



THE DUTCH
SAFETY BOARD



SUMMARY

**Capsizing of shell dredger Frisia (HA38),
North of Terschelling**

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North of Terschelling**
14 December 2010

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The aim in the Netherlands is to reduce the risk of accidents and incidents as much as possible. If accidents or near-accidents nevertheless occur, a thorough investigation into the causes of the problem, irrespective of who is to blame for it, may help to prevent similar problems from occurring in the future. It is important to ensure that the investigation is carried out independently from the parties involved. This is why the Dutch Safety Board itself selects the issues it wishes to investigate, mindful of citizens' position of dependence with respect to public authorities and businesses. In some cases, the Dutch Safety Board is required by law to conduct an investigation.

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This report is published in Dutch and English. In the event of any discrepancy between these versions, the Dutch text shall prevail.

CONSIDERATION

INTRODUCTION

“They paid dearly for their shells”. This paraphrase describes in short the nature of the marine casualty which occurred north of Terschelling during the night of Monday 13 December to Tuesday 14 December 2010, and subsequently has been investigated by the Dutch Safety Board. The investigation broadly raised the themes highlighted 110 years previously in the play “The Good Hope” (*Op hoop van zegen*). This time it concerned a shipping company which failed to meet its obligations regarding equipment, the technical condition of the ship and the safety of the crew; a skipper who did not object to the ship-owner failing to meet its obligations (possibly because the skipper was able to sail as such once again after an absence of a number of years); and government agencies which did not perform their duties at all or adequately and failed to share information with each other, despite belonging to the same ministry.

BRIEF DESCRIPTION OF THE CASUALTY

On the evening of Monday 13 December 2010, the crew of the shell dredger Frisia had completed a shell extraction operation at Gronden van Stortemelk, which is an area to the north of the passage between Vlieland and Terschelling. The skipper reported the end of their activities to the Brandaris traffic control centre on Terschelling and asked about the current weather conditions. He told Brandaris that he planned to sail north of Terschelling to Lauwersoog. He then set sail in the direction of the port of discharge as planned, against the advice of a fellow skipper. The skipper of the Frisia had told his worried colleague that he wanted to unload the shells the following morning in Lauwersoog, as agreed with the shipping company. Because of ice blocking the Frisian channels, the skipper could only keep to this agreement by sailing around the Wadden islands. During the voyage it was cold, and the ship sailed against winds reaching 5 or 6 Bft and waves as high as 1.5 to 2 metres.

The next morning, the skipper contacted the Brandaris at 4.10 a.m. He told the operator that the hold had flooded and requested an additional bilge pump to take out the water. Ten minutes later the skipper contacted the Brandaris again. Clearly more distressed, the skipper told the operator he was afraid the ship might sink. At that point, a Search and Rescue operation was initiated immediately. Shortly after 4.30 a.m., the ship capsized and disappeared from the radar screen.

Consequences

All three crew members died as a result of the accident. One was trapped and pulled down with the vessel when it suddenly capsized. The other two ended up in the water, with one of them being picked up by a dredging vessel - the Ostsee – that rushed to the scene. Unfortunately, this crew member died some days later from the effects of hypothermia. The Ostsee’s crew briefly spotted the other crew member, but lost sight of him again as he was swept away in the waves and the darkness. His body washed up on Terschelling beach the following night.

INVESTIGATION

On the day the accident occurred, 14 December 2010, the Dutch Safety Board decided to start an investigation, focussing on two key questions:

1. What were the direct causes of the incident (which control measures had failed, allowing the ship to capsize)?
2. How were the risks for the crew during the shell extraction process controlled, did laws and regulations suffice and how were they enforced?

DIRECT CAUSES

Because the ship sailed against the wind and the waves, water washed over the fore part of the ship. Because several spaces at the fore of the ship were not properly sealed off, water entered into the ship. The ship got deeper in the water and started to trim further and further forward. As a result, more and more water could wash over the vessel and find its way into the open hold, loaded with shells. Later investigation work revealed that several ballast tanks that should have been empty were still partly filled with ballast water. As the various spaces, including the hold, flooded, the ship became increasingly unstable.

