Report No 145

Navigation Act 1912
Navigation (Marine Casualty) Regulations
investigation into a lifeboat accident
and injury to crew
aboard the Antigua & Barbuda flag vessel
WADDENS
at Cairns Harbour
on
14 February 1999

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October 2000

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Investigations into marine casualties occurring within the Commonwealth's jurisdiction are conducted under the provisions of the Navigation (Marine Casualty) Regulations, made pursuant to subsections 425 (1) (ea) and 425 (1AAA) of the Navigation Act 1912. The Regulations provide discretionary powers to the Inspector to investigate incidents as defined by the Regulations. Where an investigation is undertaken, the Inspector must submit a report to the Executive Director of the Australian Transport Safety Bureau (ATSB).

It is ATSB policy to publish such reports in full as an educational tool to increase awareness of the causes of marine incidents so as to improve safety at sea and enhance the protection of the marine enviroment.

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FIGURE1.
Waddens (Renamed *Capitaine Bligh* then *Southern Man*)

Summary

On 13 February 1999, the motor vessel Waddens was berthed, port side to, at No. 8 wharf in the port of Cairns. The vessel had been on a voyage from Lihir, Papua New Guinea, to Tauranga, New Zealand, but had diverted to Cairns after it experienced problems with the main engine turbocharger.

The master and mate decided that the opportunity should be taken to run the starboard lifeboat. Permission was obtained on 14 February from Cairns Harbour Control to lower the boat and run it in the harbour. The boat was lowered to the water at 0830, manned by the 2nd mate and an able-bodied seaman (AB) and tested for about an hour.

At 0930, the lifeboat was positioned under the falls for hoisting and connected to the lifting hooks. There was some difficulty experienced in positioning the boat under the falls because of a strong tidal flow. The mate, bosun and an AB were standing by on the ship while the falls were being connected and the boat was hoisted.

When the boat was ready for hoisting, the 2nd mate returned to the aft end of the boat while the AB remained forward. The boat was hoisted to a position where the tricing pendants were to be attached and the winch stopped. At that moment, the falls suddenly disengaged and the lifeboat fell to the water, landing upright.

The 2nd mate was observed lying on the aft deck just outside the cabin. The AB, who had been at the fore end of the boat, was in the water. The AB who had been standing by on board the ship dived overboard to assist him. Both AB's then climbed aboard the lifeboat and, while one of them assisted the 2nd mate, the other manoeuvred the boat to the wharf and made it fast.

Having informed the master of the incident, the mate called Cairns Harbour Control to request assistance and an ambulance. The ambulance arrived at about 0945 whereupon paramedics attended to the 2nd mate. The lifeboat was towed by a coastguard craft to a marina pier from where the 2nd mate was taken ashore and transported by ambulance to Cairns Base Hospital.

At about 1015 the lifeboat was returned to Waddens. It appeared to be undamaged and was later hoisted and stowed on board without further incident.

Sources of information

The master, officers and crew of *Waddens*

Germanischer Lloyd (GL)

Queensland Police Service (Water Police)

Australian Maritime Safety Authority (AMSA)

Transport Accident Investigation Commission of New Zealand

Acknowledgment

Ernst Hatecke GmbH for provision of manuals and drawings.

Photograph of *Waddens* trading as 'Southern Man'; the Director, Cool Line Reefers Ltd, agents for the vessel's charterers, Pacific Tiger Line Ltd.

Narrative

Waddens

Waddens is a general cargo vessel registered in Antigua and Barbuda. The vessel has a length of 99.5 m, a beam of 17.2 m and a gross tonnage of 3 784. It has a deadweight of 5 189 tonnes at a summer draught of 6.5 m and is able to carry 350 twenty-foot containers, including 20 reefer containers. It has one hold and the engine room and accommodation are aft.

The ship was built at Oldenburg in Germany in 1984 as the Weser Guide. In 1988 the name was changed to Zim Kingston and in 1995 to Nedlloyd Trinidad. Prior to the name change to *Waddens*, it was known as the Rangiora. *Waddens* is strengthened for ice and for heavy cargoes and is classed with Germanischer Lloyd.

FIGURE 2.
***Waddens* port lifeboat**

At the time of the incident, *Waddens* was owned by a German company, Baum and Co, and was managed by the time charterers, Pacific Tiger Line in Auckland, New Zealand.

Waddens is fitted with a MaK 6M551AK single acting, diesel main engine of 2 501 kW driving a controllable pitch propeller, giving the ship a speed of 14 knots. The vessel has a bow thruster. Navigation equipment includes radar, satellite navigation and satellite communication systems.

