

Technical report S-27/2011

Investigation of the heeling experienced by fishing vessel CURRANA TRES, 50 miles off the west coast of Ireland on the 14th of May 2010

NOTICE

This report has been drafted by the Standing Commission for Maritime Accident and Incident Investigations, CIAIM, regulated by the 26th Additional Provision to Law 27/1992, dated 24 November, by National Ports' (Puertos del Estado) and the Merchant Navy (Marina Mercante), by Royal Decree 800/2011, dated 10 June and as applicable, by Royal Decree 862/2008, dated 23 May, whose functions are:

1. To carry out the investigations and technical reports of all very serious maritime accidents in order to determine the technical causes that originated them and make recommendations for the purpose of implementing the necessary measures to prevent them from occurring in the future.
2. To carry out the technical investigation of serious accidents and maritime incidents when lessons learned can be obtained for maritime safety, to prevent marine pollution from vessels, and to produce technical reports and recommendations on the same.

In accordance with Royal Decree 800/2011, the investigations will not be conducted to determine responsibilities or fault. However, CIAIM will report the causes of the maritime accident or incident even though from its results, the fault or responsibility of individuals or legal entities may be inferred. The drafting of the technical report will in no way pre-judge the decision that may fall upon the courts of law, nor will it seek the assessing of responsibilities or determination of culpabilities.

The investigation included in this report has been conducted with no other fundamental purpose than to determine the technical reasons that may have caused the maritime accidents or incidents and make recommendations for the purpose of improving maritime safety and the prevention of vessel pollution in order to prevent maritime accidents from occurring in the future.

Therefore, the use of the investigation results with any purpose other than the one described is subject in all cases to the aforesaid premises and must not, therefore, prejudice the results obtained from any other report that, in relation to the accident or incident, may be initiated in accordance with current legislation.

The use made of this report for any purpose other than for the prevention of future accidents may lead to erroneous conclusions or interpretations.



THE INCIDENT

The following report of the events has been drafted from statements provided by the crew and other documents. The times referred to in the report have been taken from the ship's clock.



Figure 1. Location of the incident

On the 5th of May 2010, fishing vessel CURRANA TRES left its base port of Celeiro, Lugo with 11 crewmembers on board.

After about 36 hours of navigation they reached the fishing ground near the west coast of Ireland where they began the fishing task carrying out 3 or 4 settings daily, which lasted between 5 and 7 hours each. They were trawl fishing from the stern, between 300 and 400 m deep, capturing mainly hake, monkfish, ling, forkbeard and Dublin Bay prawn.

The Skipper and the second Skipper stood 6 hour watches at the wheelhouse.

Background.

On the 14th of May 2010, at approximately 15:30 hours, they were fishing at a location of about 50 miles off the west coast of Ireland, at position:

latitude 54° 15' N, longitude 011° 13' W. The Skipper and the First Mechanic were sleeping in their berthing, the Second Skipper was at the wheelhouse, the Oiler was in the engine room, the Boatswain was in the cargo hold cutting ice, the Cook was at the Galley and the rest of the crew was on the upper deck.

At that moment, while trawling, they began hoisting the gear onto the port side, which caused the vessel to strongly heel towards that side, possibly favoured by the prevailing northeast wind, which the Skipper estimated as having a force of 5 or 6.

The incident.

The Cook sounded the alarm when he noticed that the galley portholes (figure 2), located on the port side main deck were submerged.

At that moment an alarm sounded, which was not recognized by the crew and alerted the Second Skipper who was on watch at the wheelhouse. After verifying that the vessel was heeling towards the port side, the Second Skipper carried out the following actions in an attempt to correct the heeling condition:

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At that moment an alarm sounded, which was not recognized by the crew and alerted the Second Skipper who was on watch at the wheelhouse. After verifying that the vessel was heeling towards the port side, the Second Skipper carried out the following actions in an attempt to correct the heeling condition:



Figure 2. Position of the galley portholes



- He positioned the rudder full starboard to prevent heeling towards the opposite side.
- He released the trawling cables leaving them loose.
- He stopped the engine in order to stop trawling the gear.