Forty minutes before the ship capsized, the crew decided to seek refuge off the coast between Terschelling and Ameland islands near the Westgat channel. However, they did not inform anyone of their plans. About twenty minutes later, Brandaris was asked to have an additional pump brought on board the Frisia because the current pump did not have the capacity to pump out all the water that had entered the hold. The capacity of the Frisia's pump was much too low. The pump did by far not comply with the capacity requirements. Moreover, the requirements were based on an erroneous assumption by the supervising authority regarding the amount of water that may be contained between the shells.

However, the seriousness of the situation still had not been expressed. This happened only ten minutes later when the distressed skipper inquired the Brandaris again about the pump, and expressed his fear that the ship would soon sink. Shortly after the ship started to drift and communication was lost. The ship capsized quickly at about 4.30 a.m.

The post mortem that was carried out on the crew member trapped and pulled under with the ship, revealed signs of asphyxiation and hypothermia. The chances of survival of the other two crew members were severely limited, because proper immersion suits were not available on board. The suits did not fit one of the crew members at all. Probably surprised by the sudden capsizing, he also did not wear a life jacket, though he presumably already fetched one. Although the other crew member was found wearing the suit, the built-in, automatically inflating life jacket had not inflated because certain parts were missing, meaning that the jacket would not work properly. Furthermore, he had had no time to completely zip up the suit, probably because the ship capsized suddenly. As result, neither of the men was wearing adequate protection against the cold seawater and thus had to waste precious energy to stay afloat and keep themselves warm. Rushing to the scene, the crew of the Ostsee spotted the men quite quickly, but could no longer save them.

RISK CONTROL AND SUPERVISION

The shipping company's risk control measures

The shipping company managed two vessels that were used to extract shells, in addition to around forty shrimp boats. After completion of the conversion into a shell dredger (mid-2009), the Frisia was then regularly deployed for shell extraction, in addition to m.v. "Vertrouwen", which had already been in service as a shell dredger for some time. The shipping company had obtained a shell extraction permit in a public call for tenders issued by the Directorate-General for Public Works and Water Management (*Rijkswaterstaat - RWS*).

The RWS did not impose any quality or safety requirements. The shipping company did not have a safety management system in place, nor was any action taken to carry out a risk inventory and evaluation on board the Frisia as required under the Working Conditions Act (*Arbeidsomstandighedenwet*). Overall, the company's attitude with regard to compliance with regulations was mostly passive and only acted if the supervising authority specifically required to do so. That happened too infrequently. Therefore, the shipping company was free to act at its own discretion, ignoring regulations as it saw fit.

The complete lack of any kind of safety management system at the shipping company was a decisive factor in the incident and its aftermath. There was no structured, demonstrable safety strategy in place. As a result, vessels were allowed to set sail in an unsafe state, without conducting risk inventories or evaluations of on-board activities. Examples of risks included:

- Holds which should have been dry could contain water, without being noticed, structurally corrected or prevented;
- The way too low capacity of the single bilge pump for the hold;
- The inappropriate life-saving equipment and the lack of properly-fitting immersion suits for all crew members;
- The lack of control by the shipping company whether and how emergency exercises were carried out;
- It had not been assured that a licensed skipper served on board;
- The fact that the shipping company repeatedly allowed the vessel to depart, despite the fact that it had been detained by the supervising authority or lacked the proper certification;
- Furthermore, the ship was used for shell extraction, an operation which should not be performed by a fishing vessel.¹

The skipper, deployed by the shipping company, did not hold the proper qualifications. He only recently began working, on a temporary basis via the company's employment agency. Still, he was given the ultimate responsibility for the vessel, a responsibility he accepted. In that capacity, he should have reported the safety risks on board the vessel to the company and demanded their elimination. He also should himself have taken steps to eliminate or reduce safety risks on board, there where possible. These include:

- the lack of proper safety equipment;
- the leakage in the shell pump's discharge line;
- the blocked water discharge ports;
- the faulty gaskets on hatches and ventilation ducts;
- the open drain from the chain lockers.

