



CIAIM-08/2017 REPORT

Grounding of the vessel TIDE NAVIGATOR at the Port of Vilanova i la Geltrú on 2 August 2016

NOTICE

This report was written by the Maritime Accident and Incident Investigation Commission (CIAIM), which is regulated by Article 265 of the Revised Text of the Law on State Ports and the Merchant Marine, approved by Royal Legislative Decree 2/2011 of 5 September, and by Royal Decree 800/2011 of 10 June.

The sole purpose of the CIAIM when investigating maritime accidents and incidents is to prevent future accidents by determining the causes and circumstances that led to the events being investigated.

This report was not written for the purpose of being used as evidence in proceedings before legal bodies and it does not seek to assign responsibilities or blame.

Any use of this report for any purpose other than preventing future accidents may lead to faulty conclusions or interpretations.

**This is an unofficial translation into English language of the official report approved by CIAIM.
The official report is written in Spanish and can be obtained from CIAIM website**

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Figure 1. TIDE NAVIGATOR ship



Figure 2. Accident location

1 SUMMARY

On 2 August 2016, the general cargo ship (M/V) TIDE NAVIGATOR was docked at the port of Vilanova i la Geltrú (Barcelona).

Early in the morning, after the port's pilot had boarded, the captain started the maneuver to exit port without assistance from any tugboats. Minutes later, as the ship started lining up with the exit channel at the port, it ran aground next to the breakwater protecting the dock.

The ship was eventually moved with help from one of the port's tugboats and docked in the port once more so it could be inspected for damage.

1.1 Investigation

The CIAIM was notified of the accident on 4 August 2016. That same day the event was classified as a "serious accident", and the Commission agreed to open an investigation. The CIAIM board approved the event's classification and the opening of a safety investigation on 14 September 2016. This report was reviewed by the CIAIM at its meeting of 15 March 2017 and, after its subsequent approval, was published on May 2017.

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2 OBJECTIVE INFORMATION

Table 1. Ship information.

Name	TIDE NAVIGATOR Before April 2015, it was called the ONEGO ST. PETERSBURG.	
Flag	Registry:	Netherlands
	Port of registry:	Heerenveen
IMO Identification	Number:	9526083
	Call sign:	PCJP
	MMSI:	245086000
Type	General cargo ship	
Main characteristics:	Overall length:	118.14 m
	Length between perpendiculars:	112.29 m
	Beam:	15.90 m
	Molded depth:	8.80 m
	Molded draft:	6.54 m
	Maximum draft:	7.20 m
	Gross tonnage:	5425 GT
	Net tonnage:	2949 NT
	Dead weight:	8200 t
	Hull material:	Steel, double hull
	Propulsion:	Diesel engine (Caterpillar-MAK 9M25C) with variable-pitch propeller.
	Powerplant:	2970 kW at 750 rpm.
	Maneuvering:	300-kW bow thruster
	Registration company:	Lloyd's Register of Shipping
Ownership and management	Owner and operator:	ForestWave Navigation BV
	<i>P&I</i> ¹ :	Raets Marine
Construction details	Built in 2011 by Zaliv in Kerch (Crimean Republic, Russia) based on a project by Damen Shipyards Bergum (Netherlands).	

Table 2. Details of the voyage.

Date	2 August 2016.
Ports of arrival / transit / destination	Departure from port of Vilanova i la Geltrú, with intended destination in the port of Sunderland (United Kingdom).
Type of voyage	Commercial.
Cargo information	6410 tons of common salt.
Crew	10 crewmembers

¹ *Protection and Indemnity*: maritime protection and liability insurance.

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	<ul style="list-style-type: none"> • 1 master, from Russia. • 1 first officer, from Ukraine. • 1 third officer, from the Philippines. • 1 chief engineer, from Russia. • 1 third engineer officer, from Ukraine. • 2 qualified seamen, from the Philippines. • 1 seaman, from the Philippines. • 1 cook, from Ukraine. • 1 trainee, from Ukraine. <p>They all had the valid titles and specialty certificates required.</p>
Documentation	The ship had the necessary valid certificates.

Table 3. Information on the event.

