



Office of Transport Safety Investigations

FERRY SAFETY INVESTIGATION REPORT

COLLISION MV *KATIKA*

PYRMONT BAY, SYDNEY HARBOUR

4 DECEMBER 2010



FERRY SAFETY INVESTIGATION

COLLISION MV *KATIKA*

PYRMONT BAY, SYDNEY HARBOUR

4 DECEMBER 2010

Released under the provisions of
Section 45C (2) of the *Transport Administration Act 1988* and
46BA (2) of the *Passenger Transport Act 1990*

Investigation Reference: 04500

Published by: The Office of Transport Safety Investigations
Postal address: PO Box A2616, Sydney South, NSW 1235
Office location: Level 17, 201 Elizabeth Street, Sydney NSW 2000
Telephone: 02 9322 9200
Accident and incident notification: 1800 677 766
Facsimile: 02 9322 9299
E-mail: info@otsi.nsw.gov.au
Internet: www.otsi.nsw.gov.au

This Report is Copyright. In the interests of enhancing the value of the information contained in this Report, its contents may be copied, downloaded, displayed, printed, reproduced and distributed, but only in unaltered form (and retaining this notice). However, copyright in material contained in this Report which has been obtained by the Office of Transport Safety Investigations from other agencies, private individuals or organisations, belongs to those agencies, individuals or organisations. Where use of their material is sought, a direct approach will need to be made to the owning agencies, individuals or organisations.

Subject to the provisions of the *Copyright Act 1968*, no other use may be made of the material in this Report unless permission of the Office of Transport Safety Investigations has been obtained.

THE OFFICE OF TRANSPORT SAFETY INVESTIGATIONS

The Office of Transport Safety Investigations (OTSI) is an independent NSW agency whose purpose is to improve transport safety through the investigation of accidents and incidents in the rail, bus and ferry industries. OTSI investigations are independent of regulatory, operator or other external entities.

Established on 1 January 2004 by the Transport Administration Act 1988, and confirmed by amending legislation as an independent statutory office on 1 July 2005, OTSI is responsible for determining the causes and contributing factors of accidents and to make recommendations for the implementation of remedial safety action to prevent recurrence. Importantly, however, OTSI does not confine itself to the consideration of just those matters that caused or contributed to a particular accident; it also seeks to identify any transport safety matters which, if left unaddressed, might contribute to other accidents.

OTSI's investigations are conducted under powers conferred by the Rail Safety Act 2008 and the Passenger Transport Act 1990. OTSI investigators normally seek to obtain information cooperatively when conducting an accident investigation. However, where it is necessary to do so, OTSI investigators may exercise statutory powers to interview persons, enter premises and examine and retain physical and documentary evidence.

It is not within OTSI's jurisdiction, nor an object of its investigations, to apportion blame or determine liability. At all times, OTSI's investigation reports strive to reflect a "Just Culture" approach to the investigative process by balancing the presentation of potentially judgemental material in a manner that properly explains what happened, and why, in a fair and unbiased manner.

Once OTSI has completed an investigation, its report is provided to the NSW Minister for Transport for tabling in Parliament. The Minister is required to table the report in both Houses of the NSW Parliament within seven days of receiving it. Following tabling, the report is published on OTSI's website at www.otsi.nsw.gov.au.

OTSI cannot compel any party to implement its recommendations and its investigative responsibilities do not extend to overseeing the implementation of recommendations it makes in its investigation reports. However, OTSI takes a close interest in the extent to which its recommendations have been accepted and acted upon. In addition, a mechanism exists through which OTSI is provided with formal advice by the Independent Transport Safety and Regulator (ITSR) in relation to the status of actions taken by those parties to whom its recommendations are directed.

CONTENTS

TABLE OF PHOTOGRAPHS	ii
TABLE OF FIGURES	ii
ACRONYMS AND ABBREVIATIONS	ii
GLOSSARY OF TERMS	iii
EXECUTIVE SUMMARY	iv
PART 1 CIRCUMSTANCES OF THE INCIDENTS	1
Collision with Sea Wall	1
Call for Assistance	2
Further Collisions	2
Intervention by the Master of the <i>Pacific Pearl</i>	4
Emergency Response	5
Incident Reporting	5
MV <i>Katika</i>	5
Vessel Damage	6
Crew	7
Passenger Statements	8
Crew Actions	8
Communication Onboard	9
Inspection of the <i>Katika</i>	9
Safety Management System	17
Emergency Drills	17
Record Keeping	19
MV <i>Port Venture</i>	21
PART 2 FINDINGS	22
Causation	22
Contributing Factors	22
Other Safety Matters	23
PART 3 RECOMMENDATIONS	24
CSH Cruises	24
NSW Maritime Authority	25
Commercial Vessel Association of NSW	25
PART 4 APPENDICES	26
Appendix 1: Sources, Submissions and Acknowledgements	26

TABLE OF PHOTOGRAPHS

Photograph 1:	Final bow and stern positions	3
Photograph 2:	View of damage	6
Photograph 3:	View of control cables	10
Photograph 4:	Loose ignition switch barrel	11
Photograph 5:	Dashboard	12
Photograph 6:	Battery installation	12
Photograph 7:	Lifejackets in wheelhouse	13
Photograph 8:	LPG gas barbeque on upper deck	14
Photograph 9:	240 volt cables and unsecured fire extinguisher	15
Photograph 10:	Oil in bilge	16

TABLE OF FIGURES

Figure 1:	MV <i>Katika</i> 's track	1
-----------	---------------------------	---

ACRONYMS AND ABBREVIATIONS

COLREGS	International Regulations for Preventing Collisions at Sea, 1972
CSH Cruises	Cruise Sydney Harbour Cruises
CVA	Commercial Vessel Association of NSW
DIP	Directly Involved Party
GPH	General Purpose Hand
MED III	Certificate of Competency as a Marine Engine Driver Grade 3
NSWMA	NSW Maritime Authority
OTSI	Office of Transport Safety Investigations
SMS	Safety Management System
SPC	Sydney Ports Corporation
TAFE	NSW Technical and Further Education Commission – vocational education and training provider
USL	Uniform Shipping Laws

GLOSSARY OF TERMS

Air Damper	A rigid metal flap which when used cuts off the supply of air to the engine room.
Carvel Planked Construction	A method used in timber boat construction whereby the hull and deck planks are laid edge-to-edge and fixed to the frame to form a smooth surface.
Bulkhead	A vertical partition between two compartments (equivalent to a wall).
Bulwark	The sides of a boat above the deck level.
Coaming	A raised edge around hatches and openings with the purpose of keeping water out.
Ferry	A vessel designed and surveyed to carry passengers for payment or reward.
Gunwale	The top edge of the side of a boat.
'Harbour Control'	Sydney Ports Corporation Sydney Harbour Radio Control Station.
King Plank	The plank to which the deck planks join over the centre line of a boat.
Port	The left hand side of a vessel when looking forward from the stern. The side where a red light is exhibited at night.
Scupper	A drain hole on deck.
Starboard	The right hand side of a vessel when looking forward from the stern. The side where a green light is exhibited at night.
Stem	The vertical front end component at the bow.
Survey Class	The figure in a Survey Class designation identifies the type of vessel e.g., "1" identifies the vessel as passenger carrying. The letter defines the permitted area of operation: A = unlimited offshore operation; B = offshore operation to 200 nautical miles seaward of the coast; C = restricted offshore operations up to 30 nautical miles seaward of the coast; D = sheltered operations (partially smooth water operations); and E = sheltered waters (smooth water operations).
Turn Short Round	Turning short round uses the effect of the transverse thrust to advantage to turn a vessel around in a confined space. The boat is stopped in the water. The rudder is put hard over to starboard (for a right handed propeller) and the engine put Ahead. Immediately the boat begins making headway turning to starboard, the rudder is brought amidships and the engine put Astern. Transverse thrust then cants the boat further to starboard. When the boat begins to lose its cant, the rudder is put over to starboard and the engine Ahead. This may be repeated as many times as necessary to bring the vessel around.