Under the circumstances, the skipper's decision to sail to the port of discharge was wrong. Evidently, he hoped to honour the agreement with the shipping company to unload the cargo in Lauwersoog on Tuesday evening, despite the bad weather forecast and an experienced skipper's warning.

The Safety Board feels it is possible that having recently been hired on a temporary basis by the shipping company, the skipper was under pressure to perform and that this may have been a reason why he did not choose to return to Harlingen to wait for better weather or to take an inland route to Lauwersoog. Once the vessel set course for Lauwersoog, taking refuge near the coast was in fact no longer a viable alternative because even if the ship had reached the chosen location, the shallow waters, choppy water and narrow sea channels typical of that area would probably still have caused problems.

Rules and regulations

The Frisia had been certified as a fishing vessel. The requirements regarding technical equipment and ship stability thus were dictated by the fisheries legislation. This was not relevant as regards the vessel's stability: the same stability criteria would have applied if the ship had been certified as a merchant vessel. Under the circumstances of the accident, a merchant vessel would have had the same stability problems. It is however interesting to note that regulations applying specifically to shell dredgers do not specify that more than one bilge pump is required for the open hold. However, the certification as a fishing vessel did influence the applicable crew requirements. Contrary to the regulations for merchant shipping, fishing crew legislation, which is fragmented and therefore difficult to follow, does not stipulate that all seamen must undergo basic safety training.

1 The Ship Act, art. 1 defines a fishing vessel as "any vessel which is used for catching fish, whales, seals, walruses or other living resources of the sea".

Government supervision

The Ministry of Infrastructure and the Environment is responsible for both earth removal operations, such as shell dredging, and for ship safety. The Directorate-General for Public Works and Water Management (*RWS*) (shell extraction) and the Transport, Public Works and Water Management Inspectorate (Netherlands Shipping Inspectorate - *NSI*) (vessel safety) are the parts of the ministry responsible for overseeing compliance with and the implementation of policy on the aforementioned points.

RWS issued permits for shell extraction purely based on financial considerations, without imposing any requirements in relation to the safety of the ships or a safety management system of any kind. Although the permit holder had to have an approved shell dredger, this was never verified in the case of the *Frisia*. *RWS* had registered the vessel's deployment in its financial records, but failed to act on the information that the *Frisia* was a fishing vessel being deployed for earth removal activities.

The *NSI* failed to perform its supervision duties properly, thereby allowing the safety situation on board the *Frisia* to persist and therefore creating a situation in which the shipping company could ignore the regulations. The *NSI* did not take the necessary steps, despite establishing in its inspections that neither the vessel, nor the crew complied with the requirements. When it was established that the skipper was not licensed, the *NSI* detained the vessel. First, the shipping company ignored the detention. Later, the *NSI* raised the detention despite the skipper's status had not changed.

The *NSI* is aware that the fishing industry does not always place the highest priority on legal provisions and that, with the exception of the good shipowners and skippers, the industry prefers to leave safety matters to the *NSI* rather than to assume responsibility.² The shipping company that owned the *Frisia* showed that it was no exception by knowingly breaking the law at its convenience. In this light, it is remarkable how accommodating the *NSI* was with the shipping company. When the shipping company failed to produce vital information, the *NSI* rewarded it with permanent certification for the *Frisia*, instead of imposing more severe restrictions. In the process, the *NSI* disregarded its own procedures for issuing permanent certificates.