The ship's complement consists of the master, two mates, a chief engineer, electrician, a bosun and three deck crew, a motor mechanic and a cook. The master and mate were from New Zealand, the chief engineer was from Germany, the 2nd mate, electrician and cook were from the Philippines, the bosun, deck crew and the motor mechanic were from Tuvalu.

The 2nd mate held a chief mate's certificate of competency issued in the Philippines. He also held a certificate for an Advanced Safety Course, dated July 1997 and had been at sea for 15 years.

FIGURE 3.
Lifting hook, plate removed

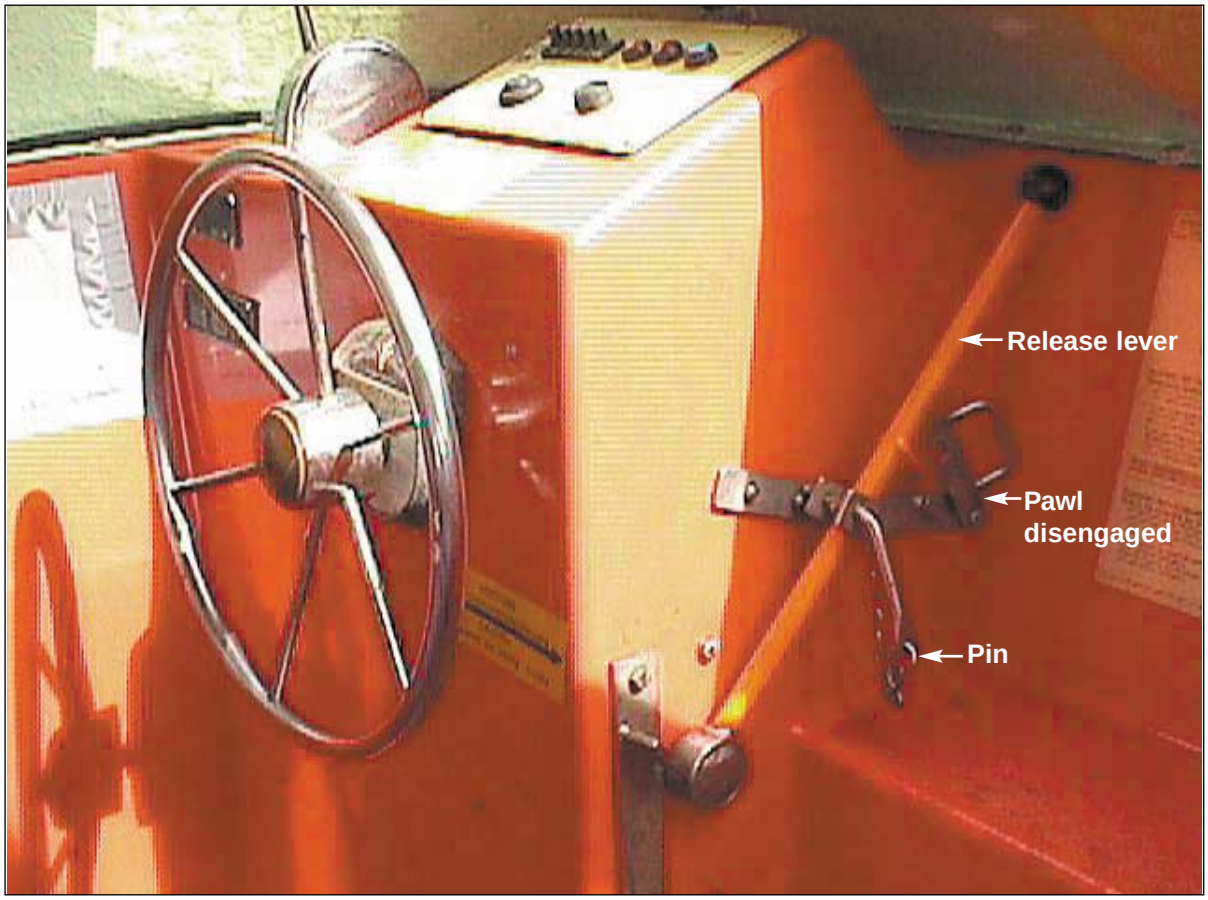
Lifeboats

Waddens is equipped with one lifeboat on each side stowed in gravity davits, each with a capacity of 18 persons. The boats, manufactured by Ernst Hatecke in Drochtersen, Germany, are closed motor boats with a length of 6.6 m, a breadth of 2.5 m and a depth of 1.18 m. Both boats have cabins extending aft for about 3.8 m from a short, raised foredeck about 60 cm in length. The after deck extends from the aft end of the enclosed cabin, for just over a metre, to a raised stern (see fig. 2, page 3).

