be kind enough to be back so that we can begin taking your evidence this afternoon at that time.
2.30.
(1.01 pm)
(The luncheon adjournment)
(2.30 pm)
THE CHAIRMAN: Good afternoon, Dr Armstrong.
A. Good afternoon, sir.
THE CHAIRMAN: May I remind you that you continue to testify according to your oath.
Mr Beresford.

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MR BERESFORD: Thank you, Mr Chairman.
Good afternoon, Dr Armstrong. We had just got to the next item, the next issue under part A, issue (ii), "Drawing Approval process", at paragraph A-15 of your report, page 1643.
You revert here to the issue of ownership of safety issues shown by drawings and documentation in 1995 which you say were not taken by the survey authority, where they were marked as "seen" rather than "approved".
You've noted that under the current requirements, Cap 548G requires that drawings and documentation are marked as approved and identified by date and signature.
"Drawings are approved by a 'recognised authority' and copies of important documentation are provided to Mardep."
In your view, these current requirements appear to be satisfactory; is that right?
A. Yes, sir.
THE CHAIRMAN: Could you take us to the actual requirement in this case so we can have a look at it.
MR BERESFORD: It's Cap 548G, which is tab 15 in the legislation bundle. Part 3 begins at section 7. Section 7 deals with the application, which is basically to a new vessel. I won't go through that in detail.
Section 8 provides for:

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"... the director or a competent surveyor may, upon application, approve plans relating to a local vessel in accordance with this part."
Section 9 I think is the key section that's referred to in this part of the report of Dr Armstrong. It says:
"No certificate of inspection or certificate of survey shall be issued in respect of a local vessel that falls within section 7(1)(a) or (b)(i) or (ii) unless plans relating to the following parts or aspects of the vessel, in so far as they are applicable, have been approved under this part ..."
Then it lists out various parts, for example, "general arrangements", which will be familiar to this Commission, "tonnage measurements and calculations"; "structures and scantlings"; "freeboard calculations; "arrangements relating to watertightness, weather-tightness, bulkheads" --
THE CHAIRMAN: Just pausing there. Applying these provisions to the drawings we've been looking at, would item (e) encompass the Sections and Bulkheads drawing?
A. It's the only reference I can find, Mr Chairman, in the regulations that does mention watertightness and bulkheads.
THE CHAIRMAN: Yes. But in your opinion, if legislation was being applied in 1995 and 1996, would it have caught the

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Sections and Bulkheads drawing?
A. In theory, Mr Chairman, yes, but in practice I think it needs some skill and understanding of the watertightness issue for that to happen.
THE CHAIRMAN: Very well.
A. I have some private doubts.
THE CHAIRMAN: So of the long list of plans, as they're called, the General Arrangement is the only one that directly matches the plans we have, or is there something else?
A. "Structures and scantlings", Mr Chairman, would cover the construction drawings.
THE CHAIRMAN: Can someone tell me what the reference is to that drawing?
A. 9(1)(c).
THE CHAIRMAN: I see the provision here, but what of the various drawings that we've got does that fall under?
MR BERESFORD: If you just bear with me a moment, Mr Chairman.
Mr Chairman, there isn't, I think, a plan referring to scantling or scantlings. So it would have to be a matter of interpretation as to which plans fell within that section.
A. I think 203, 204, 205 would generally cover that.
MR BERESFORD: I think Dr Armstrong is referring to the

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plans in marine bundle 2. Page 204 is Profile and Deck; 205 is Sections and Bulkheads; 202 is Shell Expansion.
THE CHAIRMAN: You said 203, 204, 205?
A. There may be others as well on either side.
THE CHAIRMAN: Very well. Thank you. But before we leave the legislation, that deals with "No certificate of inspection or certificate of survey shall be issued ..."
MR BERESFORD: Unless it's been approved. That's the point, Mr Chairman.
THE CHAIRMAN: Yes, I follow that. And there are other provisions at section 9(2), are there not, dealing with different vessels?
MR BERESFORD: Well, that's a survey record of safety equipment.
THE CHAIRMAN: Yes.
A. Section 10 covers the process itself.
THE CHAIRMAN: Yes.
MR BERESFORD: So section 10(1) provides the director with four options. He can approve the plan; approve it subject to conditions; refuse to approve it; or temporarily withhold the approval. He may only approve it if he's satisfied that the local vessel concerned, or the relevant part, is built or arranged in accordance with the plan.
Then, upon approval, the director is required to

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endorse and sign upon every page, and, where it's a booklet, a conspicuous part of the booklet.

He's required to include the name of the public officer to whom the power to approve the plan is delegated, rank and the date of approval.

Then there's the provision for the retention and dissemination of copies, and notice of refusal of approval.

THE CHAIRMAN: Yes. Thank you.

MR BERESFORD: Then, returning to your report at paragraph A-16, you identify as an issue this fact:

"Technical requirements were not mandatory in 1995."

You note that under Cap 548, this authorises the issues of codes of practice and makes such codes admissible in court, and also, in part IV, it requires that all local vessels be certified and licensed.

In your view, those requirements are satisfactory; they give sufficient statutory backing, in other words, to the technical requirements?

A. Yes.

THE CHAIRMAN: Presumably in 1995 there was a requirement that local vessels be certified and licensed. We've been looking at the certifications.

A. There was one for licences. I don't remember the one for certification. You may well be right.

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MR BERESFORD: Mr Chairman, you will recall that the instructions for survey, both the Blue Book and the 1995 Instructions, had no statutory underpinning.

THE CHAIRMAN: I understand that. But nevertheless, there was a regime by which a licence or a certificate of survey was issued.

MR BERESFORD: Yes. But I think Dr Armstrong's point is that the instructions for survey had no statutory backing.

THE CHAIRMAN: No, I follow that. But presumably what happened was, in the exercise of their statutory discretion, if you didn't comply with the Blue Book in the way the Marine Department wanted, they wouldn't issue a certificate of survey.

A. Presumably.

THE CHAIRMAN: Yes.

MR BERESFORD: But now under Cap 548, it's all done under the code of practice, which is issued under section 9 of Cap 548?

A. Yes.

Q. Then moving on to the next issue, issue (iii), "Alteration to local vessels", here you've noted:

"One of the major contributing factors in the loss of the Lamma IV was the increase in the weight of the vessel (lightship) by over 30% some years after the

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watertight subdivision had been calculated (by the addition of ballast and fendering and other items), resulting in a substantial decrease in freeboard to the margin line and which was not recognised."

A. Yes.

Q. You've then turned to look at the current requirement in Cap 548G, and specifically --

THE CHAIRMAN: Just pausing there.

What you have in mind there are the changes that occurred from 1996, first of all in 1998 when 8.25 tonnes of lead ballast was added to the vessel, and then in 2005 when that same lead ballast was raised by 10 inches?

A. More to do with the 1998 changes, Mr Chairman, when the ballast weight was added, plus the weight of the fendering and I believe some other alterations which resulted in a -- I remember it being a 15-tonne increase in weight, which is a substantial amount.

THE CHAIRMAN: And only 8.25 was the lead?

A. Only 8.25 was the lead.

THE CHAIRMAN: Yes.

A. It was that alteration that was my major concern, because that is not captured, other than in the intact stability. The changes with the lead being lifted up were captured for intact stability, and perhaps would

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not have made a large amount of difference to the watertight subdivision.

THE CHAIRMAN: Yes.

A. So a difference between the 1995 as-built and the 1998 changes that I was trying to make sure were captured.

THE CHAIRMAN: Yes. Thank you.

MR BERESFORD: Now, the current requirements are contained in Cap 548G of the regulations, at tab 15 of the legislation bundle.

THE CHAIRMAN: Yes.

MR BERESFORD: Section 7, Mr Chairman. Subsection (1) provides that this part, part 3, applies to a local vessel that is a new vessel, et cetera.

Sorry, we've just looked at this.

I'm just wondering if I'm looking at the right section. You say:

"Cap 548G requires any modification to the vessel to be approved by Mardep ..."

You've referred in your footnote to part 3. No, I'm looking at the wrong footnote. That's my confusion. It's my fault. It should be part 10. Section 75.

Mr Chairman, do you have section 75?

THE CHAIRMAN: I'm just making a note about another matter. One of the difficulties that we've got is this report only reached us at 9.45 this morning, so we're playing

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catch-up, as no doubt everyone else is.
MR BERESFORD: Indeed, Mr Chairman.
THE CHAIRMAN: So I'm making a note about another matter at the moment.
MR BERESFORD: I'll just pause for a moment, then.
THE CHAIRMAN: Which provision do you want us to look at?
MR BERESFORD: Section 75 of Cap 548G, tab 15.
THE CHAIRMAN: Dealing with modifications?
MR BERESFORD: Yes. Part 10 is headed "Alteration to local vessels", section 75, "Application of part 10":
"This part applies to a local vessel --
(a) in respect of which one or more of the following instruments is in force ..."
It refers to "a certificate of inspection"; "a certificate of survey"; and other instruments.
Then:
"(b) that it is to be altered --
(i) to an extent that will render the particulars stated in any certificate, record or declaration referred to in paragraph (a) inaccurate; but
(ii) not to the extent that will render the vessel a new vessel."
So, your point, Dr Armstrong, is that this requires any modification to the vessel to be approved, but only if the particulars stated on any certificate are

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modified?
A. Yes.
Q. And the trouble is that the certificate does not include the details of the weight of the ship. So if there's any alteration in the weight, then that's not covered by this requirement?
A. That is my concern, yes.
Q. And so you've suggested in your consideration 5, strongly suggested:
"... the definition of 'new vessel' be amended to include a new item under the code of practice chapter I ..."
Perhaps we can just turn that up, because it's easier to understand it in context. It's page 3438 in the code of practice. The code of practice, page 3437 at the bottom:
"'new vessel' means --
(a) a local vessel --
(i) that has never been licensed ...
(b) a local vessel that does not fall within paragraph (a) and undergoes, on or after the commencement date of the survey regulation, alteration --
(i) of ..."
Dr Armstrong, you would add a new paragraph, (D),

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would you not?
A. That was my proposal, yes. Or to insert in (A), where it says "its length, breadth or depth", it's possible to include "or maximum draft", or we could consider "or freeboard".
Q. Let's just take the one that you've proposed in your report to start with. A new (D) which would read:
"... alteration --
(i) of --
(D) its lightship weight, or its maximum draft, or its freeboard, as appropriate, which would require recalculation of the watertight subdivision and associated bulkhead locations and damage stability calculations."
A. Yes.
Q. Perhaps the exact drafting we can lead to the legislative draftsmen if they decide take it up.
A. Indeed.
THE CHAIRMAN: So applying the existing provisions to the 1998 adding of ballast to Lamma IV, there being no stipulation as to weight, there would be required no approval of the modification?
A. There was a requirement stated to reinvestigate the intact stability, sir, and that was done. But there was no appreciation that I can discover which showed they