EXECUTIVE SUMMARY

At about 11:40 pm on 4 December 2010, CSH Cruises' MV *Katika* with four crew and 40 passengers onboard was manoeuvring to disembark passengers at the Casino Wharf, Pyrmont Bay, following a Sydney Harbour cruise. On approaching the wharf, the Master was unable to engage Astern gear and, because the engine remained stuck in Ahead gear, the vessel collided with the adjacent sea wall.

With the vessel still under full power, in Ahead gear and with the wheel hard to starboard, it travelled to the other side of Pyrmont Bay and collided with Sydney Wharf Marina. It then bumped along the edge of the wharf's boardwalk until the bow became stuck on a metal ladder on the wharf with the stern resting against a finger wharf floating pontoon. The Master of another vessel, responding to the radio call for assistance from the *Katika*, berthed his vessel, ran to the *Katika*, entered the engine room and disconnected the gearbox cable and throttle.

While the vessel was wedged against the dock with the engine still running in Ahead gear, passengers were able to exit over the bow onto the dock. Seventeen passengers were injured, nine of whom were treated at the scene by paramedics and ambulance officers, with the other eight requiring short term hospitalisation. No crew members were injured. The vessel suffered significant damage to the bow above the waterline.

The Master could not engage Astern gear as the Morse/Teleflex[®] gear shift cable had dislodged from its mounting immediately below the single engine telegraph at the wheelhouse end while the gear box was in the Ahead position. He did not stop the engine and control the steering as he was concerned the vessel may be taking in water, although this could have reduced the impact of the first collision and would have allowed him to avoid subsequent collisions.

No emergency procedures were initiated at any time by any members of the crew. This lack of action most likely stems from the fact that there was no record of any emergency drills having been practised onboard for at least 12 months despite the specific requirements of the Uniform Shipping Laws Code 2009 and CSH Cruises' own Safety Management System.

At the time of the incident, operational crewing was not in accordance with the vessel's survey requirements. The Master's MED III Certificate of Competency had lapsed and the GPH had not applied for a certificate after having completed the requisite TAFE course. Additionally, when not assisting with mooring the vessel, the GPH was involved with hospitality tasks.

At no stage did the Master or his crew attempt to provide warnings or information to the passengers. The public address system was not available to the Master as it was in full-time use by the disc jockey located at the back of the main deck. Communication between the Master and the GPH was only possible when the GPH was passing or visiting the wheelhouse as there was no alternative means of direct voice communications.

The investigation revealed there had been four problems with the Morse/Teleflex[®] controls within 12 months, two of which had been noted in the log but not the others. There was no evidence of any replacement or repair action undertaken in response to these occurrences. This general lack of attention to sound operational and administrative reporting and recording requirements proved to be symptomatic of an ineffective maintenance system within CSH Cruises.

An overall inspection of the vessel revealed a large number and range of safety defects and deficiencies that had clearly been outstanding for a long time. Some were not confined to the *Katika* but also existed on the other vessel of CSH Cruises' fleet, the MV *Port Venture*.

The recommendations directed at CSH Cruises focus on:

- ensuring only qualified crew are engaged and that they maintain competency in the performance of mandatory emergency drills and only undertake duties appropriate to their positions;
- maintaining accurate and comprehensive records, e.g., crew qualifications, maintenance and servicing, vessel logs; and
- rectifying outstanding safety defects and deficiencies.

It is also recommended that the NSW Maritime Authority:

- take into account design and operational features of a vessel, e.g., the distance between the wheelhouse and engine room and the activities of passengers, when determining crew numbers and qualifications requirements as part of a vessel's survey;
- remove the option of employing a dual qualified Master 5/MED III and a GPH as an alternative to both a Master and an Engineer on vessels similar to the *Katika*; and
- increase the number of random, spot inspections and audits of all public passenger carrying vessels.

It is further recommended that the Commercial Vessel Association of NSW highlight to its members relevant key issues that have been identified in the course of this investigation.

PART 1 CIRCUMSTANCES OF THE INCIDENTS

Collision with Sea Wall

- 1.1 The MV *Katika* departed No. 7 King Street Wharf in Darling Harbour at approximately 7:45 pm¹ on Saturday 4 December 2010 for a Sydney Harbour “Fun Boat” cruise with 40 passengers and four crew onboard. The vessel is owned and operated by CSH Management trading as CSH Cruises. There were no incidents during the cruise until the vessel approached Casino Wharf in Pyrmont Bay to disembark passengers on completion of the cruise.
- 1.2 At about 11:40 pm, the Master navigated the vessel South in Pyrmont Bay, near the Sydney Wharf Marina complex on the Eastern side of the bay, and turned to starboard before reaching the Northern extremity of the Casino Wharf where he planned to berth port side to the wharf (see *Figure 1*).

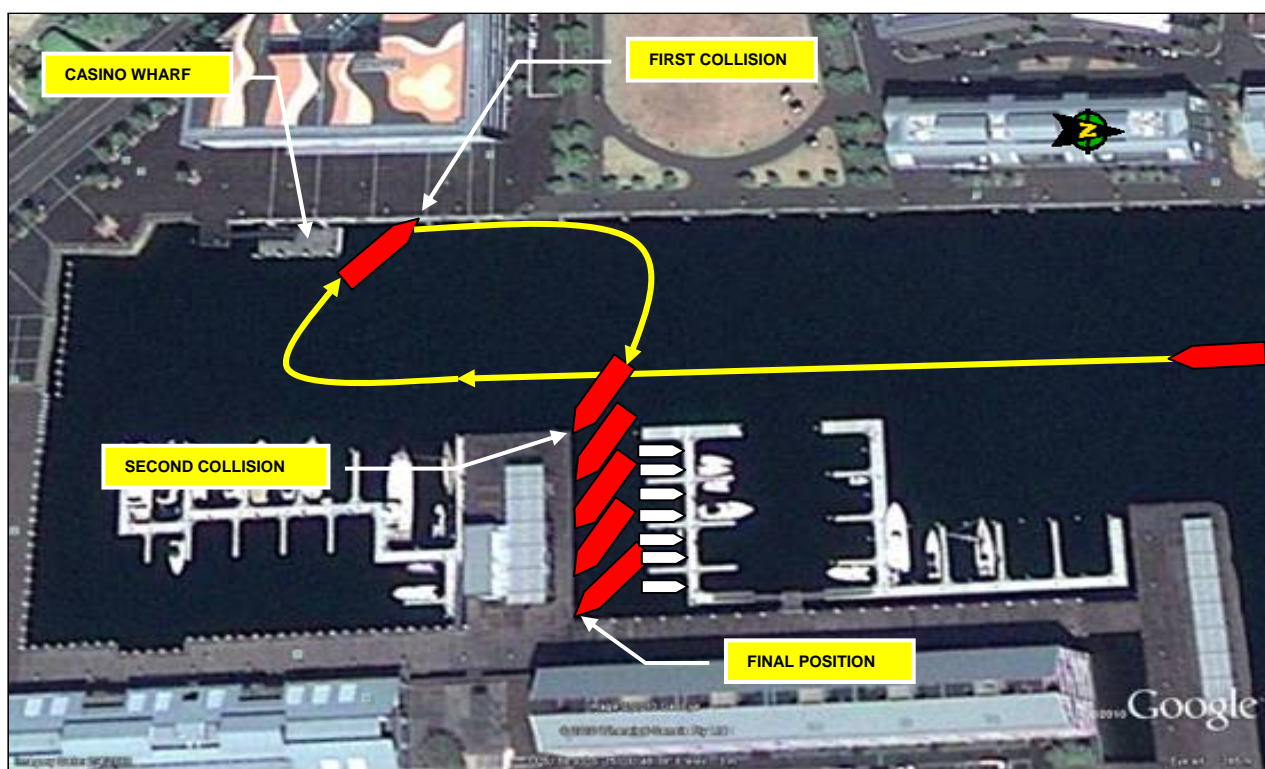


Figure 1: MV *Katika*'s track

- 1.3 After the turn had been commenced and at a point he judged to be sufficient to complete his turn, the Master moved the control lever from the Ahead position through the neutral position to the Astern position. The selection of

¹ All times referred to in this report are Australian Eastern Summer Time (GMT + 11 hours).

the Astern position would stop the vessel and the transverse thrust of the (right hand screw) propeller would assist in the manoeuvre by turning the vessel short round, swinging the stern into the wharf.