Type of event	Grounding.
Date and time	2 August 2016, 07:16 local time.
Location	41°12.68'N; 001°44.08'E.
Ship operation and phase of voyage	Port departure maneuver
Shipboard location	Bottom of forepeak and bow thruster tunnel.
Damage to ship	Cracks in forepeak metal plates.
Injured / missing / fatalities aboard	None.
Contamination	No.
Other damage external to ship	No.
Other personnel injuries	No.

Table 4. Maritime and meteorological conditions.

Wind	Calm.
Sea state	Calm.
Visibility	Good (in excess of 10 km). There was daylight. Sunrise had been at 07:05 at an azimuth of 65°. The moon was not visible.
Cloud cover	Clear.

Table 5. Response by officials on the ground and reaction by emergency services.

Organizations involved	Barcelona Maritime Authority. Vilanova i la Geltrú Port Authority.
Resources used	NAOS UNO tugboat.
Speed of response	Immediate.
Measures taken	Towed by NAOS UNO tugboat.
Results	The ship was refloated.

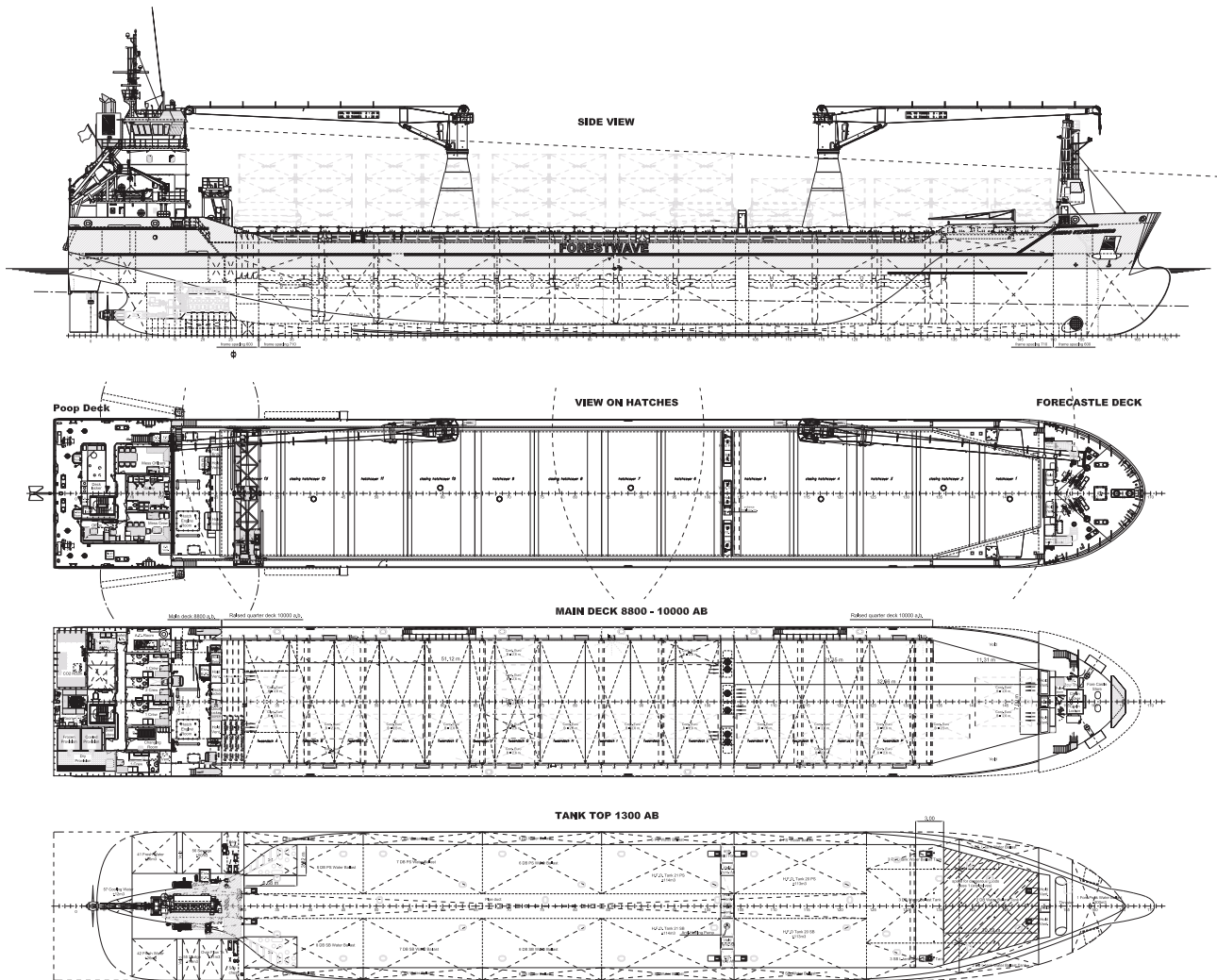


Figure 3. General layout of the ship TIDE NAVIGATOR.

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3 DETAILED DESCRIPTION

This description of the event is based on available information, statements and reports. All times are local.

On 31 July 2016 the M/V TIDE NAVIGATOR, inbound from Gandía, arrived at the Port of Vilanova i la Geltrú.

During its entry into port, the ship followed the recommendations of the onboard pilot until it left the entrance channel and entered the commercial harbor. According to the pilot, the captain was in charge during the final approach and berthing phase.

By approximately 12:30, the ship was berthed to starboard at the Baix a Mar dock (Figure 4).

The arrival maneuver was uneventful.