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needed to redo the watertight subdivision. The intact stability and the damage stability were redone, but as we know, the damage stability recalculation was incorrect, because it assumed a watertight bulkhead on frame 1/2. But watertight subdivision was never looked at. And yet the margin line was immersed.
THE CHAIRMAN: Thank you.
MR BERESFORD: You have also suggested for consideration at number 6, again strongly suggested that the certificate of survey -- I think you mean the instrument referred to in section 75(a)?
A. Yes.
Q. "... and the licence, record the vessel lightship particulars as well as the other principal characteristics."
A. Yes. It lists the main characteristics of the vessel, but not the weight, surprisingly.
Q. That's surprising to you, is it, Dr Armstrong?
A. Yes. It's an important characteristic of the vessel.
Q. In other words, you would have expected to find it there regardless of the Lamma IV incident?
A. Well, the main reason for strongly suggesting it is that it immediately picks up that if you make major changes to the vessel, and an increase in weight of the vessel of 30 per cent is a very large change to the craft,

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under the old legislation, that would not have been picked up. But by putting it in the licence, it automatically, I would suggest, would get picked up.
Q. And it was a curious feature of the evidence in this case that nobody was able to offer any explanation for the increase in weight over and above the added ballast.
A. I've not heard any good explanation.
Q. The shipbuilder was specifically asked.
THE CHAIRMAN: Were we not told that there was fendering added?
A. I made a comment about fendering, yes.
MR BERESFORD: Fendering has been added, Mr Chairman, but that didn't account for the difference.
THE CHAIRMAN: Didn't account for the whole of the difference?
MR BERESFORD: No, not the whole of the difference.
THE CHAIRMAN: Yes. We've seen some correspondence about fendering, have we not? With the Marine Department? Together with the information being given as to the proposal to add lead ballast?
MR BERESFORD: If I remember rightly, Mr Chairman, the fendering was added at a different time.
A. Page 394 of marine bundle 2. Or 3, sorry.
Q. So that's a letter dated 26 March 1997, enclosing a drawing for the additional fender.

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A. (Witness nods).
Q. Whereas the letter enclosing the revised stability book estimation was dated 10 March 1998 --
THE CHAIRMAN: Yes, you're quite right. But as you say, no full explanation has been given for the increased overall weight.
MR BERESFORD: So what I'm asking you, Dr Armstrong, is whether this would have the effect of drawing people's attention to the weight of the vessel so that if changes are made, then they have to note them and it would become apparent at least at the annual survey?
A. That was the purpose of documenting this one. I felt that would provide that obvious notification to people that it needed to be looked at.
Q. Yes. Thirdly, you have suggested for consideration at number 7 further modification to the code of practice at page 3487, which is paragraph 9 of chapter IV, headed "Freeboard and stability". We've got paragraph 9 on the screen. So the first sentence would remain the same:
"Before a vessel is to undergo any modifications, application should be submitted specifying the nature of the proposed alterations."
Then in the existing code of practice, the next sentence reads:
"Stability estimates for the modifications may be

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required to submit for approval."
And you suggest instead:
"Estimates of the effects of the modification on intact stability, damage stability and watertight subdivision should be submitted for approval."
Then you've also suggested an amendment to paragraph 9.2, which I think starts off similar. The existing version reads:
"If the stability estimates show that the alterations will adversely affect the stability of the vessel, a lightweight survey, or an inclining experiment, or a rolling period test, as appropriate, should be conducted."
And you have suggested:
"If the stability estimates show that the alterations will adversely affect the intact or damage stability of the vessel, an inclining experiment, or a lightweight survey or a rolling period test, as appropriate, should be conducted."
Then you've added this:
"If the watertight subdivision estimates show that the alterations will adversely affect the flooding capability of the vessel, additional buoyancy may be necessary."
Now, in paragraph 9.1, it's fairly easy to see what

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you've suggested, that instead of stability estimates, you've spelt it out in terms of intact stability and damage stability, and you've also added watertight subdivision.
A. Yes.
Q. And similarly in paragraph 9.2, you've replaced the reference to "stability" with "intact or damage stability".
A. I think "intact or damage" was in the original, Mr Beresford.
THE CHAIRMAN: Yes, it was.
MR BERESFORD: In paragraph 9.2, it says:
"If the stability estimates show that the alterations will adversely affect the stability of the vessel ..."
A. Ah, yes.
Q. And you've changed it to "adversely affect the intact or damage stability of the vessel."
A. Sorry, I was reading the wrong line.
THE CHAIRMAN: The wrong line was on the screen, that's why. So was I.
MR BERESFORD: You've changed the order a bit. In the original it says:
"... a lightweight survey, or an inclining experiment, or a rolling period test, as appropriate,

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should be conducted."
A. I don't think that was important. That was probably my error. Could be the same words.
Q. So there's nothing in that?
A. In the order, no.
Q. Then the important amendment is the addition:
"If the watertight subdivision estimates show that the alterations will adversely affect the flooding capability of the vessel, additional buoyancy may be necessary."
A. Yes.
Q. Do you wish to expand upon that at all?
A. We did have a discussion when I gave evidence previously that one way of -- if the problem had been identified, then it could have been solved by adding additional buoyancy. That was one way of doing it. We did talk about some other methods. But this is the most practical way of doing it.
Q. So, in summary, three proposals relating to the alteration of local vessels: (1) the definition of "new vessel" be amended; (2) Cap 548G, section 75 be amended to require the relevant instrument to record the lightship particulars; and (3) these modifications be made to paragraphs 9.1 and 9.2 of the code of practice?
A. Yes, sir.

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Q. The next issue that you've identified in your report, (iv), is headed "Life-saving arrangements". You've noted:
"Cap 548 and its subsidiary legislation do not appear to have any definition of a life jacket, or the expected performance characteristics of a life jacket, other than to state that life-saving appliances conforming to the life-saving appliances code of SOLAS would be acceptable."
You've also referred us to page 32 of your report, which is in section C, which we'll be coming to. But for now, your proposal is that there be included in Cap 548, section 2 a definition of "life jacket". What you have suggested -- I'll just read it out:
"... means a life jacket certified in accordance with ISO 12402-3:2006 (Personal Flotation Devices -- Part 3: Life jackets, performance level 150 -- Safety requirements), or equivalent, to the satisfaction of the Director."
THE CHAIRMAN: Could you take us to the provision in Cap 548 that refers to life-saving appliances by reference to SOLAS?
Mr Mok, I wonder if my memory is correct, that this was dealt with in one of the statements of Mr Wong Wing-chuen?

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MR MOK: Yes. I think it's a supplemental statement.
THE CHAIRMAN: Yes.
MR MOK: It's page 3953-5.
THE CHAIRMAN: Thank you. But where is the reference, as is asserted in Dr Armstrong's report, to SOLAS: "other than to state that life-saving appliances conforming to the life-saving appliances code of SOLAS would be acceptable." Where is that stated?
MR BERESFORD: Mr Chairman, my understanding is that this is not in the legislation or regulations made under it, but that it's Marine Department policy. There's no definition --
A. I believe it's in the code of practice in chapter VII.
MR BERESFORD: Yes. If we look at page 3507, in the definitions, we see a definition of "LSA Code", meaning:
"... the International Life-Saving Appliance (LSA) Code adopted by the Maritime Safety Committee of the Organisation by Resolution MSC.48(66)."
Also definitions of SOLAS pack life rafts. And 2.1:
"Life-saving appliances should be of approved types. Appliances which conform to the LSA Code ... are acceptable."
Is that what you had in mind, Dr Armstrong?
A. It is, yes. I'm sorry, my reference in my report is incorrect.

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THE CHAIRMAN: Thank you.
MR BERESFORD: As far as the legislation is concerned, and the regulations made under it, it's dealt with in Cap 548G, section 32, where there's no reference to SOLAS or any international convention. This provides in general terms in subsection (1):
"All life-saving appliances provided on board a local vessel shall be --
(a) sufficient to ensure the safety of persons on board the vessel;
(b) properly maintained;
(c) regularly inspected;
(d) fit for the function intended; and
(e) in good and serviceable condition."
Then in subsection (2), it has specific requirements by reference to the schedules, which we've seen and with which we're familiar.
THE CHAIRMAN: Yes.
MR BERESFORD: Just while we're here, can I ask you, Dr Armstrong, this provides:
"All life-saving appliances provided on board a local vessel shall be --
(a) sufficient to ensure the safety of persons on board the vessel ..."
If there are small children on board a vessel, but

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only adult life jackets, would they be sufficient to ensure the safety of such small children?
A. I would say not, Mr Beresford, because they would not fit.
THE CHAIRMAN: Just give me a moment, please. Thank you.
MR BERESFORD: You've suggested a definition of a life jacket -- you've suggested certified, but you haven't said by whom. I presume you mean just a life jacket that complies with the international standard that you've referred to; is that right?
A. At the end of the day, somebody has to certify it as being built to that standard. It's all very well having an ISO standard, but somebody has to certify that it meets it.
Q. So could the definition perhaps say "a life jacket approved by the Director as complying with ISO", et cetera?
A. Yes, it could.
Q. And does that international standard provide for children's life jackets?
A. It does. The level 150 actually signifies it will suit a person weighing up to 150 kg, and it's designed as a coastal life jacket, which is easily put on and usually has buckles, and I believe is a suitable standard for me to suggest would meet the requirements

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in Hong Kong local waters.
There is a children's equivalent, but it's -- I'm not sure if it's exactly the same ISO number. A little later on in my evidence, I also talk about the need for infant life jackets. So there are in fact three sizes of life jackets which may be necessary.
THE CHAIRMAN: How are the different categories distinguished one from the other in terms of weight?
A. Their weight-carrying capability?
THE CHAIRMAN: Yes.
A. I don't have the numbers in my head, Mr Chairman, I'm sorry.
THE CHAIRMAN: Does 43 kg ring a bell, as far as children are concerned?
A. I thought it was 45, if I'd been pressed. But you may be right.
THE CHAIRMAN: And infant -- can you help us as to that, or perhaps come back on that?
A. I'd have to come back to you on that.
THE CHAIRMAN: Thank you.
MR BERESFORD: Would this definition that you have proposed, then, be sufficient to include these other standards?
A. I'm not sure, Mr Beresford.
Q. So you've said there are three standards?
A. I said there were three sizes of life jackets.