Because outstanding deficiencies were ignored, it was possible that the vessel was equipped with a bilge pump that did not have the capacity to satisfy the additional stability requirements specific to shell dredgers. After all one of the deficiencies was the lack of a bilge diagram, which usually indicates pump capacities. The pump capacity was also not verified by any other means or even inquired about. It was therefore possible to obtain the certification, without the *NSI* having ever verified the capacity of the bilge pump system. Furthermore, the investigation revealed that the *NSI* greatly underestimated the amount of water that can pass between the shells (and which therefore forms the basis for the required capacity of the bilge pump). Experiments have shown that the actual amount is much higher. The actual pump capacity was therefore way too low, which explains why the crew could not pump the water out of the hold quickly enough. The fact that the hold's water discharge ports were also blocked only made matters worse.

The Board finds it surprising that *RWS* and the *NSI* did not exchange any information about vessels deployed or under supervision, despite belonging to the same ministry (Infrastructure and the Environment). As a result, an uncertified fishing ship with an unlicensed skipper and under detention was able to operate unhindered under the shell extraction permit from one department, which should have been prohibited by the other. Even without ever actually setting foot on board, if the relevant information had been shared, both parties would have concluded that the shipping company was violating the regulations.

2 *NSI* report "Als het getij verloopt", November 2007

IN SUMMARY

The shipping company failed to ensure the vessel was seaworthy. Furthermore, the vessel and the crew were subjected to risks which had not been effectively or structurally identified and controlled, while the shipping company ignored the regulations. The skipper accepted the risks, contrary to the rules of good seamanship. The Ministry of Infrastructure and the Environment and its departments RWS and the NSI allowed the shipping company too much freedom. A shell extraction permit was issued to the shipping company without the imposition of quality or safety requirements. The requirements with regard to the bilge pump capacity were too low, and in addition the NSI also failed to verify compliance. Furthermore, it also ignored the fact that the shipping company demonstrated its disregard for its own responsibility regarding the safety of the ship and its crew.

RECOMMENDATIONS

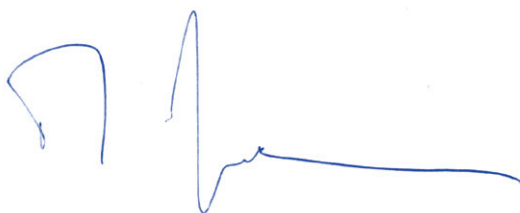
The Safety Board recommends the following:

To the shipping company

1. Demonstrate within three months to the NSI through independent examination, and further assure, that all vessel under management, including their crews, comply with rules and regulations and are deployed as such.
2. Give demonstrable priority to safety. Develop and implement a safety policy centred on the company's own responsibility. Assess and evaluate the risks, as they exist on board the managed vessels and take, where necessary, appropriate measures to manage the risks.

To the Minister of Infrastructure and the Environment

3. Organize the certification of sea going vessels in such a way that issuance of certificates only takes place after pre-assessed criteria have been fulfilled, and make this transparent. Apply functionally independent and technical verification in this.
4. Include safety as one of the criteria for issuing shell extraction permits.
5. Use the findings in this report to verify the stability and bilge pump installations on board all shell dredgers and take corrective measures where necessary on all vessels, regardless of age. Make it compulsory to have at least two independent mechanical bilge pumps for the hold on shell dredgers.
6. Require basic safety training for all seafarers on board sea going vessels, including fishing vessels.
7. Apply surveys and enforcement in such a way that it is objective that ship's managers take their own responsibility for all shipping and labour legislation, in particular with respect to appropriate safety measures on the basis of the (mandatory) risk inventories and evaluations.
8. Bring the company and all her ships under strict enforcement and demonstrate within six months that all ships comply with the rules and regulations and are deployed as such.



T.H.J. Joustra
Chairman of the Dutch Safety Board



M. Visser
General Secretary

CONCLUSIONS

The casualty with the Frisia could occur because the entire system that should guarantee safety for seagoing vessels, failed to work properly.