Entrance to the cabin is through a door at the aft end and through a forward opening hatch at the forward end, the steering console being fitted on the port side forward. The hoisting hooks (see fig. 3) for the boats are fitted on the foredeck and the stern.

The boats are fitted with an 'on load' release mechanism designed so that they

FIGURE 4.
Release mechanism



can be released while suspended by the falls or when being towed under the falls by a moving ship.

The release mechanism (see fig. 4 & fig.5 page 8) consists of a release lever fitted at the starboard side of the steering console. The release lever is connected by flexible cables to locking bolts in the hoisting hooks. To release the hooks it is necessary to unlock the release lever and pull it back. The locking bolts rotate, releasing the hooks and disengaging the falls. There are two locking devices for the release lever, a safety pin and a pawl.

The incident

Waddens had sailed from Lihir, PNG, on 7 February 1999 for Tauranga, New Zealand with a cargo of empty containers. The vessel diverted to Cairns after experiencing main engine turbocharger problems and berthed at No. 8 Wharf in Cairns at 2100 on 13 February.

The weather in far North Queensland at the time was unsettled. It was the wet season and cyclone Rona had been in the vicinity on 12 February.

The vessel normally berthed starboard side to when working cargo. On this occasion *Waddens* berthed port side to the wharf and the master and mate decided to use this opportunity to lower the starboard lifeboat and run it in the harbour. Permission was obtained on 14 February from Cairns Harbour Control for this. At about 0830 the starboard boat was lowered to the water and the 2nd mate and an AB took the boat for a run in Trinity inlet.

At about 0930, the mate instructed the 2nd mate by radio to return to the vessel and secure the lifeboat. The mate, bosun and an AB stood by on board *Waddens* at the starboard boat station.

The 2nd mate experienced difficulty with positioning the lifeboat under the falls. There was a strong tide running at the time and the boat had the tide astern. High water was at 0822 and the out-going tide was probably strengthened by local floodwater.

The 2nd mate made three attempts to position the boat before he managed to hook on the after falls. The forward fall was initially hooked on to the tricing pendant eye before being connected, correctly, to the hoisting hook on the boat. The bosun called out to the 2nd mate and the AB to warn them when he saw that they were using the eye for the tricing pendant to attach the forward falls. The 2nd mate was aware that the falls had been incorrectly set up, but the eye for the tricing pendant was convenient as a temporary measure while he tried to position the boat under the falls in the strong tide.

When both falls were correctly hooked up, the lifeboat was hoisted. According to the 2nd mate and the AB in the boat, the release lever was secured with the pin and pawl and the hooks were engaged by the locking bolts before the boat was hoisted.

As the boat was hoisted the 2nd mate was behind the cabin near the after fall. The AB was seated on the tiny area of fore deck with his legs through the forward opening hatch.

The lifeboat was hoisted almost to the embarkation deck and was about 6 m from the water when hoisting was stopped to enable the tricing pendants to be hooked onto the shackles. At that moment the 2nd mate saw the after hook release. The mate

and bosun saw the aft end of the boat dip first, followed immediately by the forward end as the forward hook released.

When the boat dropped, the mate, bosun and the AB looked over the side to see that the lifeboat had landed upright in the water. The 2nd mate was lying on the after deck, just outside the cabin door, apparently injured.

The 2nd mate had been holding on to a grab rail adjacent to the aft door of the cabin. When the boat dropped and hit the water, he had been flung against the sides of the boat and the deck.

The AB who had been in the boat at the bow was seen in the water and the AB at the starboard boat station dived in to assist him. The AB in the water was uninjured and had apparently leaped clear just prior to the boat landing in the water. Both AB's then climbed into the lifeboat.

The mate, after informing the master of the incident, contacted Cairns Harbour Control to notify them of the incident and to request ambulance assistance for the 2nd mate.

Meanwhile the AB who had been in the boat when it was hoisted, attended to the 2nd mate. The other AB manoeuvred the boat forward and it was made fast alongside the wharf.

The ambulance arrived at the wharf at about 0945 and paramedics attended to the 2nd mate. A small coastguard craft towed the lifeboat to a pier from where the 2nd mate was taken by ambulance to hospital, accompanied by the mate.

At about 1015 the lifeboat was returned to the ship. When the mate returned to the ship at about 1200, he inspected the davits, the falls, the fall blocks and the lifting eyes. He could find nothing amiss. He also inspected the boat, the lifting hooks and the release lever. The release lever was in the locked position with the safety pin fitted and pawl engaged.