- 1.4 The Master was unable to engage Astern gear so the engine remained in Ahead gear. As it continued to travel forward, the *Katika's* bows came into collision with rubber buffers and the timber and concrete sea wall on the Western side of Pyrmont Bay, 29 metres North of the end of the wharf. As a result, the vessel suffered major structural damage to its forward section.
- 1.5 The impact threw passengers off their feet resulting in a number of injuries. One passenger fell from the upper deck to the lower main saloon when he toppled over the internal stairway railing. Another passenger was knocked unconscious when he fell hitting his head on the upper deck.

Call for Assistance

- 1.6 At 11:42:14 pm, the Master of the *Katika* made a radio call to Harbour Control on Channel 13 VHF requesting assistance.² This initial call was not clear in its transmission and lacked specific detail but did mention a collision and people injured. Harbour Control immediately notified the Water Police and a Sydney Ports Corporation (SPC) vessel, and contacted 000 to seek Police and Ambulance assistance. The Sydney Ferries' RiverCat, *Marjorie Jackson*, also acknowledged the call as did a Harbour Water Taxi which sped to the scene requesting permission to exceed the 8 knot speed limit in the area to expedite their assistance.

Further Collisions

- 1.7 After the initial collision, the *Katika* continued to move forward still in Ahead gear, with the wheel hard to starboard. It travelled in an arc across Pyrmont Bay for approximately 70 metres to the Eastern side of the Bay. The starboard bow then collided with a wharf structure resulting in further damage and additional injuries to passengers. The vessel bumped along the edge of the wharf's boardwalk for a further 48 metres before the bow became stuck on a metal ladder attached to the wharf (see *Photograph 1*).

² Channel 13 VHF is controlled by Sydney Ports Corporation (SPC) Sydney Harbour Radio Control Station.



Photograph 1: Final bow and stern positions

- 1.8 As this was happening, the port stern came into contact progressively with four privately registered recreational vessels moored in pens on the Sydney Wharf Marina with the port stern finally resting against a finger wharf floating pontoon (see *Photograph 1*).
- 1.9 The Master advised that he had initially attempted to leave the wheelhouse to go to the engine room. However, passengers anxiously seeking an explanation as to what was happening were obstructing the doorway to the wheelhouse and the two flights of stairs down to the engine room.

- 1.10 As the vessel was bumping along the boardwalk, the Master was able to leave the wheelhouse and proceed down to the main deck where he attempted to lasso a fitting on the boardwalk but without success. The *Katika* was left in Ahead gear with full throttle which kept the bow against the boardwalk. The vessel finally came to a halt when it wedged against the boardwalk. All passengers and crew were then able to disembark over the damaged bow section onto the wharf.

Intervention by the Master of the *Pacific Pearl*

- 1.11 The Master on another charter vessel, *Pacific Pearl*, was in the vicinity of Pyrmont Bay when he heard the initial call for assistance on Channel 13 VHF. He proceeded to the scene, arriving to see the *Katika* hard up against the boardwalk and the finger wharf pontoon. As it had not been clear from the initial call from *Katika* if people were in the water, he informed Harbour Control that, from his observation, there were no people in the water and that emergency services were on site.
- 1.12 The Master of the *Pacific Pearl* berthed his vessel at a pontoon at the Marina, then ran to the *Katika*, boarded it, went into the engine room and disconnected the gear and throttle linkage from the engine. He left the engine running in case the vessel was taking water and pumps had to be brought to bear. He inspected the bilges and saw there was no sign of leaking and then secured the *Katika* to the wharf with mooring lines. He then went up to the wheelhouse where he observed that the gear/throttle lever was fully in the Astern position. Fortunately, the Master of the *Pacific Pearl* had been employed on a casual basis as a Master on the *Katika* five years previously and had a good working knowledge of the vessel.
- 1.13 The Master of the *Pacific Pearl* did not speak to the Master of the *Katika* as he observed that he was busy with passengers and emergency services on the boardwalk. He then returned to his vessel and departed the location without speaking to any *Katika* crew.

Emergency Response

- 1.14 Water Police launch 32 arrived on the scene at 11:49 pm, four minutes after receiving the call from Harbour Control. The SPC vessel and Fire Brigade and Ambulance units arrived soon after. Seventeen passengers were injured and were treated by the paramedics and ambulance officers at the scene; eight of the injured requiring hospitalisation. No crew members were injured.
- 1.15 After the injured had been attended to, the Police established the immediate vicinity of the vessel as a crime scene and began interviewing passengers and witnesses. The Water Police also tested the Master and crew for the presence of drugs and alcohol but they returned negative results.

Incident Reporting

- 1.16 On notification by the Water Police, the NSW Maritime Authority (NSWMA) deployed an officer to the site to commence its investigation of the incident. OTSI was not notified of the incident as required by Section 46B of the *Passenger Transport Act 1990* but was alerted to the incident by media reports.