Subsequently, The Second Skipper woke up the Skipper, who in turn woke up the first mechanic. He also used the VHS radio to call fishing vessel NUEVO MUGARDOS, which was operating in the area as well as the Irish rescue tug FAR SCOTIA, which was located nearly 11 miles from the location of the incident. Rescue tug FAR SCOTIA notified the Irish maritime rescue centre.

Meanwhile, the Oiler, who was in the engine room went up to the fishing area via the starboard side and verified that a large amount of water had accumulated on the port side, stern of the fishing area.

The First Mechanic went down to the fishing area followed by the Skipper. Upon verifying that the fishing area was flooded, the Skipper went up to the wheelhouse to coordinate the rescue and the First Mechanic attempted to find the cause of the flooding. After noticing that water was entering through the waste hopper located on the port side of the fishing area; the First Mechanic ordered the Oiler, who was on the port side, to close the hopper's inner door. He also ordered him to close the door used for accessing the engine room from the port side in order to prevent the water from entering this space, thus maintaining the electrical power supplied by the auxiliary engines.

Subsequently, they verified that the waste hopper's outer door had not been properly closed and was probably the reason why the fishing area had flooded.

When the Skipper went up to the wheelhouse, he ordered the entire crew to don their life vests and to prepare the life rafts. The crew donned their life vests and lowered the port side life raft that was located further forward, next to the wheelhouse but due to the movements of the vessel, the raft turned over. Subsequently, the port side life raft that was stowed aft of the raft that had been previously lowered was itself lowered. The rafts had to be tied due to their tendency to separate from the vessel.



Figure 3. Waste hopper

With the inner door of the waste hopper closed, the flood was controlled but the heeling of the vessel towards the port side was such that the water level had reached the upper deck. The First Mechanic checked if the fishing area's sump pumps were operating properly. The port side sump pump's electric motor, which was located aft of the waste hopper was not working because it had gotten wet during the flooding of the fishing area. The rest of the fishing area pumps (two on the starboard side, forward and aft and one on the port side, aft) were operating properly but were not bailing out the water because the flood had not reached their wells since the vessel had heeled towards her port side and her stern had sank further than her bow.

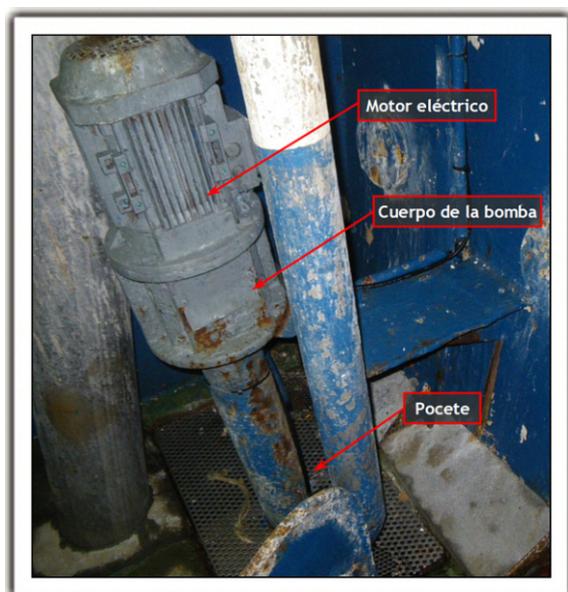


Figure 4. Stern sump pump located on the starboard side of the fishing area

The First Mechanic went up to the upper deck in an attempt to right the vessel by hanging a weight from the hydraulic crane on the starboard side. While they were preparing the manoeuvre, the port generator's motor stopped and the vessel lost all electrical power. The vessel only had emergency lighting until the First mechanic went down to the engine room and started the motor for the starboard generator.

Operating the crane from the wheelhouse, one of the fishing gears, which weighed approximately 1 ton, was pulled out the starboard side with the crane arm fully extended. This action generated a righting torque, which reduced the heeling enough to begin operating the starboard sump pumps.