On 1 August 2016 at 08:10, the ship started to load common salt into its cargo hold. The cargo loading was completed by about 21:00, and the crew then checked that the drafts were appropriate for its loading condition. The draft readings were 6.35 m forward and 6.40 m aft.

The captain went on duty at 06:00. At 06:35 the port's pilot went aboard and discussed the departure maneuver with the captain.

The pilot informed the captain that due to the ship's characteristics, the port's internal regulations required the use of a tugboat during the departure maneuver, and that the NAOS UNO tugboat was ready to assist in said maneuver. The captain of the M/V TIDE NAVIGATOR, however, did not consider this necessary, and so the tugboat stood by alongside the ship.

At 07:00 the captain gave the order to cast off and began the port departure maneuver. Only the pilot and the captain, who was at the ship's controls, were on the bridge. There was no one else from the crew acting as the helmsman. The ship left the berth under its own power (main propeller and rudder and bow thrusters).

During the departure maneuver, the pilot advised the captain on how to proceed based on the plan they had discussed minutes earlier. According to the pilot, the captain did not question his advice, but he also did not adhere to it rigorously and executed the maneuver at his own discretion.

The ship's stern was maneuvered away from the dock, and the ship moved aft until the stern was in the middle of the commercial harbor (see Figure 5). The ship then had to halt its backward momentum by ordering ahead slow until it came to a stop and then rotate with the



Figure 4. Port of Vilanova i la Geltrú. In red, mooring site of the ship TIDE NAVIGATOR

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help of the maneuvering thruster. However, since the ship was moving faster than recommended (1 knot in reverse), the captain had to increase the forward thrust to offset the inertia.

