Report of Investigation
into the Collision Between High
Speed Passenger Ferry Nan
Sha 38 and Mainland Container
Vessel 中航 908 Resulting in
102 Injuries on 17 February 2005
Purpose of Investigation

This incident is investigated, and published in accordance with the IMO Code for the Investigation of Marine Casualties and Incidents promulgated under IMO Assembly Resolution A.849(20). The purpose of this investigation conducted by the Marine Accident Investigation and Shipping Security Policy Branch (MAISSPB) of Marine Department is to determine the circumstances and the causes of the incident with the aim of improving the safety of life at sea and avoiding similar incidents in future. The conclusions drawn in this report aim to identify the different factors contributing to the incident. They are not intended to apportion blame or liability towards any particular organization or individual except so far as necessary to achieve the said purpose.

The MAISSPB has no involvement in any prosecution or disciplinary action that may be taken by the Marine Department or others resulting from this accident.
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## Glossary of Abbreviations and Acronyms

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<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>AIS</td>
<td>Automatic Identification System</td>
</tr>
<tr>
<td>CFT</td>
<td>China Ferry Terminal</td>
</tr>
<tr>
<td>Collision Regulations</td>
<td>International Regulations for Prevention Collisions at Sea</td>
</tr>
<tr>
<td>DSC</td>
<td>Digital Selective Calling</td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning System</td>
</tr>
<tr>
<td>HSC</td>
<td>High Speed Craft</td>
</tr>
<tr>
<td>HSCCC</td>
<td>High Speed Craft Consultative Committee</td>
</tr>
<tr>
<td>IMO</td>
<td>International Maritime Organization</td>
</tr>
<tr>
<td>MRCC</td>
<td>Maritime Rescue and Co-Ordination Center</td>
</tr>
<tr>
<td>MD</td>
<td>Marine Department</td>
</tr>
<tr>
<td>PRC</td>
<td>Peoples’ Republic of China</td>
</tr>
<tr>
<td>SREP</td>
<td>Speed Restriction Exemption Permit</td>
</tr>
<tr>
<td>SOLAS</td>
<td>Safety of Life at Sea Convention</td>
</tr>
<tr>
<td>SOTDMA</td>
<td>Self-Organising Time Division Multiple Access</td>
</tr>
<tr>
<td>VHF</td>
<td>Very High Frequency</td>
</tr>
<tr>
<td>VTC</td>
<td>Vessel Traffic Center</td>
</tr>
</tbody>
</table>
1. Summary of Incident

1.1 At about 0812 on 17 February 2005, a Chinese registered passenger high-speed craft (HSC) *Nan Sha No. 38* with 156 passengers on board collided with a mainland container vessel *908* near south west of Tsing Yi Island. The collision took place in restricted visibility conditions as the bow of *Nan Sha No. 38* collided into the port side forward of *908*. The location of the collision was in position at 22° 19.7’ N 114° 5.0’E. The speed of *Nan Sha No. 38* was recorded to be 40 knots before the collision.

1.2 *Nan Sha No. 38* sustained a serious structural damage at the bow whilst *908* sustained minor dent at the port side shell plating. The collision caused 102 passenger injuries on board the *Nan Sha No. 38*. Four of them were in serious condition. 17 injuries were sent to hospital from the scene. *Nan Sha No. 38* was able to return to China Ferry Terminal (CFT) under its own power. Other injured passengers were sent to hospital at CFT. There was no reported injury on board the *908*.

1.3 The investigation has established that the cause of the accident to be the failure of the Master of *Nan Sha No. 38* to operate the vessel in a safe speed under the Collision Regulations during restricted visibility. The Master also failed to observe the condition of the Speed Restriction Exemption Permit (SREP) when the visibility was less than one nautical mile.

1.4 The Master of *Nan Sha No. 38* also failed to follow the principal Fairway in navigating his vessel and took a short cut to pass the southwest corner of Tsing Yi Island. This might have caused the Master fail to detect the approaching of the *908* behind the corner at an earlier stage.

1.5 The Master is required to operate on a tight sailing schedule, which might put pressure on him in endeavoring to meet the sailing schedule without due consideration of operational safety.

1.6 It has also found that the Master of *908* had navigated at the wrong side of the Ma Wan Fairway intending to make a shorter distance to pass the bend at south west of Tsing Yi Island and failed to detect *Nan Sha No. 38* on the radar at an earlier stage.

1.7 Two categories of passenger suffered from more severe injuries during the collision on board *Nan Sha No. 38*. They are passengers sitting at the front rows who did not fasten the seat belts and few others left their seat for catering service.
2. Description of Vessels

2.1 Passenger HSC Nan Sha No. 38 (南沙38號)

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call Sign</td>
<td>BXJG</td>
</tr>
<tr>
<td>Port of Registry</td>
<td>Guangzhou (廣州), China</td>
</tr>
<tr>
<td>IMO No.</td>
<td>9121209</td>
</tr>
<tr>
<td>Type</td>
<td>Catamaran high-speed ferry</td>
</tr>
<tr>
<td>Length</td>
<td>42.0 m</td>
</tr>
<tr>
<td>Breadth</td>
<td>12.0 m</td>
</tr>
<tr>
<td>Depth</td>
<td>3.7 m</td>
</tr>
<tr>
<td>Gross Tonnage</td>
<td>610</td>
</tr>
<tr>
<td>Persons licensed to carry</td>
<td>396 passengers &amp; crew</td>
</tr>
<tr>
<td>Engine</td>
<td>4 x MTU 16V 396te74L Diesel Engine</td>
</tr>
<tr>
<td>Engine Power</td>
<td>4 x 1980 kW, 1950 r/min</td>
</tr>
<tr>
<td>Year of Built</td>
<td>1996</td>
</tr>
</tbody>
</table>

Fig. 1 Bow damage of Nan Sha No. 38

2.1.1 *Nan Sha No. 38* is a high-speed passenger catamaran ferry built with aluminum alloy. It is powered by 2 sets of water jet propulsion unit at a maximum speed of 45 knots. The vessel is equipped with two radars, a Global Positioning System (GPS), an electronic chart device, a standard compass, an echo sounder and a night vision equipment.
2.2 Mainland Container Vessel 908