MV *Katika*

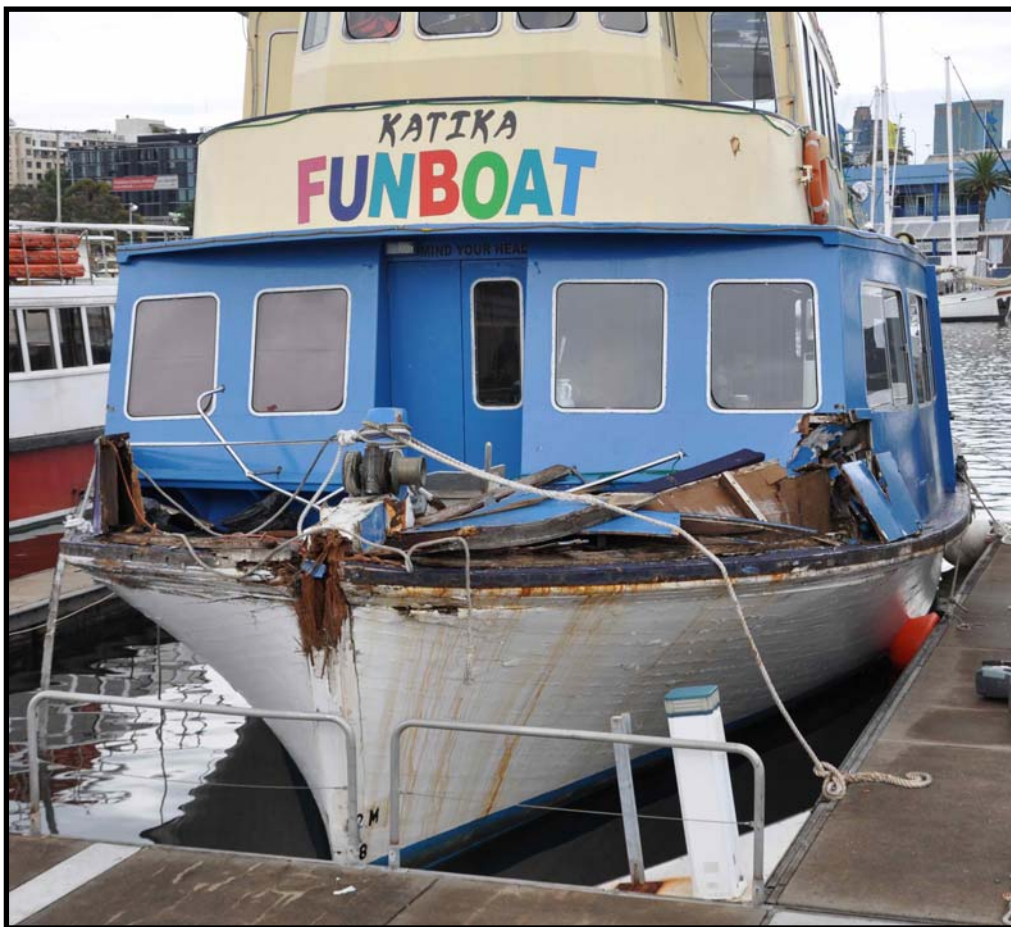
- 1.17 The MV *Katika* was built by H. Morris Boatbuilder Pty Ltd at Morris Marina, Brisbane, and launched in 1981.³ It has a carvel planked hull and was built using Queensland spotted gum hardwood. It is 19.47 metres long, with a beam of 6.7 metres and a draft of 2.82 metres. Propulsion is provided by a Cummins NT-855, 201kw, diesel engine through a Borg Warner hydraulic gear box with a conventional shaft drive. Auxiliary 240 AC electrical power is supplied by a Perkins diesel powered generator. The vessel carries 3,997kg of fixed ballast.
- 1.18 The *Katika* has three decks: a lower deck housing the galley, toilets and engine room; an enclosed main (saloon) deck with bar area; and an upper deck consisting of the wheelhouse, an enclosed area and an open rear deck with barbeque. There is a separate internal staircase between the main deck and each of the upper deck, lower deck, galley and engine room.

³ While the vessel was built before the introduction of the Uniform Shipping Laws (USL) in 1987, no exemptions for which it was eligible are relevant to the circumstances of this incident.

- 1.19 At the time of the incident, the *Katika* was in current survey with the NSWMA in Class 1E operation (Survey Registered Number 15791). It was last surveyed out of the water on 16 June 2010 and was permitted to carry 202 passengers with a maximum of 50 on the upper deck. The survey required the vessel to be crewed, as a minimum, by a Master 5 and a MED III when the number of persons onboard did not exceed 150, and a Master 5, MED III and a GPH when the number of persons exceeded 150. The survey allowed for a dual qualified Master 5/MED III to operate the vessel without an engineer provided a GPH was added to the crew in lieu.

Vessel Damage

- 1.20 The stem, king plank and forward bulwarks were damaged beyond repair and decking forward of the cabin was torn up (see *Photograph 2*). The hull planking was sprung on both sides of the bow between the waterline and the gunwale. The cabin also sustained minor structural damage.



Photograph 2: View of damage

- 1.21 Internally, the railing of the staircase between the main deck and the upper deck was damaged by the impact of passengers. Fire extinguishers were thrown about the upper and main decks and in the galley, as no retaining brackets were fitted. Fittings in the galley area forward and below the main deck area on the starboard side were loosened and crockery and cooking appliances were displaced.
- 1.22 Four vessels moored in the Marina suffered minor, superficial damage when they were hit by the stern of the *Katika*.

Crew

- 1.23 There were four crew onboard the *Katika* during the cruise; the Master holding a current Master 5 Certificate of Competency, a GPH, a disc jockey and a bartender.
- 1.24 The Master had worked as one of 12 masters employed on a casual basis by CSH Cruises onboard the *Katika* over the previous 12 months. He had obtained his Master 5 Certificate in 2007 and had held a MED III qualification but it had lapsed as he did not have it revalidated when it became due on 24 August 2009. Therefore, as the Master's MED III qualification was not valid, the crewing arrangements did not comply with the minimum survey requirements in that an Engineer should have been included in the crew.
- 1.25 The person acting as the GPH onboard did not hold a GPH certificate. She had completed a relevant TAFE course but had not registered or applied to NSWMA for the issue of a GPH qualification. She had been employed as a GPH onboard the *Katika* only once previously.
- 1.26 The disc jockey had been onboard the *Katika* a number of times. He operated from the rear area on the port side of the main deck area and controlled the public address system on the vessel. The bartender was fully engaged on bar duties during the cruise and had only been onboard the *Katika* on one previous occasion. All deck crew held appropriate Responsible Service of Alcohol qualifications.

Passenger Statements

- 1.27 In statements obtained by Police, all passengers onboard were adamant that there was no safety briefing given to them at the commencement of, or at any time during, the cruise. Also, all stated there was no warning given to brace themselves before the collision with the Western sea wall, or any warning issued by any of the crew before the subsequent collisions with the wharf boardwalk. A number of the passengers reported that the injured, including the person who was knocked unconscious, were treated by other passengers with no assistance provided by the crew.
- 1.28 Some passengers interviewed at the scene stated that, just before the first collision, the vessel seemed to increase speed, and others also stated it increased before the second collision.

Crew Actions

- 1.29 At interview, the Master admitted that he had panicked initially when he was unable to obtain Astern propulsion. This was evident in the recordings of the radio conversations between the Master and Harbour Control when he was requesting assistance on Channel 13. The recordings confirmed that, on numerous occasions, the Master did not immediately release the transmit button at the end of his transmissions. As a result, Harbour Control was not able to gain a full and accurate picture of the situation or of events as they were unfolding.
- 1.30 Although the options were available to him, at no stage did the Master attempt to stop the engine from the wheelhouse position or to steer away from other obstructions. He stated that he did not want to go into deeper water for fear of the possibility of the vessel sinking. However, he did not make any visual inspection to confirm the condition of the vessel and did not seek or receive any information from his crew as to whether or not the vessel was taking in water.
- 1.31 The GPH was involved primarily with hospitality duties during the cruise but, at the time of the initial collision, she was standing on the port side of the main saloon entrance to attend to the mooring of the vessel at the Casino Wharf.

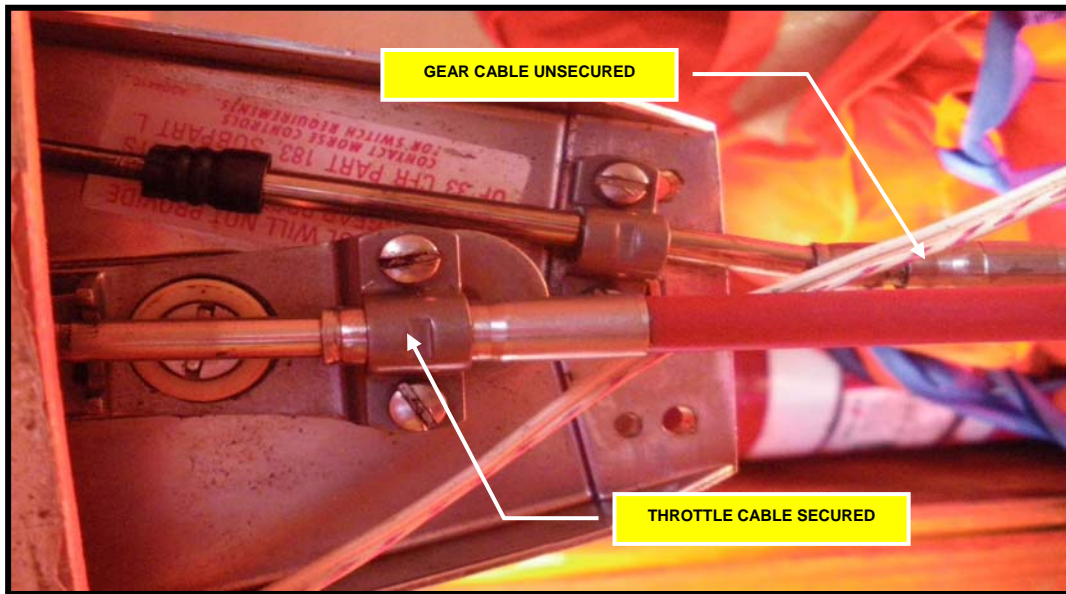
She informed investigators that there was no means available for direct communication between her and the Master.