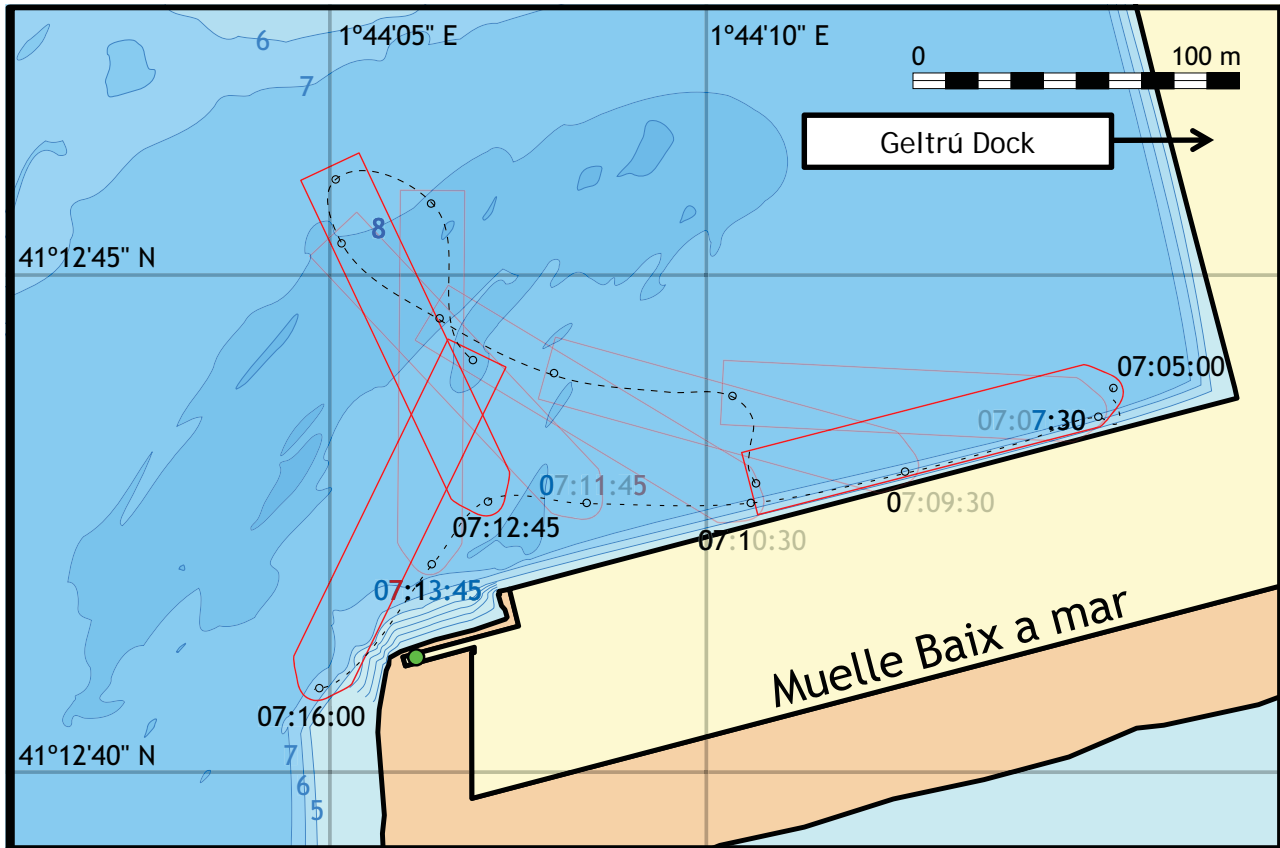


Figure 5. Diagram of the exit maneuver by the ship TIDE NAVIGATOR at the Port of Vilanova i la Geltrú, showing the ship's successive positions.

This excessive forward thrust not only stopped the ship, it made it move forward before it was able to complete its turn and line up correctly with the exit channel.

At 07:16 the ship was unable to line up with the exit channel and as it attempted to turn to starboard, the port side of the bow ran aground when it struck the side of the dock's closure dams.

Draft readings were taken for the ship's bow and stern at 07:20. Readings taken for the ballast tanks indicated that water was rushing into the forepeak. The captain made several attempts to free the ship using its own resources, but to no avail. Later, the captain also tried to add water to the aft ballast tanks and move the ship's bow to starboard with aid from the NAOS UNO tugboat, also to no avail.

At 10:15, at the pilot's suggestion, the captain ordered the NAOS UNO tugboat to push on the starboard quarter.

At 10:40 the ship was refloated.

At 11:00 the ship was temporarily docked to port at the Baix a Mar dock, where it was unballasted and righted.

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At 11:30 the ship's berth was changed to a permanent location, being docked to starboard at Geltrú dock for an underwater inspection.

On 4 August 2016 a team of divers made a temporary repair to the cracks, and after an inspection by Lloyd's Register of Shipping, the ship was allowed to leave the port on the condition that it proceed directly to a dry dock for permanent repairs.

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4 ANALYSIS

4.1 International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW)

An analysis of the STCW code revealed a series of problems that ultimately showed that the crew staffing was insufficient for some of the ship's operations, and in particular for the port departure maneuver.

4.1.1 Task overload

Chapter VIII, Section A-VIII/2, Part 4-1, Rule 15: The lookout must be able to give full attention to the keeping of a proper lookout and no other duties shall be undertaken or assigned which could interfere with that task.

