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**NOTE**

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## The falling overboard and recovery of a young child from the passenger ferry *SNOWDROP* Seacombe Ferry Terminal, River Mersey 14 October 2013

### SUMMARY

At 1429 on 14 October 2013, a 3 year old girl fell overboard from the promenade deck of the passenger ferry *Snowdrop* while the vessel was berthed alongside the Seacombe ferry terminal pier on the River Mersey. The child was quickly recovered from the water by a member of the vessel's crew and taken to hospital. The child suffered minor bruising and the crew member was unharmed.

Factors that contributed to the accident included:

- The young girl was allowed to stand on the promenade deck's outboard seating.
- The position and design of the seating allowed the child to climb up the backrest and lean over, and balance on the top of the ship's side guardrails.
- The parents supervising the child were distracted by the energetic behaviour of other young children within their group.

As a result of the actions taken by Merseytravel and the Maritime and Coastguard Agency (MCA) in response to this accident, no recommendations have been made.

### FACTUAL INFORMATION

#### Vessel

*Snowdrop* (**Figure 1**) was one of two, Class V<sup>1</sup> passenger ferries operated on the River Mersey by Merseytravel. The ferry was originally built to carry 1200 passengers but was certified to carry 650 passengers. During peak times<sup>2</sup>, the ferries operated a 10 minute commuter service between the Liverpool and Seacombe terminals. Between 1000 and 1600 they provided an hourly service, calling at Merseytravel's Pier Head (Liverpool), Seacombe and Woodside (Birkenhead) ferry terminals (**Figure 2**).

<sup>1</sup> Passenger ships engaged only on voyages in tidal rivers, estuaries, canals and lakes

<sup>2</sup> 0720 to 1000 and 1610 to 1915 hours



Figure 1: Snowdrop

Image courtesy of <http://www.merseyferries.co.uk/cruises/river-explorer-cruise/Pages/Directions.aspx>



Figure 2: Location of ferry terminals

This service was used by tourists, who could purchase *river explorer cruise* tickets to travel on the culturally famous Mersey ferries and see the historic buildings of Liverpool from the River. The vessel was also used for occasional day trips to the Manchester Ship Canal.

## Narrative

At 1350 on 14 October 2013, a group of three mothers, their four young children and a baby, boarded *Snowdrop* at the company's Pier Head passenger terminal (**Figure 2**). The children, who were all under 4 years old, were enjoying a family day out in Liverpool and had been taken on the ferry for the hourly *river explorer cruise*. Once on board, the children excitedly began to explore the vessel's passenger areas with their parents.

At 1400, with 70 passengers embarked, *Snowdrop* departed the Pier Head ferry terminal for the 30 minute crossing to Seacombe. Once underway, the vessel's two deckhands began their routine patrols of the passenger decks and a recorded passenger safety announcement was made via the vessel's public address system. The safety announcement included:

*Please note that smoking is not permitted on any part of the vessel and we also ask you not to stand on the seats, or sit on the ship's side rails.*

*We advise you to remain seated throughout the journey, particularly when arriving and leaving terminals...*

During the crossing, two of the children began to quarrel in the lower saloon. In order to separate them, one of the mothers took one of the quarrelling children up to the aft promenade deck to watch the vessel's arrival at Seacombe. Shortly after, the rest of the group also went to the promenade deck.

At about 1427, *Snowdrop* arrived at the Seacombe ferry terminal and was manoeuvred starboard side onto the terminal pier. The deck crew passed the fore and aft mooring ropes to the pier stageman<sup>3</sup> and the ferry was secured alongside. The ferry's two propulsion engines were then de-clutched from the propellers and the deck crew lowered the gangway. By the time the passengers had started to disembark, the party had re-grouped on the starboard aft side of the promenade deck. One of the children, a 3 year old girl, was standing on one of the inward facing outboard passenger seats (**Figure 3**) and was watching the activities on the pier below.

To get a better view of what was happening, the 3 year old girl leant over the backrest of the seat and rested her stomach on top of the ship's side guardrail. At the same time, one of the boys was energetically jumping on and off the same seat while the parents chatted. At one point, the boy was reprimanded by his mother for standing on his tiptoes on the seat and leaning over the guardrail.