<table>
<thead>
<tr>
<th>Port of Registry</th>
<th>Zhongshan(中山), China</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Ship</td>
<td>Container</td>
</tr>
<tr>
<td>Year of built</td>
<td>2000</td>
</tr>
<tr>
<td>Gross Tonnage</td>
<td>997</td>
</tr>
<tr>
<td>Net Tonnage</td>
<td>558</td>
</tr>
<tr>
<td>Length Overall</td>
<td>49.8 m</td>
</tr>
<tr>
<td>Breadth</td>
<td>12.98 m</td>
</tr>
<tr>
<td>Depth</td>
<td>4.18 m</td>
</tr>
<tr>
<td>Main Engine</td>
<td>Diesel engine</td>
</tr>
<tr>
<td>Engine Power</td>
<td>474 kW</td>
</tr>
</tbody>
</table>

Fig. 2: Port side damage of 908 after collision

2.2.1 908 is a PRC registered container vessel primarily engaged in coastal trade between Hong Kong and ports in China. She was propelled by a single conventional propeller driven by a main diesel engine with power at 474 kW. The vessel was fitted with a radar, a GPS and a magnetic compass as the navigational equipment.

2.2.2 According to the registered particulars, the vessel has only one cargo hold. At time of collision there were 4 containers on board.
3. **Sources of Information**

3.1 Report of Marine Casualty provided by the Master of *Nan Sha No. 38*;

3.2 Report of Marine Casualty provided by the Master of *908*;

3.3 The Master, Assistant Master, Chief Engineer, assistant engineer and sailors of *Nan Sha No. 38* were interviewed by the Investigating Officer;

3.4 The Master and sailor of *908* were interviewed by the Investigating Officer;

3.5 Eleven passengers on board the *Nan Sha No. 38* were telephone interviewed by the Investigating Officer;

3.6 Hong Kong Observatory;

3.7 Hydrographic Office, Hong Kong Marine Department;

3.8 Harbour Patrol Section, Hong Kong Marine Department;

3.9 Vessel Traffic Centre, Hong Kong Marine Department;
4. Outline of Events

4.1 Account of Nan Sha No. 38

4.1.1 At about 0800 on 17 February 2005, Nan Sha No. 38 departed from China Ferry Terminal (CFT) to Nan Sha, China with 156 passengers on board. The journey normally requires about 80 minutes with a normal cruising speed of 40 knots.

4.1.2 The weather condition was generally foggy with prevailing local fog patches. Fog warning due to low visibility was broadcast by VTC since 0300 on that morning. After departure, Nan Sha No. 38 followed the Northern Fairway and started to accelerate to its cruising speed of about 40 knots. Tidal condition was about 0.1 knot in a northerly direction during the passage.

4.1.3 There were four persons in the wheelhouse. The Master was manually steering the vessel using the control levers, which was located in front of the Master’s seat. The Assistant Master was sitting adjacent to the Master at the starboard side keeping a visual lookout and radar watch on the second radar. The Chief Officer was sitting at the night vision station at the far starboard side. The night vision equipment was not in use because of daytime navigation. The Chief Officer was keeping a visual lookout. The Chief Engineer was sitting at the port side of the wheelhouse facing the machinery console. His duty was to monitor the engine maneuvering control and was not engaged in any navigational duty. During the voyage the Master remained the overall control of the vessel.

4.1.4 According to the statements given by the Master, the machinery and navigation equipment were all in normal working order. Navigation lights were switched on during navigation. The Master stated that prior to reaching the Tsing Yi Island the visibility was good and the sea condition was calm. After reaching south of Tsing Yi Island, fog patches were encountered in the area, visibility dropped to about 300 metres. The Master reduced the speed temporary to 37 knots for a short period of time but resumed to 40 knots shortly afterwards.

4.1.5 Two radars on board Nan Sha No. 38 were switched on and were functioning properly. The Master and the Assistant Master were keeping watch on each of the radar console. Both radars were set at 1.5 nautical miles range in an off-center mode. As the sea was relatively calm, the clutter control of the two radars had been set to its normal value and the Master stated that the clutter control did not affect the detecting of other vessels.
4.1.6 The traffic was light in the area before the collision. There was no vessel in the vicinity of *Nan Sha No. 38* that required the Master to take avoidance action.

4.1.7 When *Nan Sha No. 38* approached to the southwest corner of Tsing Yi Island the Master observed a number of stationary echoes locating between the boundary of the Ma Wan Fairway and the Tsing Yi Island. According to the experience of the Master these echoes were believed to be the cluster of anchored barges that were anchoring outside the loading berth of the Euro-Asia terminal at south west of Tsing Yi Island. Apart from the stationary echoes the Master also observed a slow moving target (later identified as a sand barge) on the starboard bow going in the same direction.

4.1.8 As the track of the moving sand barge did not impair the course of *Nan Sha No. 38*, the Master passed clear to the stern of this vessel. After passing, he suddenly saw the silhouette of a container vessel, which was later identified to be the *908*, and observed it was crossing from starboard to port of *Nan Sha No. 38* at close quarters. The Master and the Assistant Master both stated that they had not observed the echoes of *908* on the radar at an earlier stage. The container vessel caught them by surprise as it suddenly emerged out from the fog. The Master immediately stopped and reversed both engines to full astern.

4.1.9 The collision occurred afterwards with the bow of *Nan Sha No. 38* collided into the port side of the container vessel. The collision caused severe damage to the bow of the *Nan Sha No. 38*. The crash stop of the vessel at the collision caused the passengers inside the passenger compartment to be thrown forward against stationary objects and resulted in a large number of casualties.

4.1.10 After the collision the Master informed the Marine Department Rescue Coordination Centre (MRCC) via the Digital Selective Calling radio equipment and established communication on VHF Channel 16. The Master also deployed other officers to inspect the condition of damage to the vessel and the passengers.

4.1.11 No ingress of water to the vessel’s compartments was reported. The vessel remained upright after the collision. The Master later made public announcement of the collision to the passengers. 102 passengers and crew were reported to have injured during the accident.
Fig. 3  Tracks of Nan Sha No. 38 and 中航908
4.2 Account of Mainland Registered Container Vessel  中航908

4.2.1 中航908 is a mainland registered container vessel trading between Hong Kong and ports in Pearl River Delta region. On the day of accident, 中航908 departed from the River Trade Terminal in Tuen Mun and proceeded to Yaumatei for discharging containers.