When the water level inside the fishing area was below the stern port side sump pump's electric motor, the first Mechanic removed the motor, which was not working and replaced it with the motor from the bow starboard side pump. The

fishing area's bow sump pumps were not working because the water was not flooding their wells due to the vessel's trim towards the stern. This way, the water was bailed out of the fishing area using the stern sump pumps that were located on both sides.

At one point, the water inside the engine room covered the rear shaft. A sump pump and a wash pump were started in order to bail out the water from the engine room if needed.

When the vessel was righted after the water was bailed out of the fishing area and the engine room, the crew collected the net that had been suspended from the crane. Then, they placed the gear on board and used the crane to hoist the inflated life rafts that had been lowered back onto the vessel.

The vessel then set course to the port of Cillero, where they arrived on the 17th of May 2010, along with fishing vessel NUEVO MUGARDOS.

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FACTUAL INFORMATION

The vessel

Fishing vessel CURRANA TRES, whose main characteristics are listed in table 1 is a fishing vessel under Spanish flag, owned by Spanish fishing company Santos Armadores S. L., which is used for trawling.

It was built by Astilleros Zamakona Pasaia, S. L., in Pasajes, Guipúzcoa, in 1999 and she entered service in January 2000.

Originally, the vessel was called NUEVO HERMANOS ARIAS and her owner was Spanish fishing company Pesqueras Arial S.L., but in April 2005, the vessel was bought by the current owner, who changed her name.



Figure 5. Fishing vessel CURRANA TRES.

Table I. Main characteristics of the vessel

Vessel Name	CURRANA TRES
Type	Trawler
Builder	Astilleros de Pasaia S. A.
Location where she was built	Pasajes, Guipúzcoa
Country where she was built	Spain
Year built	1999
Build Number	302
Flag country	Spain
Owner o	Santos Armadores S. L.
Marking	EADV
Port of Registry	Pasajes, Guipuzcoa
Base port	Celeiro, Lugo
Hull material	Acero
Length overall	37,50 m
Length between perpendiculars	30,50 m
Moulded Breadth	8,40 m
Moulded draught	5,60 m
Depth to the upper deck	3,70 m
Gross Tonnage (GT)	364
Net tonnage (NT)	109
Propulsion	Diesel engine with propeller
Maximum power	441 kW

At the time of the incident all of the vessel's certificates were current.



The vessel had been dispatched from the 23rd of February 2010 to the 24th of May 2010 for trawling in the North Atlantic at 36° N (zones CIEM Vb, VI, VII and VIII adb).

Modifications carried out on the vessel

Since it was built in 1999, the vessel underwent two modifications:

- The existing 1.5 t crane was replaced with a 3 t crane and a platform was built (figure 6).