Chapter VIII, Section A-VIII/2, Part 4-1, Rule 16: The duties of the lookout and helmsperson are separate and the helmsperson shall not be considered to be the lookout while steering, except in small ships where an unobstructed all-round view is provided at the steering position and there is no impairment of night vision or other impediment to the keeping of a proper lookout. The officer in charge of the navigational watch may be the sole lookout in daylight provided that on each such occasion:

1. *the situation has been carefully assessed and it has been established without doubt that it is safe to do so;*
2. *full account has been taken of all relevant factors, including:*
 - *[...] proximity of dangers to navigation, [...]*
3. *assistance is immediately available to be summoned to the bridge when any change in the situation so requires.*

On 2 August 2016, while maneuvering to exit the Port of Vilanova i la Geltrú, only the captain and the pilot were on the bridge of the M/V TIDE NAVIGATOR. The captain was simultaneously responsible for:

- The lookout's duties.
- The helmsman's duties.
- Ground communications.
- Communications with undocking/unmooring personnel.
- Communications with the pilot.

This task overload made it difficult for the captain to pay sufficient attention to the maneuver and to adhere strictly to the recommendations given by the pilot, which resulted in a higher risk of executing the port departure maneuver incorrectly.

4.1.2 Watch arrangements

Chapter VIII, Section A-VIII/2, Part 4-1, Rule 17: In determining that the composition of the navigational watch is adequate to ensure that a proper lookout can continuously be

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maintained, the master shall take into account all relevant factors, including those described in this section of the Code, as well as the following factors: [...]

- 4. the additional workload caused by the nature of the ship's functions, immediate operating requirements and anticipated maneuvers; [...]*
- 8. activities taking place on board the ship at any particular time, including radiocommunication activities and the availability of assistance to be summoned immediately to the bridge when necessary; [...]*
- 10. rudder and propeller control and ship maneuvering characteristics;*
- 11. the size of the ship and the field of vision available from the conning position;*
- 12. the configuration of the bridge, to the extent such configuration might inhibit a member of the watch from detecting by sight or hearing any external development; [...]*

Chapter VIII, Section A-VIII/2, Part 4-1, Rule 18: When deciding the composition of the watch on the bridge, which may include appropriately qualified ratings, the following factors, inter alia, shall be taken into account: [...]

- 3. proximity of navigational hazards which may make it necessary for the officer in charge of the watch to carry out additional navigational duties;*
- 4. use and operational condition of navigational aids such as ECDIS radar or electronic position indicating devices and any other equipment affecting the safe navigation of the ship; [...]*
- 6. whether there are radio duties to be performed; [...]*
- 8. any unusual demands on the navigational watch that may arise as a result of special operational circumstances.*

The composition of the watch during the port departure maneuver was as shown in Table 6.

Table 6. Crew tasks.

Crewmember	Location	Tasks
Master	Bridge	Navigation and maneuvering.
First officer	Forecastle	Responsible for tasks in the forecastle.
Third officer	Afterdeck	Responsible for tasks on the afterdeck.
Engineer officer	Engine room	Responsible for tasks in the engine room.
Third engineer officer	Engine room	Tasks in the engine room.
Qualified seaman no. 1	Forecastle	Undocking/unmooring tasks.
Qualified seaman no. 2	Forecastle	Undocking/unmooring tasks.
Seaman	Afterdeck	Undocking/unmooring tasks.
Cook	Afterdeck	Undocking/unmooring tasks.
Trainee	Afterdeck	Undocking/unmooring tasks.

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In light of the watch arrangements during the departure from port, the bridge watches were covered entirely by the captain, who was unable to summon any other crewmember to help him, since everyone else was otherwise engaged and at watch stations far away from the bridge.

4.2 Area where ship ran aground

The area where M/V TIDE NAVIGATOR ran aground was modified years ago (see Figure 6).

At one end of the commercial harbor, a jetty that was perpendicular to the dock was removed. Even though the bottom in the rest of the port is sandy, in the area where the jetty used to be the seabed is made of rock.

Since the ship ran aground atop a rocky seabed, the damage was much more severe and the refloating process more complicated than if the bottom had been sandy.

The damage to the ship involved an area of the ship's bow on the port side measuring 9 m long by 3 m wide. The hull plating between frames 150 and 159, from the forepeak to the double bottom of the bow thruster housing, was deformed. Five cracks some 15 cm long were found between frames 155 and 156, which caused flooding in the forepeak.