At 1335, a senior constable from the Cairns Water Police attended the vessel and interviewed the master. The master completed a Queensland Transport marine incident report form on the accident. The senior constable arranged for photographs to be taken of the lifeboat and davits to assist with determining whether the hoisting gear was defective.

The lifeboat was inspected and found to have no apparent damage. It was attached to the falls once more and hoisted to its stowed position without incident.

The Australian Maritime Safety Authority (AMSA) surveyor at Cairns was notified of the incident the next day and boarded the vessel at 1030 that day to obtain a report of the incident. He inspected the boat in its stowed position and could see no signs of damage to the boat. He also checked the release mechanism and was unable to find any reason for a malfunction. He advised the master to contact the vessel's classification society, Germanischer Lloyd (GL) and arrange for inspection and testing of the lifeboat falls and davits. The tests were arranged for 0900 the next day.

The AMSA surveyor was then appointed as an investigator by the Inspector of Marine Accidents to conduct the investi-

gation on behalf of the Marine Incident Investigation Unit (MIIU - later to become part of the ATSB).

At 0900 on 16 February 1999, the investigator and a surveyor for GL commenced the tests. The lifeboat was launched without incident and an inspection of the release mechanism and hooks was carried out. Then, with the boat just clear of the water, several attempts were made to induce the release mechanism to operate, to simulate the incident, but without success.

The lifeboat, davits, falls and brakes were successfully load tested by the GL surveyor and no defects were found.

The 2nd mate's injuries, initially reported as a broken arm and leg, required him to be admitted to hospital and, subsequently, to be repatriated.