4.2.2 According to the statement of the Master, all navigational equipment were functioning properly including the navigation lights, which had been switched on. During the voyage the Master passed the Ma Wan area via the Ma Wan Fairway. The Master was steering the vessel and a sailor was keeping a lookout in the wheelhouse. Shortly before the collision, the vessel was proceeding at a speed of 9 knots and maintained a position to the east side of the Ma Wan Fairway. Radar had been switched on because of the restricted visibility.

4.2.3 The traffic condition was light in the area. After passing the Tsing Ma bridge dense fog patches were encountered. The Master stated that he had sounded the fog signal at intervals and slowed down his vessel.

4.2.4 On approaching to the Euro-Asia terminal, the Master observed a target at its port bow on the radar (later identified to be the sand barge). Later on he saw the silhouette of a sand barge approached towards his vessel. The Master slowed down and adjusted its course to starboard to avoid collision. The sand barge was observed to have altered its course to starboard to make room for safe passing. The two vessels passed port to port and cleared each other.

4.2.5 After passing the sand barge, the Master suddenly saw a fast moving target approaching fine on the port bow on the radar (later identified to be Nan Sha No. 38). The high-speed ferry was later observed visually at a distance of about 100 metres away. As the container vessel was still slowing down at this juncture and the collision was imminent, the Master stated that he had no time to take any action to avert collision. After a few seconds the Nan Sha No. 38 collided into the port side forward of 中航908.

4.2.6 As the port side of 中航908 was hit at large force, it caused the direction of the bow to be pushed almost 90 degrees to southwest direction. After the collision, the Master stopped the engine and checked for damages. Collision damages were found to be minor. 中航908 continued to stay on scene until arrival of the Police launches.
4.3 Damage to Vessels

*Nan Sha No. 38*

4.3.1 Due to the direct head on impact, *Nan Sha No. 38* sustained extensive structural damage at the forward bow. Large areas of torn and broken structures at the forecastle were pushed aft by the collision impact and piled up at the rear end of the forward deck. After hull damage inspection on the forward end of the vessel and above the waterline, it was confirmed that no ingress of water was found to the main hull and no apparent damage to the other parts of the vessel. The vessel remained upright after the collision and the damages appeared to have not impaired the seaworthiness of the vessel. No oil pollution was found.

*908*

4.3.2 As *908* is a steel container ship, it sustained only minor dent to its port side shell plating during the impact. The collision damage was light and confined to above the vessel’s waterline, which did not impair the seaworthiness of the container vessel.

4.4 Rescue Operation of *Nan Sha No. 38*

4.4.1 The first call for assistance was received by the Maritime Rescue Co-ordination Centre (MRCC) of Marine Department via a Digital Selective Calling (DSC) distress alert at 0812 in position 22° 19.7’ N 114° 5.0’E. The vessel’s name was immediately verified to be *Nan Sha No. 38* via the MRCC database system.

4.4.2 *Nan Sha No. 38* informed the MRCC of the position of the collision and she had sustained damages at the bow but confirmed no water was leaked into its compartments. The Master also advised that at least 4 persons had suffered from serious injury and a large number of passengers suffered from injury to lesser extent.

4.4.3 Due to the foggy weather, the Government Flying Service advised at 0900 that the condition of restricted visibility would not be suitable for airlifting operation. At 0905 the first Police Launch 41 arrived at scene and secured alongside *Nan Sha No. 38*. The rescue team transferred from the vessel 17 passengers and crew who suffered from more severe injuries to hospital whilst other less serious injuries were instructed to remain on board. At 0945 under the escort of government launches, *Nan Sha No. 38* proceeded under its own power and returned to the China Ferry Terminal (CFT). Upon arrival the less serious injuries were sent to
hospital.

4.4.4 The rescue operation stood down at 1045 on the same date.
5. Analysis of Evidences

5.1 Certifications and Experiences

_Nan Sha No. 38_

5.1.1 _Nan Sha No. 38_ is a high-speed ferry registered in Guangzhou, China. The vessel was last surveyed by China Classification Society on 2 November 2004. Its statutory trading certificates were issued by the Guang Zhou Maritime Safety Administration of the Peoples’ Republic of China (PRC) and were found in good order.

5.1.2 The Master obtained the Certificate of Competency for Seafarers of the PRC in 1996. He also completed the Class A special training on high-speed craft which permitted him to serve as Master of high-speed passenger ferry. He has been working on board _Nan Sha No. 38_ as Master since 1997. Up to present the Master remains serving onboard the same vessel, trading in the same route between Hong Kong and the port of Nan Sha for more than 7 years.

5.1.3 The Assistant Master’s Certificate of Competency for Seafarers of the PRC was issued in 2004. The Master and the Assistant Master are both holding appropriate Certificate of Competency qualified to take charge of the _Nan Sha No. 38_.

_中航908_

5.1.4 The statutory trading certificates of the container vessel _中航908_ were issued by the Zhongshan Maritime Safety Administration Authority of PRC. All trading certificates were inspected and found to be in good order. The PRC Certificate of Competency held by the Master of _中航908_ has been verified fit for the competency to work as Master on board the container vessel.

5.2 Weather, Visibility and Tidal Stream

5.2.1 According to the Hong Kong Observatory, the weather conditions on 17 February 2005 was cloudy, wind was slight and fog patches were prevailing in most areas inside the waters of Hong Kong. The 0800 visibility report issued by the Vessel Traffic Centre (VTC) of Marine Department revealed that the visibility in the Victoria Harbour was 8 kilometers. Due to fog patches, at the west of the Victoria Harbour the visibility dropped to 180 metres in the Western Anchorage and 370 metres in Ma Wan area.
5.2.2 As the visibility in certain areas fell below two nautical miles (3.7 kilometers), visibility warnings were broadcast by VTC at hourly interval on VHF channels 12, 14 & 67 before Nan Sha No. 38 departed from the China Ferry Terminal. However, there was no evidence that this broadcast information had been received and acted upon by the Master before departure or when they reached the restricted visibility area before collision.