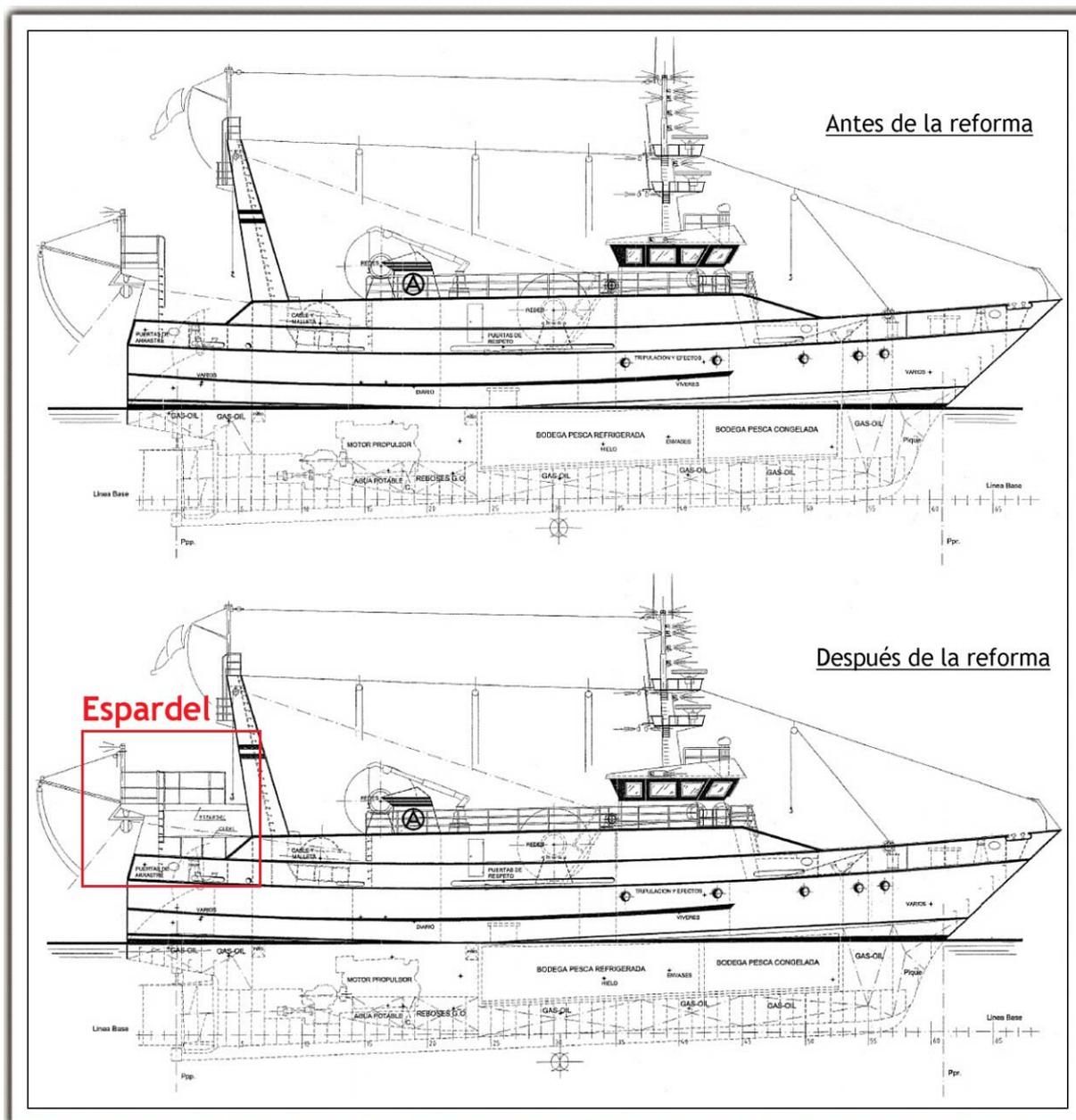


Figure 6. Vessel CURRANA TRES. General arrangement before and after the modification work conducted in April 2005



The total weight added to the vessel during these modifications was 3.48 t, with an initial lightweight of 362.44 t. During the modernization project conducted in April 2005, the specifications stated that the vessel still complied with the stability criteria and that a new stability test was not required since the change in the vessel's lightweight was 0.96%.

The work was carried out at Talleres Corima de Cillero, Lugo in 2005, but it was not recorded in the ship's record until the 10th of December 2010 after the incident, when it was approved by the Maritime Authority of Burela.

- Modification work consisting in replacing the propeller with another similar one and adding a 1.5 t shroud and solid ballast at the forepeak for a total of 13.5 t.

On the 11th of August 2005, the vessel's stability calculations, which set the vessel's new lightweight at 377.44 t were submitted to the Maritime Authority of Burela. These calculations show that "the vessel's lightweight being set at 362.44 t, results in a 4.1% increase, which requires a new stability experience be conducted.

The improvement was carried out at Astilleros Armón Burela S. A., in Burela, Lugo in 2005 and it was authorized by the Maritime Authority of Burela in July 2006.