Communication Onboard

- 1.32 The vessel's internal telephone communication system was inoperable and allegedly "*had not worked for many years*". Though there was a public address system onboard, the Master could not use it to make announcements to passengers as it was used primarily by the disc jockey for entertainment purposes.
- 1.33 No portable radios were provided to crew despite the distance between the wheelhouse, lower deck and galley precluding direct voice communications. Further, with passengers partying on both decks, voice communications would have been almost impossible at other than close range while the cruise was underway. The only opportunity for direct communication between the GPH and the Master was limited to those occasions when the GPH visited the wheelhouse while doing rounds of the vessel and attending to passengers on the upper deck. [CSH Cruises reports walkie-talkies have now been made available on all cruises and crew have been instructed to use them.]

Inspection of the *Katika*

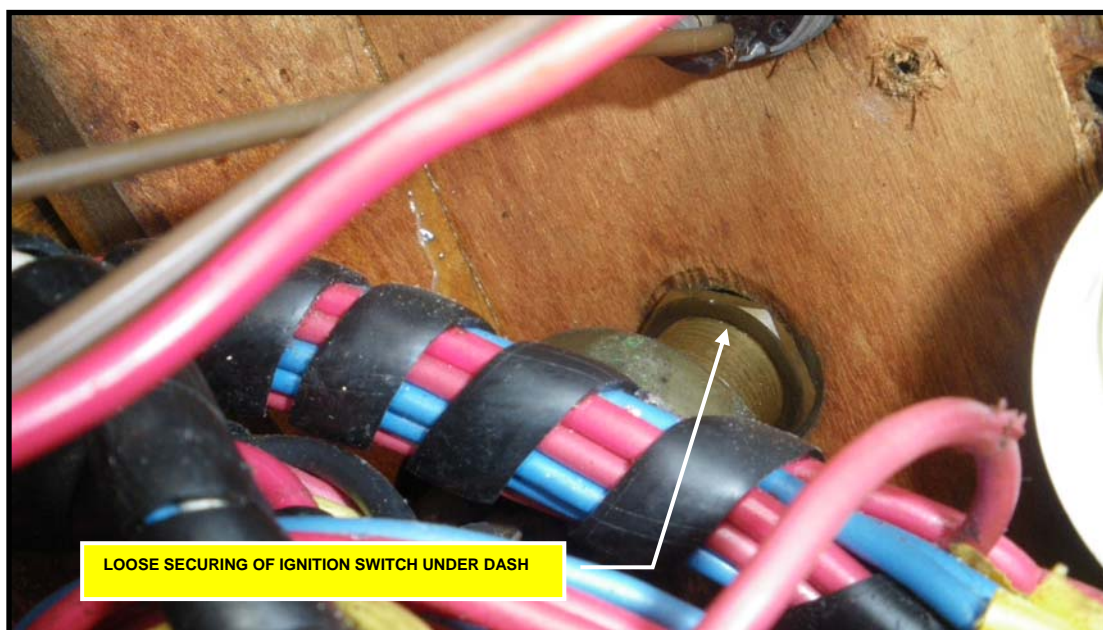
- 1.34 OTSI investigators conducted preliminary inspections of the *Katika* on 6 and 7 December 2010 at Blackwattle Bay Marina where it had been towed after the incident. Further examinations were conducted on 15 December 2010 and again on 13 January 2011 with the Master of the vessel at the time of the collision available to describe his experience of the incident to investigators.
- 1.35 The initial inspection of the *Katika* revealed that the throttle control cable was still connected and would work the throttle in both the Ahead and Astern position. However, the outer Morse/Teleflex[®] gear cable casing was not secured to the control housing under the control lever in the wheelhouse (see *Photograph 3*). As a result, the mechanism did not respond when the Master attempted to change gear from Ahead to Astern.



Photograph 3: View of control cables

- 1.36 The Morse/Teleflex[®] control unit is operated with a single lever. The central lever position is the Neutral position. The first position forward engages Ahead gear and the next position engages the throttle. The reverse applies. If the gear cable is disconnected while in gear, any movement of the lever in either direction only acts on the throttle. This accounts for the increase in speed of the *Katika* just prior to the first collision. In trying to engage Astern gear, but without success, the Master pulled the lever fully backwards which served only to increase the throttle to full engine speed.
- 1.37 Examination of the cable connections at the engine revealed that both gear and throttle cables had been disconnected by removal of the retaining nut on the cable linkage. It was initially suspected this was done when the *Katika*'s engine was shut down after it finally came to rest. However, it was ascertained from subsequent inquiries that the Master of the *Pacific Pearl* had disengaged the cables.
- 1.38 The engine is shut down from the wheelhouse by turning the ignition key anticlockwise to activate the solenoid on the fuel rack. This was tested on the night of the incident by the NSWMA investigator which showed that this function was working correctly so the engine could have been shut down from the wheelhouse. The Master could have done this when he realised impact was imminent, thereby reducing the collision force, or even after the initial

collision thereby probably avoiding subsequent collisions. However, the barrel of the ignition mechanism was not secured to the dashboard and the whole key and barrel rotated unless held firmly in one hand while the key was turned with the other hand (see *Photograph 4*). It was reported as having been like this for some time.



Photograph 4: Loose ignition switch barrel

- 1.39 The dashboard in the wheelhouse was not secured properly nor was the single lever control mounting. Some switches on the dashboard showed markings to indicate what the switch operated but much of the labelling was unreadable and other switches were not labelled (see *Photograph 5*). The horn button was not marked and could easily be mistaken for the main engine start or shut down switch.
- 1.40 On further examination of the *Katika*, the battery terminals were found to be badly corroded (see *Photograph 6*) and the air intake to the auxiliary diesel generator was almost totally blocked with dust. There were loose wiring connections throughout the 24 volt electrical systems in the wheelhouse and in other areas including the engine room, galley, bar and saloon and upper decks. The whole engine room showed evidence of very poor housekeeping and there were no records to verify that any maintenance had been carried out.



Photograph 5: Dashboard



Photograph 6: Battery installation

1.41 An overall inspection of the vessel revealed an additional twenty-six safety defects and deficiencies:

- No passenger safety briefings were given at the commencement of cruises despite scripts being available.⁴
- All upper deck life jackets were crammed under the wheelhouse dashboard where they could interfere with the control cables and wiring. Passenger access to this stowage located in a blind area was hampered by the Master in his position at the wheel (see *Photograph 7*).
- Many of the life jackets on the lower deck were still in their manufacturer's plastic wrapping thus preventing immediate use.