5.2.3 The tidal stream was slight at southwest of the Tsing Yi Island, moving at about 0.1 knot in a northerly direction. The slight tidal stream should have no bearing to this accident in relation to the high-speed of Nan Sha No. 38.

5.3 Speed Restriction and the Speed Restriction Exemption Permit (SREP)

5.3.1 The Fourth Schedule to the Shipping and Port Control Regulations (Cap. 313A) stipulates the maximum permitted speed for all vessels underway in the harbour and principal fairways, ranging from 8 to 15 knots. The Schedule also stipulates 15 knots as the maximum permitted speed for high-speed craft underway anywhere in the waters at night. These speed limits are set having regard to relevant factors including traffic volume, availability of sea space, safety of sailing at night, prevailing visibility and efficiency of port operations and transport services. In addition, the Shipping and Port Control Ordinance (Cap. 313) requires Masters of vessels to comply with the International Regulations for Preventing Collisions at Sea (Collision Regulations). According to the Collision Regulations, Masters of vessels shall proceed at safe speed appropriate to the prevailing circumstances.

5.3.2 Under Section 63 of Cap. 313 Ordinance, the Director of Marine has granted a total of 132 speed restriction exemption permits (SREPs) (Appendix 1) to high-speed craft operating on scheduled ferry services to outlying islands, Discovery Bay, Park Island, Macau and 17 Pearl River ports. Vessels holding SREPs are allowed to navigate at a speed higher than the limits specified in the Schedule, ranging from 15 to 35 knots within the limits of Victoria Harbour when navigating on principal fairway. The exemption is granted so that these vessels may travel at a speed higher than the limits to meet public demand for fast and efficient transport by sea. Even with the granting of permit, it remains the responsibility of the vessel Master to ensure navigation at a safe speed having regard to the weather and traffic conditions, manoeuvrability of the vessel and such other relevant factors.
To ensure that safety is not compromised, SREPs are granted only to vessels which meet safety standards and which are operated by crew holding additional specified certificates (such as Type Rating Certificate and Radar Observer Certificate). Also, the exemption will not be applicable whenever visibility is below one nautical mile. The Marine Department (MD) monitors the operation of high-speed craft holding SREPs closely to ensure compliance with the permit conditions, and withdraws them in case of any breach of such conditions.

### 5.4 Speed of Nan Sha No. 38

**5.4.1** In the collision location at southwest of Tsing Yi Island, the statutory speed limit for vessel at size of *Nan Sha No. 38* is 15 knots. Rule 6 of the International Regulations for Prevention Collisions At Sea (Collision Regulations) states that a vessel shall at all times proceed at a safe speed so that the Master could take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions. The state of visibility and the maneuverability with reference to its stopping distance should be considered when determining a safe speed.

**5.4.2** Due to different design of vessels, different types of engine and hull form may generate different maneuverability characteristic and stopping distance. Thus their safe speed may also vary. For general navigational safety and as a guide to the safe use of speed, a vessel should normally be able to stop and avoid collision with other vessel within half the visibility distance.

**5.4.3** This distance should allow sufficient time for the Master to respond to the unexpected circumstances taking into account of the vessel’s emergency stop characteristic. Although the statutory limit for the vessel is 15 knots, depending on the state of visibility and traffic condition, the safe speed could be much lower than the statutory limit. As a general indication, for an ordinary local vessel, the speed should not be more than 10 knots if under the visibility of 300 metres.

**5.4.4** After *Nan Sha No. 38* passed clear of the Victoria Harbour limit at 0809, when she arrived south of Tsing Yi Island, fog patches were encountered and visibility was reduced to 300 metres. Under such condition, the SREP should be ceased to be valid. Once the permit became invalid, the statutory speed limit of 15 knots should be applicable to the vessel. At this time the Master should immediate slow down the vessel to a safe speed not exceeding the statutory limit of 15 knots adapting to the prevailing environment of restricted visibility as required.
by the SREP and the Collision Regulations.

5.4.5 The VTC recorded that Nan Sha No. 38 was traveling at 40 knots at the time of collision. It appears that at the collision, the Master did not have sufficient time to slow down the speed of the vessel. The severe bow damage of Nan Sha No. 38 also gave evidence that the vessels were colliding at a high-speed. In this regard, the Master appeared to have not taken the necessary measures to adapt to the deteriorating visibility condition - when Nan Sha No. 38 encountered poor visibility at about 0809, the Master did not reduce speed to a level appropriate to the prevailing circumstances and conditions as required by the Collision Regulations.

5.5 Sailing Schedule of Nan Sha No. 38

5.5.1 The sailing schedule for Nan Sha No. 38 on 17.2.2005 was as follows:

<table>
<thead>
<tr>
<th>CFT</th>
<th>Nansha</th>
<th>Nansha</th>
<th>CFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Departure</td>
<td>Arrival</td>
<td>Departure</td>
<td>Arrival</td>
</tr>
<tr>
<td>0800</td>
<td>0920</td>
<td>0930</td>
<td>1045</td>
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5.5.2 The distance from Hong Kong to the Port of Nansha is approximately 43 nautical miles. For a vessel to meet the above schedule of 1 hour and 20 minutes of steaming time, taking into account the slow maneuvering to and from the berths at each end, Nan Sha No. 38 is to be navigated at least 35 knots in order to arrive Nansha port on time.

5.5.3 Secondly, the time between arrival Nansha port and next departure was 10 minutes. Taking into account disembarking and boarding of passengers, the schedule is considered very tight. As such it is expected that the Master would need to navigate at a high speed in order to arrive the destination on time or even before time. In case when a situation requires him to navigate safely in restricted visibility or collision avoidance, under the circumstances, slowing down might be the least desirable option to be considered by the Master.

5.5.4 High-speed catamaran ferries such as Nan Sha No. 38 transport large number of passengers on fixed schedules, a situation which may create pressure to the Master in maintaining the fixed schedule. The Master constantly endeavors keeping the vessel at least 35 knots for the whole voyage to avoid delays. In this accident it cannot be determined if the consequence of any delays was one of
the issues that influenced the Master’s decision in not reducing the speed in fog. However to help with the situation the company could make alleviating arrangement with contingency ferry schedule arrangement when in fog season. Masters should also be provided with clear guidance on the safe speed in restricted visibility so that they would not be blamed for the delay.