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Q. Three sizes of life jackets?
A. I do not have a copy of this ISO standard, unfortunately, and I do not know if it includes -- I understand it does include infants and children, but I have not seen it so I'm not sure. It's the standard that's adopted in a number of different countries, particularly in Europe, for coastal life jackets, and also in Australia.
THE CHAIRMAN: What then is the difference between a coastal life jacket and an ocean life jacket?
A. I don't understand the full ramifications of the difference between them, Mr Chairman. Certainly I'm aware that a full life jacket is designed to do a certain number of features, including righting an unconscious person in the water and holding their mouth a certain distance above the water level. I think a coastal life jacket doesn't have quite the same onerous requirements for holding the person's mouth so far above the water.
THE CHAIRMAN: Thank you.
A. Full life jackets are also much more difficult to put on, and generally I understand -- I haven't seen one which has buckles on that is easy to put on.
THE CHAIRMAN: I'm sorry, you haven't seen?
A. I haven't seen one that's fully compliant which has

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buckles.
THE CHAIRMAN: Yes.
A. There may be, but I haven't seen one.
MR BERESFORD: I suppose it's commonsense, isn't it, that you don't need the same safety equipment in Victoria Harbour as you need in the Southern Ocean?
A. That's the philosophy, yes.
Q. Then you've picked up that in schedule 3 table 7 to Cap 548G -- this is, I think, an incidental point, is it not? It's not directly relevant:
"... table 7 does not specify the need for children's life jackets for class IV vessels licensed to carry not more than 60 passengers."
Given that such a vessel would only require three children's life jackets, I take it it didn't seem to you to be -- it wouldn't be particularly onerous to require it, so you suggest that that might be subject to revision.
A. Yes.
Q. And just to read it on to the record, your consideration 9 is:
"delete '100%' from table 7 and replace with '100% adult life jackets + 5% children life jacket'."
A. Yes.
Q. In other words, the same as the table we're concerned

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with, table 1?
A. The same as class I vessels.
Q. Then in paragraph A-23, you raise the issue of the origin of the requirements for 5 per cent life jackets for children. You say that you don't understand that. You say:
"SOLAS requirements state 'a number of life jackets suitable for children equal to at least 10% of the number of passengers on board shall be provided or such greater number as may be required to provide a life jacket for each child'."
A. Yes, and it's the final part of that that I think is important.
Q. Yes.
THE CHAIRMAN: May we see the SOLAS requirement, please?
A. It's document A of my report.
MR BERESFORD: Document A begins at page 1683.
THE CHAIRMAN: Yes.
MR BERESFORD: Can you help us, please, Dr Armstrong?
THE CHAIRMAN: Regulation 7, I think the footnote says.
A. It's page 1692.
MR BERESFORD: Paragraph 2 to regulation 7?
A. 2.1.
Q. 2.1.1, in fact?
A. Correct.

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Q. "A life jacket complying with the requirements of paragraph 2.2 .1 or 2.2.2 of the code shall be provided for every person on board the ship and, in addition:
.1 a number of life jackets suitable for children equal to at least 10% of the number of passengers on board shall be provided or such greater number as may be required to provide a life jacket for each child".
THE CHAIRMAN: What is the position in the United Kingdom or Australia as to the provision of children's life jackets?
A. In Australia, I know that the requirement is to have the greater number, to cover the number of children on board.
THE CHAIRMAN: So every child must be provided with a life jacket?
A. Correct. I don't know the position in the UK.
THE CHAIRMAN: Is that in this recent federally made legislation?
A. It certainly is in the federally made one. You'd have to look at each of the states' ones to see what they have suggested, and I don't know.
THE CHAIRMAN: And to which categories of vessel does that apply?
A. It certainly would not apply to vessels operating in smooth waters, but would certainly apply to vessels

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operating offshore, within a certain distance. And somewhere in between. I cannot recall.
THE CHAIRMAN: This is clearly an important issue, so may I ask you, if you could come back to us --
A. I will do that.
THE CHAIRMAN: -- because it's always useful to compare the regime operating in other well-regulated jurisdictions, and Australia and the United Kingdom would fall into that category.
A. I do have the documentation with me, so I could do that quite quickly.
THE CHAIRMAN: Thank you very much.
MR MOK: Mr Chairman, earlier you mentioned 43 kg.
THE CHAIRMAN: Yes.
MR MOK: I think the reference you might have in mind is in one of the minutes of meetings between Mardep and the industry, which is exhibited in Mr Wong Wing-chuen's statement. Can I refer you to that?
THE CHAIRMAN: Yes. Page?
MR MOK: Page 4609-3 in marine bundle 13.
THE CHAIRMAN: Yes. This is the paragraph that you corrected, did you not?
MR MOK: That's right. And the reference there is to the IMO Standard. So if it is helpful, we can supply a copy of that standard to the Commission.

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THE CHAIRMAN: Yes.
MR MOK: I understand that the definition of "infant" is the bit that I have crossed out, the 15 kg and 100 cm.
THE CHAIRMAN: You think, then, an infant is up to 15 kg --
MR MOK: That's right.
THE CHAIRMAN: -- and a child from there up to 43?
MR MOK: Between there to 43. But we will double-check that and supply to you a copy of the IMO Standard.
THE CHAIRMAN: Thank you very much.
MR BERESFORD: I'm grateful to my learned friend.
So, in your report, you have recommended for consideration at number 10:
"delete '100%' from table 7 and replace with '100% adult life jackets + 5% children life jacket or such greater number as may be required to provided a life jacket for each child on board'."
A. Yes.
Q. I think you mean table 1, don't you? Perhaps you mean table 7 as well, but --
A. I was referring under A-22 to table 7, so ...
Q. Table 7 looks as though it's been carried over from your previous issue and consideration.
A. Possibly.
Q. But table 7 refers to:
"Class IV vessels that are licensed to carry not

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more than 60 passengers and are not let for hire or reward and operate within waters of Hong Kong."
A. I think I mean table 1.
Q. So we're not really concerned with that in this Inquiry. We're concerned with schedule 3, part 2, table 1, which refers to class I vessels.
A. Thank you.
Q. At A-24, we come to the next issue which relates to the storage of life jackets in plastic bags. You say:
"Many life jackets remaining on board Lamma IV were stored in unmarked plastic bags held within the orange bag under the seat, which meant that they were not immediately identified as life jackets. Furthermore it is understood that some of the life jacket tapes were tied together and the knots were difficult to untie."
You've noted in your recommendation for consideration at number 11 that:
"Plastic bags were easily ripped open, but in a panic situation it is suggested that they were not immediately identifiable as containing life jackets. The reason for the plastic bags is understood to be to prevent attack by insects ..."
Correct me if I'm wrong, Dr Armstrong, or perhaps somebody else will, but I'm not sure that anybody actually said that they had any difficulty identifying

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life jackets as life jackets.
A. I can only repeat my experience, Mr Beresford. When I went on board Lamma IV and I sat down in a chair and I saw under the chair there were life jackets clearly marked in English, with some Chinese characters, and didn't have any difficulty in recognising there would be a life jacket under the seat. But I was very surprised when I reached underneath and pulled out a white plastic bag, which has been described as a garbage bag, because my mind was immediately a little confused. And I wasn't even in a panic situation. "What have I got here in this plastic bag? Is it somebody's lunch? What do I do about it? Do I undo the knot?"
Q. Knots is a different matter.
A. So eventually I just ripped it open and of course --
THE CHAIRMAN: And you told it us that was easily done, as I remember?
A. As I said here, it was easily done.
THE CHAIRMAN: So this problem could be solved if the plastic bag were transparent, then you would see the orange bag beneath it.
A. I bow to your wisdom.
MR BERESFORD: We can perhaps remind ourselves with a picture at police bundle III, page 141. I'm grateful to my learned friend Mr McGowan for reminding me of the

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location of these photographs. There's another one where you can see the plastic bag more clearly at page 324.
THE CHAIRMAN: I think we'd been referred to these photographs so that we can read what is on the yellow pouch, marked very clearly, at least in English, and presumably in Chinese characters, "Life jacket".
MR McGOWAN: You can actually also see inside the plastic bag in these photographs the orange that you referred to, sir.
THE CHAIRMAN: We have the point. Thank you.
A. Then of course the point about the tapes of the life jackets themselves being --
MR BERESFORD: I'm coming to the tapes in a moment, yes. Just focusing on the plastic bags for a moment.
So when you refer to the knot, you mean a knot in the plastic bag?
A. A knot in the plastic bag. It did confuse me for a short period of time.
Q. And in answer to my question, the evidential foundation for this is your inspection, rather than any evidence that's been recorded?
A. Yes, correct.
Q. You've also said:
"... it is understood that some of the life jacket

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tapes were tied together and the knots were difficult to untie."
A. Certainly on the ones I inspected, the tapes were tied together but they were able to be undone. Just there were a lot of them.
Q. So that would imply an inadequate inspection, would not?
A. Possibly, yes.
Q. And you've noted the current requirement in Cap 548G, schedule 3, part 1, section 2(b), which is headed "Operational readiness and maintenance of life-saving appliances", and provides:
"Whenever a local vessel is being used or operated, every life-saving appliance carried on board the vessel shall be --
(a) in working order;
(b) ready for immediate use; and
(c) placed in a position easily accessible."
So, of course, if the tapes are knotted, then they're not exactly ready for immediate use?
A. Yes. I said "possibly" in answer to your previous question because it crossed my mind, Mr Beresford, that the survey may have been satisfactory but whoever then put all the life jackets back underneath the seats may have wrapped the tapes around the life jacket. So it may not have been the survey.

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Q. I think I referred to inadequacy of the inspection, and advisedly so, because of course there's an annual survey which involves a survey by a Government surveyor, but there's also a weekly inspection.
A. Ah. I'm sorry. I misunderstood.
THE CHAIRMAN: Perhaps it's at the end of each weekly inspection that they're neatly tied away.
MR BERESFORD: Anyway, under the heading "For Consideration 11", you've simply said that the Commission will need to decide whether this plastic bag solution is an acceptable solution.
Turning then to your next head, the next issue, issue (v), "Redundancy of emergency electrical power". The issue you've identified is this:
"The source of the emergency electrical power should be separate from the main power supply, to avoid loss of power in case of fire or flooding in the engine room."
It's that separation that you mean by "redundancy"; is that right?
A. Yes, it is.
Q. You've referred us to the code of practice at page 3458.
THE CHAIRMAN: Which bundle?
MR BERESFORD: The code of practice is in marine bundle 11, Mr Chairman. There's a copy in the legislation bundle. I'm not sure which copy you're referring to on a regular

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basis.
THE CHAIRMAN: And in bundle 11, where do I find it?
MR BERESFORD: The code of practice begins at page 3416, and I'm referring, you, Mr Chairman, to page 3458.
THE CHAIRMAN: Thank you.
MR BERESFORD: Pages 3458 and 3459.
This is a table in chapter II, which is headed "Survey/Inspection, Issuance of Certificate and Plan Approval", and it's in section 7, which is headed "Survey/Inspection Items and Survey/Inspection Programmes". There are three tables set out in section 7: table 1, "Initial Survey"; table 2, "Periodical Survey"; table 3, "Final Inspection".
Table 3, "Final inspection", is at pages 3458 to 3459. You note that this does not have a requirement for redundancy of emergency electrical power or a separate source of power supply.
THE CHAIRMAN: Is there any provision for emergency power?
A. Yes. I believe page 3473 might help.
THE CHAIRMAN: Thank you.
A. Paragraph 21.5.
THE CHAIRMAN: So the point you're making is that although there is a provision that requires an emergency power source, it doesn't provide that it should be kept separate from the batteries, which are likely to be in

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the engine room?
A. Or the generator that's in --
THE CHAIRMAN: Or the generator.
A. Yes, correct.
THE CHAIRMAN: Of course, on Lamma IV they were in the engine room --
A. Yes.
THE CHAIRMAN: -- albeit in boxes of some degree of tightness, or not?
A. Yes. And also the engine room is the greatest source of fire on board a vessel.
THE CHAIRMAN: And of course, that placed them well below the waterline as well?
A. It did.
THE CHAIRMAN: On a vessel like Lamma IV, where might the batteries to be used for the emergency lighting be located?
A. I can only refer to other designs, and that can be in an emergency battery locker behind the wheelhouse, somewhere in that region.
THE CHAIRMAN: Yes. Does that create any problems for charging the batteries from the distance from your generators or your engine?
A. I don't believe so. It's a length of cable.
THE CHAIRMAN: Yes.