Photograph 7: Lifejackets in wheelhouse

- Emergency exit signs did not conform to regulations as they were not illuminated or connected to an emergency power supply.
- There were no emergency exit signs at the entrances to the engine room or galley located below the main deck.

⁴ A script that mentions life jackets and mustering in an emergency is contained in CSH Cruises' Standard & Procedure No. 1.9, *Pre Cruise Passenger Briefing*, dated 01/05/2005. A script, "*Welcome On Board Katika The Fun Boat*", found amongst the vessel's survey papers in the wheelhouse also mentions life jackets.

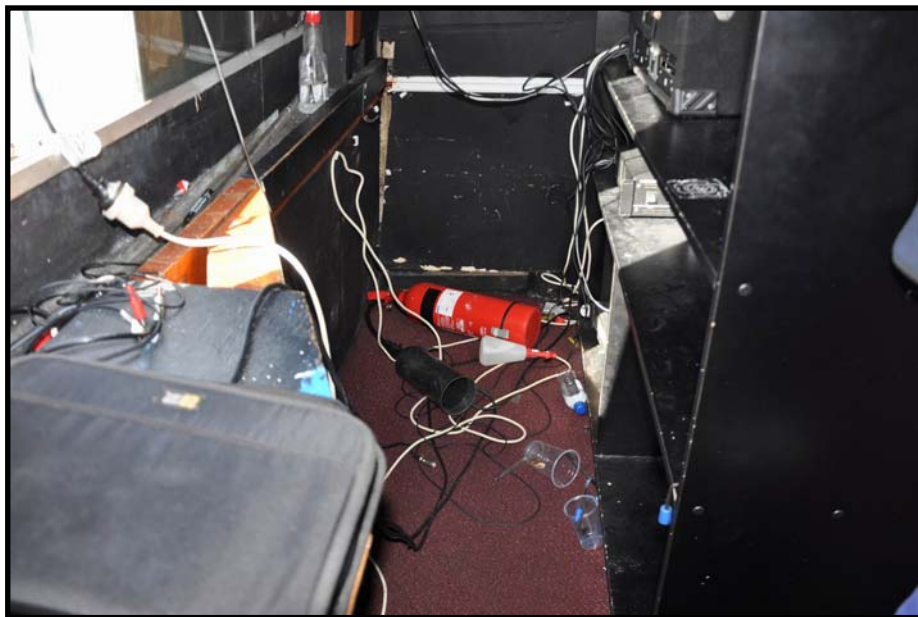
- There was a horizontal line of decorative green lights permanently affixed around the aft deck and wheelhouse. These could be easily confused with the *Katika's* running navigation lights and so its direction of travel during hours of darkness or in conditions of restricted visibility could be mistaken by other vessels. This contravenes the *International Regulations for the Prevention of Collisions at Sea, 1972 (COLREGS)*.⁵
- LPG gas bottles on the top deck were unsecured (see *Photograph 8*).
- The barbecue on the top deck had no gas fitting compliance plate.
- There were no warning signs advising of “hot surfaces” near the barbecue.
- The location of the gas bottles on the top deck was such that, in the event of a gas leak, LPG gas could enter the engine room as the scuppers were located in close proximity to the engine room air intakes.
- The barbecue was secured with jagged, sharp metal straps which could inflict injury.



Photograph 8: LPG gas barbeque on upper deck

⁵ COLREGS Part C Lights and Shapes Rule 20 (b) states: “The Rules concerning lights shall be complied with from sunset to sunrise, and during such times no other lights shall be exhibited, except such lights which cannot be mistaken for the lights specified in these Rules or do not impair their visibility or distinctive character, or interfere with the keeping of a proper look out”.

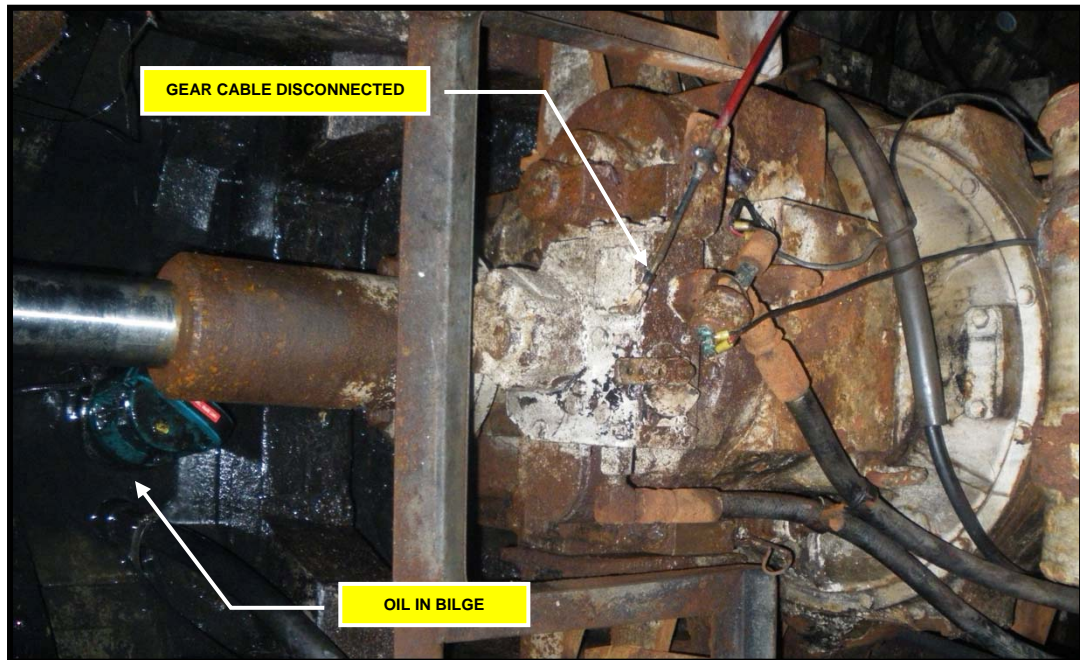
- The strobe light attached to the life ring near the wheelhouse was unserviceable.
- Numerous 240 volt power leads were not tagged as required and speaker cables ran through open windows to the top deck allowing water in inclement conditions to run down the cables into electrical equipment (see *Photograph 9*).
- Fire extinguishers were not secured and so could become missiles in a collision.



Photograph 9: 240 volt cables and unsecured fire extinguisher

- There was no signage indicating the location of first aid kits. After a search, they were found under life jackets in the wheelhouse and were in need of re-stocking.
- The compass contained a large air bubble.
- The onboard gangway did not comply with the USL Code in that it had only one side rail.
- There was no sign indicating the location of, or instructions for, the operation of the NAF S-III fire suppression system on the main deck.
- There were no warning signs indicating trip and head hazards on coamings on doors and stairs.

- Large amounts of oil floating on the bilge water in the engine room presented a fire risk (see *Photograph 10*).



Photograph 10: Oil in bilge

- The battery box in the engine room was unsecured, relying on the weight of the batteries themselves to keep it in place.
- The air dampers to the engine room had no signs showing open or closed positions; they were half way between when inspected.
- There was no sign indicating the location of the emergency fuel shut-offs.
- The shore power/generator indicator switch on the main electrical panel was broken and required pliers to turn it.
- The connection of the party lights around the rear upper deck railing to the 240 volt power supply was broken and posed a risk of electrocution as the lighting was secure to the metal railing.
- There was no fire hose onboard for the main engine-driven fire pump although there was a hose fitted to the 240 volt powered pump.