5.6 Action Taken to Avert Collision by Nan Sha No. 38
5.6.1 Upon sighting the silhouette of 南沙 908 the Master immediately pulled the engine throttles to full astern and hard over to starboard. However as the vessel was proceeding at high speed, the reverse of engine and course alteration were ineffective to slow down the vessel in a close quarters situation.

5.6.2 It should be noted that before the collision the Master of Nan Sha No. 38 appeared to have not sounded the required fog signal prescribed by the Collision Regulations.

5.7 Bridge Watchkeeping and Lookouts of Nan Sha No. 38
5.7.1 The Master stated that he was not aware of the presence of 南沙 908 before the collision. The Assistant Master, who was keeping a lookout on the radar did not see the target of the 南沙 908. The Chief Officer was keeping a visual lookout. The Master however, stated that he did not receive any report from the Chief Officer in sighting of vessel before the collision.

5.7.2 Under the condition of restricted visibility, visual contact of 南沙 908 was difficult. The lookout would be relying solely on the radars on board. As 南沙 908 is a steel ship, due to the good radar wave reflective characteristic of the steel hull, the radars on board Nan Sha No. 38 should be able to detect the returned echoes of 南沙 908.

5.7.3 The two radars are of Furuno FCR-1411 and FR-2100 model, their performance were checked after the collision and were found to be functioning properly. According to the statement made by the Master, the sea clutter was low as the sea waves in the area was slight and it did not affect the receiving signals. Under normal situation 南沙 908 should have been detected by the radar of Nan Sha No. 38. During investigation there was doubt as to the statement claimed by the Master and his assistant that they did not see the target of 南沙 908 on the radar. However they were able to see the echoes of the same way sand barge which was on the starboard bow.
5.8 Track of Nan Sha No. 38 and Local Traffic Condition

5.8.1 At south of Tsing Yi Island off the oil depots, the Northern Fairway diverted from a general south west direction to a north west direction forming a “V” path. Due to the operation of dangerous goods and mooring of large tanker vessels in the depots, transiting vessels passing this area should follow the Fairway to turn slightly south and keep a safe distance from the three oil depots. A west cardinal buoy was located to indicate safe passing of transiting vessel.

5.8.2 Between 0809 and 0812, Nan Sha No. 38 was navigating in the area. The track record of Nan Sha No. 38 from the VTC indicated that it had navigated outside the Northern Fairway in an attempt to make a short cut around the southwest corner of Tsing Yi Island. After passing the oil depots the vessel entered the Ma Wan Fairway at an oblique angle. Instead of following the general direction of flow, Nan Sha No. 38 cut across the Ma Wan Fairway towards the middle part of the traffic lane (fig. 3). This maneuver could cause Nan Sha No. 38 to be in the inappropriate lane of the Ma Wan Fairway.

5.8.3 Under the situation of poor visibility, a prudent Master should slow down his vessel and to proceed with extreme caution in this area due to the possibility of merging traffic. The short cut steered by Nan Sha No. 38 is considered inappropriate as it navigated outside the Northern Fairway and caused the vessel to navigate closer to shore. As such the angle of approach by Nan Sha No. 38 might narrow the detecting angle of its radar for any traffic coming from behind the southwest corner of Tsing Yi Island.

5.8.4 At time of the collision there were also a number anchored barges off the Euro-Asia terminal. As Nan Sha No. 38 passed fairly close to shore, the geographical location of the coastline and the large clusters of anchored barges off the Euro-Asia terminal might have obscured the early radar detection of opposite traffic behind the corner (fig. 4). When Nan Sha No. 38 proceeded further to the west, the presence of 908 was closely behind the northbound sand barge. Under the circumstances the sand barge might obscure the radar detection of 908 due to the relatively low antenna height of Nan Sha No. 38. As a result of these obstructions, the presence of 908 could only be observed visually by Nan Sha No. 38 when it was at close quarters.
Figure 4  Radar image of vessels at 08 h 11m 10s on 17.2.2005

( Vector in front of the echoes denotes its speed )
5.9 Company Document on Operating Manual
5.9.1 Section 13-1/8 of the operating manual issued by the management company laid down instructions and operating procedures while navigating in restricted visibility. Measures such as use of safe speed, post lookouts and other precautionary measures were also published in the manual. The Master of Nan Sha No. 38 should be conversant with the content, as he had been serving on the vessel for more than 7 years.

5.9.2 Given the tight sailing schedule demanded from the management company, there appeared no provision in the operating manual that gave the Master discretion for him to slow down the vessel in restricted visibility. It should be noted that slowing down the vessel in fog to ensure the safety of passengers is the paramount consideration over any other commercial considerations. If the safety issue is not being assured sufficiently by the company, it could cause unnecessary hesitation to the Masters when they face a decision on whether he might be blamed for delaying the vessel or should take the risk of continuing the speed in order to meet the sailing schedule. Simultaneously the company should also schedule contingency plans in foggy seasons, such as arrangement of extra vessels and make early announcement to the passengers of the foggy weather and the expected delay.

5.10 Safety Awareness
5.10.1 The above findings reflect a lack of safety awareness on the potential dangers associated with the speeding and not following the fairway in restricted visibility condition. It is further believed that complacency might have a bearing on the cause of this incident, both on the over-reliance of the radar and reduce vigilance induced by routine operation of the Master in navigating the vessel. Under the company’s ferry scheduling, apparently it was not the first time for the Master to have speeding the vessel in fog. The previous uneventful experience could have reduced his safety awareness on the potential danger of using high speed in restricted visibility condition.