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MR BERESFORD: There is a reference to an emergency power system on page 3449. This is in a different chapter, dealing with the submission of plans and data. It appears to be applicable only to category B vessels, according to the annotation at asterisk 9.
THE CHAIRMAN: Category what vessel?
MR BERESFORD: B.
THE CHAIRMAN: What is a category B vessel?
A. It's a cargo vessel.
MR BERESFORD: It's chapter I, section 5, "Category of Vessel". "Launch" and "Ferry Vessel" are both category A, as can be seen from page 3440.
Then there's also provision, just about where you're putting your proposed amendment, at paragraph 21.5, page 3473:
"The vessel's emergency lighting, navigation lights for vessels of length exceeding 24 metres, fixed fire extinguishing system ... should be provided with emergency power supply of sufficient capacity."
So it seems that there's a provision requiring an emergency power supply, but not expressly separated?
A. Correct, yes.
THE CHAIRMAN: Was the location of the auxiliary batteries dealt with in plans that we've looked at? I know you tried to help us with the circuit diagram. But was that

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a plan that the Marine Department would have seen?
A. It was a plan that was submitted to the Marine Department. I cannot recall if that particular one was marked "approved" or "seen", but I think it was approved, sir.
THE CHAIRMAN: Can you remember the title of the plan?
A. It's at page 317 in marine bundle 2, sir.
THE CHAIRMAN: Yes.
A. This is not an approved copy, I'm sorry. They are shown, if you would like me to position the cursor -- but this is only a schematic, and this isn't necessarily the exact location.
THE CHAIRMAN: I recall you took us to this on the last occasion.
A. I did, sir, yes.
THE CHAIRMAN: And it was your opinion that they were the ones on the port side of the vessel.
A. Yes. Just below the cursor there.
MR BERESFORD: The point is that they were located in the engine room; isn't that right?
A. Yes.
THE CHAIRMAN: So in a place where fire was a possibility --
MR BERESFORD: Or flooding.
THE CHAIRMAN: -- and below the waterline?
A. Correct.

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MR BERESFORD: When you say that the code of practice does not have a requirement for redundancy of emergency electrical power, it's probably not quite accurate because it does provide for emergency electrical power, which must be something different from the standard electrical power.
A. I understand, yes. Redundancy of location, perhaps.
Q. But what it doesn't provide for is that the source of the emergency electrical power should be in a different location.
THE CHAIRMAN: I think we're all at one about that.
A. Yes.
THE CHAIRMAN: It's the use of the word "redundant" you're taking issue with.
A. The words are wrong, yes.
MR BERESFORD: Well, it's the location we're talking about?
A. It's the location.
Q. So your recommendation 12 for consideration is that there should be an addition to table 3 at page 3 page 3459, after item 9.
A. Yes. I think now you've pointed it out to me, it would be also advisable to put it on page 3473, after paragraph 21.5.
Q. Well, in fact you have dealt with that in your consideration 13.

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A. Thank you.
Q. But perhaps consideration 13 would suggest "the emergency source of power shall not be located below the deepest load waterline or in the machinery space"?
A. Yes.
THE CHAIRMAN: As you state, the obvious place in Lamma IV would have been in the wheelhouse?
A. Well, I'm not sure in the wheelhouse is the right place, sir.
THE CHAIRMAN: Because of the fire danger there?
A. Because of the fact there is a fire danger, and batteries of this type usually give off hydrogen, which can be or is a flammable gas. So they have to be vented to atmosphere.
THE CHAIRMAN: Yes. As it was in the engine room?
A. As it was in the engine room.
MR BERESFORD: We've jumped a bit, because we've jumped the issue at paragraph A-28 in your report, but I'll come to that. Can I just read your consideration 12 into the record, and that was:
"Add an additional item to the code of practice chapter II section 7 table 3, C&D: [after item] 9 'Location of emergency source of electrical power should be outside machinery space and above waterline-verification'."

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A. Yes.
Q. I just wanted to ask you, as far as positioning it above the waterline, how would that assist in the present case?
A. In the case of Lamma IV?
Q. Yes.
A. It depends how high above the waterline, of course, it had been located. But if it had been above the main deck, then the batteries would not have been swamped. But of course we don't know that the batteries were swamped immediately on Lamma IV.
Q. They would only not have been swamped if they had been positioned in the bow, wouldn't they?
THE CHAIRMAN: I think what you mean by that is whether they carried on functioning.
A. Whether they carried on functioning; whether they were filled with water, which would stop them working.
MR BERESFORD: Even if they had been positioned above the waterline, unless they were in the bow, because Lamma IV stank stern-first --
A. But they seemed to have continued to operate for some period of time, even though the vessel was partly underwater.
Q. That may be less due to the fact that they were above the waterline. In fact, they weren't; they were in the

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engine room.
A. On the floor of the engine room, so a long way down.
Q. Yes. But perhaps they were in sealed boxes; I don't know.
A. They were in fibreglass boxes. I'm not 100 per cent certain that the watertight integrity of those boxes was maintained, because they were very close to the damage on the vessel and it would be rather surprising if they were not damaged, particularly the vent up through the deck. But I have no evidence one way or the other, because when I saw the vessel, it had been tidied up and a lot of the debris taken away.
Q. But my question is, how does it assist in the present case -- on the facts of the present case, how would it have assisted to have had the source of the emergency power supply above the waterline?
A. Well, my belief is in the present case, if they'd been above the waterline they would have continued operating until such time as the vessel sank.
THE CHAIRMAN: And the water reached where they were?
A. Yes.
MR BERESFORD: Yes. Well, if they were in the stern above the waterline, that would have been immediately.
THE CHAIRMAN: I think we've got the point, Mr Beresford.
MR BERESFORD: I don't wish to test the Commission's

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patience, but what I want to ask is whether it might be an alternative to place them in waterproof boxes vented to the deck in, say, the crew space or the void further forward, but still below the waterline?
A. I understand. My problem with a waterproof box, Mr Beresford, is that they may be waterproof at the time of construction and at the time of survey, but are they maintained watertight? Batteries are an item that needs constant maintenance and that requires a crew to make sure that at all times they are put back in the way which they were originally, which I think is asking for potential for disaster, anyway.
THE CHAIRMAN: Were these batteries marine deep-cycle batteries?
A. My understanding is that's the case, yes.
THE CHAIRMAN: So, sealed?
A. Sealed batteries, yes. Sealed but --
MR BERESFORD: That explained the ability to carry on functioning for some time after submersion?
A. Possibly, yes.
Q. Then in paragraph A-28, you deal with this specifically. You say:
"The source of the emergency electrical power should be located above the deepest load waterline, to minimise swamping in case of flooding of the engine room."

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You refer to the current requirement, which is in the code of practice at page 3473, section 21. We've referred to that already.
Then consideration 13, which we've already discussed, you suggest adding a new paragraph after 21.5:
"The emergency source of power shall not be located below the deepest load waterline."
And I think we've agreed you've suggested adding "for the machinery space", or "in the machine space"?
A. Yes. Probably better to say "in the same space as the source of electrical power", or "normal source of electrical power".
THE CHAIRMAN: Is there anything in Australian or UK legislation about the location of emergency sources of power, the batteries that will provide emergency power?
A. I can forward a copy of the documents to you, Mr Chairman.
THE CHAIRMAN: Thank you.
MR BERESFORD: Then we come on to your next issue, headed "Damage stability", issue (vi). You note that there are references in annex F to the expression "margin line", but there is no definition of that term "margin line" either within the code of practice or Cap 548 or

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Cap 548G. And you've proposed that a definition be added to the code of practice --
THE CHAIRMAN: Before we get to that, could I see the reference to "margin line" in annex F? Which page is that?
MR BERESFORD: The first one is page 3544, Mr Chairman.
THE CHAIRMAN: Thank you.
MR BERESFORD: We see under part 2, paragraph (3)(d):
"no partial subdivision above margin line is provided ..."
And page 3546, paragraph (9)(b):
"in no case should the margin line be submerged in the intermediate stages or final stage of flooding."
The Commission will recall that that (9)(b) is a similar condition to that which we discussed in the course of taking evidence in the 1994 appendix.
The cross-reference is the fax dated 1 August 1994 at marine bundle 8, page 2081. The Commission will perhaps recall my questioning a number of surveyors about the requirement at page 2085, the twin requirement "at the final stage of flooding the margin line shall not be submerged", alongside the requirement for "a positive residual metacentric height of at least 50 mm".
THE CHAIRMAN: Was "margin line" defined here?

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MR BERESFORD: It was defined, as I recall -- I have to check, but I think it was defined as either 3 inches or --
THE CHAIRMAN: We know what it is, but was it defined as such? We're told it was 3 inches and was converted from the imperial to metric.
Is that your understanding?
A. It is defined in -- 348, was it?
MR SHIEH: I have to dig it up.
THE CHAIRMAN: So there is a definition of "margin line"?
MR BERESFORD: Mr Chairman, my learned leader refers to a statute but it has to be borne in mind that no statute was applicable to local vessels.
THE CHAIRMAN: Yes.
MR BERESFORD: What they were doing was adopting a sketch applicable to ocean-going vessels and using it for guidance.
THE CHAIRMAN: Thereby adopting, for guidance, as you say, that provision?
MR BERESFORD: Yes. And the provision is reflected in Cap 369AM, which is at legislation bundle tab 11. Yes, "margin line" is defined as meaning:
"... a line drawn at least 76 millimetres below the upper surface of the bulkhead deck at the side of the ship".

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In fact, that's referred to by Dr Armstrong in his consideration number 14, because his proposal is that a definition be added to the code of practice "consistent with SOLAS (or as in Cap 369AM)."
Is that right, Dr Armstrong?
A. It's not quite consistent with Cap 369AM, because I've suggested 75 mm. I believe Cap 369AM says 76 mm. But it is consistent with SOLAS.
Q. Which is consistent with SOLAS?
A. 75. It used to be 3 inches, which was 76. But SOLAS is now 75.
Q. These issues are in the nature of tidying up the code of practice, and in fact you've set out the definition at the top of page 1648 of your report.
A. Yes.
Q. This being the SOLAS definition?
A. Being the SOLAS definition.
Q. Another issue of the same nature, paragraph (9)(a) of annex F, page 3546, refers to a calculation by the constant displacement method. In consideration 15, you suggest that this be deleted on the grounds that this is obsolete.
A. Correct. I think there are easier ways of doing it.
THE CHAIRMAN: So you suggest simply deleting but not deleting and adding something else?