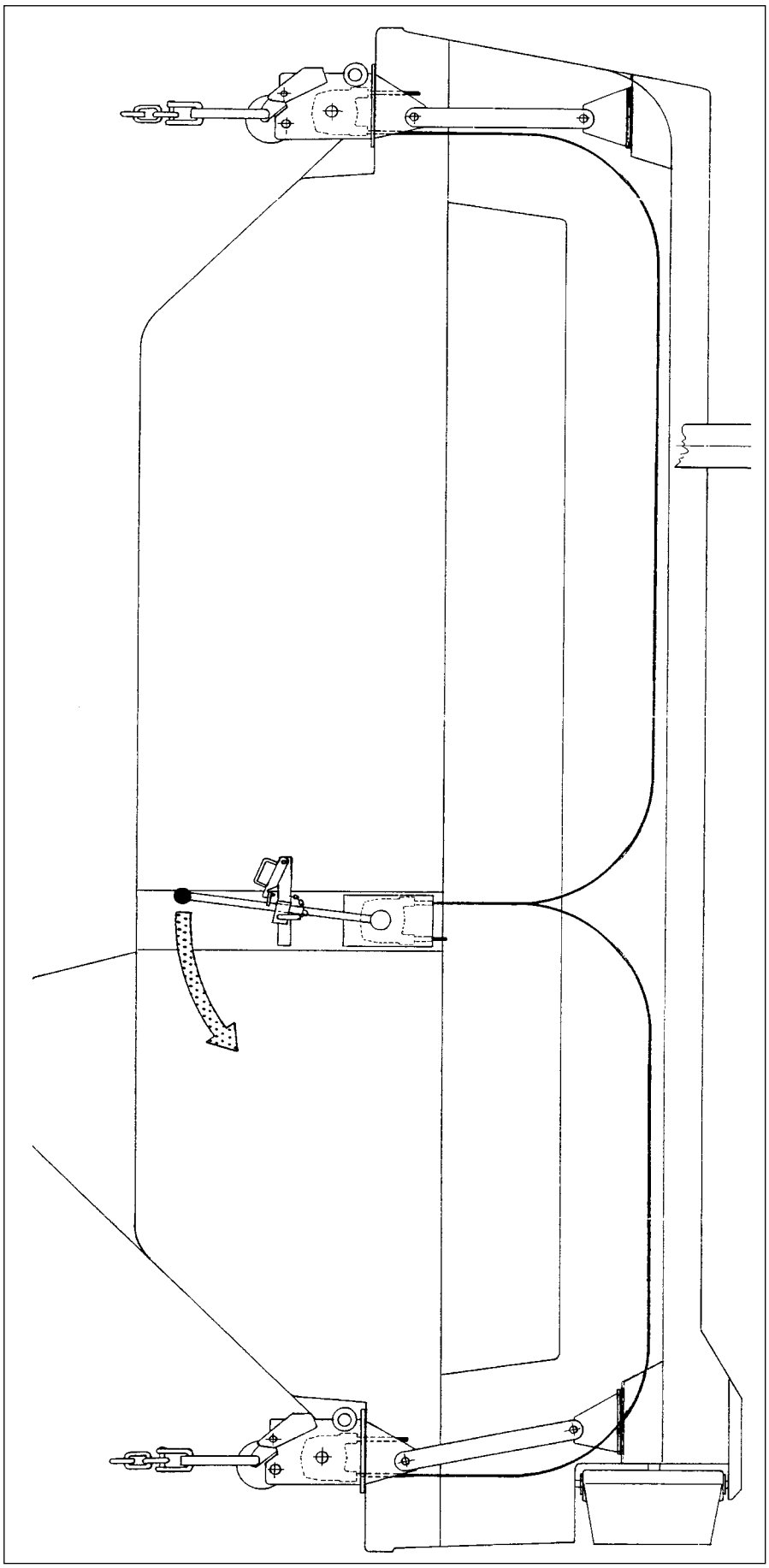


FIGURE 5.
Release lever mechanism diagram

Comment and analysis

Evidence

On 15 February 1999, the investigator interviewed the master and others involved in the incident, except for the 2nd mate who was in hospital. He also obtained a statement from the mate.

The 2nd mate was interviewed the following day and again after his release from hospital.

The investigator's report with attachments including the mate's statement, photographs, a record of interview with the 2nd mate, the lifeboat manual and the report from the classification society, was sent to the MIIU.

The manufacturers of the lifeboat, Ernst Hatecke of Drochtersen in Germany, were informed of the incident and were asked for comments on the release of the boat. They replied that it must have been human error and explained the operation of the lifting hooks in detail. They also supplied drawings and the manuals for the release mechanism and for the boat.

On behalf of the MIIU, the Transport Accident Investigation Commission (TAIC) in New Zealand conducted additional interviews with the master and mate in December 1999 (both live in New Zealand) in an attempt to determine the sequence of events that led to the incident.

Investigators from the MIIU visited *Waddens* (now trading as *Capitaine Bligh*) on 14 December 1999 at Sydney. As the vessel was berthed starboard side to, the boat could not be lowered, but the hooks and release mechanism were examined in a further attempt to determine the cause of the release.

A simplified events and causal factors diagram is shown at page 14.

The release mechanism

The manual for the operation of the boat cautions that the hooks may be released under load in any position. The lever for the release mechanism of the boat is secured by two locking devices, a pin and a pawl. The manufacturer's manual refers to the pin as a safety pin (see fig. 4, page 4).

The safety pin passes through a bracket that houses the release lever, preventing the lever from being moved unless the pin is first withdrawn and the pawl lifted. The pawl, which engages in a lug on the release lever, must be lifted clear of the lug to permit movement of the release lever.

The manual states:

> To release the hooks:
>
> 1. Turn the safety pin and pull it out.
> 2. Move up the locking pawl and pull the release lever.
> 3. After releasing the hooks return the release lever to the original position.

For preparing to hoist the boat, the manual states:

> 1. Check the resting position of the hooks and release lever (safety pin in place).
> 2. Push the long link into the hooks.

The manufacturers confirmed that, after the hooks were unlocked, under the weight of the boat, they would open, freeing the falls and releasing the boat. When the

boat was released, the hooks were designed to be returned to an upright position by counterweights. When the release lever was returned to its original position, the hooks would be secured once more. The hooks would then be ready, if required, for the falls to be hooked up again after the release lever was secured.

Attempting to re-create the incident

At 0900 on 16 February, with the boat just clear of the water, the investigator and the class surveyor made several attempts to determine the cause of the incident. They did this by raising the boat with the release lever not locked in position and with the hooks not correctly secured by the locking bolts.

They determined that the boat could be hoisted with the release lever housed as it should be for hoisting, but not locked by either the safety pin or the pawl. This was carried out to see if the load on the hooks would induce the release lever to operate. That did not happen.

The boat was then hoisted with the hooks not locked by the locking bolts but, as soon as the load came onto the hooks, they rotated and released. This test showed that if the hooks were not properly locked, they would release immediately any weight came on them.

The release mechanism operated as it was supposed to and there was no indication that any mechanical failure might have been a factor in the incident.

Interviews

None of those interviewed could explain why the boat had dropped off the falls.

The master and mate stated that the 2nd mate and the AB were experienced in the launching and recovery of the lifeboat, often working together as they were on the day of the accident.