5.11 Conduct of Master of 908 in the Collision
5.11.1 The PRC container vessel 908 was navigating to the east side of the Ma Wan Fairway before the collision. Rule 9 of the Collision Regulations requires a vessel when navigating on a fairway should keep its position to the starboard side of the fairway as is safe as practicable. In this case 908 should maintain its position to the west side of Ma Wan Fairway.
5.11.2 To navigate a vessel at the reverse side of a Fairway would cause it to meet a lot of opposite traffic and is particularly dangerous in restricted visibility. There was no reasonable explanation provided by the Master of 908 as to why he took such behaviour in navigating his vessel. Due to the geographical location in the area, it is possible that the container vessel intended to take a shorter distance in negotiating a bend at southwest corner of Tsing Yi Island.

5.11.3 While approaching to the bend, 908 met the northbound sand barge coming from opposite direction. Other than this sand barge, the Master did not observe in an earlier stage on the radar of the approaching of Nan Sha No. 38 which was behind the sand barge. It is possible that the Master had overly concentrated on the avoidance action to be taken with the sand barge and did not see the fast moving Nan Sha No. 38 at an earlier stage, as the duration of closing in was short.

5.12 Situation of Passenger HSC Speeding in Restricted Visibility
5.12.1 Due to tight ferry schedule, the situation of HSC speeding in fog in the waters of Hong Kong was not uncommon. In March 2005, the Marine Department had conducted special operation to detect situation of speeding of the HSC in restricted visibility. During the period of special operation a total of 11 speeding cases were recorded by the VTC. Although the law enforcement unit of Marine Department had already followed up with the offences, the finding has triggered an alarm to the seriousness of HSC speeding in restricted visibility.

5.13 Behaviour of Masters of HSC to Navigate at High Speed in Fog
5.13.1 When visibility falls below two nautical miles, the VTC would broadcast visibility condition at some strategic locations such as Man Wan, East Lamma Channel, Victoria Harbour to the vessel operators at hourly interval. This broadcast is a navigational information for the vessel operators and it did not explicitly require the Masters to slow down the vessel.

5.13.2 Under the SREP the HSC can only operate at high speed at visibility of one nautical mile and above and the Master remains the ultimate person to determine if he should reduce the speed taking into account the visibility and the surrounding circumstances. Whether or not to slow down the vessel would rely on the Master’s judgment that the visibility had been reduced to less than one nautical mile. In reality slowing down the vessel from 40 knots to less than 15 knots may create psychological pressure on the Master fearing that the vessel
may not arrive the destination on time.

5.13.3 During the investigation few HSC Masters stated that during the foggy seasons, the waters of Hong Kong often covered by fog patches. Visibility may be as good as over one kilometre and then suddenly becoming poor in the next moment. The Master therefore, under the condition of SREP, could use high speed between the fog patches.

5.13.4 In a more realistic situation, some Masters might just take the chance to speed up through the fog patches instead of slowing down as the poor visibility might only last for a few minutes or even seconds. The situation is not difficult to understand if a Master is constantly under pressure to meet sailing schedule.

5.14 Monitoring of HSC in Hong Kong Vessel Traffic Centre (VTC)

5.14.1 The VTC conducts radar surveillance with coverage of 95% of the navigable waters of Hong Kong. The coverage extends from the inner Victoria Harbour to the boundary of the waters of Hong Kong SAR. The VTC also monitors the traffic of ocean going ships, river trade vessels of over 1000 gross tonnage and other selected vessels such as ships carrying dangerous goods.

5.14.2 As the VTC radar surveillance covers most areas inside the waters of Hong Kong, the voyage track of each HSC was recorded in the form of raw radar image in the radar surveillance system of the VTC. In this case the tracks of Nan Sha No. 38 and 908 were also recorded. After the accident the target echoes were traced back in order to ascertain the identification, the speed and course of the two vessels before the collision.

5.14.3 Due to the HSC’s high frequency of traffic movement and their speed, under the existing arrangement it would be difficult to track and identify instantly the echoes of a HSC on the VTC radar display. Although the vessel might ultimately be identified at a later stage after retrieving the track record, instant monitoring of HSC could not be made. In a case when a VTC traffic controller observes a target moving at a high speed in fog, he would not be able to give instant warning to the Master over the VHF radio as the vessel could not be identified at that moment of time.

5.15 Possible Means to Improve Monitoring of HSC Traffic

5.15.1 Due to the technical difficulties of radar tracking, instant monitoring could only be done if the HSC is to install with an electronic device that could instantly and
automatically transmit its identity and position to other appropriately equipped shore stations and vessels.

5.15.2 The shipborne Automatic Identification System (AIS) as specified by International Maritime Organization (IMO), is a ship and shore based broadcast system, operating in the VHF maritime band. It is capable of sending and receiving ship information such as identity, position, course, speed, ship particulars and cargo information to and from other ships and shore. It can handle over 2,000 reports per minute and updates information as often as every two seconds. It uses Self-Organising Time Division Multiple Access (SOTDMA) technology to meet this high broadcast rate and ensure stable and reliable ship-to-ship and ship-to-shore operation.

5.15.3 When an AIS is installed on board a HSC, the VTC should be able to receive these automatic transmitted signals and identify the vessel instantly the HSC on the radar display of the VTC. When the vessel is identified, the VTC should also be able to give direct warning by calling up the Master if the vessel is found speeding in restricted visibility. By requesting the HSC to install an AIS, the VTC should be able to monitor the traffic of HSC in a more active role.

5.15.4 Under the requirement of applicable legislation on the revised Chapter 5 of the Safety of Life At Sea Convention (SOLAS), all existing passenger HSC irrespective of their sizes and routes are required to install the AIS on board by 1 July 2008. Due to the situation of HSC speeding in restricted visibility, the Marine Department may consider bringing the requirement earlier and requesting the passenger HSC to install the AIS in advance for the purpose of better control and monitor of HSC traffic, particularly when in restricted visibility.