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A. Correct.
MR BERESFORD: That's because we can calculate it with computers rather than by old manual methods; is that right?
A. It used to be a terrible calculation to do, taking many, many hours. Now you can do it in probably 10 seconds or something like that. Because computers allow you to do a lot of iterative routines, the method of doing it has changed considerably.
Q. So it's sufficient, in your view, for the condition of the vessel after damage to be stated to be that there should be a positive residual GM of at least 50 mm?
A. Yes, I would say so. My difficulty is if this is left in, then it would actually prevent you from using many of the computer methods in use today.
Q. Yes, I see.
The next section is section (vii), headed "Watertight subdivision".
Mr Chairman, this is quite a substantial section and it's perhaps one of the most important parts of this report, so if that would be a convenient moment to take a break?
THE CHAIRMAN: Yes. We'll certainly take an afternoon break. We'll take a break for 15 minutes.
(3.59 pm)

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(A short break)
(4.14 pm)
THE CHAIRMAN: Just give me a moment, please, Mr Beresford.
MR BERESFORD: Certainly, Mr Chairman.
THE CHAIRMAN: Thank you. Yes.
MR BERESFORD: Dr Armstrong, we were just coming to your next issue, which is "Watertight subdivision"; issue (vii) in your report, at page 1648. You've noticed that:
"At the time of construction of Lamma IV, (1995) watertight subdivision was a requirement included in the Instructions in force at the time, with detailed legislation provided by schedule 1 of Cap 369AM."
As we were just discussing before the break, Cap 369AM did not apply to what we now call local vessels, at least by legislation, but it was adopted in part as a matter of practice by the Marine Department.
A. Yes. Referred to in the letter you put up recently at page 2081, I think.
Q. The letter of 1 August 1994 --
A. Yes.
Q. -- stating:
"For every vessel carrying more than 100 passengers, the watertight subdivision (one-compartment flooding) requirements are to be complied with. (see attached

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copies, schedules 1 and 3)."
Which were effectively schedules 1 and 3 of Cap 369AM?
A. Yes.
Q. You've said:
"Damage stability requirements were given in schedule 3 of Cap 369AM, but these were not mandated under the Instructions in force at the time. Nevertheless, the builder of Lamma IV did investigate the damage stability and stated the damaged GMT value as well as the watertight subdivision calculation."
When you say "the builder", are you referring there to the damage stability calculations, the booklets provided by Cheoy Lee?
A. Yes.
Q. Not the Damage Stability Booklet provided by the naval architect upon completion of the vessel?
A. I was referring to the ones done by Cheoy Lee.
Q. Yes. You are aware of the one provided by Naval-Consult, are you?
A. I am, yes.
Q. Miscellaneous bundle, page 111. They treated the steering compartment and the tank room as one, for the purposes of their calculation.
A. May I have a look at that? Thank you.

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Q. Miscellaneous bundle, page 111.
A. Yes. Thank you. I have seen it before.
Q. They start with a section on intact stability. The damage stability starts at page 140.
At page 141, we see the steering and tank room damage taken together.
A. (Witness nods).
Q. And at page 142. There's a graph at page 143, "Steering & Tank Room Damage". This goes on through page 146. At page 147, they deal with engine room and so on.
A. I think you're right, Mr Beresford, to imply that my wording is a little loose. Maybe it should say "the designer and builder of Lamma IV did investigate the damage stability". This is paragraph A-34.
Q. Yes. Then you say:
"It is necessary to explain the terms 'watertight subdivision' and 'damage stability'."
In paragraphs (a), (b) and (c) you explain watertight subdivision, stability and damage stability respectively.
I'm just going to read those out:
"(a) Watertight subdivision is the process by which a vessel may be prevented from foundering (sinking) owing to a breach of watertight integrity (such as the admission of water following a collision), and subject

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to limitation on the size of the hole in the ship. By limiting the size of any internal compartment of the ship and surrounding it by watertight bulkheads, sufficient buoyancy can be provided by all of the remaining compartments that are not damaged so that the vessel continues to float. The size of each compartment is usually determined by the volume necessary for the waterline of the damaged craft to remain below the main deck, by a nominal distance of 75 mm. The location of 75 mm below the deck is usually called the margin line.
(b) Stability of a ship is a measure of the ability of the craft to return to the upright position if displaced to one side by some external force, such as the wind or weather or other forces such as passengers crowding on one side or cargo shifting to one side. Stability is only referenced to the transverse direction, and usually associated with a roll or heel angle.
(c) Damage stability refers to the ability of the vessel to return to an upright position if displaced to one side by an external force, when the watertight integrity of the craft is breached and water has entered the vessel."
Then you say in paragraph A-36:
"If sufficient water enters a vessel, then it will

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either capsize by rolling over owing to insufficient damage stability (but not necessarily sink) or it will founder (sink) in the upright condition or with excessive trim, owing to insufficient watertight subdivision. A good example of a vessel foundering owing to inadequate subdivision, but having adequate damage stability is the Titanic, about which many learned papers have been written on its stability and watertight integrity. The Titanic sank by the stern, and indeed broke in half whilst remaining 'upright' and did not capsize to one side. In my opinion, the sinking of Lamma IV was also a case where the craft sank but had adequate damage stability, as the craft foundered by the stern without rolling over and capsizing to one side."
You then make the point:
"Watertight subdivision is a quite separate item from damage stability and the characteristics of one cannot be easily determined from the characteristics of the other."
A. Yes.
Q. You go on to illustrate this. You say:
"Lamma IV had excellent subdivision when constructed in 1995 and had adequate damage stability. In fact the subdivision was so good that subsequent calculations showed that it could remain afloat without submerging

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the margin line with any two compartments flooded, (although the regulations only required one-compartment standard)."

THE CHAIRMAN: To whose calculations are you referring there?

A. I was referring to my own calculations, Mr Chairman.

THE CHAIRMAN: Thank you.

A. And I would just like to confirm that when I state "two compartments", I was assuming there was a watertight bulkhead at frame 1/2.

MR BERESFORD: Are those the calculations we looked at this morning in relation to your third supplemental report?

A. Yes.

THE CHAIRMAN: So when you say "Lamma IV had excellent subdivision when constructed", would it perhaps be more accurate to say "when designed, but not constructed as designed"?

A. With regard to the watertight bulkhead --

THE CHAIRMAN: Yes.

A. -- yes, sir, but my aim of that sentence was really to imply the weight of the vessel as it was built in 1995, the original lightship weight.

I think also the Preliminary Damage Stability Book that you referred to a few minutes ago, Mr Beresford --

MR BERESFORD: Miscellaneous bundle, page 111.

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A. -- also shows two-compartment standard as being met.

Q. Yes. So, in other words, even if you disregard the bulkhead at frame 1/2 as directed by the 0.1L rule, it would still meet the two-compartment standard --

A. Yes.

Q. -- with its original weight?

A. Yes.

THE CHAIRMAN: By that you're referring to a consideration of damage condition with flooding of the steering and tank room?

A. Yes, correct.

MR BERESFORD: With its original weight, if you treat the steering compartment and the tank room as one, would it have remained afloat with that one plus the engine room flooded?

A. No, I don't believe so, because there was no buoyancy at the after end of the vessel at all in that case.

Q. Does that illustrate the importance of having some buoyancy at the after end of the vessel, regardless of the 0.1L rule?

A. Yes, exactly. The 0.1L rule is just a theoretical exercise, of course. It's what I was trying to say when I was -- in my first report, when I was talking about the 0.1L being thought of from the perspective of either the tank room or from the steering gear compartment.

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Yes, the rule is very important when you're thinking of the steering gear compartment being flooded, but not so important when the tank room is flooded because the damage is less than 0.1L in length.

Q. But it's just one test, isn't it? There are other considerations. So one might need an after peak compartment to provide buoyancy, regardless of the 0.1L rule?

A. Correct.

Q. And the purpose of the 0.1L rule is to cater for the possibility that a hole might be made at the bulkhead --

A. Yes.

Q. -- of a small compartment?

A. Yes. I believe that's one of the requirements why the forefathers, whoever they were, originally legislated the idea of an aft peak bulkhead, quite separate from watertight subdivision.

Q. Thank you. Then you go on to say:

"Unfortunately when the weight of the vessel was increased in 1998 by the addition of solid ballast and fendering and possibly some other items, amounting to a weight increase of over 30%, the subdivision standard was substantially reduced, allowing the margin line to become submerged when the two aft compartments were flooded. It was not recognised at the time that the

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watertight subdivision had been compromised by the addition of weight.

However at the same time, by adding a substantial amount of weight low down in the vessel, the damage stability capability increased."

By that you're referring to the stability reference to the transverse direction?

A. Yes.

Q. You say:

"This example may be theoretical, because Lamma IV was not required to meet a standard to survive with two compartments damaged, but it does demonstrate that subdivision and damage stability are not the same and are not connected. Improving one does not imply improving the other, and can reduce it."

A. Yes.

Q. "In the condition in which Lamma IV sank, with three compartments flooded (engine room, tank room and steering gear compartment), according to my calculations the vessel had adequate damage stability and the proof of that lies with the fact that it sank by the stern without rolling over to one side."

A. Yes.

Q. So when on Day 43 Mr Wong Wing-chuen said, at page 89, line 18:

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"The stability here should also include the intact stability and damage stability. The two are together as one."

And then at line 23:

"As far as a naval architect is concerned, intact and damage stability, they are one and the same thing. If one goes wrong, the other would go wrong too."

You would disagree with that for the reasons that you set out?

A. Not necessarily, Mr Beresford. Stability is the ability of the vessel to come upright after being displaced to one side. That same characteristic is true whether the vessel is intact or damaged. So I can understand that he's saying they are connected, and if one is insufficient, there is a possibility the other would be insufficient, but I would say I don't agree with him saying if one goes wrong, the other could go wrong, because they are two different criteria. They have to meet two different criteria. They may be concerned with the ability of the vessel to come back upright, but in the damaged state, the criteria, you may recall, is that it has a GM greater than 0.05. But the intact stability criteria are considerably more voluminous and they're a much different standard.

What Mr Wong has not referred to here, and I suspect

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he means -- which is purely guesswork on my part, I guess -- is that watertight subdivision is quite different to intact stability. Is there a mention in Mr Wong's evidence of watertight subdivision?

Q. Well, I asked him:

"Whereas the damage stability, which starts at page 695, assumes a hole in the hull?

Answer: It assumes that if there is a hole in any one of a single -- in only one single compartment, then what will happen to its longitudinal stability and also transverse stability.

Question: Yes. It's a very different question, isn't it?

Answer: No. For naval architects, they are the same question. Because if the inclining experiment data is not accurate, it will affect both the intact stability and damage stability."

A. Mr Wong has used the term "longitudinal stability" there. I think I know what he's getting at. Longitudinal stability would imply some degree of watertight subdivision, but it's the wrong terminology, because longitudinally it would have no propensity to come back upright again. If it was slowly sinking by the stern, there's no restoring force trying to bring it upright. So the term "longitudinal stability" I think

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is incorrect. It's more a case of watertight subdivision.

So I couldn't agree that they were the same question.