When the 2nd mate was interviewed, he stated that:

- The falls were properly engaged in the hooks prior to the boat being lifted
- The hooks were correctly locked
- The release lever was in its correct position and both locking devices were engaged.

The AB who had been in the boat with the 2nd mate agreed that the falls were properly engaged and that the hooks were correctly locked. He was certain that the release lever was in its correct position and that it was locked with both locking devices.

The master had examined the boat shortly after the incident and the mate further examined the boat at about 1200, about two and a half hours after the incident. Neither the master, nor the mate was able to find anything wrong with the release gear or the lifeboat and could only conclude that human error had caused the accident.

The master was again interviewed on 6 December 1999 and described events as he remembered them. During the interview, he stated that he had been informed that the AB had been on the foredeck of the boat, coiling the rope into the cabin through the open hatch. The master thought that the build up of rope might have dislodged the release lever and he seemed sure that there was a

connection between the coiling of the rope and the release of the boat.

The mate was again interviewed on 7 December 1999. He stated that, at the time of the accident, the 2nd mate was in the cockpit behind the cabin and the AB was forward, coiling the painter into the cabin through the open forward window. The AB was half in and half out of the window while he was coiling the rope.

In the opinion of the mate, in that position, the AB ran the risk of fouling the release lever either with his leg or with the rope and, if the securing devices for the release lever were not in place, the release lever could be accidentally operated.

The mate checked the release lever about two and a half hours after the incident and found that it was in the locked position with both securing devices fitted. However, the nature of the accident led the mate to conclude, after tests on the boat by the investigator and the class surveyor, that the release lever must have been operated to cause the boat to drop and that the lever was subsequently repositioned and secured before he was able to examine it. There was sufficient time between the incident and the mate's examination of the boat for this to have been done.

The problem in positioning the boat under the falls when it returned to the ship and the initial use of the eye for the tricing pendant to secure the forward fall had no bearing on the accidental release of the boat.

Placement of the release lever

The release lever was located on the right hand side of the steering console. It was positioned so that looking down from the (backward sloping) forward window of the cabin, only the lower half of the lever and the safety pin and pawl could be seen. The upper half of the lever was hidden from view under the backward slope of the cabin front.

With the release lever secured by the safety pin and pawl, it would not have been possible to operate it. If the safety pin and pawl were not in position however, it is conceivable that the lever could be moved by inadvertent contact with the AB's foot or leg, although that is considered unlikely, due to the lever's position. It is also unlikely that the AB, who was reported to be familiar with the system, would operate the release lever, when the boat was suspended above the water.

The mate mentioned that the AB had been coiling the painter while he was half in and half out of the forward hatch. If the safety pin and pawl were not in position, or if the AB had removed the pin and the pawl to clear a tangle of rope, it is possible that, with the rope and the AB's legs in close proximity to the release lever, the lever was fouled and drawn aft, releasing the boat.

The time taken for the boat to drop 6 m with an acceleration of 9.81 m/sec/sec is calculated to have been 1.1 seconds. In that time the AB had either leaped over the side into the water or was thrown clear of the boat, sustaining bruising only. This would seem to indicate that the AB was either outside, or was extricating himself from the hatch as the hooks released. It would also be consistent with the need for the AB to adjust his position to secure the tricing gear. This was supported by the 2nd mate's statement that the incident

occurred as the hoisting had stopped and that both men were preparing to secure the tricing pendants.

Every indication is that the release lever was operated and, despite the 2nd mate and AB maintaining that the lever was locked, the safety pin and pawl could not have been in place.

The manufacturer's comments

To assist with analysing the incident, the matter was referred to the manufacturers of the boat for their comments. The manufacturers responded;

> The boats of this ship have been delivered in February 1984 to Brand Werft in Germany. The boats are equipped with on-load hoisting hooks. Hook bedding and release mechanism tests have been carried out under survey of See-BG. From 1984 up to now we have received no information regarding these boats, consequently the hoisting hooks have never been maintained by us.
>
> From the accident report, we have to take the conclusions regarding this accident that the hooks have been released by the release lever in normal on-load operation by a person which was not familiar with it.
>
> A disadjustment of the system would normally interfere only with one hook side. As both hooks have been released together we have some doubts regarding a disadjustment.

The accident

The investigation revealed no evidence of mechanical failure. To release the hooks, the release lever would need to be unlocked and then pulled back. The manufacturers also concluded that the release lever would have been operated in this instance though they might not be correct in assuming that the person who caused the release of the hooks was not familiar with the system. The master and mate considered that both the 2nd mate and AB were familiar with the system.