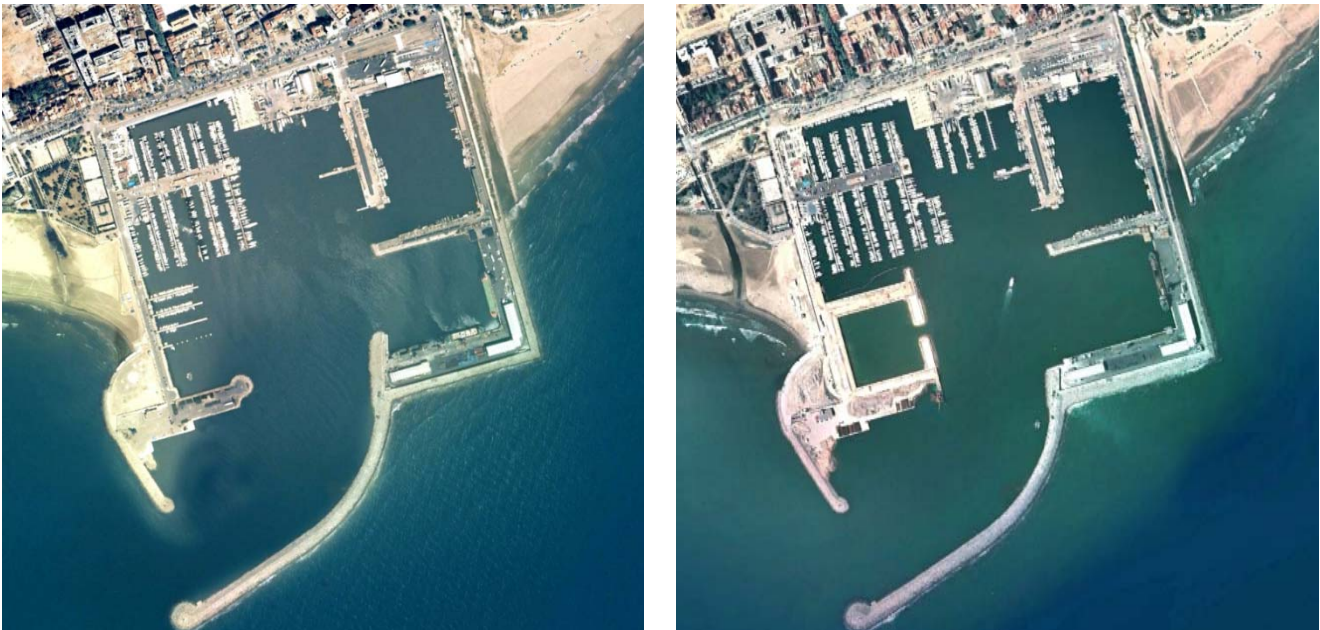


Figure 6. Before and after the modifications at the Port of Vilanova i la Geltrú.

4.3 Drafts and safety margins

Once the loading operations were complete, the ship's draft was checked to ensure it was consistent with the estimates. The readings were as follows:

- Stern draft: 6.40 m
- Bow draft: 6.35 m

These readings exactly matched those estimated based on the ship's arrival condition and the cargo loaded aboard.

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In the dock where the ship was moored, the maximum draft allowed by the Port Authority of Vilanova i la Geltrú is 6.40 m. The ship was loaded to the maximum permitted by the port. There was no safety margin above and beyond said limit.

While the port authority includes its own safety margin when limiting the draft to 6.40 m, there are areas of navigation where the real depth of the harbor approaches 6.70 m, leaving a very small safety margin.

4.4 Effect of overdraft and dynamic trim (squat)

The effect of increased draft and squat in ships sailing through narrow channels in shallow water has been known for centuries. This effect, already observed in 1835 by Scott Russell, results from changes in hydrodynamic pressure on the hull of the ship as it moves through water of any depth, but is more pronounced in shallow waters. The shape of the hull also influences the effect: ships with a block coefficient close to one (fuller shapes) tend to sink more at the bow, while those with narrower shapes tend to sink at the stern.