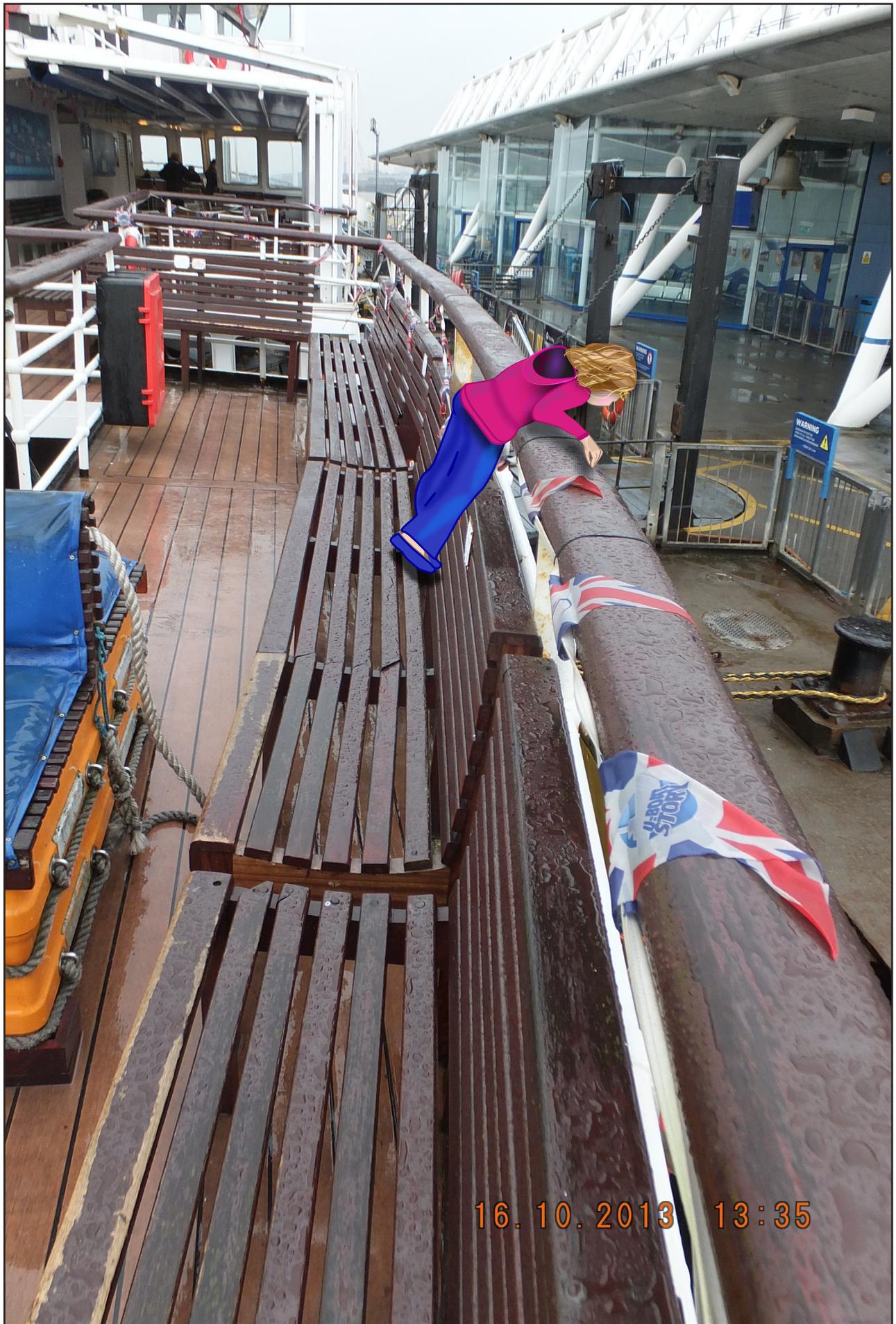
At 1429, with the parents distracted by the energetic behaviour of the other children, the 3 year old girl leaned a little further over the guardrail and suddenly fell overboard (**Figure 4**). She cartwheeled during the fall and fell between the pier's rubber tyre fendering<sup>4</sup> and the vessel, and into the water (**Figure 5**). *Snowdrop*'s master, who was standing at the starboard bridge wing counting the passengers as they disembarked, saw an object fall and told his mate that something had been dropped overboard.

Within seconds, the shouts and screams from passengers in response to the child falling overboard alerted the master and crew. The mate immediately ran out of the starboard bridge wing door, jumped down the vertical ladder from the bridge deck to the promenade deck and went to the starboard aft side. He was followed soon after by the master.