The 2nd mate and AB were adamant that the release lever was secured by the pin and the pawl. For this accident to have occurred, however, they must have been mistaken.

The issue of the jerk that is often experienced when stopping the hoisting of a boat was examined as a possible contributory cause. However, during the hoisting tests carried out after the incident by the investigator and the class surveyor, with the release lever in the correct position but unsecured, no evidence was revealed to support this possibility.

Lifeboat maintenance

The operation and maintenance manual stated that the hoisting hooks were to be cleaned of salt deposits every month and, that every month, all moveable parts of the hoisting hooks and release lever were to be lubricated. The manual also stated that a check for correct functioning of the release system was to be carried out every month. A more recent requirement is that an operational test under a specified load is to be carried out every 5 years.

The company was ISM accredited, but the ship was not yet required to be accredited. The maintenance records for the boats and fittings were requested by the MIIU, but the indications were that these records did not exist.

Issues of design

The MIIU has investigated two other incidents where lifeboats were released inadvertently because release mechanisms were apparently mistaken for engine or steering controls or were thought to

operate steering. Both these incidents involved issues of ergonomics and training of the crew.

In one instance, a lever at the starboard side of the engine casing operated the mechanism for on-load release of the boat (MIIU report no. 71). The lifeboat engine was being run while the boat was swung out and suspended under the davits, but the propeller was stationary. In an attempt to put the lifeboat into gear, it is probable that one of those in the boat pulled the release lever, releasing the boat. The investigators were struck by the similarity of the lever to the levers for ahead and astern gear for engines on a number of lifeboats.

In another instance, a crewmember was instructed, during a Port State Control inspection, to operate the boat's rudder. The crewmember turned a radial spoked wheel adjacent to the coxswain's seat, but this operated the release mechanism resulting in the lifeboat being launched over the ship's stern. The steering wheel was located on a console in front of the coxswain's seat and the report concluded that one of the main contributing factors was the crewmember's lack of knowledge of free-fall lifeboat controls (MIIU report no. 128).

In each case, crewmembers suffered serious injuries requiring hospitalisation and repatriation.

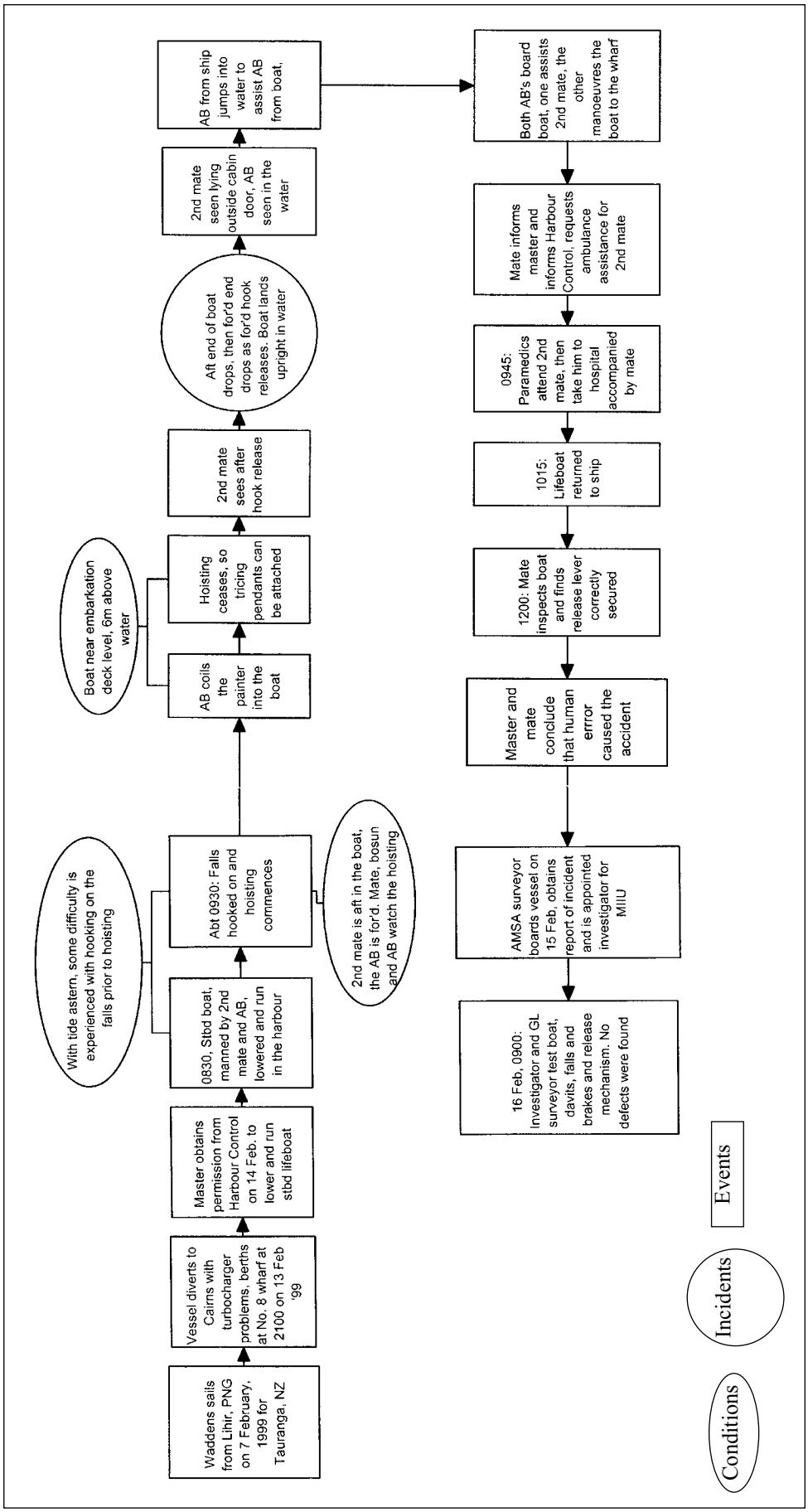
In the case of *Waddens*, though the boat's crew was said to be familiar with the release mechanism, the most likely explanation for the cause of the incident is that the release lever was not secured by the safety pin and pawl.