Both improvement projects were carried out on the vessel without prior authorization from the Administration. According to the improvement projects, the weight of the vessel had increased by 16.58 t, which was a 4.54% increase in her initial lightweight.

The Crew

The vessel's crew at the time of the incident was comprised of the following eleven personnel:

- 1 Skipper of Spanish nationality.
- 1 Second Skipper of Spanish nationality.
- 1 First Mechanic of Spanish nationality.
- 1 Cook of Spanish nationality.
- 1 Boatswain of Spanish nationality.
- 1 Oiler of Indonesian nationality.
- 5 Sailors of Indonesian nationality.

The following irregularities were found regarding the crew:

- The crew list included a Second Mechanic of Spanish nationality that was not on board and therefore, did not provide a statement to CIAIM members.
- The Second mechanic was replaced by an Oiler of Indonesian nationality that was not on the crew list and did not possess the qualifications required for carrying out the duties of Second Mechanic, which he was carrying out.
- As per statements provided, the Boatswain relieved personnel at the wheelhouse during meal hours without being qualified to do so.

Except for the aforementioned irregularities, crew members were in possession of the proper diplomas and certificates required for carrying out their duties.



Meteorological information

At the time and location of the incident, the wind direction was from the NW with force 4 or 5 on the Beaufort scale. There was good visibility, a strong swell and deep sea currents from the NW and 3 metres of significant wave height.

Inspection of the vessel after the incident

After the incident, an inspection of the vessel was conducted, which included a new stability test that verified that the vessel's lightweight was 421.38 t. Relative to the initial lightweight of 362.44 t, the lightweight had increased by 59 t, which equates to 16.26% and not the 4.54% initially estimated during the improvement projects.

The new stability book approved in 2010 set the vessel's displacement under maximum load condition (departure from fishing grounds condition with 100% of the catch on board) at 572.8 tons as compared to 553.4 tons set in the initial stability book, which is an increase of 19.4 tons of displacement. This increase can essentially be broken down into the following items:

- A 59 t increase in lightweight.
- A reduction of 33 t in the maximum weight of the fish allowed in the cargo hold. In order to reach this weight reduction, the new stability considers a fish density of 0.381 t/m^3 , in comparison with 0.56 t/m^3 in the fish hold and 0.7 t/m^3 in the frozen cargo hold, which were included in the stability book that had been approved in 1999.
- A reduction of 10 t in the weight of the nets in the machines.
- Other minor changes in weights included in the stability book.

Worth mentioning is that Royal Decree 543/2007, applicable to fishing vessels with less than 24m in length provides reference values for the density of fish cargo and sets the following values among others:

- boxed frozen shellfish: 0.38 t/m^3
- Fish cooled in wooden boxes: 0.70 t/m^3
- Boxed frozen white fish: 0.63 t/m^3

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ANALYSIS AND CONCLUSIONS

The most probable cause of the incident was the flooding of the fishing area through the waste hopper located on the port side. The waste hopper's outer door had been left open or had been improperly closed and the lower door was open.

Water entered through the waste hopper because the vessel experienced an excessive draught to the stern and the lower portion of the waste hoppers outer door was normally below the flotation line. In this configuration, the stern sank even further during trawling and the sea level was above the waste hopper's lower door, causing the fishing area to flood when the waste hopper doors were left open or weren't closed properly.

The water that entered the waste hopper caused the vessel to heel towards her port side and her stern to sink. In this condition, only the fishing area sump pump that was located at the stern on the port side had water in its well and was operating. However, these pumps are not designed to handle the flooding of the fishing area and their flow was not enough to bail out the water that was entering through the waste hopper and therefore, the flooding of the fishing area was progressively increasing. When the water level reached the electrical motor of the sump pump that was operating, the motor got wet and the pump stopped bailing out water, which resulted in an increase in the flood rate, which endangered the stability of the ship.

Action on the part of the crew, who closed the waste hopper's door, used the crane to correct the heeling of the vessel and replaced the inoperative electric motor, the capsizing of the vessel was prevented.