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<sup>3</sup> The stageman is responsible for the shoreside mooring operations and is equipped with a lifejacket to allow him to work within the mooring stations guardrails

<sup>4</sup> Used to prevent damage to the vessel or berth



**Figure 3:** Position of child prior to falling overboard



Figure 4: Seacombe pier CCTV footage of child falling

The passengers who were already looking over the starboard aft promenade deck guardrail were blocking the mate's view, so he ran down the stairwell to the main deck. When he looked over the vessel's bulwark rail and saw the child in the water, she was looking up at him with her eyes wide open.

*Snowdrop's* engineer, who was standing on the pier and was in the process of handing over his responsibilities to a relieving engineer, responded immediately to the commotion by entering the pier's aft mooring station to look for the child in the water. The terminal's stageman followed the engineer and joined the search. In panic, the child's mother ran down to the main deck, across the gangway to the pier and climbed through the safety barrier guardrails of the aft mooring station.

The mate, realising that the 3 year old probably could not swim and was being kept afloat temporarily by her padded jacket, took the decision to go into the water to rescue the child. He climbed over *Snowdrop's* bulwark, stood on the tyre fender (**Figure 5**), and then lowered himself into the water and grabbed the little girl. He was swiftly followed by the engineer, who climbed down from the pier and stood on the fender.

The deck crew lowered a mooring rope from the deck of the ferry to the waterline. The mate then grabbed hold of this and used it to support himself and the child in the water. The mate, having drifted under the fender, was unable to see



**Figure 5:** Gap between *Snowdrop* and Seacombe terminal fendering

anyone above, but he could hear the engineer's voice and when he saw the engineer's outstretched hand he quickly passed the child to him. The engineer lifted the child up and passed her to the stageman on the pier.

With the child recovered from the water, the mate began to succumb to the effects of the cold water and did not have the strength to swim to the vessel's rescue ladder, which by then had been rigged at the stern of the ferry. The crew tried to use the mooring rope to pull him aft, but the master, recognising that

this was impractical, intervened and moved the rescue ladder to the starboard quarter. The mate then climbed the ladder unaided back onto the vessel.

At 1432, the master returned to the bridge and reported the incident to Merseytravel's customer operations manager by telephone, who in turn instructed the Seacombe ferry terminal staff to call 999 and request an ambulance. Further calls were made to the company's health and safety department and to the police.

By 1443, Merseytravel's senior management, media and the external liaison departments had been informed. This was followed at 1500 with an initial notification of the incident to the coastguard by a member of the senior management, and a further call to the Liverpool coastguard from the master at 1539.

The cold and wet 3 year old child was taken into the terminal building to be warmed up prior to the arrival of the ambulance. She was taken to hospital for assessment and, having suffered only minor bruising, returned home with her mother that day.

### **Environmental conditions**

The water temperature in the River Mersey was approximately 10°C and low water had occurred at 1330. At the time of the accident, an ebb tide of about 0.4kt existed. The River Mersey had a tidal range of up to 10m, and narrowing in the river estuary can increase tidal currents to above the charted flow of 5.3kt in the mid-channel.

### **Crew**

*Snowdrop* had a crew of six: the master, mate, engineer, two deckhands, and a bar assistant who provided a passenger refreshment service. The crew had many years of experience of operating Merseytravel ferries on the River Mersey. They were well aware that passengers, particularly children, were likely to stand on seats and climb the guardrails to look over the ship's side. The deckhands regularly had to instruct people to climb down during their patrols of the upper decks.

### **The child**

The 3 year old girl was 970mm tall. She could not swim and was with her mother on the ferry. She was wearing stretch leggings, canvas trainers, a vest and a pink padded 'puffa' style hooded coat.

## Promenade deck guardrail and seating

*Snowdrop's* promenade deck ship's side guardrails were 1100mm high. They were fabricated from mild steel and had four horizontal steel rails that were supported and secured to the deck by vertical steel stanchions (**Figure 6**). Varnished hardwood capping was fitted to the upper horizontal rail.

The promenade deck passenger seats were constructed from hardwood planks and had a horizontal slat design. The outboard seats faced inward with the seats back up against the ship's side guardrails (**Figure 6**). The ferry had always had seating positioned along the outboard edge of the promenade deck but there had been several different types of seats fitted since build. The seating the 3 year old was standing on had been installed approximately 10 years previously.

The deck to seat height was about 460mm with the distance between the seat and the top of the capping rail approximately 635mm. The horizontal backrest slats were about 40mm high with a space of approximately 20mm separating them. Attached to the backrest slats at varying intervals were traffolyte signs, engraved with the warning: *NO STANDING ON SEATS* (**Figure 6**).