There was a very small area of foredeck on the boat, 60 cm in length at the centreline. Most of the space on the foredeck was taken up by the hoisting hook and other fittings. It would require a certain amount of agility to carry out any tasks at the fore end of the boat and it could be safest to have one's legs on one of the steps within the boat. In that position, however, the release lever was in close proximity and there would be the danger of contact with it. The problem could be more acute if a crewmember was standing on a step next to the release lever, coiling a rope within the boat at the same time. Space would be at a premium and this could lead to fouling of the lever.

The position of the lever is such that it interferes with free movement on the steps leading to the forward hatch of the boat. It is also close to the control position for the engine where there is the potential for confusing the lever with the gear lever for the engine.

It could not be established exactly when the lifeboat engine was taken out of gear or stopped. Even though there is no evidence that the release of the boat was due to any ambiguity in design, the Inspector considers that the proximity of the release lever to the engine controls illustrates a need for improved ergonomics.

FIGURE 6.
Events and causal factors chart



Conclusions

These conclusions identify the different factors contributing to the incident and should not be read as apportioning blame or liability to any particular individual or organisation.

Based on the available evidence, the Inspector concludes that:

1. Mechanical failure was not a factor.

2. The locking devices securing the release lever were not engaged.

3. The release mechanism was operated inadvertently, possibly by the boat's painter fouling the release lever.

Contributing to the accident were issues of poor ergonomic design:

1. The release lever was fitted at a position in the boat where it could interfere with free access to and from the fore deck through the cabin window.

2. The location of the release lever meant that, if unlocked, it might be moved accidentally to a position at which the hoisting hooks could release.

3. Although there is no evidence that the release lever was mistaken for the gear lever for the engine in this instance, the proximity of the lever to the engine controls, in the Inspector's opinion, increased the possibility of accidental release.

Submissions

Under sub-regulation 16(3) of the Navigation (Marine Casualty) Regulations, if a report, or part of a report, relates to a person's affairs to a material extent, the Inspector must, if it is reasonable to do so, give that person a copy of the report or the relevant part of the report. Sub-regulation 16(4) provides that such a person may provide written comments or information relating to the report.

The final draft of the report, or relevant parts thereof, was sent to:

The vessel's managers

The master, mate, 2nd mate and the AB

Submissions were received from the mate and the 2nd mate and the report was amended where necessary.

Details of *Waddens*

IMO No.	8317978
Flag	Antigua and Barbuda
Classification Society	Germanischer Lloyd
Vessel type	General cargo
Owner	Baum and Company
Year of build	1984
Builder	Brand Schiffswerft, Oldenburg, Germany
Gross tonnage	3 784
Summer deadweight	5 189 tonnes
Length overall	99.5 m
Breadth, extreme	17.2 m
Draught (summer)	6.5 m
Engine	6 cyl. MaK 6M551AK single acting diesel
Engine power	2 501 kW
Service speed	14 knots
Crew	11