Safety Management System

- 1.42 CSH Cruises had a documented Safety Management System (SMS) as required by Section 53D of the *Passenger Transport Act 1990* but the copy onboard the *Katika* was in a basic template format. The overall content and detail in most sections were far from adequate for it to be an effective and useful document. The instructions contained within the SMS were generalised and vague; emergency procedures were not specific to the operation of the particular vessel. There was no index or page numbering. The majority of the Masters who had worked on the *Katika* and were interviewed stated they had not read the SMS as they did not have the time.
- 1.43 CSH Cruises' SMS is being completely rewritten as a result of an audit undertaken by the NSWMA in April 2010. The NSWMA Periodic Survey Team is assisting the Company with this work.

Emergency Drills

- 1.44 The conduct of drills at regular intervals on all commercial vessels is a requirement for compliance with the Uniform Shipping Laws Code 2009. In addition, the *Katika's* survey requires that:

"The owner must ensure that all crew have had sufficient training in the operation of the vessel and are able to safely and efficiently operate it at all times and in all conditions".

- 1.45 The primary objective in conducting drills is to ensure the maintenance of a high level of crew competency in handling a wide range of emergency situations which could endanger the lives of passengers and crew. The USL Code requirement is for drills to be performed, at intervals of not greater than two months, to cover collision, fire, sinking, person overboard, Master incapacitated, medical emergency and abandoning ship. Conducting drills also provides an opportunity for crews to establish a working relationship, for the Master to learn his crew's capabilities and to test the serviceability of onboard emergency equipment.

- 1.46 The SMS procedural requirements included:

"The MV Katika will complete an emergency drill at least once fortnightly. Drills must be recorded in the vessel log. Supplementary to this and in

line with record keeping requirements, Masters are required to fill out a Drill Report Form and forward it to the Designated Person for review and archiving.”⁶

However, there were no records, including log book entries, of emergency drills having been conducted in the twelve months preceding the collision.

- 1.47 The *Katika*'s log for the period 4 December 2009 to 4 December 2010 showed that it had been commanded by 12 different Masters over 71 cruises. In the same period, 25 different crew members had been employed onboard on GPH, bar and disc jockey duties. Log entries did not specify the duties undertaken by each individual and therefore compliance with the survey crewing requirements could not be fully determined for each cruise undertaken.
- 1.48 Masters and crew members are employed on a casual basis usually for a six hour period to cover the average four hour cruise. The two non-cruising hours are taken up with pre-start checks, victualling the vessel, travel to embarkation points, return to base from disembarkation points, shut down, cleaning and securing the vessel. This leaves no time for undertaking mandatory emergency drills.
- 1.49 It appears the GPH are primarily engaged in hospitality-oriented tasks throughout all phases of the cruise apart from mooring the vessel, rather than giving priority to assisting the Master in the safe navigation of the vessel. The casual nature of employment and the turnover of crew are not conducive to the development of good teamwork among crew members and especially an effective working relationship between Masters and GPHs.
- 1.50 On the *Katika*, with the Master in the wheelhouse three decks away from the engine room and with passengers moving about unrestricted in between, it is essential that the GPH be fully competent to operate pumps, fuel and air shut offs and the fixed engine room fire suppression system, as well as assist in watch keeping duties onboard, rather than engaging in hospitality duties.
- 1.51 The seasonal nature of the cruise industry also militates against the forming of regular, effective and competent crew teams. During the six weeks leading up

⁶ CSH Cruises' Standard & Procedure No. 35, *Completion of Emergency Drills*, dated 01/02/2005.

to New Years Eve, most boats work one, sometimes two, cruises a day. Throughout the remainder of the year, they might charter only once per week during the summer months and may not go out at all in winter except for special events. Consequently, crew, especially GPH, change from boat to boat taking the first work offer available.

Record Keeping

- 1.52 **Maintenance.** CSH Cruises' record keeping was found to be of a very poor standard. The Company did not have a record of maintenance conducted on its vessels either onboard or ashore. The lack of any maintenance books prevented a detailed examination of the adequacy of servicing and responsiveness to defect reporting.
- 1.53 Currently, minor repairs and maintenance are undertaken by the Master/MED III on duty unless major mechanical work is likely to be involved, in which case a qualified marine engineering contractor is called in. Common practice is to report defects to management verbally. There is no system in place for recording maintenance work requirements although entries are made in the vessel's log on occasions. When log entries are made, no record is made or endorsement entered into the log as to whether or not the work was ever completed.
- 1.54 Two instances of problems with the Morse/Teleflex[®] control cables in the preceding twelve months were noted in brief in the log; one on 24 February 2010 and an undated entry sometime between 22 April and 15 May 2010. Another two occurrences in the same period were revealed during interviews; problems on 23 October 2010 were not logged by the Master and a Marina operator reported the vessel stuck in gear and nearly colliding with moored vessels at the Fish Market wharves on 13 October 2010. However, there was no record of any replacement or repairs undertaken in response to any of these occurrences.
- 1.55 **Crew.** No physical check of the qualifications of any of the crew being employed was being undertaken and no records of competencies or qualifications were being kept. Thus, the Company could not be assured that crew members were appropriately qualified and currently competent. The

cruise on 4 December 2010 is a prime example where the Company hired a Master as a Master 5/MED III whose MED III certificate of competency had expired and a GPH who did not hold a certificate of competency issued by the NSWMA.

1.56 Incident recording and reporting. Though required by the Company's SMS, there is no incident reporting system in place and no incident reporting records were available. Four reportable incidents are noted in the vessel's log for the 12 months leading up to 4 December 2010, but there is no evidence of further processing or other follow-up action. These incidents were:

- a passenger overboard on 20 December 2009;
- two groundings, on 30 January 2010 and 9 October 2010; and
- an engine room main exhaust fire on 23 October 2010 resulting in the disablement of the vessel and a need to transfer passengers to another vessel.

1.57 Masters and crew who had worked on the *Katika* advised of other serious incidents not included in the log including:

- a passenger jumping overboard twice during a cruise;
- a collision between the vessel and a wharf in Blackwattle Bay on 15 April 2007 when the engine stuck in Ahead gear, resulting in major damage to the vessel and the wharf; and
- a situation on 13 October 2010 when the vessel remained in Ahead gear because Astern gear could not be engaged (with the same Master in control as on 4 December 2010).

1.58 Despite it being a mandatory legislative requirement, these incidents were not reported to either the NSWMA or OTSI. There is no record of any action taken in response to any of the incidents.

1.59 Log book. Examination of the log reveals that important detail is not always recorded by Masters, e.g., full names and details of the qualifications or positions of crew onboard, pre-departure checks of emergency equipment and passenger numbers.

MV Port Venture

- 1.60 Investigators examined the other vessel in CSH Cruises' fleet, the MV *Port Venture*, to determine whether or not the safety issues identified were confined to the *Katika*.
- 1.61 The *Port Venture*'s log book showed a similar high turnover of crew with seven different Masters and 24 different staff having operated the vessel in the same 12 month period. However, the *Port Venture* was being better maintained than the *Katika* and this may be largely attributable to there being a more 'permanent' Master recently being onboard.
- 1.62 The SMS was the same as that on the *Katika* even though the vessels have different propulsion systems, equipment locations and means of accessing machinery. A person overboard drill conducted on 24 April 2010 was recorded in the log but it was the only drill recorded in the 12 months to 4 December 2010. The Master who had conducted the drill advised that it had neither included an object being thrown into the water to simulate a person nor the practice of a retrieval method.
- 1.63 The following general safety defects and deficiencies were also identified:
- green and red spot lights mounted horizontally on the rear upper deck could easily cause confusion as to the vessel's direction of travel;
 - emergency exit signage did not comply with legislation;
 - some life jackets were still in the manufacturer's plastic packaging; and
 - an inability to readily deploy the anchor due to a damaged fairlead.
- 1.64 The Master immediately rectified the life jacket matter. However, despite the importance of being able to deploy an anchor in an emergency situation, the damaged fairlead had not been repaired more than five weeks after the problem had been identified to the Company by investigators.