THE CHAIRMAN: But the issue for this Commission is simply the adding of the 8.25 tonnes of lead plus the other unexplained 7 tonnes to the vessel's weight, which resulted in the margin line being submersed in 1998. That's the issue.

A. Correct, and in this case watertight subdivision -- I'm sorry. Yes, the watertight subdivision criteria in schedule 1 states that the margin line should not be submerged when the vessel is upright.

Schedule 3, which covers damage stability, says the vessel shall have a GM of at least 0.050, and the margin line shall not be submerged at the side of the vessel.

They're two quite different criteria and two quite different phenomena. In one, the boat is heeled over and in the other it's upright. The damage stability on Lamma IV, I believe, was adequate -- barely, but adequate -- but the watertight subdivision was not. It failed watertight subdivision. Under what I have seen from Mr Wong's evidence, he's only concerned with damage stability, and I think the damage stability of Lamma IV was adequate, but barely adequate. The failure was

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watertight subdivision.

If I might add to that, Mr Chairman? A good example of that is when the weight was added to Lamma IV over the years, that the damage stability improved because weight had been added low down in the vessel, as I say in my report here. But, in fact, the watertight subdivision got considerably worse.

Q. Yes. That's the point that you made at paragraph A-40 of your report?

A. Yes.

Q. You then go on to deal with the current situation at paragraph A-43, and you say:

"The question arises whether the issues of watertight subdivision and damage stability are adequately covered in the current regulations and could a situation happen again to a new vessel similar to that of Lamma IV, where the weight increased and the watertight subdivision requirements were not met, or a watertight bulkhead was certified even though it was not watertight.

Watertight subdivision is a fundamental characteristic of ship design. It is calculated at a very early stage and before the hull shape and layout of the vessel is finalised, and sometimes it determines the principal characteristics of the craft, such as

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length or beam or depth. There is no specific requirement on Cap 548G concerning the requirements of watertight subdivision, nor of damage stability, except for a broad requirement in section 9 that plans relating to '(e) arrangements relating to watertightness ... bulkheads' and' (f) stability' should be approved."

You then refer to the 2006 code of practice at page 3447. Chapter II, section 5. Chapter II is headed "Survey/Inspection, Issuance of Certificate and Plan Approval"; section 5 is concerned with "Plans and Data required to be submitted".

You say:

"[This] requires that estimated damage stability information is submitted at an early stage, and a final damage stability calculation is provided after the vessel is complete."

So we see the estimated damage stability information referred to in the table under number 5, item (A)(6), "Estimated Damage Stability Information".

Where do we get the requirement, please, for a final damage stability calculation after the vessel is complete?

A. Number (9).

Q. After the inclining experiment. And both cross-referenced to chapter IV, section 2?

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A. Yes.

Q. Chapter IV, section 2 is at page 3485, headed "Damage Stability":

"Every launch and ferry vessel designed to carry more than 100 passengers should meet a damaged stability standard as prescribed in annex F of this Code."

Annex F we've already looked at in a preliminary way in relation to the definitions of "margin line" and what have you. I think we'll be looking at that in more detail as we work our way through your report.

In relation to section 5 and the table we saw there, you point out that there is no reference to the location of bulkheads or to watertight subdivision in that section.

A. Correct. Although to do damage stability calculations, you would need to know where the bulkheads were located.

Q. Yes. Then you refer to the code of practice, chapter IV, titled "Freeboard and Stability". That commences at page 3480. You refer to section 2, which I've just read, page 3485; referring to annex F, which is page 3544.

Before we come to that, you make this point:

"The remainder of [chapter IV] mainly covers intact (undamaged) stability and other unrelated matters. There is no reference in this chapter to watertight subdivision."

A. Yes.

Q. Annex F, then, at page 3544, is titled "Damaged Stability Requirements for Launches, Ferry Vessels".

"In part 1, Damaged Stability Requirements, there is reference to the vessel being 'subdivided by bulkheads, which should be watertight up to the bulkhead deck, into compartments the maximum length of which should not exceed the length permitted by the required freeboard and intact stability as calculated in accordance with parts 2 and 3 of this annex.'"

You then say:

"This might appear to refer to watertight subdivision, but it makes little technical sense to me."

You give three reasons. You say:

"The length of a compartment cannot have any relationship with a vessel freeboard, and in any case there is no reference to freeboard in parts 2 or 3 of the annex. Furthermore, there can be no relationship between intact stability and the length of a damaged compartment, as intact stability by definition refers to a vessel without damage."

You conclude:

"This whole section appears to have been written by someone who did not understand the concept of watertight subdivision."

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A. Yes, I did.

Q. Then in relation to part 2, headed "Assumptions on which calculations are to be based", which reads:

"The stability of every vessel should be determined by calculation in accordance with the following conditions and assumptions ..."

You say:

"It might reasonably be assumed that the first sentence ... should read 'The damage stability of every vessel ...' rather than 'The stability of every vessel ...'"

You've already pointed out that paragraph (3)(d) on that page refers to a margin line, but there's no definition of a margin line.

In part 2, section (6) on page 3545, you say that this refers to the extent of damage, but "there is no reference to whether this is limited to one-compartment damage, and without such a reference it can only be assumed that the extent of the damage quoted can be applied anywhere in the ship. This means that if the damage occurs on a bulkhead, then there will be a two-compartment standard."

A. Correct.

Q. You say:

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"This may well be the intention of the writer, and I have no difficulty with this, except to note that it is a higher standard than would be applied in most other countries. In Australia for example, passenger vessels have to meet a one-compartment standard for passenger numbers up to 399, and only above 400 is there a two-compartment standard."

A. Yes.

Q. Do you know what the situation is in the UK?

A. I do not, Mr Beresford, no.

Q. Then part 3 on that page "commences with the words 'the intact stability of the vessel should be deemed to be sufficient if ... after the assumed damage ...', which is difficult to understand because after damage there is no relevance of intact stability. I suggest that the word 'intact' should be replaced by 'damaged'."

A. It was the only logical interpretation I could put on it.

Q. Then you go on to comment:

"The whole of annex F gives the impression that individual phrases have been borrowed from various IMO publications and previous Hong Kong regulations without proper consideration of the whole meaning."

A. Yes.

Q. "In summary, in annex F there is no clearly defined

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requirement for watertight subdivision, no defined criteria against which to judge the adequacy of watertight subdivision, and no guidance on the procedures to be adopted to calculate it."

A. Yes.

Q. You say:

"There is damage stability criteria but no clear definition of the standard of the assumed damage."

A. Correct.

Q. And you make this point:

"I am unable to judge whether the Chinese version is correctly written and that the English version might have been poorly translated."

So your consideration 16 is:

"That the whole of annex F is carefully rewritten. It should not contain the complicated formulations contained in schedule 1 of Cap 369AM, originally copied from 1974 SOLAS (and SOLAS has since been rewritten and does not contain these same calculations any more)."

A. Correct.

Q. "Modern computer software has made the calculation of watertight subdivision a simple process. What is needed in annex F is a concise summary of the outcomes to be achieved by watertight subdivision."

I take it that that's something that you would want

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to consider at further length?

A. I think it could be quite a simple and easily understood section, unlike its predecessor, which was difficult even for me. And I don't think it's difficult to write. The main difficulty might be more in your area of getting it accepted into legislation.

Q. But can you give us an idea of the outcomes that you consider need to be achieved by watertight subdivision?

A. By all means. Clearly state what the criteria are; that is, the margin line, fundamentally the margin line; and to calculate where the bulkheads are, such that if the extent of flooding is -- and then give an extent of flooding -- which could be the same as already contained in annex F and probably should be, because it's the same as SOLAS. And then quote where the damage occurs, which I would suggest would be one-compartment standard. And then a simple phrase saying "In case of damage to any one compartment, the margin line should not be submerged". I think it's really quite simple.

Q. Yes.

A. How that is done does not need to be defined; it can be done by a number of different softwares which are readily available.

Q. When you say "calculate where the bulkheads are", is that where you would include instructions such as the

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0.1L rule?

A. I would not refer to the 0.1L rule, other than as a footnote. I think the Australian regulation is quite good. It basically shows a diagram with a bulkhead which is smaller -- a compartment that's less than 0.1L, and it has a damage overlaid -- a big red blob overlaid over it and says, "In this case, the bulkhead is a non-conforming bulkhead", or uses some such terminology, indicating the bulkhead is not assumed to be watertight in that location.

Q. But would you make it clear or not that where you have such a non-conforming bulkhead or a bulkhead which is assumed not to be watertight, that is not to affect any other requirement for a watertight bulkhead in that position?

A. Yes. Thank you. That will be essential.

Q. Moving on to your next section, the next issue, issue (viii), "Seats and seat attachment". At paragraph A-57, you say:

"Seats were poorly attached to the deck of composite sandwich construction on Lamma IV, and became loose over time."

At A-58 you identify the current requirements in the code of practice, at page 3490. Paragraph 3.5:

"The form, design and attachments to the deck of

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passenger seats should be adequate for the intended service."
You say:
"This is reflected in the operating licence and the certification on installation suitable for 'combined coxswain' operation of a class I vessel ..."
THE CHAIRMAN: Remind me, if you would, Mr Beresford, of the provision that obtained when Lamma IV was built.
MR BERESFORD: Yes, Mr Chairman.
THE CHAIRMAN: A similar bland description, was it not?
MR BERESFORD: It was very similar. It was:
"... all seats are properly secured in position ..."
That was marine bundle 2, page 384.
THE CHAIRMAN: Is that the Blue Book provision?
MR BERESFORD: No, that's the certificate of survey. The certificate of survey was defined in its form under the Shipping and Port Control Ordinance (1978) at that time.
THE CHAIRMAN: Sorry, which is the provision that deals with seats? It's on the screen.
MR BERESFORD: It's item (9).
THE CHAIRMAN: "... all seats are properly secured in position ..."
MR BERESFORD: Yes.
THE CHAIRMAN: But was there not a provision in the Blue Book?