5.16 Situation of Passenger Compartments

5.16.1 After the accident an appeal was made on major newspapers to request the passengers to provide information regarding the accidents. Eleven passengers have turned up and provided information as to the occurrence in the passenger compartment after the collision. The passengers were telephone interviewed and their views and opinions were summarized as follows:

.1 that they had difficulties in pulling the lifejacket out for use as they were stowed beneath the seats;

.2 seat belts were not easily noticeable;
.3 cans of beverage which were left at the front desk of the kiosk were thrown forward during the impact and hit the face of a passenger;

.4 luggage were left in the passageway causing obstruction in emergency;

.5 the Master had made an announcement to the passengers after about 10 minutes. There was, however no assurance in the announcement to confirm that if the vessel was safe or it would be sinking. The uncertainty had caused panic to the passengers;

5.16.2 After the accident an unscheduled inspection trip was made by the Investigating Officer on board another Nansha ferry. Apart from verifying the complaints made by the passengers, it was also found that the cabin crew generally possessed a passive attitude in caring of passengers in the compartment. Disposal of luggage bags in the passageway and uncontrolled passenger movement were still observed onboard. These irregularities reflect a poor sense of personal safety awareness both from the cabin crew and failure of the ferry company to monitor the performance standard of its crew.

5.17 Lifejackets and Safety Instructions

5.17.1 On board Nan Sha No. 38, lifejackets were stowed under the passenger seats. The number of lifejackets was found to be in order. Safety leaflets regarding the escape routes and instructions to don a lifejacket were provided to each passenger in their seat pocket. Arrow signs to indicate emergency exits were adequately marked in the passenger compartments and vessel’s safety equipment were examined after collision and also found to be in good order.

5.17.2 After the accident, a few passengers complained that they had difficulties to take the lifejacket from beneath the seat. On board inspection reviewed that a few lifejackets were stowed inside a pocket container which was secured at the lower side of the seat cushion (fig. 5). Passengers would need to unhook the pocket container before taking out the lifejacket.

5.17.3 In reality passengers might become nervous after an accident that they might not see the hook device from top. Under emergency situation one would pull the pocket cover forward eagerly from beneath the seat. However the lifejacket would not be freed unless the pocket cover had been cleared from the hook. This type of design appeared to have not taken into account the reality of emergency situation.
5.18 **Condition of Seat Belts on Board**

5.18.1 Although the applicable legislation of Cap. 369AW Merchant Shipping (Safety) (High Speed Craft) Regulation stipulates that only seats at the front rows where no protective structure forward are required to be fitted with seat belts, on board *Nan Sha No.38* the seat belts were installed to all seats. All of them are lap belt type fixing at two sides of the seat and fastened at the middle of the abdomen area.

5.18.2 According to the passengers’ information the seat belts were not easily noticeable when boarding. Some of the seat belts were found loosely hanged at one end while the other was squeezed and hidden in between the seat cushions. Others were found wrapped up by rubber bend and appeared not ready for use. In this accident most of the passengers including those sitting at the front rows did not fasten their seat belt. Of the eleven passengers that called in to provide information, none of them was wearing any seat belt.

5.18.3 Besides the improper laying of seat belts, the crew did not make rounds after departure in ensuring that the passengers sitting at the front rows had fastened the seat belt. The investigation also revealed that none of the officers or Master in the wheelhouse had fastened their seat belts during navigation. These slackened attitude and lack of monitoring arrangement on board further discouraged the passengers to use the seat belt. As a result some of the passengers sitting at the front rows were injured when they were thrown to the floor during collision.
5.19 Possible Causes of Injuries During Collision

5.19.1 The sudden impact force during the collision caused the seated passengers to be thrown forward with their head hit against the rear side of the forward seat. As a result, most of them suffered from head contact and neck sprain while remain seated.

5.19.2 Apart from the minor injury to the seated passengers, the cause of more severe injuries in this accident is due to lack of safety awareness of passengers sitting at the front rows in the use of seat belts and uncontrolled movement of passengers strolling along the passageway. As the collision occurred while the vessel was proceeding at high speed, the sudden stop caused these unprotected passengers to be thrown at great force against the vessel’s structure. During the investigation it was found that the strolling passengers had suffered from the most severe injury.

5.19.3 On board the Nan Sha No. 38, a kiosk was located at the aft section of the lower passenger compartment. The kiosk would be opened for service in selling snacks, instant noodles and hot beverages after passenger boarding. Because the kiosk was operating in a self-service mode, passengers would have to walk to the kiosk for the food and beverage. As the departure of Nan Sha No. 38 was in morning hour, passengers would approach to the kiosk for their breakfast.

5.19.4 The practice of uncontrolled passenger movement in the passageway creates potentially hazard to their safety as the vessel was traveling at high speed. In a
situation of restricted visibility condition, the danger of sudden stoppage or course alteration could be even higher.

5.20 Search and Rescue Operation
5.20.1 Given the large number of casualties in this accident, the rescue operation in this accident was carried out successfully by various Government Departments. Despite the foggy weather in that morning they responded efficiently in locating the vessels and controlled the on-scene situation in a professional manner. The rescue team prioritized in attending the more serious injuries and sent them to the hospital from scene. After assessing the situation the vessel was permitted to return to CFT with the remaining passengers. Swift co-ordination with the Hospital Authority was arranged for the ambulances to standby at the CFT so that the remaining passengers suffering from injuries of lesser extent were able to assess to the hospital upon returning to CFT without delay.

5.21 Fatigue and Alcohol Impairment
5.21.1 When the investigating officer interviewed the Masters and the crew members of Nan Sha No. 38, they appeared to be in a sober condition and there was no observation of any alcohol impairment.

5.21.2 As the vessel was operated only during day time, the crew should have sufficient resting at night. The Masters and crew of both vessels had their normal resting time and did not appear to have suffered from any fatigue.
6. Conclusions

6.1 At about 0812 on 17 February 2005, a Chinese registered passenger HSC Nan Sha No. 38 with 156 passengers on board collided with a mainland container vessel 908 near south west of Tsing Yi Island. The collision took place in restricted visibility conditions as the bow of Nan Sha No. 38 collided into the port side forward of 908. The location of the collision was in position at 22°19.7' N 114°5.0'E. The speed of Nan Sha No. 38 was recorded to be 40 knots before the collision.

6.2 Nan Sha No. 38 sustained a serious structural damage at the bow whilst 908 sustained minor dent at the port side shell plating. The collision caused 102 passenger injuries on board the Nan Sha No. 38. Four of them were in serious condition. 17 injuries were sent to hospital from the scene. Nan Sha No. 38 was able to return to CFT under its own power. Other injured passengers were sent to hospital on arrival to CFT. There was no reported injury on board the 908.