**Figure 6:** *Snowdrop* promenade deck seating against guard rail and warning signs

## Ship's side guardrail requirements

Regulation 63 of The Merchant Shipping (Passenger Ship Construction: Classes III – V1A) Regulations 1998 requires sufficient protection “as to prevent any person from accidentally falling overboard.”

The Maritime and Coastguard Agency (MCA) Instructions to Surveyors mandate a prescriptive minimum height for the guardrails, which include:

### 9.1.2 Decked ships of Classes IV to VI(A)

9.1.2.1 *The height of the bulwarks, or of the uppermost rail on any deck, shall be not less than 915mm for ships of Classes IV and V,*

The requirements did not specify the arrangement between passenger seating and a vessel's guardrail.

## Domestic Safety Management Code

*Snowdrop* was required to comply with MSN<sup>5</sup> 1754(M) the *Safety Management Code for Domestic Passenger Ships of Classes III to VI(A)* (DSM Code). The purpose of the DSM Code is to establish a common standard for the safe operation of passenger ships employed in the domestic trade. The requirements included the development and implementation of safe practices for, inter alia:

- Procedures to ensure safe operation of ships in compliance with relevant rules;
- Lines of communication between personnel, ashore and afloat;
- Procedures for reporting accidents; and
- Procedures for responding to emergency situations.

To meet these requirements Merseytravel set out its operating procedures in a Safety Management Manual (SMM). The DSM Code also required passenger ship operators to provide a *designated link* between its ships and its shore base. This was to ensure that in the event of an emergency there was immediate communication with the emergency services.

In order to ensure compliance with the DSM Code, Merseytravel conducted periodic internal audits on board its two ferries, and the MCA conducted bi-yearly external audits. The last MCA audit had taken place on 23 September 2011.

After the incident on 14 October 2013, the MCA conducted a DSM Code audit, which found that Merseytravel had not identified a Designated Person and therefore had not provided the required *designated link*.

## Managing the risk of passengers falling overboard

The guidance provided in Merseytravel's SMM for managing groups of school children while the ferry was underway, included:

*b) The group should NEVER stand or sit on the handrails*

*c) The group's supervisors should pay attention to the gaps between the handrails particularly in relation to small children.*

The ferry operator had also recognised that some of its passengers were likely to be tempted to stand on the upper deck seating, and acknowledged that this introduced an increased risk of falling overboard. In order to reduce the likelihood of passengers standing on the seats, the vessel's safety broadcast warned against it, as did the warning signs on the backs of the seats.

In addition to the crew carrying out patrols of the passenger deck, *Snowdrop* was equipped with a CCTV<sup>6</sup> that allowed the master and mate to monitor the passenger spaces from the bridge. The CCTV system was not in operation at the time of the accident.

## Manoverboard procedures

The vessel's *Emergency Action Plan* included instructions on the actions to take in the event of a man overboard (MOB). The instructions required:

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<sup>5</sup> Merchant Shipping Notice

<sup>6</sup> Closed circuit television

- The crew member witnessing the MOB to contact the vessel's bridge, and the bridge team to sound three short blasts on the ship's whistle.
- The master to inform Mersey Vessel Traffic Services and the coastguard of details of the vessel's location and numbers of passengers in the water.
- The mate to organise for the vessel's rescue boat to be deployed.

There are no recorded previous incidents of a man overboard while a Merseytravel ferry was alongside a terminal.

## ANALYSIS

### The fall

The little girl fell overboard as a result of leaning too far over the top of the promenade deck guardrail. She was able to do this because she had been allowed to stand on the seats positioned around the outer edge of the deck. Although suffering from some minor bruising, she was fortunate to not have hit something hard as she fell to the water, and also to have survived her immersion.

At 970mm tall, the child was about 340mm taller than the top of the guardrail when she stood on the seat (**Figure 3**). This meant that she would still have been too short, even if she had stood on the tips of her toes, to lean over the guardrail. Therefore, to get into a position to lie on her stomach on top of the guardrail capping, she must have climbed up the seat back. The gaps between the horizontal wooden slats on the seat back would have made this easier to achieve.

Unaware of the danger, the child probably found the capping rail quite a comfortable support to lean on while looking overboard. However, it is likely that her feet were no longer anchored and, as she over balanced, her polyester 'puffa' coat slid on the smooth varnished capping rail.