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MR BERESFORD: No, I don't believe there was?
A. I believe so.
MR MOK: Page 1773.
MR BERESFORD: I'm grateful to my learned friend Mr McGowan. Chapter 3, 4.1:
"Where seats are provided for passengers ..."
THE CHAIRMAN: Page?
MR BERESFORD: Let me just turn it up, Mr Chairman.
THE CHAIRMAN: Yes. As Mr Mok pointed out, paragraph 26 provides:
"Seats should always be properly secured."
MR BERESFORD: Yes. I'm sorry to have taken some time coming to that. I was just tracking it through.
Mr Chairman, you're absolutely right, it's paragraph 26 on page 1773, in the Blue Book. That language, "properly secured", reflects the certificate of survey.
THE CHAIRMAN: Remind me of the reference for that?
MR BERESFORD: Page 1773, marine bundle 8.
THE CHAIRMAN: No, that's Blue Book. What is the certificate of survey?
MR BERESFORD: The certificate of survey is marine bundle 2, page 384.
THE CHAIRMAN: Thank you.
MR BERESFORD: We can see the current language reflected in

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the 1995 Instructions at page 1835, which is chapter III, paragraph 4.1:
"Where seats are provided for passengers, their form, design and attachments to the deck should be adequate for the intended service."
THE CHAIRMAN: Yes. Thank you.
MR BERESFORD: Just for your note, Mr Chairman, Mr Commissioner, the reference in Dr Armstrong's first report to these provisions is at page 422 of expert bundle 1.
THE CHAIRMAN: Thank you.
MR BERESFORD: So we see the 1995 language has come in to the code of practice, "adequate for the intended service".
Dr Armstrong, you point out:
"This is reflected in the operating licence and the certification on installation ..."
And you've given us a reference there: page 3627, which is an annex to the code of practice.
We see at paragraph 1(b) -- this is described as:
"Determination of maximum number of persons to be carried and/or Survey Certification on installation suitable for 'combined coxswain' operation of a class I or II vessel."
At 1(b) it says:

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"The form, design and attachments to the deck of passenger seats should be adequate for the intended service. The seating construction ..."
THE CHAIRMAN: Yes. Thank you.
MR BERESFORD: You point out that it's not clear what is an "adequate attachment".
A. Yes.
Q. So at consideration 17, you have suggested:
"... some realistic value against which the attachment of seats might be judged [should be set]. This value will need to allow for the constant changes in loads owing to operation of the vessel in waves and causing the attachments to work loose over time."
You have suggested a methodology at appendix IV to the report, which is page 1681. You say:
"... [this] is based on the assumption that an adequate attachment is one that remains intact during operation of the vessel during its normal operation in its intended service for the entire period of time between annual surveys."
Turning to appendix IV at page --
THE CHAIRMAN: Before we get there, do the Australians have legislation that condescends to this detail, as to a value to be given in respect of the attachments of seats on this kind of vessel?

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A. No, Mr Chairman, they do not.
THE CHAIRMAN: Is there such a requirement in the United Kingdom?
A. I do not know.
THE CHAIRMAN: Not federally or in any of the states in Australia do they condescend to this kind of particularity?
A. I will have to find out for you, Mr Chairman.
THE CHAIRMAN: So, annex IV?
MR BERESFORD: If I can just follow on from that, Mr Chairman.
Dr Armstrong, there are provisions of this nature, are there not, in the High-Speed Code?
A. In the High-Speed Craft Code, there are indeed. I think one of the difficulties there is in Australia, Mr Chairman, is that we're talking here about foam-sandwich construction decks, and most passenger vessels would not allow, in Australia, foam-sandwich construction because of the fire risk. So it's somewhat unusual for seats to be fitted in this sort of situation. Which is why I don't know the answer to the question.
THE CHAIRMAN: Yes. What about New Zealand; do you know the position there?
A. I do not.

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THE CHAIRMAN: Because it's in New Zealand that the superstructure was made.
A. And New Zealand has quite a good reputation for building GRP structures.
THE CHAIRMAN: Yes, it certainly does.
A. I can find out.
THE CHAIRMAN: Yes, Mr Beresford.
MR BERESFORD: Thank you, Mr Chairman.
Appendix IV is headed "Potential seat foundation design criteria".
You say:
"Hoberock published values in 1977 of horizontal acceleration values at which passengers became uncomfortable when seated. These values are given in the 2000 HSC Code in annex 3 and reproduced in the following table."
We can see the table on the screen. The comment says:
"A seated person will start to hold on to keep balance: Peak value horizontal acceleration: 0.15 [grams]."
Is that right?
A. 0.15 G, the acceleration of gravity.
Q. I'm sorry. Go on, please. You were going to explain the measurement "G"?

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A. Basically a measure of the acceleration owing to gravity and equal to 9.81 metres per second squared.
THE CHAIRMAN: 32 feet per second; is that it?
A. 32.2, yes.
THE CHAIRMAN: Thank you.
A. That, of course, is not a constant figure because the vessel is moving in waves. It's a variable value, and the value given there is the maximum value over a 5-minute period.
MR BERESFORD: Yes, I see. And against the comment "The average seated person will start to struggle to keep balance whilst holding", you've given the value as "0.25 G".
A. Correct.
Q. And against the comment "Persons will fall out of seats without seat belts", you've given the value as 0.45 G.
A. Correct. These are taken straight out of the HSC Code.
Q. Then you've said:
"It is suggested from inspection of the above table that a suitable design value for an adequate attachment of seats might be 0.20 G (1-in-100 occurrences)."
A. That's 1-in-100 waves, if you like; 1-in-100 oscillations of the vessel from side to side.
Q. You then tell us:
"The acceleration value of 0.2 G is the maximum

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value recorded in any 5-minute period. If it is assumed that the average wave period in the waters of Hong Kong is 3 seconds, then there are 100 wave encounters on average in every 5-minute period, ignoring the effect of ship speed and heading relative to the waves. If a vessel is to operate for 4 hours every day, for 360 days a year, then there will be 17,280 periods of 5-minutes duration in between annual surveys, or 1,728,000 wave encounters."
Without going through all the details of the calculation, which, if this page can be scrolled down, we can see on the screen, you calculate that the most probable peak value of acceleration owing to waves in one year of operation would be -- is that 3 metres per --
A. 3 metres per second squared.
Q. 3 metres per second squared.
"If [you apply] that to the standard mass of a passenger (75 kg) applied at a distance above the deck of 0.9 metres", as amended.
A. Correct.
Q. "... then the seat attachment should be designed for a maximum moment of 195 newton metres."
A. Correct.
Q. "This attachment of the seat [therefore] may be checked

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by a physical test on the seat by applying a moment of 195 newton metres to the seat, which represents the highest anticipated load during normal operation in 12 months."

A. To understand perhaps in more everyday language, that's equivalent to about 19 kg at 1 metre above the deck.

Q. So how is that normally done in practice? We heard from the ship surveyors that they would sort of go along and wobble the seat, if they could.

A. Well, 19 kg is a rather light bag that you're taking it you onto an airline. So that's the sort of mass involved, the force involved. It's not particularly large.

Q. How do they test it on high-speed craft, for example, subject to the High-Speed Craft Code?

A. Oh, that's very detailed. You have to apply a considerable number of different loadings and accelerations at different locations on the seat.

Q. But do they do it in situ, on the vessel?

A. In a laboratory.

Q. It's done in a laboratory?

A. Mm. In a testing facility, anyway.

I'm not suggesting they should test every seat, Mr Beresford. I just think one typical or maybe one on each deck or something like that could be very easily

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tested just by applying of horizontal force.

Q. But you're talking about an in situ test rather than a laboratory test?

A. I am talking about a practical test.

Q. Yes.

A. Because you couldn't really do this in a laboratory. You'd need to recreate the exact same deck construction, and that's, I don't believe, necessary. Although the disadvantage here is that the vessel would have been built before you did the testing, and if it failed, then the shipyard would have to think of some way of getting around that problem, which may include through-bolting or -- it's not impossible.

Q. But I suppose the long and the short of it is that this detailed mathematical calculation gives some indication of the force that needs to be applied in order properly to test the seat attachment?

A. That was the intention of it. The statistical mathematics are quite well proven and well understood. There's nothing that a mathematician would not understand in the calculation.

Q. No, but my question is, how is your practical naval surveyor or ship surveyor going to apply this to a seat on a boat?

A. Yes. The requirements would not be in this sort of

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form. The requirements would say something like "apply a force of 20 kg horizontally to the seat", which is not dissimilar to what was done by Dr Cheng, I think, the forensic scientist, on his tests on board Lamma IV.

THE CHAIRMAN: Yes.

MR BERESFORD: Thank you.

So, leaving seats and moving on to "Structural issues", issue (ix) in your report.

There are two structural issues you refer to, plating thickness and corrosion. Dealing first with plating thickness. The issue you've identified is:

"Lamma IV was manufactured with hull plating of less than the thicknesses shown on the approved drawings."

The current requirement you've identified in the code of practice in chapter III, part 1, page 3461.

Is what you're referring to, Dr Armstrong, the first part of part 1, item (1):

"Except as otherwise specified, every vessel should be designed and built to the requirements of rules and regulations of a classification society as listed at annex A ..."

A. Yes, correct.

Q. "... having regard [to] the size, construction material, and operational services of the vessel."

So you point out:

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"... structure is designed in accordance with the requirements of a classification society. It further states that the classification society rules and regulations are to be complied with in their entirety."

A. I think that's an important sentence.

Q. Yes. And it's the second sentence which I didn't read out. Then you say:

"However it is not clear to me from reading the code of practice whether the minimum scantlings shown on the drawings might be liberally interpreted by the person surveying the ship, as detailed in paragraph A-14 of this report."

In paragraph A-14, of course, you use the case of the changes to Lamma IV as an example that if the approved drawing shows 5 mm plating and the surveyor accepts overall plate at 4.83 mm, then it's unclear how that should be recorded in the as-built plans.

A. It's potentially worse under the current regulations, because it may be just quite a different company or organisation doing the plan approval to that one doing the survey. They're not even in the same building. As I understand the current system.

Q. Well, you've got drawings specifying 5 mm, 5 mm plate. You've got a letter saying "We've received 4.83 mm plate, which we're intending to use." As I understand

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you, you're saying that the code of practice does not offer any solution as to how to deal with that problem.
A. I don't think it does offer any solutions. It does permit different authorities to have different functions, and if one of those authorities is approving 5 and then the question comes to the surveying authority, "We've used this plate, it's only 4.83, is that okay?", how does the message get from the one authority to the other? How does the person doing the plan approval know that it's being built out of different-thickness plate? I accept it's only a small amount, but what are the tolerances of the particular classification society? We've seen that they vary, and they vary with different years of publication.
Q. But if the vessel is designed and built to the rules and regulations of one particular classification society, the fact that another classification society is doing the survey shouldn't make any difference to that, should it? They would have to look at the first classification society's rules, wouldn't they?
A. I'm not sure it's as simple as that, because I don't think the classification societies have the same philosophy behind how they design their scantlings. The formulations, for example, can be different between the societies.

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Q. That may be true, but if one is surveying a vessel designed to another's specifications, they couldn't just superimpose their own rules, could they?
A. I don't know. But I think the possibility could arise, and this is why I wanted to alert the Commission to this problem, as I saw it. The survey authority can be a private person appointed by the director. Would a private individual interact with a classification society in such a way? There's nothing to require him to do so in the regulations.
Q. Is there not, Dr Armstrong? If the code of practice requires the vessel to be designed and built to the requirements of rules and regulations of a particular classification society, is not any subsequent surveyor, regardless of which society he may belong to, or whether he's private or public or whatever -- is he not bound by that? I'm just wondering if this is a real problem.
A. It may not be a real problem. I've merely raised the issue and drawn it to the attention of the Commission. I think it could be a problem. It's part of understanding better how the current system is actually operating practically.
Q. And that leads us to your consideration number 2, because you refer us back to that.
A. Yes.