Increase in displacement

The greater draught at the stern was due to the increase in the vessel's lightweight, attributed in part to unauthorized improvements that were carried out without prior approval from the Maritime Authority. We conclude that the vessel normally operated under overload conditions.

After the approval of the new stability book in 2010, after the accident, the vessel's lightweight was updated to her real value but the fish load under maximum load condition decreased by 33 t, changing the density of the fish without justification and for their convenience. The vessel may continue operating in the same fishing grounds as she did prior to the accident and fishing the same species. Also, no proper justification is found for the decrease in the weight of the nets on the machines with respect to the weight that was listed for these nets in the original stability book.

This way, the vessel may operate with a displacement that is higher than the maximum listed in the stability book and therefore in an overload condition and not in compliance with the minimum assigned freeboard.

Opening of the waste hopper

The specific instructions for the Skipper included in the vessel's original stability book were not complied with. Regarding the waste hopper, the specific instructions specify that "as a general rule, all hull openings must be firmly closed using watertight means during navigation; and while these are open, ship personnel must be monitoring them at all times. An opening must never be left unattended. In particular, the waste hopper will incorporate a double lock; when open, personnel will be monitoring it and prior to leaving the fishing area, ship personnel will ensure it is firmly closed. The vessel will never navigate with the waste hopper door open".



Considering everything that has been presented, this Commission has concluded the following:

1. In an eleven year period, the vessel's lightweight increased by 59 t without the Maritime Administration having been notified. Regardless of the causes, it is recommended that a procedure be drafted that provides a more efficient control of a vessel's lightweight.
2. As a consequence of this, the vessel normally operated in an overload condition.
3. The Maritime Administration authorized improvements of the vessel after these had been carried out.
4. The vessel is very sensitive to an operational error when operating the waste hopper since simply by not checking that the outer door is closed properly may have resulted in the loss of the vessel. The existence of such opening is a hazard that was not been properly controlled.
5. It is the opinion of this commission that no effective measures have been taken to guarantee that a similar incident does not occur in this same vessel. The fish load volume has not been limited, nor has the lightweight been lowered, nor has the waste hopper been removed. Therefore, if the vessel operates under these same conditions and capturing the same fish species, it will probably continue operating in an overload condition, with a larger displacement than the maximum authorized, increasing the possibilities of a similar incident occurring or one that results in much more serious consequences.

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RECOMMENDATIONS

This Commission, in view of the conclusions reached, provides the following recommendations for the intent of preventing similar incidents or accidents from occurring in the future:

To the General Directorate for the Merchant Navy:

1. To urgently review the vessel's stability book to guarantee that regardless of the density of the capture, the freeboard will not be lower than the minimum approved and to consider immobilising the vessel for safety purposes until this is carried out.
2. To not renew the freeboard certificate of vessels that do not have the freeboard markings in accordance with current regulations.
3. To set or modify procedures that guarantee that no vessel under a Spanish flag will be authorized to navigate and issued a certificate without having ensured that modifications of the vessel, which should have been authorized by the Maritime Authority have not been carried out.
4. To require a stability test be conducted anytime they become aware that modifications have been carried out, which have not been supervised by the Maritime Authorities.
5. To require a stability test be conducted of fishing vessels larger than 15 m in length every ten years in order to guarantee an effective control of the lightweight and the stability of these types of vessels.
6. To analyze the advantage of prohibiting fishing vessels from using waste hoppers or other types of openings that are located below the first flooding point as per the stability book calculations and the freeboard calculation.
7. For vessels with more than 24 m in length, set reference values for the density of the catch according to the species captured and the method used for conserving the catch.

To the Shipowner and Skipper of vessel CURRANA TRES:

8. To establish operating procedures that guarantee that under all circumstances, both waste hopper doors will be properly closed when no personnel are present at the fishing area.

To the Colegio Oficial de Ingenieros Navales (Professional association of Naval Engineers):

9. To distribute the conclusions of this report among their members and promote the best professional practices for drafting the stability books of fishing vessels.

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