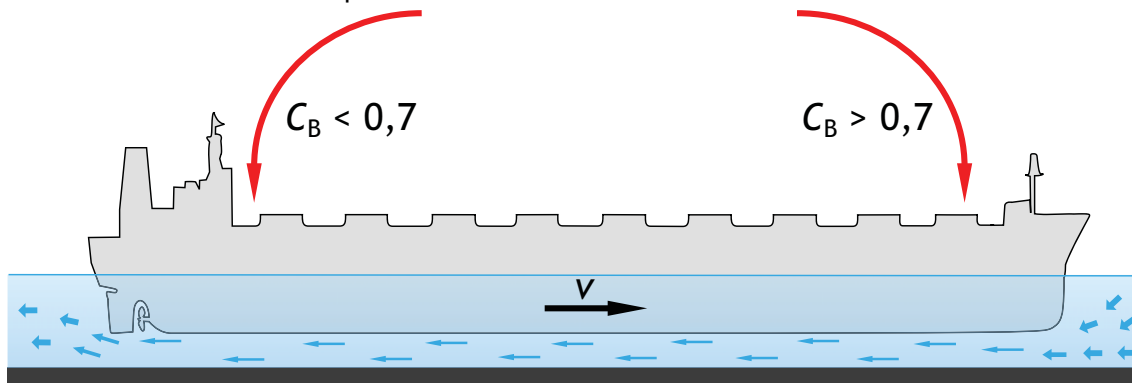


Figure 7. Influence of the block coefficient on dynamic trim.

This made the IMO adopt resolution A.601, which requires all vessels with a length of 100 m or more to have a maneuvering manual in the bridge with specific information on the squat effect. As a result of the study, and to estimate it theoretically, the following formula was proposed, which yields the increase in draft (Sq) in meters:

$$Sq = \frac{C_B}{30} \cdot \left(\frac{B \cdot T}{B_c \cdot H} \right)^{\frac{2}{3}} \cdot v^{2.08}$$

Where C_B is the ship's block coefficient, B its beam, T its length, B_c the width of the channel, H the depth of the channel and v is the ship's speed over ground, expressed in knots.

Using this formula and the characteristics of both the ship and the port, the squat effect can be estimated. In this case, it would cause the bow to sink approximately one centimeter, which is completely negligible and played no role in the accident.

4.5 Use of port's tugboat

According to the pilot's statement, he informed the captain of the requirement to use a tugboat, but the captain declined assistance from the tugboat, which remained in stand-by in the port.

Article 22 of the Piloting Regulations for the Port of Vilanova i la Geltrú, approved in April 2010, states that a vessel is required to use a tugboat if its length exceeds 85 m (and/or its draft 6 m) if it has no auxiliary maneuvering thrusters, or 110 m even if it has such thrusters. Therefore, based on its length, the ship TIDE NAVIGATOR was required to use a tugboat.

The same article in the Regulations, however, states that the pilot can change the criteria for using a tugboat based on the maneuverability, characteristics and special conditions of the ship, and on the maneuver to be carried out. Since the ship did not use a tugboat, and this was allowed by the pilot, it follows that the pilot did not consider the use of a tug to be strictly necessary.

The dimensions of the ship were significant in relation to the harbor in which it would attempt to turn around. Furthermore, during this maneuver there was only one person on the bridge (the captain) controlling the rudder and engine orders and acting as lookout. Despite all of this, the pilot saw it fit to relax the criteria in the piloting regulations and allowed the ship to attempt the exit maneuver without the use of a tugboat.

* * *

5 CONCLUSIONS

An analysis of the accident reveals that it was caused by human error by the captain, who did not line up correctly in the navigation channel, driving the ship into the slope at one end of the harbor. Contributing to the accident was the lack of personnel on watch in the bridge during the port departure maneuver.

Also contributing to the accident was the pilot's faulty decision to allow the port departure maneuver to take place without assistance from a tugboat.

6 SAFETY RECOMMENDATIONS

For the captain of the TIDE NAVIGATOR vessel:

1. Establish a system for watchstanders such that during in-port maneuvers, there is at least one lookout and one helmsperson on watch in the bridge.

To the shipping company:

2. Expand the ship's crew so that during in-port maneuvers, there is at least one lookout and one helmsperson on watch in the bridge.

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