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Q. It is that further clarification is needed, and some feedback on how this has worked over the past six years since the code of practice has been in operation.
A. Yes.
Q. The second structural issue is "Corrosion", and you've noted the issue as being:
"Disagreement on the corrosion properties of different materials."
You've identified the current requirements as -- you say:
"Corrosion is extensively covered for steel items in the code of practice annex M. Corrosion is also covered by the rules and regulations of the classification society" -- we've seen some examples of those in the course of the hearing -- "and is generally embedded within their formulations for scantlings."
You've proposed for consideration at 18:
"That reference is made in annex M that the information relates only to steel material."
A. Yes.
Q. We then come to issue (x), "Watertight bulkheads and access openings", and you identify the issue as:
"Access openings fitted in watertight bulkheads."
You identify the current requirements as being the hull construction requirements in the code of practice,

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chapter IIIA, part 2, section 2, at page 3461.
That section we've already looked at, in relation to your comments on the aft peak bulkhead. We'll just look at it again generally in relation to watertight bulkheads. Because, unlike the Blue Book, this makes clear -- it says:
"Every launch or ferry vessel should be fitted with the following watertight bulkheads ..."
A. Yes.
Q. "(a) collision bulkhead", which we've seen.
"(b) fore and after bulkhead of main engine space".
(c) deal with compartments exceeding 2/5ths of the length.
"(d) if the vessel exceeds 24 metres in length, an aft peak bulkhead unless the engine room is situated at aft end of the vessel."
A. Yes.
Q. So quite plainly, under the code of practice, an aft peak bulkhead must be watertight and couldn't be the aft engine room bulkhead.
A. Unless the engine room is at the after end of the vessel, I guess.
Q. Unless the engine room is at the after end, yes.
In addition, you point out that section 2.5 says bulkheads should be of watertight construction, and 2.6

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provides:
"Access openings fitted in watertight bulkheads should be equipped with effective watertight closing appliances."
A. Correct.
Q. So I just pose hypothetically that if Lamma IV had been constructed under the code of practice, the bulkhead between the steering compartment and the tank room would have been required to be watertight, unambiguously so?
A. Yes.
Q. And even though it had an access opening, it would unambiguously have been required to have been fitted with an effective watertight closing appliance?
A. Yes, that's how I read it.
Q. You make the comment that under paragraph 2.1(d), which says "'an aft peak bulkhead unless the engine room is situated at aft end of the vessel' clearly indicates that the aft peak bulkhead is expected to be located in the after part of the vessel."
A. Yes.
Q. One might think that that was indicated by the words "aft" and "peak" as well.
A. It has been queried, Mr Beresford.
Q. So you suggest for consideration at number 19:
"Current requirements appear to cover the need for

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watertight doors, both at the design approval stage, and at the survey stage."
A. Yes.
Q. But you nevertheless go on to make two suggestions. You say:
"(a) It is suggested that hinged watertight doors have a maximum permitted width of 800 millimetres with a sill no more than 2.5 m below the freeboard deck and marked on each side of the boundary in bold and permanent lettering 'This door to be kept closed and secured'. Only one hinged watertight door should be permitted within any hull (ie maximum of one in each hull of a catamaran). Hinged watertight doors should be arranged to generally open forward (or outboard) except doors to the aft peak and other high flooding risk spaces should open into the space."
A. Correct, Mr Beresford. I have one small suggestion to amend this though.
Q. Yes?
A. As you were reading it out, I suddenly became concerned about the word "secured" and how that might be translated. It is not intended to indicate it should be locked, because that could be disastrous. So maybe we should lose the words "and secured".
Q. Yes, I see.

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A. The words used to be "This door to be kept closed at sea at all times", and maybe that would be better than "and secured".
THE CHAIRMAN: You're contrasting here a hinged watertight door with a sliding one, are you?
A. No, I'm not suggesting sliding doors at all. Sliding doors are wonderful things, Mr Chairman, and they can operate with the vessel heeled over to one side, and they can operate with a force of water behind the door, trying to open a hinged door. But they are very cumbersome and very expensive and take up a lot of room. So I think on a local craft, it's probably a bit of overkill.
Australia, I know, allows hinged watertight doors in some situations, one of which is partially smooth waters, which I believe covers most of Hong Kong waters. So the requirements you see here are actually copied from the Australian regulations for hinged watertight doors.
Q. In your last sentence in that subparagraph (a), where you're talking about the direction in which doors should open, you say you make an exception for doors to the aft peak and other high-flooding-risk spaces. So does that imply that in your opinion, the aft peak is a high-flooding-risk space?

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A. Certainly, yes.
Q. Could you just clarify why that is, please?
A. This is because there are hull penetrations often in an aft peak space, such as a propeller shaft or a rudder shaft.
Q. Yes.
A. And being penetrations, there is always the risk of leakage. In the case of rudders and propellers, there's also the risk of them hitting the bottom and being forced up into the hull, which is an obvious flooding risk. And the purpose of hinging into that direction is of course such that any water coming into the space would force the door even tighter on to its coaming.
Q. Might this be the reason for requiring an aft peak bulkhead, watertight bulkhead, in every launch or ferry vessel exceeding 24 metres in length?
A. I believe that is one of the reasons for that, yes.
Q. And might it have been a reason for requiring an aft peak bulkhead in the Blue Book as well?
A. It could well have been.
Q. Then at (b), you say:
"It is suggested that a hinged watertight door should be fitted with catches and other quick-action closing devices capable of being operated from each side of the bulkhead in which the door is fitted. The speed

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of complete closure of the door (including securing) should not exceed 90 seconds with the vessel in the upright position. All hinged watertight doors should be provided with a means of indication at the operating compartment (eg the wheelhouse) to show whether the door is open or closed. An audible alarm should be provided at each side of the opening."

A. I did suggest that, yes.

MR BERESFORD: Mr Chairman, I note the time.

THE CHAIRMAN: Yes. Just looking ahead at the next item, the drawing as-fitted, or "Built in accordance with the approved plans", remind me, if you would, as to the evidence we've received from Hongkong Electric as to the provision of any drawing or any -- is it a letter that says it was built as-fitted?

Mr McGowan?

MR McGOWAN: It was a very long time ago, Mr Chairman. I can't remember. We'll try and find that out as quickly as possible.

THE CHAIRMAN: Do you remember, Mr Beresford?

MR BERESFORD: We have been provided with as-fitted drawings and there was a requirement in the contract that such drawings be provided.

THE CHAIRMAN: I'm aware of the contractual requirement.

MR McGOWAN: My recollection was there was a letter covering

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some documents.

THE CHAIRMAN: Very well. But Mr Beresford thinks there was a drawing.

MR BERESFORD: There were drawings, yes.

MR McGOWAN: Well, the documents being drawings. There was a letter which said, "Here are the following", or something like that. I'll try and refresh my memory for tomorrow morning.

THE CHAIRMAN: In anticipation perhaps that could be tracked down so that we can address that tomorrow.

MR BERESFORD: Mr Chairman, just looking ahead to tomorrow, I understand Professor Ho's report has been finalised and it's proposed that he be interposed tomorrow.

THE CHAIRMAN: When is it proposed that it be served, first of all?

MR SHIEH: It has literally been served as the hearing has been going on in the afternoon. It has been served.

THE CHAIRMAN: Very well.

MR SHIEH: An email has gone out to all the parties, attaching the report.

THE CHAIRMAN: Right.

MR SHIEH: Because Professor Ho is not available on Friday, so I propose that we interpose him tomorrow. He should finish comfortably within tomorrow, hopefully.

THE CHAIRMAN: So what are you proposing as far as

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Dr Armstrong's day for tomorrow?

MR SHIEH: Well, subject to completing Professor Ho's evidence really on the electrical wiring, we interpose Professor Ho and then continue with Dr Armstrong.

THE CHAIRMAN: Very well. Has any counsel got any submission on that suggestion? I see people shaking their heads.

MR McGOWAN: It sounds very sensible to me.

THE CHAIRMAN: Dr Armstrong, if you can accommodate us, that's what we'll do. We'll take Professor Ho, who has other commitments on Friday. If you would be on standby, as it were, we'll come back to you when we've dealt with Professor Ho.

A. Yes, of course, Mr Chairman.

THE CHAIRMAN: Thank you for accommodating us.

MR McGOWAN: Perhaps I can just ask one thing. You'll recollect perhaps when Dr Armstrong was giving evidence in January, at the end of January, that Mr Grossman gave him a diagram showing various authorities who dealt with the Lamma IV at stages of design and build, and asked him to comment on that. It was agreed that would be done as part of the second part of this proceeding. I just wondered whether perhaps --

THE CHAIRMAN: Is this the document to which you referred recently?

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MR McGOWAN: No, this was a document that had been produced by our instructing solicitors which showed the various people who had been involved in the approval of the plans of Lamma IV.

THE CHAIRMAN: Yes. What was Dr Armstrong to contribute to that?

MR McGOWAN: Well, the actual document is in the RSRB file at page 1322.

THE CHAIRMAN: Yes.

MR McGOWAN: It was talked about on Day 27 at page 18.

THE CHAIRMAN: Ah, yes.

MR McGOWAN: Dr Armstrong said he'd need a bit of time to think about it, and it was probably a part 2 or part 3 question, and it was agreed to be deferred. I just mention it now so that if Dr Armstrong has time to look at the question and the piece of paper tomorrow before he comes to give evidence, he doesn't --

THE CHAIRMAN: I see what looks like a flowchart.

MR McGOWAN: Yes.

THE CHAIRMAN: What is Dr Armstrong to do with this?

MR McGOWAN: Well, the question was asked of him, and I can turn that up if you wish --

THE CHAIRMAN: Just remind me.

MR McGOWAN: -- whether, given all those people were involved in the approval of the design and the build, it

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would be understandable for Hongkong Electric as a lay client to accept it without further enquiry themselves.

THE CHAIRMAN: Very well.

That's the question, Dr Armstrong. I don't think that will keep you up late at night.

MR McGOWAN: I'm sure it won't. It's probably delaying us now, Mr Chairman.

THE CHAIRMAN: Yes.

MR McGOWAN: But I just raise it so the Doctor has a chance to think about it.

THE CHAIRMAN: Would someone provide Dr Armstrong with a copy of that, and perhaps the page from the transcript, so that he can be reminded of the issue.

MR McGOWAN: Certainly. Thank you.

THE CHAIRMAN: Thank you.

Mr Shieh, have we contacted Mr Dominic Yeung as to the position of the China Classification Society?

MR SHIEH: Could I just take instructions.

An email has been sent notifying those instructing Mr Yeung, I believe, but no response has yet been received.

THE CHAIRMAN: Thank you. Perhaps in anticipation of this issue arising, you could find the page reference for the witness statement --

MR SHIEH: Of the China Classification Society witness?

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THE CHAIRMAN: Yes, that's it. No need to find it now. So that we can lay our hands on it. Because one way of dealing with that issue may simply be to read out that statement.

MR SHIEH: Yes. We'll locate that and perhaps we'll deal with it first thing tomorrow morning, depending on whether there is a response.

THE CHAIRMAN: Thank you very much. There was another matter about recalling a witness for cross-examination. We indicated that we were not favourably disposed to that application. But that's another matter that is outstanding. That's all.

MR SHIEH: Yes.

THE CHAIRMAN: So we'll adjourn now until 10 o'clock tomorrow.

(5.35 pm)

(The hearing adjourned until 10 am on the following day)

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