### Guardrail and seat design

The side guardrail on board *Snowdrop* exceeded the specified minimum height requirements of 915mm for a Class V passenger vessel. However, the position of the seating around the outer edge of the promenade deck provided a platform for passengers to stand on; and when they did, the effective height of the guardrail was reduced to 635mm.

Given that passengers enjoying a river cruise were more likely to want to look out from the vessel at the river and shoreline, than face inboard, the probability of children, in particular, wanting to stand or kneel on the seating, was entirely foreseeable. The design of the seating also made it easier for the young child to climb on to the top of the guardrail. The gaps between horizontal wooden slats on the seat back provided toe holds for little feet to push against.

The risk of passengers climbing ship's side rails and small children falling between them is well recognised by ferry and cruise ship operators. Although not a requirement, the guardrails on modern passenger vessels typically have vertical steel bars pitched closely together. This makes it more difficult to climb and prevents small children squeezing between the bars.

### Measures taken to monitor and control passengers

It is evident that many parents and guardians will allow, or even encourage their small children to stand on seats and other objects to get a better view. Typically, the children are closely supervised but, as in this case, the slightest distraction can lead to catastrophic outcomes. Although it is difficult to monitor a child's every move, much less to envisage every possible scenario in which a child could be injured,

the marine environment introduces additional dangers not commonly encountered by the general public. Consequently, the importance of closely guiding a young child while on board a vessel cannot be overstated.

The controls put in place by Merseytravel to prevent this type of accident relied on passenger compliance, parental control and crew vigilance. Despite the warning signs on the seat backs, the public address announcements and the crew patrols, experience showed that passengers would continue to stand on the seats and climb on the guardrails.

It was therefore inevitable that the control measures would eventually be circumvented, and that better safeguards were required in order to maintain an effective height of guardrail during normal operations. On board *Snowdrop*, such actions could have included raising the guardrail behind the seats, or moving the seats away from the ship's side guardrails.

## The rescue

The rapid response to the situation by the crew and, in particular, the mate, almost certainly saved the little girl's life. The ship's crew did not follow the company's MOB procedure and the mate placed himself in extreme danger by entering the water without a safety line, thermal protection or any means of buoyancy. However, seeing the child looking up at him, and recognising that time was of the essence, it is understandable that the mate made an instant decision to enter the water.

Fortunately, it was just after low water, with an ebb tide of about 0.4kt. The rapid and detrimental effects of cold water are not always recognised or understood by seafarers, and 'cold water shock'<sup>7</sup> has led to many fatalities. Indeed, the mate discovered very quickly that the water temperature was debilitating and rapidly affected his ability to swim to the recovery ladder at the stern. It was, therefore, fortunate that the master acted swiftly to move the ladder and place it by the mate. The mate was aware of the risks of lowering himself into the tidal River Mersey. It was therefore a very brave thing to do.

## Communications

The manner in which the crew responded to the girl falling overboard meant that the procedure set out in the vessel's *Emergency Action Plan* was not followed. The involvement of both the mate and the master in the recovery of the little girl meant that no one was immediately available to make the prescribed emergency calls. Consequently, if the situation had changed and either the girl or the mate had been swept downriver, a delay in contacting the coastguard, or deploying the vessel's rescue boat, could have been critical.

Of significant concern was the lack of a Designated Person or *designated link* between the ship and ashore who fully understood the maritime communications protocol. Emergency calls were subsequently made to the ambulance service with a flawed expectation that the information would be relayed to the coastguard. Although, in this situation, the order in which the emergency services were contacted achieved the desired response in respect of the incident, emergency procedures are there for good reasons and can ensure the rapid provision of expert support should the situation develop further.

## CONCLUSIONS

- The 3 year old girl fell overboard because she over balanced while leaning over the top of the ship's side guardrail. She was able to do this because she had been allowed to stand on the outer deck seating to watch the ship berth, and the design of the seats enabled her to climb up the seat back to lean over and lie on the top of the rail.

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<sup>7</sup> Cold water shock occurs when sudden immersion takes place in water 15°C or below. The cold can paralyse muscles, cause muscle spasms, and trigger a rise in heart rate and blood pressure resulting in a heart attack. The spasms and a gasp reflex can cause water to be ingested or for the breath to be held involuntarily.