- The shipping company failed to ensure the vessel was seaworthy, thereby endangering its crew.
- The skipper accepted this and undertook the voyage despite the weather conditions.
- The NSI, responsible for the certification of fishing vessels, unjustly certified the Frisia.
- The NSI failed in its enforcement tasks both in respect of the vessel and the shipping company.

Direct causes

En route to Lauwersoog, water entered the fore part of the vessel because some of the spaces were not properly closed. The vessel began to trim further and further forwards, causing it to take on even more water. Gradually, more and more seawater flooded the large open hold loaded with shells. The amount of water in the hold could even increase more because the water discharge ports were blocked.

The crew could not pump the water out of the hold quickly enough because the capacity of the bilge pump was far too low.

The vessel lost stability and quickly capsized due to the large amount of water on board. As a result of the capsizing and because of lack of proper safety equipment, all three crewmembers perished.

Underlying causes

The shipping company deployed a vessel which was not seaworthy. The lack of any form of safety management played a decisive role in this respect. This is pointed out by the following:

- Holds which should have been dry could contain water, without being noticed, structurally corrected or prevented;
- The way too low capacity of the installed single bilge pump for the hold;
- The inappropriate life-saving equipment and the lack of properly-fitting immersion suits for all crew members;
- The lack of control by the shipping company whether and how emergency exercises were carried out;
- The absence of a sufficiently licensed skipper on board;
- The fact that the shipping company repeatedly allowed the vessel to depart, despite the fact that it had been detained by the supervising authority or lacked the proper certification;
- Furthermore, the ship was used for shell extraction, an operation which should not be performed by a fishing vessel.

The skipper, first responsible on board – including under the law – should himself have reported the safety shortcomings on board the Frisia to the shipping company and, if possible, attempted to reverse or prevent them himself. The main issues being:

- the lack of proper safety equipment;
- the leakage in the shell pump's discharge line;
- the blocked water discharge ports;
- the faulty gaskets on hatches and ventilation ducts;
- the open drain from the chain lockers.

Under such unfavourable circumstances, the skipper should not have undertaken the voyage to the planned port of discharge. It is possible, however, that the skipper, not licensed and under temporary contract, felt pressured to accept the situation on board.

As well as unjustly certifying the Frisia, the NSI also failed to perform its enforcement and supervisory duties adequately in respect of the vessel or the shipping company. The conduct of the shipping company should have prompted the NSI to be stricter in its supervision, whereas in fact it did the opposite.

This is shown by the following:

- The NSI accepted the Frisia to be deployed at sea, not certified, without a licensed skipper and under detention, for operations (shell extraction) that should not be performed by a fishing vessel;
- The capacity of the open hold's bilge pump had never been verified during the certification process, despite the fact that the single bilge pump was essential to the ship's safety. Furthermore, the capacity requirements were calculated erroneously, given the amount of water that could pass between the shells in the hold.
- Despite the fact that the Frisia did not meet the criteria for permanent certification, it was issued with a permanent certificate by the NSI one month before the accident. Certification should have never been granted, given the nature of the unresolved safety issues.

RWS issued permits for shell extraction purely based on financial considerations, without imposing any requirements in relation to the safety of the ships or a safety management system of any kind. RWS assumed tacitly that the NSI would monitor safety and take action, if necessary.

The two departments did not share the necessary information with each other, which led to a situation in which an uncertified fishing ship with an unlicensed skipper and under detention could operate without hindrance under a shell extraction permit from one department, which should have been prevented by the other department from the same ministry.

Other findings

The Frisia was only fitted with one single bilge-pump, without any requirement to provide for a secondary means. Also an alternative safety barrier, such as a wind-restriction was not imposed. The possibility to empty a flooded hold was therefore dependent on a single system.

The investigation revealed that seamen are allowed to work on board fishing vessels without demonstrating that they have acquired any basic skills in fire fighting, health care or survival at sea. It has therefore not been assured that knowledge of these skills is available. Furthermore, it has been noted that the fishing crew regulations are not clear and easily accessible.

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