6.3 The investigation has established that the cause of the accident to be the failure of the Master of Nan Sha No. 38 to operate the vessel in a safe speed under the Collision Regulations during restricted visibility. The Master also failed to observe the condition of the SREP when the visibility was less than one nautical mile.

6.4 The following contributing factors are also identified:

Nan Sha No. 38

6.4.1 the Master of Nan Sha No. 38 failed to follow the principal Fairway in navigating his vessel and took a short cut to pass the southwest corner of Tsing Yi Island. This might have caused the Master fail to detect at an earlier stage the approaching of 908 from behind the bend off south west of Tsing Yi Island.

6.4.2 the tendency for the Master to operate on a tight sailing schedule, which might put pressure on him in endeavoring to meet the sailing schedule without due consideration of operational safety.

6.4.3 given the tight sailing schedule, there appeared no provision in the company’s procedures that could give the Master discretion for him to slow down the vessel in restricted visibility.
6.4.4 The Master of 中航908 had navigated at the wrong side of the Ma Wan Fairway intending to make a shorter distance to pass the bend at southwest of Tsing Yi Island.

6.4.5 The Master of 中航908 failed to detect Nan Sha No.38 on the radar at an earlier stage.

6.5 The following observations arising from the findings of this investigation were also noted:

6.5.1 to better monitoring of HSC traffic, installation of AIS equipment should be considered on board the HSC.

6.5.2 the ultimate decision of slowing down the vessel is left to individual Master after assessing the local visibility condition. The situation is not considered satisfactory as a number of HSC Masters were found violating the condition of SREP for speeding in fog.

6.6 The following factors were identified which contributed to more severe casualties in the accident:

6.6.1 Passengers sitting at the front rows did not fasten the seat belts;

6.6.2 The uncontrolled passenger movement on board

6.7 Other identified areas to be improved were:
6.7.1 disposal of luggage in passageway;
6.7.2 seat belts were not ready for use;
6.7.3 insufficient information to passengers after accident and
6.7.4 means of stowage of lifejacket did not cater for the panic condition of passenger during emergency

6.8 In general passive attitude of the cabin crew in the caring of passengers was found. The cabin crew appears to be deficient in their safety awareness. The ferry company also failed to monitor properly on their performance standard.
7. Recommendations

7.1 The Investigating Officer is of the opinion that the causes of collision have been established. In view that this investigation has revealed certain shortcomings of the PRC Masters of both vessels, a copy of the report should be sent to the PRC Administration for their information and appropriate follow up action.

7.2 The Marine Department is recommended to seek advice from the High Speed Craft Consultative Committee (HSCCC) to install AIS in advance to all existing passenger HSC in enabling identification and monitoring under the VTC.

7.3 The VTC is recommended to consider giving advice on the validity of SREP during the broadcast of fog warning.

7.4 The ferry company is recommended to review its procedures and sailing arrangement in ensuring safe navigation during restricted visibility situation. The procedures should also give discretion to the HSC Masters in case of delay.

7.5 The ferry company should assess the risks and hazards with respect to safety of passengers associated with the operating of HSC as mentioned in paragraph 6.7 and establish policies and procedures with a view to eliminating such risks.

7.6 The ferry company should develop measures of continuous improvement to its crew with a view to enhance the safety awareness. The performance standard of the crew should also be monitored during their course of duty.

7.7 A copy of the report should be sent to the HSCCC requesting the HSC ferry companies to look into the findings of this accident with a view to ensuring that safety of navigation and passengers of their HSC are maintained.
8. **Submissions**

8.1 In the event that the conduct of any person or organization is criticized in an accident investigation report, it is the policy of the Marine Department that a copy of the relevant part of the draft report is given to that person or organization so that they have an opportunity to rebut the criticism or offer evidence not previously available to the investigating officer.

8.2 The draft reports were forwarded to the following parties on 25 April 2005:

- Master of *Nan Sha No. 38*
- Master of *908*
- Management company of *Nan Sha No. 38*
- Vessel Traffic Centre of Marine Department

8.3 Submissions on the report were received from the lawyer representing the management company of *Nan Sha No. 38*, the Master of *908* and the Vessel Traffic Centre of Marine Department. The Investigating Officer has taken into account some of the views from the submissions and the draft report has been suitably amended. Other submissions that have not been incorporated into the report would be responded separately to the parties concerned.

11 May 2005
Appendix 1

THE GOVERNMENT OF HONG KONG SPECIAL ADMINISTRATIVE REGION
MARINE DEPARTMENT

Speed Restriction Exemption Permit
No. 04-074

Name of Vessel: Nan Sha No.38
Call Sign/Lic. No.: BXJG

Pursuant to Section 64 of the Shipping and Port Control Ordinance, Cap.313, the Laws of Hong Kong, permission is hereby granted to the person in charge of vessel specified above to operate at a speed greater than that permitted by Regulation 19(1) & (2) of the Shipping and Port Control Regulations subject to the following conditions:

1. The vessel is to proceed under normal operating conditions, which must be to the satisfaction of the Director.

2. The vessel is to be used between the Macau Ferry Terminal or China Hong Kong Ferry Terminal and ports in the Mainland.

3. The vessel is to proceed at a speed of not more than ___15___ knots within the limits of Victoria Punt except while proceeding along and within the boundaries of the Southern, Northern and North Green Island Fairways where the maximum permitted speed is ___35___ knots.

4. The person in charge of the vessel and the person in charge of the machinery, in addition to the appropriate certificate of competency, shall have a valid Type Rating Certificate.

5. The visibility is one nautical mile or above.

1. This permission shall have effect from ___1 June 2004___ until ___31 May 2005___ inclusive provided that the terms and conditions of this permission are fully complied with. It may be cancelled or withdrawn if the Director considers it necessary to do so for any other reason.

3. This permission does not relieve the master of his obligation of complying with the International Regulations For Preventing Collisions at Sea nor of following the ordinary practice of seamanship to proceed at a safe speed appropriate to the prevailing circumstances.

4. This permission shall be kept on board the vessel and produced for inspection by the Director, an authorised officer, or by any other officer appointed, on demand or within such time and at such place as the Director or such officer may specify.

(K.M. Ng)
for Director of Marine