- The adults responsible for the child and the other children in their group were not complying with the broadcast and written safety instructions, and were distracted at the moment the girl slipped.
- The mate ignored his personal safety and responded instinctively by entering the water to rescue the girl.
- The girl was extremely fortunate not to suffer major injury during the fall and to be rescued unharmed after entering the water.
- The ship's emergency response plan was not implemented and the coastguard were not informed immediately.
- Experience had shown that the controls in place on board *Snowdrop* to prevent passengers, particularly children, from standing on the deck seats were ineffective, but more effective positive actions to remove or mitigate the hazard had not been taken.
- The lack of a *designated link* within Merseytravel resulted in delayed and incomplete liaison between the company and the emergency services.

## ACTION TAKEN

Merseytravel has:

- Removed the seating adjacent to the promenade deck guardrail on *Snowdrop* and *Royal Iris of the Mersey* (Figure 7).
- Arranged for two shore based managers to be trained as Designated Persons.
- Undertaken a full review of:
  - the vessel's risk assessments;
  - crew training; and
  - the Safety Management System.

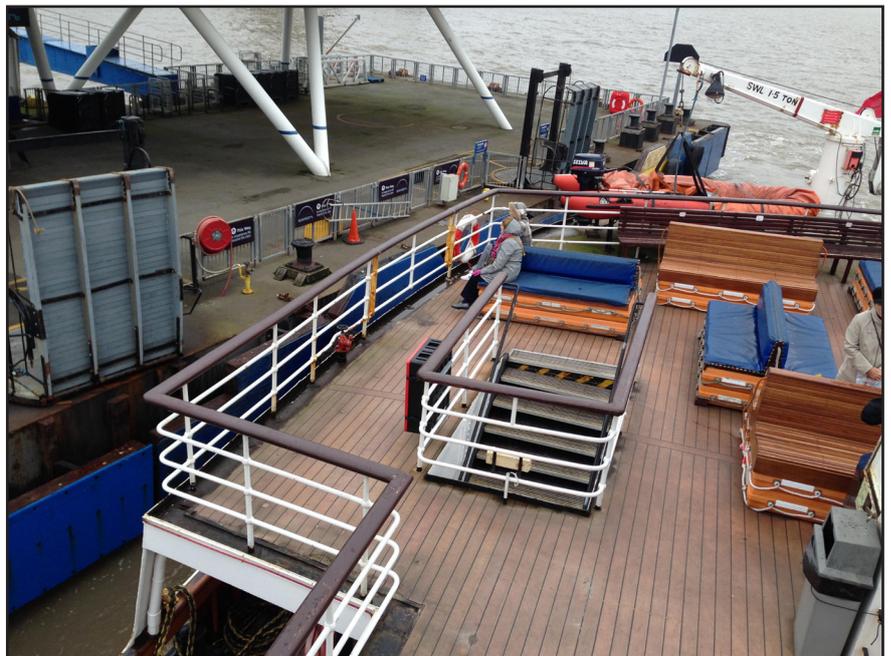


Figure 7: *Snowdrop* promenade deck with guard rail seating removed

The **Maritime and Coastguard Agency** has:

- Increased its oversight of the Merseytravel vessels and the company's safety management system.
- Reviewed the risk assessments of commercial vessel operators in the Lake District where similar seating arrangements are in place.

## RECOMMENDATIONS

In view of the actions already taken, no recommendations have been made.

## SHIP PARTICULARS

Vessel's name	<i>Snowdrop</i>
Flag	United Kingdom
Classification society	Lloyd's Register
IMO number/fishing numbers	8633724
Type	Passenger ferry
Registered owner	Merseytravel IPTA
Manager(s)	Mersey Ferries Limited
Year of build	1959
Construction	Steel
Length overall	46.45m
Registered length	43.73
Gross tonnage	670
Minimum safe manning	Five
Authorised cargo	Passengers

## VOYAGE PARTICULARS

Port of departure	Liverpool ferry terminal
Port of arrival	Seacombe ferry terminal
Type of voyage	Internal waters
Cargo information	70 passengers
Manning	Six

## MARINE CASUALTY INFORMATION

Date and time	14 October 2013 at 1429
Type of marine casualty or incident	Marine Casualty
Location of incident	Seacombe ferry terminal
Place on board	Promenade deck
Injuries/fatalities	Light bruising
Damage/environmental impact	None
Ship operation	Passenger service
Voyage segment	Alongside
External & internal environment	Wind force 2, good visibility, air temperature (maximum) 13°C, water temperature approximately 10°C, river ebbing at 0.4kt
Persons on board	Passengers disembarking