PART 2 FINDINGS

Causation

- 2.1 The collision with the Western sea wall and a wharf on the Eastern side of Pyrmont Bay occurred as a result of the Master being unable to obtain Astern gear when manoeuvring to bring the *Katika* along side the Casino Wharf. Gear selection was prevented because the Morse/Teleflex[®] gear cable had become detached from its mounting at the single lever control, leaving the gear box in Ahead gear.

Contributing Factors

- 2.2 The Master did not stop the engine and control the steering immediately he became aware that there was a problem. If he had, the impact of the first collision may have been reduced and subsequent collisions could have been avoided. As a consequence, the vessel hit the sea wall at full throttle then continued on, uncontrolled and still at full throttle, and collided a second time before coming to a standstill wedged against the Eastern wharf's boardwalk.
- 2.3 From the condition of the vessel and lack of records, it is evident that adequate routine maintenance was not being undertaken. Also, if reported, defects were not being actioned in a timely and effective manner, if at all. Problems with the gear lever control were known, as similar incidents had occurred on at least three previous occasions, the most recent being on 13 October 2010.
- 2.4 At the time of the incident the *Katika* was not crewed in accordance with the Certificate of Survey as the Master did not hold a current MED III certificate of competency. As such, an Engineer should have been included among the crew.
- 2.5 The Crew was not competent in handling emergency procedures, as no time had been scheduled for crew to undertake emergency drill training, and the drills required to comply with the USL Code 2009 and to meet the vessel's survey requirements, had not been practised on the *Katika* for at least 12 months.⁷

⁷ This is reflective of an industry-wide problem of inadequate drill practices. Because of the casual nature of crew employment, GPH in particular have limited opportunities to develop their skills within a regular crew and to gain a comprehensive knowledge of the vessels on which they are working.

- 2.6 The Master did not have direct communications with crew members, so could not get their assistance in handling the incident. Similarly, he could not communicate with passengers as the public address system was being controlled by the disc jockey. A timely warning to passengers may have resulted in fewer injuries, at least from the second collision.

Other Safety Matters

- 2.7 The GPH did not hold a certificate of competency and, with the exception of assisting with mooring, was utilised primarily in a hospitality role instead of assisting the Master with the vessel's safe navigation.
- 2.8 CSH Cruises does not have a system in place to ensure vessel maintenance requirements are reported, actioned and recorded in a timely and effective manner.
- 2.9 Given the distance between the wheelhouse and engine room, it is impractical to expect the Master to undertake both navigation and engineer duties when a party cruise is underway, especially in the event of an incident. Where a GPH is employed in lieu of an Engineer, to be effective, that GPH needs to be trained and experienced beyond basic requirements and have a means for reliable, direct voice communications with the Master.
- 2.10 The significant number of safety defects and deficiencies identified on the vessel, some of which were also found on the other fleet vessel, indicated a serious, on-going lack of attention and allocation of resources to ensuring crew and passenger safety.

PART 3 RECOMMENDATIONS

- 3.1 To prevent a recurrence of this type of incident, it is recommended that the following remedial safety actions be undertaken by the specified responsible entities.

CSH Cruises

- 3.2 Sight certificates of competency before engaging any crew members to ensure their qualifications are current and valid for their intended employment.
- 3.3 Establish and maintain a register containing all the details of qualifications held by employed crew particularly the expiry dates of safety-related certificates.
- 3.4 Establish a roster for the completion of emergency drills in accordance with the requirements of the USL Code 2009 so as to ensure all crew employed are competent in performing these drills before being allowed to work on any Company vessel. Maintain details of drills completed in vessel logs and in a consolidated Company record.
- 3.5 Establish incident recording and reporting systems that keep management adequately informed and also comply with the external reporting requirements of Section 46B of the *Passenger Transport Act 1990*.
- 3.6 Maintain a register of all maintenance and servicing conducted on all vessels with endorsements as to when and by whom the work is completed, and provide feedback to Masters at the completion of work.
- 3.7 Utilise GPH in the correct role of assisting the Master in the safe navigation of the vessel and not in hospitality duties.
- 3.8 Ensure dedicated voice communications are maintained at all times between the Master and GPH onboard.
- 3.9 Conduct a safety briefing to all passengers at the commencement of all cruises and charters and record that it has been conducted in the vessel's log.
- 3.10 Ensure vessel logs are completed legibly and comprehensively including the full names of all crew members along with their assigned positions and duties,

the number of passengers, the times associated with all recorded occurrences, and the completion of pre-departure and safety equipment inspections.

- 3.11 Rectify the safety defects and deficiencies identified in this investigation as applicable on all fleet vessels.

NSW Maritime Authority

- 3.12 From a safety perspective, take into account design and operational features of a vessel, e.g., the distance between the wheelhouse and engine room and the activities of passengers, when determining crew numbers and qualifications requirements as part of a vessel's survey.
- 3.13 Remove the option of employing a dual qualified Master 5/MED III and a GPH as an alternative to both a Master and an Engineer on vessels with similar design and operational features to the *Katika*.
- 3.14 In relation to all public passenger carrying vessels, increase the number of random, spot inspections and audits which examine the adequacy and currency of crew qualifications and competencies, adherence to emergency drill requirements and general safety compliance onboard.

Commercial Vessel Association of NSW

- 3.15 Issue a circular, or equivalent notice, to all members highlighting the importance of:
 - scrutinising the qualifications of all onboard employees and maintaining an up-to-date register of details of certificates;
 - maintaining crew competencies by conducting emergency drills in accordance with the USL Code;
 - ensuring GPH perform their role of assisting the Master with safe navigation of the vessel at all times and not have them engaged on other duties, especially on vessels where the Master is also acting as the Engineer; and
 - regularly inspecting Morse/Teleflex[®] cable installations for faults, especially on vessels utilising single lever controls, and recording the details of these inspections.

PART 4 APPENDICES

Appendix 1: Sources, Submissions and Acknowledgements

Sources of Information

- CSH Cruises
- NSW Maritime Authority

References

- Chart AUS 200
- Occupational Health and Safety Regulation 2001
- *Passenger Transport Act 1990* (NSW)
- Uniform Shipping Laws 2009

Submissions

The Chief investigator forwarded a copy of the Draft Report to the Directly Involved Parties (DIPs) to provide them with the opportunity to contribute to the compilation of the Final Report by verifying the factual information, scrutinising the analysis, findings and recommendations, and to submit recommendations for amendments to the Draft Report that they believed would enhance the accuracy, logic, integrity and resilience of the Investigation Report. The following DIPs were invited to make submissions on the Draft Report:

- CSH Cruises
- NSW Maritime Authority
- Commercial Vessel Association of NSW (CVA)

The NSW Water Police Marine Area Command and the Independent Transport Safety Regulator (ITSR) were also offered the opportunity to comment on the Draft Report.

Written responses were received from CSH Cruises, NSW Maritime Authority, the CVA, Marine Area Command and the ITSR. The CVA advised that it is not their practice to comment on investigations of this nature but that it is a strong supporter of Safety Management Systems and constantly reminds its members about safety issues.

The Chief Investigator considered all representations made by DIPs and responded to the author of each of the submissions advising which of their recommended amendments would be incorporated in the Final Report, and those that would not. Where any recommended amendment was excluded, the reasons for doing so were explained.

Acknowledgements

The locality map reproduced as *Figure 1* is used with the permission of Google Earth.

Photograph 1 is reproduced with the permission of Nairn Johnston, Superscope Marine.